Supplementary materials

Table S1

Moderators included in previous and the present meta-analyses

Moderator	Scott et al. (2004)	Ma (2006)	Rose & Lin (1984)	Tsai (2013)	Yasin & Yunus (2014)	The present meta-analysis
Age	Dichotomized continuous variable: 1. Below 14 (d = 0.67) 2. 14 or above (d = 0.59)	Categorized continuous variable (5 levels): 1. Kindergarten (d = 0.49) 2. Primary School (d = 0.75) 3. High School (d = 0.82) 4. College Students (d = 0.79) 5. Adults (d = 0.91)	Not examined	Not examined. Only included adult learners	Categorical variable (3 levels): 1. Preschool (d = 1.53) 2. School (d = 1.08) 3. University (d = 1.15)	Categorized continuous variable (5 levels): 1. Preschool/ Kindergarten 2. US Grade 1-8 3. US Grade 9-12 4. University Students 5. Adults
Grade level	Categorical variable (2 levels): 1. Academics (d = .65) 2. Organizations (d = 1.41)	Categorized continuous variable (5 levels): 1. Kindergarten (d = 0.49) 2. Primary School (d = 0.75) 3. High School (d = 0.82) 4. College Students (d = 0.79) 5. Adults (d = 0.91)	Not examined	Not examined; Only included adult learners	Not examined	Categorized continuous variable (5 levels): 1. Preschool/ Kindergarten 2. US Grade 1-8 3. US Grade 9-12 4. University Students 5. Adults
Giftedness	Categorical variable (2 levels): 1. Nongifted (d = .72) 2. Gifted (d = .38)	Not examined	Not examined	Not examined	Not examined	Not examined. Gifted population excluded.
Academic achievement	Categorical variable (2 levels): 1. Below average (d = 0.68) 2. Above average (d = 0.66	Not examined	Not examined	Not examined	Not examined	Not examined. Many studies did not report academic achievement of the participants.

Gender of sample	Categorized continuous variable (3 levels): 1. Predominantly male (d = 1.14) 2. Roughly equal proportion (d = 0.66) 3. Predominately female (d = 0.42)	Not examined	Not examined	Not examined	Not examined	Not examined. The boundary between "roughly equal" and "predominately" is unclear.
Type of outcome measure	Categorical variable (4 levels): 1. Divergent thinking (d = 0.75) 2. Problem solving (d = 0.84) 3. Performance (e.g., creative products) (d = 0.35) 4. Attitude and behaviour (d = 0.24)	Categorical variable (12 levels): 1. Attitude (d = 1.34) 2. Originality (Divergent thinking) (d = 0.89) 3. Fluency (Divergent thinking) (d = 0.74) 4. Composite score (Divergent thinking) (d = 0.65) 5. Guilford's Structure-of-Intellect Model (Divergent thinking) (d = 0.46) 6. Elaboration (Divergent thinking) (d = 0.44) 7. Flexibility (Problem Solving) (d = 0.90) 8. Fluency (Problem Solving) (d = 0.73) 9. Composite score (Problem Solving) (d = 0.63) 10. Elaboration (Problem Solving) (d = 0.55) 11. Quality (Problem Solving) (d = 0.55)		Not examined	Not examined	Categorical variable (3 levels): 1. Divergent thinking 2. Creative problem solving 3. Creative product We excluded non-performance-based measures (e.g., attitude and behaviour).

		12. Originality (Problem Solving) (*d* = 0.47)				
Dimension of divergent thinking	Categorical variable (4 levels): 1. Fluency (*d* = .61) 2. Flexibility (*d* = .66) 3. Originality (*d* = .72) 4. Elaboration (*d* = .54)	Categorical variable (12 levels): 1. Attitude (*d* = 1.34) 2. Originality (Divergent thinking) (*d* = 0.89) 3. Fluency (Divergent thinking) (*d* = 0.74) 4. Composite score (Divergent thinking) (*d* = 0.65) 5. Guilford's Structure-of-Intellect Model (Divergent thinking) (*d* = 0.46) 6. Elaboration (Divergent thinking) (*d* = 0.44)	Categorical variable (Verbal: 3 levels; Figural: 4 levels). Verbal: 1. Fluency (*d* = 0.55) 2. Flexibility (*d* = 0.54) 3. Originality (*d* = 0.69) Figural: 1. Fluency (*d* = 0.42) 2. Flexibility (*d* = 0.35) 3. Originality (*d* = 0.43) 4. Elaboration (*d* = 0.29)	Categorical variable (5 levels): 1. Fluency (*d* = 1.29) 2. Flexibility (*d* = 1.42) 3. Originality (*d* = 0.95) 4. Elaboration (*d* 0.03) 5. Attitude (*d* = 0.57)	Not examined	Categorical variable (3 levels): 1. Fluency 2. Flexibility 3. Originality

		7. Flexibility (Problem Solving) (d = 0.90) 8. Fluency (Problem Solving) (d = 0.73) 9. Composite score (Problem Solving) (d = 0.63) 10. Elaboration (Problem Solving) (d = 0.55) 11. Quality (Problem Solving) (d = 0.55) 12. Originality (Problem Solving) (d = 0.47)				
Modality of divergent thinking	Not examined	Not examined	Categorical variable (2 levels): 1. Verbal (d = 0.60) 2. Figural (d = 0.37)	Not examined	Not examined	Categorical variable (2 levels): 1. Verbal 2. Figural
Publication year	Dichotomized continuous variable: 1. Before 1980 (d = 0.78) 2. 1980 or after (d = 0.64)	Not examined	Not examined	Not examined	Not examined	Continuous variables: Publication year
Author education	Categorical variable (2 levels): 1. Nondoctorate (d = 0.70) 2. Doctorate (d = 0.64)	Not examined	Not examined	Not examined	Not examined	Not examined. But we examined the impact of publication status on effect sizes (PhD dissertation/Grant research report vs Published articles.)

Publication status	Categorical variable (2 levels): 1. Peer reviewed (*d* = 0.76) 2. Non-peer reviewed (*d* = 0.41)	Not examined	Not examined	Not examined	Not examined	Categorical variable (2 levels): 1. Unpublished (PhD dissertation or grant research report) 2. Published Only peer reviewed journal articles were included.
Sample size	Dichotomized continuous variable: 1. Below average (*d* = 1.00) 2. Above average (*d* = 0.35)	Not examined	Not examined	Not examined	Not examined	Continuous variables: The standard error of the effect size (i.e., measure of study precision)
Number of treatment groups	Dichotomized continuous variable: 1. Single (*d* = 0.99) 2. Multiple (*d* = 0.43)	Not examined	Not examined	Not examined	Not examined	Use RVE to compute the weight for each effect size, taking into account the number of treatment groups and the number of outcome measures.
Number of outcome measures	Dichotomized continuous variable: 1. Single (*d* = 0.11) 2. Multiple (*d* = 0.76)	Not examined	Not examined	Not examined	Not examined	Use RVE to compute the weight for each effect size, taking into account the number of treatment groups and the number of outcome measures.
Control group	Categorical variable (2 levels): 1. Absent (*d* = 0.97) 2. Present (*d* = 0.66)	Not examined	Not examined	Not examined	Not examined	Not examined. We only included studies with a control group.
Type of control group	Not examined	Not examined	Not examined	Not examined	Not examined	Categorical variable (2 levels): 1. Inactive control 2. Active control

Evaluation structure	Categorical variable (2 levels): 1. Posttest only (*d* = 1.01) 2. Pretest-Posttest or longitudinal (*d* = 0.54)	Not examined	Not examined	Not examined	Not examined	Categorical variable (2 levels): 1. Posttest only 2. Pretest-Posttest
Experimental design	Not examined	Categorical variable (3 levels): 1. Quasi (*d* = 0.65) 2. Paired sample (*d* = 0.71) 3. Real experiments (*d* = 0.84)	Not examined	Not examined	Not examined	Categorical variable (3 levels): 1. Random 2. Non-Random 3. Unspecified
Training to criterion	Categorical variable (2 levels): 1. Yes (*d* = 0.63) 2. No (*d* = 0.72)	Not examined	Not examined	Not examined	Not examined	Categorical variable (2 levels): 1. No 2. Yes
Time to posttest	Dichotomized continuous variable: 1. Relatively short (*d* = 0.54) 2. Relatively long (*d* = 0.65)	Not examined	Not examined	Not examined	Not examined	Categorized continuous variable (4 levels): 1. Same day 2. Between 1 and 7 days 3. 8 days or longer 4. Unspecified
Use transfer task	Categorical variable (2 levels): 1. Yes (*d* = 0.51) 2. No (*d* = 0.74)	Not examined	Not examined	Not examined	Not examined	Not examined. Transfer task was not explicitly defined.
Origin of outcome measure	Not examined	Not examined	Not examined	Not examined	Not examined	Categorical variable (2 levels): 1. Researcher-made 2. Independent

Investigator was the trainer	Categorical variable (2 levels): 1. Yes (d = 0.66) 2. No (d = 0.80)	Not examined	Not examined	Not examined	Not examined	Not examined. But we examined if researcher-made or independent measures were used to evaluate the training.
Prized provided	Categorical variable (2 levels): 1. No (d = 0.69) 2. Yes (d = 0.26)	Not examined	Not examined	Not examined	Not examined	Not examined. Training that provided prize/money/reward were categorized as non-cognitive training.
Use of overt praise	Categorical variable (2 levels): 1. No (d = 0.69) 2. Yes (d = 0.61)	Not examined	Not examined	Not examined	Not examined	Not examined. Training that provided prize/money/reward were categorized as non-cognitive training.

Training content	Categorical variable (6 levels): 1. Cognitive (r = .31, beta = .24) 2. Social (r = -.19, beta = -.28) 3. Personality (r = -.09, beta = -.07) 4. Motivational (r = -.16, beta = -.10) 5. Confluence (r = -.01, beta = .14) 6. Other (r = -.17, beta = -.09)	Categorical variable (12 levels): 1. Attitude training (d = 1.46) 2. Simple ideation (d = 0.99) 3. Synectic (d = 0.77) 4. Problem identifying (d = 0.34) 5. Incubation (d = .20) 6. SCAMPER (d = 0.06) 7. The New Directions in Creativity Program (d = 1.41) 8. Composite of technique (d = 0.84) 9. CPS (d = 0.82) 10. Khatena's training method (d = 0.82) 11. Computer-aided creativity training (d = 0.63) 12. Purdue Creativity Training (d = 0.61)	Categorical variable (6 levels): 1. Creative Problem Solving (d = 0.629) 2. Productive Thinking Program (d = 0.118) 3. Other Creative Thinking Programs (d = 0.483) 4. Purdue Creative thinking program (d = 0.329) 5. School Programs (d = 0.525) 6. Special techniques (d = 0.484)	Not examined	Categorical variable (7 levels): 1. Inventive problem solving/TRIZ methods (d = 1.05) 2. Integration of creative lectures, case studies and creativity counselling (d = 0.65) 3. Creative problem solving/problem solving (on-line or classroom) (d = 1.41) 4. Learning activities based on computer/ technology application (d = 0.99) 5. Group plays (d = 1.72) 6. Operational mechanisms of group composition (d = 0.99) 7. Group interactive brainstorming (d = .32)	Categorical variable (3 levels): 1. Non-cognitive 2. Cognitive 3. Combined
Training duration	Continuous variable (r = .02, beta = .26)	Not examined	Not examined	Not examined	Not examined	Continuous variable: Training Duration (in days)
Total minutes	Continuous variable (r = .14, beta = -.39)	Not examined	Not examined	Not examined	Not examined	Continuous variable: Total Training Time (in minutes)

Distributed training	Dichotomized continuous variable: 1. Distributed *(reference group)* 2. Massed (*r* = -.07, beta = .10)	Not examined	Not examined	Not examined	Not examined	No examined. But we included both Total Training Time, Training Duration, and many other moderators in the same meta-regression model to examine the unique impact of these moderators.
Focus of the training	Continuous variable (rating, 4-point scale, the extent to which exercises and instructional material would serve to develop creative problem-solving capacities including); 8 focuses: 1. Problem identification (*r* = .37, beta = .48) 2. Information gathering (*r* = .02, beta = -.06) 3. Information organization (*r* = .17, beta = -.02) 4. Conceptual combination (*r* = .16, beta = .14) 5. Idea generation (*r* = .21, beta = .18) 6. idea evaluation (*r* = -.03, beta = -.20) 7. Implementation planning (*r* = .19, beta = .05) 8. Solution monitoring (*r* = .17, beta = -.07)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.

Application of techniques	Continuous variable (rating, 4-point scale: to what extend the technique was emphasized); 17 techniques: 1. Divergent thinking (r = .02, beta = -.01) 2. Convergent thinking (r = .17, beta = .12) 3. Critical thinking (r = .22, beta = .26) 4. Metacognition (r = .15, beta = .07) 5. Ideation (r = .07, beta = .13) 6. Elaboration (r = -.19, beta = -.06) 7. Illumination (r = -.27, beta = -.38) 8. Constraint identification (r = .15, beta = .07) 9. Strength/weakness identification (r = -.03, beta = .32) 10. Feature comparisons (r = -.04, beta = .11) 11. Feature listing (r = -.05, beta = -.22) 12. Analogies (r = .06, beta = .12) 13. Checklisting (r = -.06, beta = .12) 14. Brainstorming (r = .09, beta = -.03)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.

	15. Imagery (*r* = -.21, beta = .15) 16. Metaphors (*r* = -.18, beta = -.22) 17. Expressive activities (*r* = -.27, beta = -.24)					
Domain specific exercise	Categorical variable (2 levels): 1. No *(reference group)* 2. Yes (*r* = .05, beta = -.08)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Holistic (whole) learning	Categorical variable (2 levels): 1. Part *(reference group)* 2. Whole (*r* = -.18, beta = .00)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Taught discrete (component) skills	Categorical variable (2 levels): 1. No *(reference group)* 2. Yes (*r* = .15, beta = .05)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
General model applied	Categorical variable (2 levels): 1. No *(reference group)* 2. Yes	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.

	(*r* = .39, beta = .46)					
Realistic practice	Continuous variable (rating, 4-point scale) (*r* = .31, beta = .00)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Amount of training time devoted to practice	Continuous variable (rating, 4-point scale) (*r* = .24, beta = .32)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Depth of practice	Continuous variable (rating, 4-point scale) (*r* = .24, beta = -.01)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Difficulty of material	Continuous variable (rating, 4-point scale) (*r* = .20, beta = .05)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Amount of instructional feedback	Continuous variable (rating, 4-point scale) (*r* = -.09, beta = -.15)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.
Media	Continuous variable (rating, 4-point scale); 10 media: 1. Lecture (*r* = .20, beta = .30) 2. Video or audio (*r* = .07, beta = .17 3. Computer assisted (*r* = -.01, beta = .00)	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.

	4. Individualized coaching (*r* = .09, beta = .02) 5. Programmed instruction (*r* = .07, beta = .07) 6. Discussion (*r* = -.04, beta = -.14) 7. Social modelling (*r* = .16, beta = .07) 8. Behaviour modification (*r* = -.04, beta = -.02) 9. Cooperative learning (*r* = .21, beta = .18) 10. Case based (*r* = .25, beta = .11)					
Practice exercise	Continuous variable (rating, 4-point scale, the extent to which practice exercises involved one specific exercise); 8 exercises: 1. Classroom exercises (*r* = .13, beta = .10) 2. Field exercises (*r* = .01, beta = -.21) 3. Self-paced exercises (*r* = .02, beta = -.10) 4. Written exercise (*r* = .04, beta = -.13) 5. Computer exercise (*r* = -.01, beta = -.06) 6. Imaginative exercise (*r* = -.27, beta = -.25) 7. Performance/production exercise	Not examined	Not examined	Not examined	Not examined	Not examined. Some studies did not provide full description of the training materials; Subjective judgement.

	(*r* = .31, beta = .35) 8. Group exercises (*r* = .06, beta = .00)					

Table S2

Full-Text Articles Accessed for Eligibility

Title	Authors	Year	Publication Type	Publication Information	Included in previous meta-analyses	Included in this meta-analysis	Reason for exclusion
Training College Adults to Think Creatively with Words	Khatena	1970	Journal	Psychological Reports	Ma, 2006	Yes	Included
Effects of Creativity Training, Defensiveness, and Intelligence on Divergent Thinking.	Dellas	1971	Conference Paper	American Educational Research Association Convention	No	Yes	Included
Teaching disadvantaged preschool children to think creatively with pictures	Khatena	1971	Journal	Journal of Educational Psychology	Scott et al., 2004; Ma, 2006	Yes	Included
A Second Study Training College Adults to Think Creatively with Words	Khatena	1971	Journal	Psychological Reports	Ma, 2006	Yes	Included
Evaluation of components of the Purdue Creative Thinking Program: A longitudinal study.	Speedie et al.	1971	Journal	Psychological Reports	No; in reference list of Scott et al. (2004)	No	Not enough data to estimate effect size
A program for training creative thinking: inner city evaluation	Davis	1972	Grant Report	ED070809	Scott et al., 2004; in the reference list of Ma (2006)	Yes	Included
Applied creativity: The creative studies project: II. Results of the two-year program.	Parnes & Noller	1972	Journal	Journal of Creative Behavior	No	Yes	Included
Creativity Training: Management Tool for High School Department Chairmen	Burstiner	1973	Journal	Journal of Experimental Education	Scott et al., 2004; Ma, 2006	Yes	Included
Creative Level and its Effects on Training College Adults to Think Creatively with Words	Khatena	1973	Journal	Psychological Reports	Ma, 2006	Yes	Included

Training sixth grade children to think creatively with words.	Khatena & Dickerson	1973	Journal	Psychological Reports	Scott et al., 2004; in the reference list of Ma (2006)	Yes	Included
Effects of free association training on children's ideational fluency	Piers & Morgan	1973	Journal	Journal of Personality	No	Yes	Included
Effects of developmental group-counseling and creativity training on creativity, adjustment, and achievement	Brandt	1974	PhD	Lehigh University	No	No	Not enough data to estimate effect size
Training Creative Thinking in General Education Science	Mccormack	1974	Journal	Journal of College Science Teaching	Scott et al., 2004	Yes	Included
Improving children's creative problem solving ability: The Purdue Creativity Project.	Treffinger et al.	1974	Journal	Journal of Creative Behavior	No	No	No control group
Enhancing Creativity by Modifying What Subjects Say to Themselves	Meichenbaum	1975	Journal	American Educational Research Journal	Ma, 2006	Yes	Included
Creativity Training in Elementary Schools in Brazil	Alencar et al.	1976	Journal	Journal of Experimental Education	No; in reference list of Scott et al. (2004)	Yes	Included
Creative problem-solving training for graduate and professional students.	Biles	1976	PhD	Kansas State University	No	Yes	Included
Developing the Creative Potential of Educable Mentally Retarded Students	Ford & Renzulli	1976	Journal	Journal of Creative Behavior	Ma, 2006	No	Atypical population
The modification of fourth graders' problem solving abilities	Houtz & Feldhusen	1976	Journal	Journal of Psychology	Scott et al., 2004	Yes	Included
Training of Original Responses and Academic Performance of Fifth-Grade Students	MacDonald et al.	1976	Journal	Psychological Reports	Scott et al., 2004; Ma, 2006	No	Not enough data to estimate effect size
The Effectiveness of a Creativity Training Program in the Language Arts	Callahan & Renzulli	1977	Journal	Psychological Reports	No	Yes	Included
Effects on children’s divergent thinking abilities of a period of direct teaching for divergent production	Franklin & Richards	1977	Journal	British Journal of Educational Psychology	Ma, 2006	Yes	Included

Enhancing creativity in an informal educational framework.	Goor & Rapoport	1977	Journal	Journal of Educational Psychology	Ma, 2006	Yes	Included
Creativity and the creative individual	Lester	1977	PhD	University of Missouri	No	Yes	Included
The effects of simulation games and creativity training on children's divergent thinking.	Staso	1977	PhD	University of Texas at Austin	No	Yes	Included
The effects of amount and spacing of creativity training sessions on immediate and enduring gains in the creative production of third grade children.	Waterstreet	1977	PhD	University of Georgia	No	Yes	Included
Strengthening affective components of creativity in a college course.	Davis & Bull	1978	Journal	Journal of Educational Psychology	Scott et al., 2004	No	Did not measure performance
Inspiration in the creative process and meditation.	Sanford	1978	PhD	Johns Hopkins University	No	No	Full-text not available
The effects of creativity training, classroom atmosphere and cognitive style on the creative thinking abilities of Egyptian elementary school children.	Sherief	1978	PhD	Purdue University	No	Yes	Included
Self-instructional use of programmed creativity-training materials with gifted and regular students.	Huber et al.	1979	Journal	Journal of Educational Psychology	No	Yes	Included
The longitudinal effects of creativity training.	Seghini	1979	PhD	The University of Utah	No	No	Not enough data to estimate effect size
Effects of Training on the Divergent-Thinking Abilities of Kindergarten Children	Cliatt et al.	1980	Journal	Child Development	Scott et al., 2004	Yes	Included
The effects of "talents unlimited" on planning and productive thinking of fifth grade students in frederick, maryland	George	1980	PhD	American University	No	Yes	Included
A creativity-training workshop: Short-term, long-term, and transfer effects	Glover	1980	Journal	Journal of Genetic Psychology: Research and Theory on Human Development	Scott et al., 2004; Ma, 2006	Yes	Included
The effects of the implementation of creativity training in the elementary school social studies curriculum/Implementation of	Tweet	1980	PhD	Montana State University	Scott et al., 2004; Ma, 2006	Yes	Included

Creativity Training in the Elementary School Curriculum Through Two Varied Techniques.							
The effects of a training program in creativity on creative behavior of head start teachers	Davidson	1981	PhD	Georgia State University	No	Yes	Included
The response of older women to a creative problem-solving program	Engelman	1981	Journal	Educational Gerontology	No	Yes	Included
Effect of brainstorming on creativity	Muttagi	1981	Journal	Indian Journal of Social Work	Scott et al., 2004	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
Impact of creativity training on academic achievement and creative thinking skills concerning four ethnic-sex groups in the fourth grade.	Rodriguez	1981	PhD	New Mexico State University	No	No	No control group
Brief creativity training: A controlled comparison of self-instructional and associational procedures.	Rostafinski	1981	PhD	Ohio University	No	Yes	Included
The Assessment of a Training Program for the Development of Creativity and Self-Esteem in Mentally Handicapped Greek Children	Stasinos	1981	Journal	Journal of Creative Behavior	No	No	Atypical population
Creativity training for mentally handicapped children and young adults.	Suzanne	1981	PhD	Humanistic Psychology Institute	No	No	Atypical population
Self-instructional training in the generation of alternatives as a training component for community mental health center outpatients	Warren	1981	PhD	University of Southern Mississippi	No	No	Atypical population
Training in creative problem solving: Effects on ideation and problem finding and solving in an industrial research organization	Basadur et al.	1982	Journal	Organizational Behavior and Human Performance	No; in reference list of Scott et al. (2004)	Yes	Included
Developing creativity in gifted children	Lowery	1982	Journal	Gifted Child Quarterly	No	No	Atypical population
The influence of creativity intervention training on the adjustment potential of kindgarten children	Markewitz	1982	PhD	University of Santo Tomas	No	Yes	Included

The effects of multimodal creativity training on the creativity	Carter	1983	PhD	Kent Stae University	Scott et al., 2004	Yes	Included
The Effects of Creativity Training on Learning Disabled Students' Creative Written Expression	Jaben	1983	Journal	Journal of Learning Disabilities	Scott et al., 2004	No	Atypical population
The Effect of Relaxation and Imagination Exercises on the Creativity of Elementary Children	Peak & Hull	1983	Conference Paper	Northern Rocky Mountain Educational Research Association	Scott et al., 2004	No	Not enough data to estimate effect size
Effects of an instructional program and teacher's verbal praise on the creative performance of fourth grade children	Shaffer-Zamari	1983	PhD	Hofstra University	No	Yes	Included
Training creativity of children assessed by the obscure figures test	Furze et al.	1984	Journal	Perceptual and Motor Skills	No	Yes	Included
Creative Response Styles: The Effects of Socioeconomic Status and Problem-Solving Training	Haley	1984	Journal	Journal of Creative Behavior	Ma, 2006	Yes	Included
Enhancing the creative potential and self-esteem of mentally handicapped Greek children.	Stasinos	1984	Journal	Journal of Creative Behavior	No	No	Atypical population
Creative reading materials and the development of students' creative thinking skills (torrance tests, attitude, ideal child checklist)	Below	1985	PhD	University of Georgia	No	Yes	Included
Fostering creative behavior among university women	Daniel et al.	1985	Journal	Journal on Gifted Education	Scott et al., 2004	No	Did not measure performance
Effects of Instruction on Elementary-Age Students' Productive Thinking	Jaben	1985	Journal	Psychological Reports	Scott et al., 2004; Ma, 2006	No	Atypical population
Effect of Instruction for Creativity on Learning Disabled Students' Drawings	Jaben	1985	Journal	Perceptual and Motor Skills	Scott et al., 2004; Ma, 2006	No	Atypical population
Enhancement of creative abilities in middle school students using computer technologies compared to traditional approaches	Tisone	1985	PhD	Ohio State University	No	Yes	Included
Generalization of creative productive-thinking training to LD students' written expression.	Fortner	1986	Journal	Learning Disability Quarterly	No	No	Atypical population
Visual imagery training: Stimulating utilization of imaginal processes.	Parrott	1986	Journal	Journal of Mental Imagery	No	No	No control group

The influence of training in creative thinking and problem-solving on the creative behavior of fifth grade pupils	Abruzzo	1987	PhD	Hofstra University	No	No	Not enough data to estimate effect size
The effects of an experimental training program on the creative thinking abilities of adults	Albano	1987	PhD	Temple University	Tsai, 2013	Yes	Included
Effects of Training on Learning Disabled Students' Creative Written Expression	Jaben	1987	Journal	Psychological Reports	Ma, 2006	No	Atypical population
Creativity Training with Preschool Children Living in Children's Homes	Kalmár & Kalmár	1987	Journal	Studia Psychologica	No	No	Atypical population
An investigation of the effects of a creativity training program on measures of creative thinking and achievement for gifted students: A longitudinal experimental study.	LeRose	1987	PhD	University of Wisconsin	No	No	Atypical population
The effects of problem-solving strategy and outcome expectancy cues on creative problem-solving performance	Maddox	1987	PhD	Florida State University	No	Yes	Included
Long-Term Effects of Creativity Training with Middle School Students	Baer	1988	Journal	Journal of Early Adolescence	No; in reference list of Scott et al. (2004)	Yes	Included
Creative problem-solving and its effect on eighth-grade students	Bush	1988	PhD	West Virginia University	No	Yes	Included
Influence of positive affect upon creative thinking and problem solving in children.	Greene & Noice	1988	Journal	Psychological Reports	Scott et al., 2004; Ma, 2006	No	Not focus on creativity training
An exploration of creativity training for management students	Griffith	1988	PhD	Boston University	Ma, 2006	No	Full-text not available
Children's Self-Directed Critical Thinking	Hudgins & Edelman	1988	Journal	Journal of Educational Research	Scott et al., 2004	No	Not focus on creativity training
The influence of training method on managers self-efficacy and idea generation among	Gist	1989	Journal	Personnel psychology	Tsai, 2013	No	No control group
Effects of creative problem solving training on communication behaviors in small group	Firestien	1990	Journal	Small Group Research	Scott et al., 2004	No	Not on individual creativity
Creativity training: an assessment of a novel approach	Harkins & Macrosson	1990	Journal	Journal of Business Psychology	No	No	Not enough data to estimate effect size

Creativity Training	Solomon	1990	Journal	Personnel Journal	Scott et al., 2004	No	Full-text not available
Enhancement of Creativity in Computer Environments	Clements	1991	Journal	American Educational Research Journal	Scott et al., 2004; Ma, 2006	Yes	Included
On the efficacy of programed instruction on training creative problem-solving strategies	Cott	1991	PhD	Hofstra University	No	Yes	Included
Effectiveness of creativity training and its relation to selected personality factors	Kabanoff & Bottger	1991	Journal	Journal of Organizational Behavior	Scott et al., 2004; Tsai, 2013	Yes	Included
The Role of Imagery Training on Tohono O'odham Children's Creativity Scores	Nelson & Lalemi	1991	Journal	Journal of American Indian Education	Scott et al., 2004	Yes	Included
Retention and Transfer of Children's Self-Directed Critical Thinking Skills	Riesenmy et al.	1991	Journal	Journal of Educational Research	Scott et al., 2004	No	Not focus on creativity training
The effect of creativity training methods on the creative thinking of fourth, fifth, and sixth-grade minority students	Sikka	1991	PhD	Mississippi State University	No	Yes	Included
Training effects on the divergent thinking attitudes of japanese managers.	Basadur et al.	1992	Journal	International Journal of Intercultural Relations	Ma, 2006	No	Did not measure performance
Can engineering students be trained to think more creatively?/The Construct Validity of Divergent Scores in the Structure-Of-Intellect Learning Abilities Test	Clapham & Schuster	1992	Journal	Journal of Creative Behavior	No	Yes	Included
The effects of a holistic creativity program on the self-concept and creativity of third graders.	Flaherty	1992	Journal	Journal of Creative Behavior	No	Yes	Included
Enhancing creativity in older adults.	Goff	1992	Journal	ournal of Creative Behavior	Ma, 2006	No	Not focus on creativity training
Effects of incubation and imagery training on creativity	Houtz & Frankel	1992	Journal	Creativity Research Journal	Ma, 2006	Yes	Included
Uncovering the creative dimensions of computer-graphic design products	Howe	1992	Journal	Creativity Research Journal	Ma, 2006	No	Not focus on creativity training
Focusing technique to facilitate creative problem-solving	Hueftle	1992	PhD	University of Denver	No	Yes	Included

Training teachers to foster creativity using the 4MAT model.	Murray	1992	PhD	University of Massachusetts Amherst	No	No	Not focus on creativity training
Effects of training in creativity and creative problem finding upon business people	Fontenot	1993	Journal	Journal of Social Psychology	Scott et al., 2004; Ma, 2006; Tsai, 2013	No	Not on individual creativity
Problem Solving Aptitude among Secondary Marketing Education Students.	Fritz	1993	Journal	Marketing Educators Journal	Scott et al., 2004	No	Not focus on creativity training
Creativity Enhancement as a Function of Classroom Structure: Cooperative Learning vs. the Traditional Classroom.	Golovin	1993	Conference Paper	Annual Meeting of the Mid-South Educational Research Association	No	Yes	Included
Immunizing children against the negative effects of reward: A further examination of intrinsic motivation training techniques/Immunizing children against the negative effects of reward	Hennessey & Zbikowski	1993	Journal	Creativity Research Journal	Scott et al., 2004	Yes	Included
Creativity training - developing the agency-client creative interface	Michell	1993	Journal	European Journal of Marketing	No	No	Did not measure performance
Effects of Trait Anxiety and the Scamper Technique on Creative Thinking of Intellectually Gifted Students	Mijares-Colmenares et al.	1993	Journal	Psychological Reports	Ma, 2006	No	Atypical population
Creativity Training and the Stability and Internal Consistency of the Kirton Adaption-Innovation Inventory	Murdock	1993	Journal	Psychological Reports	Scott et al., 2004	No	Did not measure performance
Divergent thinking is not a general trait: A multidomain training experiment	Baer	1994	Journal	European Journal of Engineering Education	No	Yes	Included
The effects of a training intervention designed to develop creativity within individuals on figural creativity and hemispheric brain dominance	Conway	1994	PhD	Temple University	No	No	No control group
Can giftedness be taught?	Jaušovec	1994	Journal	Roeper Review	No	No	No control group

Effect of creativity training upon concept map complexity: SLD, gifted, and regular education 5th, 6th, and 7th grade students	Russell	1994	PhD	West Virginia University	No	No	Did not measure performance
Effects of the creativity training program on preschoolers.	Suwantra	1994	PhD	Illinois State University	Ma, 2006	Yes	Included
The creative personality: Exploring relations of creativity and openness to experience	Broyles	1995	PhD	Southern Methodist University	No	No	No control group
The Effect of Synectics Training on Gifted and Nongifted Kindergarten Students	Meador	1995	Journal	Journal of Educational Psychology	Scott et al., 2004; Ma, 2006	Yes	Included
The Effects of Task-Specific Divergent-Thinking Training	Baer	1996	Journal	Journal of Creative Behavior	Scott et al., 2004	Yes	Included
The Relationship between Creativity and Interpersonal Problem-Solving Skills in Adults	Blissett & Mcgrath	1996	Journal	Journal of Creative Behavior	No	Yes	Included
The effects of Chinese painting appreciation education on the artistic achievement of junior high school students in Taiwan	Chen	1996	PhD	Florida International University	No	No	Not focus on creativity training
Effect of an Intervention in Synectics on the Creative Thinking of Nurses	Gendrop	1996	Journal	Creativity Research Journal	Ma, 2006; Tsai, 2013	Yes	Included
Promoting Children's Creativity: Effects of Competition, Self-Esteem, and Immunization	Gerrard et al.	1996	Journal	Creativity Research Journal	Scott et al., 2004	Yes	Included
A Preliminary Assessment of the Effectiveness of Creativity Training in Marketing	Gilbet et al.	1996	Journal	Journal of Marketing Education	No	Yes	Included
An Empirical Examination of the Value of Creativity Support Systems on Idea Generation	Massetti	1996	Journal	MIS Quarterly	Tsai, 2013	No	Not focus on creativity training
The Effects of Teaching Students How to Invent	Westberg	1996	Journal	Journal of Creative Behavior	No	Yes	Included
Ideational Skills Training: A Key Element in Creativity Training Programs	Clapham	1997	Journal	Creativity Research Journal	Scott et al., 2004; Ma, 2006	Yes	Included
Creativity in real-world engineering concept design	Bush	1998	PhD	University of Minnesota	No	No	No control group
The effect of analogy instruction on young children's metaphor comprehension	Castillo	1998	Journal	Roeper Review	Scott et al., 2004	No	Atypical population

Effects of creativity training in young soccer talents	Kovac	1998	Journal	Studia Psychologica	Scott et al., 2004	Yes	Included
Promoting Insightful Problem Solving	Ansburg & Dominowski	2000	Journal	Journal of Creative Behavior	No	Yes	Included
Fostering creativity in engineering undergraduates	Cropley & Cropley	2000	Journal	High Ability Studies	Scott et al., 2004; Yasin & Yunus, 2014	Yes	Included
Computer-based creativity training: Training the creative process	Kobe	2001	PhD	University of Nebraska	Ma, 2006	Yes	Included
The effect of a computer simulation activity versus a hand-on activity on product creativity in technology education.	Michael	2001	Journal	Journal of Technology Education	Yasin & Yunus, 2014	No	Not focus on creativity training
It Doesn't Hurt to Ask: Effects of Instructions to Be Creative, Practical, or Analytical on Essay-Writing Performance and Their Interaction With Students' Thinking Styles	O'Hara & Sternberg	2001	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Effect of group interactive brainstorming on creativity	Park-Gates	2001	PhD	Virginia Polytechnic Institute and State University	Yasin & Yunus, 2014	No	Not focus on creativity training
Crossing cultures: Training effects on the divergent thinking attitudes of Spanish-speaking south American managers	Basadur et al.	2002	Journal	Creativity Research Journal	Tsai, 2013	No	Did not measure performance
Effects of a Creativity Training Program on Divergent Thinking Abilities and Self-Concept in Monolingual and Bilingual Classrooms/Effects of a creativity training program on creative abilities and self-concept in monolingual and bilingual elementary classrooms.	Fleith	2002	PhD	University of Brasília	No	No	Not enough data to estimate effect size
The effects of creative problem solving training on creativity, cognitive type and R&D performance	Wang & Horng	2002	Journal	R&D Management	Tsai, 2013	No	No control group
Effects of Solution Elicitation Aids and Need for Cognition on the Generation of Solutions to IllStructured Problems	Bulter et al.	2003	Journal	Creativity Research Journal	Ma, 2006	No	Not focus on creativity training
Effect of creativity training on preschool children.	Komarik & Brutenicova	2003	Journal	Studia Psychologica	No	Yes	Included

Individual Characteristics and Creativity in the Marketing Classroom: Exploratory Insights	McIntyre et al.	2003	Journal	Journal of Marketing Education	No	No	No control group
Effects of using creative problem solving in eighth grade technology education class at Hopkins North Junior High School	Mrymel	2003	Master Dissertation	University of Wisconsin-Stout	Yasin & Yunus, 2014	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
The Effect of Problem-Solving Instruction on Children's Creativity and Self-Efficacy in the Teaching of the Practical Arts Subject	Chung & Ro	2004	Journal	Journal of Technology Studies	Yasin & Yunus, 2014	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
Teaching students to solve insight problems: Evidence for domain specificity in creativity training	Dow & Mayer	2004	Journal	Creativity Research Journal	No	Yes	Included
Auditors' Performance in Computer-Mediated Fraud Assessment Brainstorming Sessions: An Investigation of the Effects of Anonymity and Creativity Training	Lynch	2004	PhD	University of South Florida	No	No	Not on individual creativity
Measuring and enhancing creativity	Mahboub et al.	2004	Journal	European Journal of Engineering Education	No	Yes	Included
Optimization of creativity: The roles of processes and components.	Shadinger	2004	PhD	The University of Alabama	No	Yes	Included
The impact of training on the formulation of ill-structured problems	Ellspermanaa	2005	Journal	Omega	No	No	Did not measure performance

The effect of operational mechanisms on creativity in Design	Warr & O'Neill	2005	Conference Paper	International Conference on Human-Computer Interaction	Yasin & Yunus, 2014	No	Not focus on creativity training
Enhancement of Ideational Fluency by Means of Computer-Based Training	Benedek et al.	2006	Journal	Creativity Research Journal	Valgeirsdottir & Onarheim, 2017; Tsai, 2013	Yes	Included
Enhancement of Creativity through aOne-semester Course in University	Cheung et al.	2006	Journal	Journal of Creative Behavior	Valgeirsdottir & Onarheim, 2017	Yes	Included
Intervention in Creativity With Children Aged 10 and 11 Years: Impact of a Play Program on Verbal and Graphic–Figural Creativity	Garaigordobil	2006	Journal	Creativity Research Journal	No	Yes	Included
Creativity in the Design Curriculum	Hokanson	2006	Journal	Journal of Visual Literacy	Yasin & Yunus, 2014	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
The impact of nurturing creativity in language arts classrooms for improving students' creative products	Lee	2006	PhD	Tennessee State University	No	Yes	Included
Creativity and Planning: Training Interventions to Develop Creative Problem-Solving Skills	Osburn & Mumford	2006	Journal	Creativity Research Journal	No, in reference list of Valgeirsdottir & Onarheim (2017)	No	No control group
Effects of instruction in creative problem solving on cognition, creativity, and satisfaction among ninth grade students in an introduction to world agricultural science and technology course	Alexander	2007	PhD	Texas Tech University	No	Yes	Included

A lighthouse in the desert? Evaluating the effects of creativity training on employee innovation	Birdi	2007	Journal	Journal of Creative Behavior	Valgeirsdottir & Onarheim, 2017	No	Did not measure performance
Creating creativity in the design studio: Assessing the impact of metacognitive skill development on creative abilities	Hargrove	2007	PhD	North Carolina State University	No	Yes	Included
Improving creative problem-solving in a sample of third culture kids (PhD: Effects of Divergent Thinking Training/Instructions on Torrance Tests of Creative Thinking and Creative Performance)	Ju Lee et al.	2007	Journal	School Psychology International	No	Yes	Included
Social Innovation: Enhancing Creative Performance Through Causal Analysis	Marcy & Mumford	2007	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Fostering creativity in the capstone engineering design experience	Shields	2007	Conference Paper	Annual Conference & Exposition	No	No	No control group
Training Insightful Problem Solving: Effects of Realistic and Puzzle-Like Contexts	Cunningham & MacGregor	2008	Journal	Creativity Research Journal	No	Yes	Included
The effectiveness of western creative teaching methods in China: An action research project.	Dineen & Niu	2008	Journal	Psychology of Aesthetics, Creativity, and the Arts	No	Yes	Included
Measuring and Training Creativity Competencies: Validation of a New Test	Epstein et al.	2008	Journal	Creativity Research Journal	No	No	No control group
How to develop creative imagination?: Assumptions, aims and effectiveness of Role Play Training in Creativity (RPTC)	Karwowski & Soszynski	2008	Journal	Thinking Skills and Creativity	Valgeirsdottir & Onarheim, 2017	No	No control group
An Investigation of Training in Creative Problem Solving and its Relationship to Affective and Effective Idea Generation of Entrepreneurial Learners	Leach	2008	PhD	Nova Southeastern University	No	Yes	Included
Creativity enhancement of information systems personnel: A study of the effects of creativity training and individual creative support system software.	McNair	2008	PhD	TUI University	No	Yes	Included
The development of inventive thinking skills in the upper secondary language classroom	Sokol et al.	2008	Journal	Thinking Skills and Creativity	No	No	No control group
A longitudinal analysis of student creativity scripts	Zampetakis et al.	2008	Journal	Journal of Creative Behavior	Valgeirsdottir & Onarheim, 2017	No	Did not measure performance

Creativity training effects upon concept map complexity of children with ADHD: an experimental study	Alkahtani, Keetam	2009	PhD	University of Glasgow	No	No	Atypical population
Enhancing fluent and flexible thinking through the creative drama process	Karakelle	2009	Journal	Thinking Skills and Creativity	Valgeirsdottir & Onarheim, 2017	Yes	Included
Creative self-efficacy: An intervention study	Mathisen & Bronnick	2009	Journal	International Journal of Educational Research	Valgeirsdottir & Onarheim, 2017	Yes	Included
The impact of creativity training on an accounting negotiation	Ogilvie & Simms	2009	Journal	Group Decision & Negotiation	Tsai, 2013	No	Not on individual creativity
Effects of Association Instruction on Fourth Graders' Poetic Creativity in Taiwan	Cheng et al.	2010	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Computer games development and appreciative learning approach in enhancing students' creative perception	Computer & Education	2010	Journal	Computer & Education	Yasin & Yunus, 2014	No	Did not measure performance; not focus on creativity training
Instructional technology and creativity among university students: the missing link	Eyadat & Eyadat	2010	Journal	World Journal on Educational Technology	Yasin & Yunus, 2014	No	Not focus on creativity training
The Effects of Training Preservice Teacher in Creative Problem Solving and Classroom Management	Pannells	2010	PhD	University of Oklahoma	No	Yes	Included
Playing with Thinkertoys to build creative abilities through online instruction.	Robbins & Kegley	2010	Journal	Thinking Skills and Creativity	Valgeirsdottir & Onarheim, 2017	No	No control group
The effectiveness of the Creative Reversal Act (CREACT) on students' creative thinking	Sak & Oz	2010	Journal	Thinking Skills and Creativity	No	No	No control group
Designing computer-based training for creativity: an examination of learner control, feedback, and creative personal identity	Smith	2010	PhD	Colorado State University	No	No	No control group
Enhancing Creative Thinking through Designing Electronic Slides	Al-Ali Khaled	2011	Journal	International Education Studies	Yasin & Yunus, 2014	No	Not focus on creativity training

Is it possible to have students think creatively with the help of active learning techniques?	Bakir	2011	Conference Paper	World Conference on Educational Sciences	No	No	Not enough data to estimate effect size
Web-based training for innovation: An examination of training regimens, training environment and the moderating influence of creative personal identity and intrinsic motivation.	Cassidy	2011	PhD	Pennsylvania State University	No	Yes	Included
Sensitivity of EEG upper alpha activity to cognitive and affective creativity interventions	Fink et al.	2011	Journal	International Journal of Psychophysiology	No	No	No control group
The Efficacy of Teaching Creativity: Assessment of Student Creative Thinking Before and After Exercises	Karpova et al.	2011	Journal	Clothing and Textiles Research Journal	Valgeirsdottir & Onarheim, 2017	No	No control group
Is it possible to improve creativity? If yes, how do we do it?	Kim et al.	2011	Book chapters	Computed Aided Chemical Engineering	Valgeirsdottir & Onarheim, 2017	No	No control group; neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
The effect group plays on the development of the creativity of six-year children	Rizi et al.	2011	Conference Paper	Procedia Social and Behavioral Sciences	Yasin & Yunus, 2014	No	Not focus on creativity training
The instructional model based on engineering creative problem solving principles to develop creative thinking skills of undergraduate engineering students.	Seechaliao	2011	Journal	European Journal of Social Sciences	Yasin & Yunus, 2014	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports

The effects of computer use on creative thinking among kindergarten children in Jordan	Shawareb	2011	Journal	Journal of Instructional Psychology	Yasin & Yunus, 2014	No	Not focus on creativity training
Training Insight Problem Solving Through Focus on Barriers and Assumptions	Walinga et al.	2011	Journal	Journal of Creative Behavior	No	Yes	Included
Evaluating the impact of TRIZ creativity training: an organizational field study	Birdi et al.	2012	Journal	R&D Management	Valgeirsdottir & Onarheim, 2017	No	Did not measure performance
Creativity training: An examination of training content, format, and activity type	Byrne	2012	PhD	University of Oklahoma	No	No	No control group
Stimulating creativity via exposure to other people's ideas	Fink et al.	2012	Journal	Human Brain Mapping	No	Yes	Included
Experimental assessment of TRIZ effectiveness in idea generation	Hernandez et al.	2012	Conference Paper	2012 ASEE Annual Conference & Exposition	Yasin & Yunus, 2014	No	Not enough data to estimate effect size
Creativity Improvement by Idea-Marathon Training, Measured by Torrance Tests of Creative Thinking (TTCT) and Its Applications to Laboratories	Higuchi et al.	2012	Conference Paper	International Conference on Knowledge, Information and Creativity Support Systems	Valgeirsdottir & Onarheim, 2017	No	No control group
The Development of Critical and Creative Thinking Skills for 21st Century Learning	Missett	2012	PhD	University of Virginia	No	Yes	Included
Storyline and Associations Pyramid as methods of creativity enhancement: Comparison of effectiveness in 5-year-old children	Smogorzewska	2012	Journal	Thinking Skills and Creativity	No	No	Not on individual creativity
Innovation 101: Promoting undegraduate innovation through a two-day boot camp	West et al.	2012	Journal	Creativity Research Journal	Valgeirsdottir & Onarheim, 2017	No	No control group
Evaluation of a creativity intervention program for preschoolers	Alfonso-Benlliure et al.	2013	Journal	Thinking Skills and Creativity	No	No	Not enough data to estimate effect size
Impacts of learning inventive problem-solving principles: students' transition from systematic searching to heuristic problem solving	Barak	2013	Journal	Instructional Science	Yasin & Yunus, 2014	Yes	Included

Thinking about applications: Effects on mental models and creative problem-solving.	Barrett et al.	2013	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Thinking About Applications: Effects on Mental Models and Creative Problem-Solving	Barrett et al.	2013	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Course in new thinking in higher education: enhancing creativity through the means of training, theory and workshop	Byrge & Hansen	2013	Journal	Problems of education in the 21st century	Valgeirsdottir & Onarheim, 2017	No	No control group
Students technological creativity using online problem-solving activities	Chang	2013	Journal	Journal of Technology and Design Education	Yasin & Yunus, 2014	Yes	Included
Developing 4- to 6-year old children's figural creativity using a doodle-book program	Dziedziewicz et al.	2013	Journal	Thinking Skills and Creativity	No	Yes	Included
Creativity Effects of Idea-Marathon System (IMS): Torrance Tests of Creative Thinking (TTCT) Figural Tests for College Students	Higuchi et al.	2013	Conference Paper	International Conference on Knowledge, Information and Creativity Support Systems	No	Yes	Included
Increasing Students' Scientific Creativity: The “Learn to Think” Intervention Program	Hu et al.	2013	Journal	Journal of Creative Behavior	No	Yes	Included
Enhancing Digital Fluency through a Training Program for Creative Problem Solving Using Computer Programming	Kim et al.	2013	Journal	Journal of Creative Behavior	No	Yes	Included
Applying the neuroscience of creativity to creativity training	Onarheim & Friis-Olivarius	2013	Journal	Frontiers in Human Neuroscience	Valgeirsdottir & Onarheim, 2017	No	No control group
Teaching People to Manage Constraints: Effects on Creative Problem-Solving	Peterson et al.	2013	Journal	Creativity Research Journal	No	No	Not enough data to estimate effect size
Working memory training is associated with lower prefrontal cortex activation in a divergent thinking task	Vartanian et al.	2013	Journal	Neuroscience	No	No	Not focus on creativity training
Effectiveness of Training Creativity on Preschool Students	Zahra et al.	2013	Conference Paper	International Forum on	No	Yes	Included

				Engineering Education			
The impact of age and training on creativity: A design-theory approach to study fixation effects	Agogué et al.	2014	Journal	Thinking Skills and Creativity	No	No	Not focus on creativity training
Creativity training enhances goal-directed attention and information processing	Bott et al.	2014	Journal	Thinking Skills and Creativity	No	Yes	Included
Improving ceativity performance by short-term meditation	Ding et al.	2014	Journal	Behavioral and Brain Functions	Valgeirsdottir & Onarheim, 2017	No	Not focus on creativity training
Developing children's intercultural competence and creativity	Dziedziewicz et al.	2014	Journal	Thinking Skills and Creativity	No	Yes	Included
Targeted intervention to increase creative capacity and performance: A randomized controlled pilot study/Creativity training enhances goal-directed attention and information processing	Kienitz et al.	2014	Journal	Thinking Skills and Creativity	Valgeirsdottir & Onarheim, 2017	Yes	Included
Increasing Creativity in Design Education: Measuring the E/Affect of Cognitive Exercises on Student Creativity	Merril	2014	PhD	Kansas State University	No	Yes	Included
Creativity and its antecedents: An investigation of different assessments and training effects	Perry	2014	PhD	Iowa State University	No	No	No control group
The feasibility of enhancement of knowledge and self-confidence in creativity: A pilot study of a three-hour SCAMPER workshop on secondary students	Poon et al.	2014	Journal	Thinking Skills and Creativity	No	No	No control group
The effectiveness of mentoring strategy for developing the creative potential of the gifted and non-gifted students	Sahin	2014	Journal	Thinking Skills and Creativity	No	Yes	Included
Developing children's language creativity through telling stories- an experimental study	Smogorzewska	2014	Journal	Thinking Skills and Creativity	No	Yes	Included
Training creative cognition: adolescence as a flexible period for improving creativity	Stevenson et al.	2014	Journal	Frontiers in Human Neuroscience	Valgeirsdottir & Onarheim, 2017	Yes	Included
An Experiment in Facilitating Creative Thinking in Second Degree Accelerated Nursing Students	Tull	2014	PhD	Texas State University	No	Yes	Included
Thinking hats and good men: Structured techniques in a problem construction task	Vernon & Hocking	2014	Journal	Thinking Skills and Creativity	No	Yes	Included
Embodied cognitive flexibility and neuroplasticity following Quadrator Motor Training	Ben-Soussan et al.	2015	Journal	Frontiers in Psychology	Valgeirsdottir & Onarheim, 2017	No	Not focus on creativity training

Embodied creativity training: Effects on creative self-efficacy and creative production	Byrge & Tang	2015	Journal	Thinking Skills and Creativity	Valgeirsdottir & Onarheim, 2017	No	No control group
A Study of the Effect of Creative Thinking Program on Improving Students' Culinary Creativity	Cheng & Chou	2015	Conference Paper	International Conference on Creative Education	No	Yes	Included
Improving your creative potential without awareness: Overinclusive thinking training	Chiu	2015	Journal	Thinking Skills and Creativity	No	Yes	Included
Training of Verbal Creativity Modulates Brain Activity in Regions Associated with language- andmemory-Related Demands/Modulation of resting-state network connectivity by verbal divergent thinking training (same data, re-analysis)	Fink et al.	2015	Journal	Human Brain Mapping	Valgeirsdottir & Onarheim, 2017	Yes	Included
Teaching Creative Thinking Skills: A Longitudinal Study	Im et al.	2015	Journal	Clothing and Textiles Research Journal	Valgeirsdottir & Onarheim, 2017	No	No control group
Creative Interpersonal Problem Solving Program: Igniting Creativity in Elementary Students	Kashani-Vahid et al.	2015	Conference Paper	International Conference of Cognitive Science	No	Yes	Included
Creativity training for future engineers: preliminary results from an educative experience	Morin et al.	2015	Conference Paper	International Conference on Education and New Learning Technologies	No	No	No control group
Aptitude-Treatment Interactions during Creativity Training in E-Learning: How Meaning-Making, Self-Regulation, and Knowledge Management	Yeh & Lin	2015	Journal	Journal of Educational Technology & Society	No	No	No control group
The effectiveness of a creativity course on developing Chinese design students' creative thinking	Zhu	2015	PhD	University of the Pacific	No	Yes	Included
Fostering creativity by a specially designed Doris tool	Zivkovic et al.	2015	Journal	Thinking Skills and Creativity	No	Yes	Included
Using Scratch to foster creativity behind bars: Two positive experiences in jail	Bustillo & Garaizar	2016	Journal	Thinking Skills and Creativity	No	No	Atypical population
A Study on the Effects of Creativity Training Program on the Creative Behaviors of Preschool Children	Dere & Omeroglu	2016	Conference Paper	International Conference on Lifelong Education and	No	No	Did not measure performance

				Leadership for All			
Short Term Intervention Model for Enhancing Divergent Thinking among School Aged Children	Doron	2016	Journal	Creativity Research Journal	No	Yes	Included
The effect of tabletop role-playing games on the creative potential and emotional creativity of Taiwanese college students	Dyson et al.	2016	Journal	Thinking Skills and Creativity	No	Yes	Included
Pretend Play and Creativity in Preschool-Age Children: Associations and Brief Intervention	Fehr & Russ	2016	Journal	Psychology of Aesthetics, Creativity, and the Arts	No	Yes	Included
Fostering Creativity in Tablet-Based Interactive Classrooms	Kim et al.	2016	Journal	Journal of Educational Technology & Society	No	Yes	Included
A study on the application and effects of smart support system for creativity in engineering education	Lim	2016	Journal	Journal of Engineering Education Research	No	No	Neither indexed journal papers, PhD dissertations, conference papers, preprint, nor research reports
Designing EEG Neurofeedback Procedures to Enhance Open-ended versus Closed-ended Creative Potentials	Lin & Shih	2016	Journal	Journal of Creative Behavior	No	Yes	Included
The effect of wording and placement of task instructions on problem-solving creativity	Mascio et al.	2016	Journal	Journal of Creative Behavior	No	No	Not focus on creativity training
Learning to relax versus learning to ideate: Relaxation-focused creativity training benefits introverts more than extraverts	O'Connor et al.	2016	Journal	Thinking Skills and Creativity	No	Yes	Included
Creativity training in causal inference using the idea post-exposure paradigm: Effects on idea generation in junior high school students	Sannomiya & Yamaguch	2016	Journal	Thinking Skills and Creativity	No	Yes	Included
An Experimental Investigation of the State of Creativity, Critical Thinking and Creativity Training in Undergraduate Engineering Students	Sola	2016	PhD	University of Central Florida	No	No	No control group

Training Your Brain to Be More Creative: Brain Functional and Structural Changes Induced by Divergent Thinking Training	Sun et al.	2016	Journal	Human Brain Mapping	No	Yes	Included
The creative training in the visual arts education	Ulger	2016	Journal	Thinking Skills and Creativity	No	Yes	Included
Improving creativity training: a study Of designer skills	Valgeirsdottir et al.	2016	Conference Paper	International Design Conference	No	No	No control group
Beyond belief: Structured techniques prove more effective than a placebo intervention in a problem construction task	Vernon & Hocking	2016	Journal	Thinking Skills and Creativity	No	Yes	Included
The Future Problem Solving Program International: An Intervention to Promote Creative Skills in Portuguese Adolescents	Azevedo et al.	2017	Journal	Journal of Creative Behavior	No	Yes	Included
The effects of analogical and metaphorical reasoning on design thinking	Choi & Kim	2017	Journal	Thinking Skills and Creativity	No	No	Not on individual creativity
Fostering creativity in school aged children through perspective taking and visual media based short term intervention program	Doron	2017	Journal	Thinking Skills and Creativity	No	Yes	Included
The right tool for the right task: Structured techniques prove less effective on an ill-defined problem finding task	Hocking & Vernon	2017	Journal	Thinking Skills and Creativity	No	Yes	Included
The Effect of Using the Creative Reversal Act in Science Education on Middle School Students' Creativity Levels	Karaca & Koray	2017	Journal	Eurasian Journal of Educational Research	No	Yes	Included
Can a creative interpersonal problem solving program improve creative thinking in gifted elementary students?	Kashani-Vahid et al.	2017	Journal	Thinking Skills and Creativity	No	No	Atypical population
The Random-Map Technique Enhancing Mind-Mapping with a Conceptual Combination Technique to foster Creative Potential	Malycha & Maier	2017	Journal	Creativity Research Journal	No	Yes	Included
Enhancing Creativity on Different Complexity Levels by Eliciting Mental Models	Malycha & Maier	2017	Journal	Psychology of Aesthetics, Creativity, and the Arts	No	Yes	Included
Efficacy of teaching creative thinking skills: A comparison of multiple creativity assessments	Perry & Karpova	2017	Journal	Thinking Skills and Creativity	No	No	No control group

When Theater Comes to Engineering Design: Oh How Creative They Can Be	Pfeiffer et al.	2017	Journal	Journal of Biomechanical Engineering	No	No	Did not measure performance
Enhancement of Creative Thinking Skills Using a Cognitive-Based Creativity Training	Ritter & Mostert	2017	Journal	Journal of Cognitive enhancement	No	No	No control group
Changes in Brain Activation Associated with Spontaneous Improvization and Figural Creativity After Design-Thinking-Based Training: A Longitudinal fMRI Study	Saggar et al.	2017	Journal	Cerebral Cortex	No	Yes	Included
Effects of the Skills4Genius sports-based training program in creative behavior	Santos et al.	2017	Journal	PLOS one	No	Yes	Included
Investigating the suitability of computerised creativity training activities for teaching creativity and problem-solving skills in engineering education	Valentine	2018	PhD	RMIT University	No	No	Not focus on creativity training
A Study on the Effects of Creativity Training Program on Creative Behaviors of Children	Dere	2018	Conference Paper	International Conference on Lifelong Education and Leadership	No	No	Did not measure performance
Modulation of resting-state network connectivity by verbal divergent thinking training	Fink et al.	2018	Journal	Brain and Cognition	No	No	No control group
Is it Possible to Enhance the Creative Thinking Skills of EFL Learners through Training?	Gursoy & Bag	2018	Journal	Advances in Language and Literary Studies	No	No	Not focus on creativity training
Creative Thinking Strategies for Life: A Course for Professional Adults Using Art	Hoffmann et al.	2018	Journal	Journal of Creative Behavior	No	Yes	Included
Infusing creative pedagogy into an English as a foreign language classroom: Learning performance, creativity, and motivation	Liao et al.	2018	Journal	Thinking Skills and Creativity	No	Yes	Included
Creative Problem Solving in Small Groups: The Effects of Creativity Training on Idea Generation, Solution Creativity, and Leadership Effectiveness	Puccio et al.	2018	Journal	Journal of Creative Behavior	No	No	Not on individual creativity
Developing Cognitive and Motor Creativity in Children Through an Exercise Program Using Nonlinear Pedagogy Principles	Richard et al.	2018	Journal	Creativity Research Journal	No	Yes	Included

The Creativity Challenge Game: An educational intervention for creativity enhancement with the integration of Information and Communication Technologies (ICTs)	Stolaki et al.	2018	Journal	Computer & Education	No	No	No control group
Exploration of Creativity Techniques in Software Engineering in Training-Application-Feedback Cycle	Bobkowska	2019	Conference Paper	Workshop on Enterprise and Organizational Modeling and Simulation	No	No	Did not measure performance
Online Gamified Training for Business Innovation: Examining an Embodied Gamified E-learning Module on Creativity	Brøndum	2019	Journal	Journal of Creativity and Business Innovation	No	No	No control group
Fostering children's creative thinking skills with the 5-I training program	Gu et al.	2019	Journal	Thinking Skills and Creativity	No	No	No control group
The development and evaluation of the effect of creative problem-solving program on young children's creativity and character	Kim et al.	2019	Journal	Thinking Skills and Creativity	No	Yes	Included
The effects of a cognitive pathway to promote class creative thinking. An experimental study on Italian primary school students. [References].	Lucchiari et al.	2019	Journal	Thinking Skills and Creativity	No	No	Not enough data to estimate effect size
Exploring the Effects of Creativity Training on Creative Performance and Creative Self-Efficacy: Evidence from a Longitudinal Study	Meinel et al.	2019	Journal	Journal of Creative Behavior	No	No	No control group
The Investigation on Creative Thinking into Projected-Base Programming Course for College Students	Peng & Wang	2019	Conference Paper	International Conference on Innovative Technologies and Learning	No	No	No control group
Using computer-based cognitive mapping to improve students' divergent thinking for creativity development	Sun et al.	2019	Journal	British Journal of Education Techology	No	No	No control group
Examining the effects of creativity training on creative production, creative self-efficacy, and neuro-executive functioning	Vally et al.	2019	Journal	Thinking Skills and Creativity	No	No	No control group
Fostering learner creativity in the English L2 classroom: Application of the creative problem-solving model. [References].	Wang	2019	Journal	Thinking Skills and Creativity	No	No	No control group

Enhancing creativity through aesthetics-integrated computer-based training: The effectiveness of a FACE approach and exploration of moderators	Yeh et al.	2019	Journal	Computers & Education	No	No	No control group
Changes in divergent thinking strategy due to creativity training: Findings from dynamic causal modelling	Abdul Hamid et al.	2020	Conference Paper	International Seminar on Medical Physics	No	Yes	Included
The benefits of the learn to think program for preschoolers' creativity: An explorative study.	Bai et al.	2020	Journal	Journal of Creative Behavior	No	Yes	Included
Fostering University Students' Idea Generation and Idea Evaluation Skills With a Cognitive-Based Creativity Training	Broekhoven	2020	Journal	Creativity. Theories – Research - Applications	No	No	No control group
Effects of gamified classroom management on the divergent thinking and creative tendency of elementary students	Chen et al.	2020	Journal	Thinking Skills and Creativity	No	No	Not focus on creativity training
The Effects of a Verbal and a Figural Creativity Training on Different Facets of Creative Potential	Fink et al.	2020	Journal	Journal of Creative Behavior	No	No	No control group
On the benefits of thinking creatively: Why does creativity training strengthen intercultural sensitivity among children	Groyecka et al.	2020	Journal	Thinking Skills and Creativity	No	No	No control group
Testing the effects of digital gamified creativity training	Hänninen et al.	2020	Journal	Journal of Creativity and Business Innovation	No	No	No control group
Performance Incentives, Divergent Thinking Training, and Creative Problem Solving.	Huo	2020	Journal	Journal of Management Accounting Research	No	No	Included
The effectiveness of the selective problem solving model on students'mathematical creativity: A solomon four group-research	Kirisci et al.	2020	Journal	Thinking Skills and Creativity	No	Yes	Included
Nurturing and enhancing creativity of nursing students in taiwan: A quasi-experimental study.	Liu et al.	2020	Journal	Journal of Creative Behavior	No	Yes	Included
Effect of creativity training on teaching for creativity for nursing faculty in Taiwan: A quasi-experimental study.	Liu et al.	2020	Journal	Nurse education today	No	No	Did not measure performance
Enhancing creativity by training metacognitive skills in mental imagery	May et al.	2020	Journal	Thinking Skills and Creativity	No	Yes	Included

Improving creative ability of base of pyramid(BOP) students in india	Parikh et al.	2020	Journal	Thinking Skills and Creativity	No	Yes	Included
Fostering students' creative thinking skills by means of a one-year creativity training program	Ritter et al.	2020	Journal	PLOS one	No	Yes	Included
Effects of divergent thinking training on students' scientific creativity: The impact of individual creative potential and domain knowledge	Sun et al.	2020	Journal	Thinking Skills and Creativity	No	Yes	Included
Applying project-based learning and SCAMPER teaching strategies in engineering education to explore the influence of creativity on cognition, personal motivation, and personality traits	Wu & Wu	2020	Journal	Thinking Skills and Creativity	No	No	No control group
Increased creative production in Spanish university students of Education	Chacon-Lopez	2021	Journal	Thinking Skills and Creativity	No	Yes	Included
Empowering creativity through training	Gu	2021	PhD	Radboud University	No	No	Full-text not available
Emotions, Creativity, and the Arts: Evaluating a Course for Children	Hoffmann et al.	2021	Journal	Empirical Studies of the Arts	No	Yes	Included
Creative Thinking Counseling Teaching Program can Improve the Creativity, Creative Tendency, and Self- Concept of Grade 7 Students: A Quasi-Experimental Study	Huang et al.	2021	Journal	Journal of Creative Behavior	No	Yes	Included
CLEAR IDEAS: Can Idea Implementation Training Enhance the Development of New Ideas Beyond Idea Generation Training?	Jones-Chick et al.	2021	Journal	Journal of Creative Behavior	No	Yes	Included
Creativity training for multifaceted inferences of reason behind others' behaviors	Sannomiya et al.	2021	Journal	Thinking Skills and Creativity	No	Yes	Included
Exploring Entrepreneurial Students' Perceptions of Online Mindful Creativity Training: A Mixed Methods Case Study	Schmitz	2021	PhD	Drexel University	No	No	Did not measure performance
Stimulating Creativity: Examining the Effectiveness of Four Cognitive-based Creativity Training Techniques	Gu et al.	2022	Journal	Journal of Creative Behavior	No	No	Not enough data to estimate effect size
Active versus Passive Strategy in Online Creativity Training: How to Best Promote Creativity of Students with Different Cognitive Styles?	Gu et al.	2022	Journal	Thinking Skills and Creativity	No	No	No control group

Table S3

Interrater Reliability

Moderator	Cohen's Kappa
Categorical Moderator	
Age Group	1.00
Training Content	0.95
Randomization	0.97
Use of a Prestest	0.99
Type of Control Group	0.98
Type of Outcome Measure	1.00
Origin of Outcome Measure	0.98
Training to Criterion	0.99
Posttest Timing	0.97
Publication Status	1.00
Modality of Divergent Thinking Measures	1.00
Dimension of Divergent Thinking Measures	1.00
Use of a Delayed Posttest	1.00
Power Analysis	0.92
Replication	0.89
Preregister	1.00
Study Location	1.00
Continuous Moderator	*ICC*
Total Training Time	1.00
Training Duration	1.00
Publication Year	1.00
Sample Size (Treatment)	1.00
Sample Size (Control)	1.00
Information for computing the effect size (e.g., *M*, *SD*, *F*-value, *t*-value, and *p*-value)	0.99-1.00

Note. ICC: Intraclass Correlation Coefficient.

Table S4

Sensitivity Analysis with a Range of Value for the Within-Study Effect Size Correlation (ρ) Assumed by the RVE Model

	ρ = 0	ρ = .2	ρ = .4	ρ = .6	ρ = .8	ρ = 1.0
Overall effect size	0.53	0.53	0.53	0.53	0.53	0.53
Standard error	0.03	0.03	0.03	0.03	0.03	0.03

Table S5

Overall Effect Size, its Standard Error, 95% CI, and 95% PI by Different Meta-Analysis Methods

		Estimated Overall Effect Size			
Method	Number of effect sizes	*g*	*SE*	95% *CI*	95% *PI*
RVE	844	0.53	0.03	0.47, 0.59	-0.58, 1.63
Aggregated Effect Size	169	0.51	0.03	0.45, 0.57	-0.14, 1.17

Table S6

RoBMA Model-Averaged Bayes Factors for Publication Bias (Randomly Select one Effect Size per Study, Repeated for 100 Times)

	Summary of the RoBMA Models			
	Mean	Median	Lowest	Highest
Bayes factor	1997093.59	$BF_{10} = 18.46$	$BF_{10} = 0.32$	$BF_{10} = 199709359.3$

Note. 169 effect sizes; the Bayes factor indicates how many times more likely that the data are under the model assuming the presence of publication bias than the model assuming the absence of publication bias.

Table S7

Effect Size Estimate Corrected for Publication Bias (Randomly Select one Effect Size per Study, Repeated for 100 Times)

	Estimated Overall Effect Size *g*			
Method used	Mean	Median	Lowest	Highest
PET	0.13	0.12	-0.14	0.38
PEESE	0.31	0.31	0.16	0.45
PET-PEESE	0.16	0.12	-0.14	0.45
Trim-and-fill	0.31	0.41	-0.01	0.64
RoBMA	0.23	0.19	-0.02	0.48

Note. 169 effect sizes.

Table S8

Results of the RVE Mixed-Effects Meta-Regression Models with One Moderator at a Time

Categorical Moderator	*k*	*m*	I^2	τ	Statistics	*g*	*SE*	95% *CI*	*p*
Sample Characteristics									
Age Group	169	844	87.53	0.59	$F(4, 39.8) = 0.21$	-	-	-	.934
Preschool/Kindergarten	15	73				0.54	0.10	0.33, 0.75	< .001
US Grade 1-8	59	355				0.49	0.05	0.39, 0.60	< .001
US Grade 9-12	9	31				0.50	0.16	0.13, 0.88	.016
University Students	68	313				0.55	0.05	0.45, 0.65	< .001
Adults	18	72				0.56	0.09	0.38, 0.75	< .001
Training Characteristics									
Training Content[a]	169	844	87.43	0.57	$F(2, 17.1) = 0.89$	-	-	-	.431
Non-Cognitive	8	20				0.37	0.14	0.02, 0.71	.040
Cognitive	122	590				0.52	0.04	0.45, 0.59	< .001
Combined	52	234				0.57	0.06	0.45, 0.69	< .001
Study Characteristics									
Randomization	169	844	87.29	0.56	$F(2, 37.1) = 1.03$	-	-	-	.366
Non-Random	74	351				0.51	0.05	0.42, 0.61	< .001
Random	82	445				0.51	0.04	0.43, 0.60	< .001
Unspecified	13	48				0.69	0.12	0.43, 0.96	< .001
Type of Control Group	169	844	87.40	0.56	$t(115.0) = -0.29$	-	-	-	.774
Inactive	110	548				0.53	0.04	0.45, 0.61	< .001
Active	59	296				0.51	0.05	0.41, 0.62	< .001

Categorical Moderator	*k*	*m*	I^2	τ	Statistics	*g*	*SE*	95% *CI*	*p*
Use of a Pretest	169	844	87.41	0.57	$t(120.0) = -1.06$	-	-	-	.292
Posttest Only	61	288				0.57	0.05	0.47, 0.68	< .001
Pretest-Posttest	108	556				0.50	0.04	0.43, 0.58	< .001
Type of Outcome Measure[a, b]	167	835	87.50	0.57	$F(2, 39.7) < 0.01$	-	-	-	.997
Divergent Thinking	135	685				0.53	0.03	0.46, 0.60	< .001
Creative Problem Solving	28	76				0.52	0.10	0.31, 0.73	< .001
Creative Product	29	74				0.53	0.10	0.33, 0.73	< .001
Origin of Outcome Measure[a]	169	844	87.33	0.57	$t(59.0) = -0.44$	-	-	-	.661
Researcher-Made	43	125				0.55	0.07	0.41, 0.69	
Independent	136	719				0.52	0.03	0.45, 0.59	
Training to Criterion[a]	169	844	87.40	0.56	$t(30.1) = 0.68$	-	-	-	.505
No	150	725				0.52	0.03	0.45, 0.58	< .001
Yes	25	119				0.58	0.09	0.40, 0.76	< .001
Posttest Timing	169	844	87.42	0.57	$F(3, 35.6) = 0.67$	-	-	-	.575
Same Day	68	314				0.50	0.05	0.41, 0.59	< .001
Between 1-7 Days	42	229				0.53	0.07	0.39, 0.66	< .001
8 Days or Longer	8	49				0.61	0.06	0.46, 0.76	< .001
Unspecified	51	252				0.55	0.06	0.43, 0.68	< .001
Publication Status	169	844	87.34	0.56	$t(83.7) = 2.84$	-	-	-	.006
Unpublished	48	262				0.39	0.06	0.28, 0.50	< .001
Published	121	582				0.58	0.04	0.51, 0.65	< .001

Continuous Moderator	*k*	*m*	I^2	τ	Statistics	*B*	*SE B*	*p*
Training Characteristics								
Total Training Time (log-transformed)[c]	146	743	88.26	0.60	$t(58.3) = 2.16$	0.03	0.01	.035
Training Duration (log-transformed)[d]	161	824	87.74	0.59	$t(97.8) = 0.18$	< 0.01	0.01	.860
Study Characteristics								
Standard Error	169	844	86.65	0.55	$t(55.6) = 4.34$	1.76	0.41	< .001
Publication Year	169	844	87.30	0.56	$t(97.1) = 0.95$	< 0.01	< 0 .01	.350

Note. *k* = number of studies; *m* = number of effect sizes.
[a] Some studies appear in multiple categories. Thus, the sum of the number of studies from all the categories was larger than 169.
[b] Two studies used multiple types of outcome measures but reported only the overall effect (2 studies; 9 effect sizes). They were excluded from the analysis.
[c] Twenty-three studies did not report the total training time and were thus excluded from the analysis.
[d] Eight studies did not report training duration and were thus excluded from the analysis.

Table S9

Results of the RVE Mixed-Effects Meta-Regression Models with One Moderator at a Time (Divergent Thinking Measure Only)

Categorical Moderator	*k*	*m*	I^2	τ	Statistics	*g*	*SE*	95% *CI*	*p*
Publication Status	95	436	90.54	0.64	$t(46.8) = 2.01$				.050
Unpublished	27	122				0.38	0.08	0.21, 0.55	< .001
Published	68	314				0.57	0.05	0.47, 0.67	< .001
Dimension[a]	95	436	90.48	0.65	$F(2, 77.8) = 0.80$				.452
Fluency	94	188				0.49	0.05	0.39, 0.58	< .001
Flexibility	51	86				0.54	0.09	0.37, 0.71	< .001
Originality	82	162				0.55	0.05	0.45, 0.65	< .001
Modality	95	436	90.46	0.64	$t(86.4) = -1.88$				.063
Verbal	62	265				0.58	0.05	0.47, 0.69	< .001
Figural	50	171				0.43	0.06	0.30, 0.56	< .001

Continuous Moderator	*k*	*m*	I^2	τ	Statistics	*B*	*SE B*	*p*
Standard Error	95	436	90.17	0.64	$t(27.8) = 2.76$	1.47	0.53	.010
Total Training Time (log-transformed)	86	407	91.00	0.69	$t(27.0) = 1.69$	0.03	0.02	.102

Note. *k* = number of studies; *m* = number of effect sizes.

[a] Some studies appear in multiple categories. Thus, the sum of the number of studies from all the categories was larger than 95.

Table S10

Results of the Logistic Regression Models with Publication Year as the Predictor Variable

	Logistic Regression Model with Publication Year as the Predictor Variable			
Dependent Variable	*B*	*SE B*	*z* value	*p*
Randomization at the individual level	-0.01	0.01	-1.02	.307
Use an active control group	0.01	0.01	0.86	.389
Use a pretest	0.01	0.01	0.87	.383
All three features	0.01	0.02	0.86	.391

Note. Number of studies = 169; *B*: unstandardized coefficients of the predictors

Table S11

Results of Tests for Publication Bias (Only Included Studies Meeting 3 of the 4 Criteria)

Methods Used	Results
Egger's regression	$B = 1.16$, $SE\ B = 0.48$, $p = 0.046$
RoBMA	$BF_{10} = 3.73$

Notes. The bayes factor indicates how many times more likely our data are under a model assuming the presence of publication bias vs. a model assuming the absence of publication bias.

Table S12

Effect Size Estimate Corrected for Publication Bias (Only Included Studies Meeting 3 of the 4 Criteria)

	Estimated Overall Effect Size				
Method used	*g*	*SE*	τ	95% *CI*	*p*-value or Bayes Factor
No correction	0.28	0.06	0.30	0.15, 0.42	$p < .001$
PET-PEESE	0.10	0.18	0.19	-0.25, 0.46	$p = .577$
Trim-and-fill	0.13	0.07	0.28	-0.01, 0.27	$p = .068$
RoBMA	0.09	/	0.19	< -0.01, 0.35[b]	$BF_{10} = 0.702$[c]

Note. 19 studies and 129 effect sizes.
[a] PET estimate: $g = 0.10$, $SE = 0.18$, $p = 0.577$; PEESE estimate: $g = 0.19$, $SE = 0.11$, $p = 0.09$. The PET estimate was taken as the corrected effect size estimate.
[b] 95% credible interval.
[c] Our data were 0.702 times more likely under the model assuming the presence of an effect than under the model assuming no effect.

Table S13

Number of Studies Reporting Scores on Each Dimension (or Combination of Dimensions) of the Verbal Divergent Thinking Test

Verbal Divergent Thinking Dimension Measures Used	Number of Studies
Fluency, flexibility, and originality	35
Fluency and flexibility	2
Fluency and originality	13
Fluency	11
Flexibility	0
Originality	1
Overall score only	8
Other dimensions only	2

Note. Only studies using the verbal divergent thinking test were included (N = 72).