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SYSTEMATIC REVIEW

Effects of dance on cognitive function in older adults: a systematic review and meta-analysis

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Abstract

Background: dance is a mind–body activity that stimulates neuroplasticity. We explored the effect of dance on cognitive function in older adults.

Methods: we searched MEDLINE, EMBASE, CENTRAL and PsycInfo databases from inception to August 2020 (PROSPERO:CRD42017057138). Inclusion criteria were (i) randomised controlled trials (ii) older adults (aged ≥ 55 years), (iii) intervention—dance and (iv) outcome—cognitive function. Cognitive domains were classified with the Diagnostic and Statistical Manual of Mental Disorders-5 Neurocognitive Framework. Meta-analyses were performed in RevMan5.3 and certainty of evidence with GradePro.

Results: we reviewed 3,997 records and included 11 studies ($N = 1,412$ participants). Seven studies included only healthy older adults and four included those with mild cognitive impairment (MCI). Dance interventions varied in frequency (1–3×/week), time (35–60 minutes), duration (3–12 months) and type. We found a mean difference (MD) = 1.58 (95% confidence interval [CI] = 0.21–2.95) on the Mini Mental State Examination for global cognitive function (moderate-certainty evidence), and the Wechsler Memory Test for learning and memory had an MD = 3.02 (95% CI = 1.38–4.65; low-certainty evidence). On the Trail Making Test-A for complex attention, MD = 3.07 (95% CI = −0.81 to 6.95; high-certainty evidence) and on the Trail Making Test-B for executive function, MD = −4.12 (95% CI = −21.28 to 13.03; moderate-certainty evidence). Subgroup analyses did not suggest consistently greater effects in older adults with MCI. Evidence is uncertain for language, and no studies evaluated social cognition or perceptual–motor function.

Conclusions: dance probably improves global cognitive function and executive function. However, there is little difference in complex attention, and evidence also suggests little effect on learning and memory. Future research is needed to determine the optimal dose and if dance results in greater cognitive benefits than other types of physical activity and exercise.

Keywords: ageing, cognition, executive function, attention, learning, memory, older people, systematic review

Key Points

- This systematic review and meta-analysis included 11, heterogeneous, studies.
- Grading of Recommendations Assessment, Development and Evaluation (GRADE) certainty of evidence was moderate for global cognitive function and executive function.

- Dance probably improves global cognitive function and executive function.
- A core outcome set for cognition and dance is needed.

Background

Dance is a mind–body activity of purposeful rhythmic movement to music. Dance may stimulate neuroplasticity in several cognitive functions such as learning and memory to learn new movement patterns, attention to follow instructions, executive functions to execute complex movement patterns and social cognition to connect movement with meaning and emotional expression amid social interactions [1]. Recent evidence has demonstrated beneficial changes in brain structure such as increased hippocampal volume, gray matter and white matter integrity [2]. Dance also strengthens the connectivity between both cerebral hemispheres with neural activation in motor, somatosensory and cognitive brain areas [2].

There is increasing interest in the use of dance to improve perceptual–motor function as part of rehabilitation for people with Parkinson's disease [3]. Taking part in physically active and socially integrated activities such as dance may help to maintain or improve cognitive function and lower risk of acquiring dementia over time [4,5]. Therefore, we conducted a systematic review and meta-analysis of randomised controlled trials (RCTs) examining dance and cognitive function in older adults.

Registration

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) [6] was used to prepare this manuscript. This protocol was registered on the PROSPERO (CRD42017057138) and published [7]. A completed PRISMA checklist is included in Supplementary Material A1.

Search strategy

We conducted a systematic search using MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL) including clinicaltrails.gov, PsyInfo and conference proceedings. We developed our search strategy with the assistance of a Cochrane-trained librarian (final search: August 2020).

Study selection

We elected to only include RCTs because this is a new area and our intent was to synthesise information regarding the potential therapeutic benefits by addressing efficacy questions (i.e. does the intervention work in the ideal or controlled study setting).

Population

Older adults (aged 55+) were included in this review. There were no restrictions on type of living arrangement (e.g. community-dwelling, retirement residence or long-term care) or diagnoses.

Intervention

Dance was defined as a mind–body activity of purposeful rhythmically movement to music.

Comparator

Studies for the effect of dance on cognitive function were included if they evaluated dance relative to any control-group (e.g. education, walking, waitlisted or no physical activity).

Outcomes

The primary outcomes of interest were global cognitive function as well as executive function, which include task switching (cognitive flexibility) and response inhibition. However, we considered all measures of cognitive function.

Data collection process

Two authors independently screened for relevancy, and conflicts were resolved by a third reviewer. Two authors independently and in duplicate abstracted the data. To better organise and synthesise our results, we added the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) neurocognitive framework [8] at the data extraction stage due to the large number of assessment tools identified. Using clinical judgement, all assessments were classified into one of the DSM-5 Neurocognitive domains: global function, executive function, learning and memory, complex attention, language, social cognition function and perceptual–motor function. A PRISMA flow diagram documented the study selection and we calculated inter-rater reliability.

Certainty of the evidence and risk of bias

We assessed the risk of bias using the Cochrane Risk of Bias tool [9] and summarised the certainty of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach [10] to rate certainty of evidence. Each domain of cognitive function was reported as high, moderate, low and very low certainty of evidence-based on risk of bias, inconsistency, indirectness, imprecision and publication bias. The certainty of evidence and risk of bias were assesssed independently and in duplicate. For any disagreement, a third reviewer confirmed the final assessment.

Data analysis

Descriptive statistics were used to describe the publication (year; country; type), participants (N; cohort; setting; age) and intervention (type; dose; frequency; duration; adherence rate). Review Manager software (RevMan5.3) was used to conduct meta-analyses. Data were entered as means (standard deviation [SD]) and analysed using the aggregate random effects models. The degree of statistical heterogeneity was evaluated from forest plots, using chi-square tests and I^2 statistic ($I^2 > 50\%$ indicates moderate to substantial heterogeneity). Pooled mean difference (MD) along with 95% confidence intervals (CIs) were reported. Additional subgroup analyses were performed on the effect of dance on cognition in relation to (i) the severity of cognitive impairment (i.e. healthy adults versus mild cognitive impairment [MCI] defined using the Peterson criteria [11]); (ii) dance dose (i.e. number of hours over the study period), if applicable. If there was insufficient data for meta-analysis, a narrative synthesis was performed.

Results

A total of 3,997 records were identified and 11 studies were included in the final analysis (Figure 1). There was strong agreement between the reviewers in title and abstract screening with an unweighted kappa of 0.84 (95% CI = 0.73–0.94) and full-text screening with an unweighted kappa of 0.93 (95% CI = 0.78–0.99). Table 1 provides an overview of included studies published from the year 2015–20 across nine countries. Supplementary Material A2 outlines additional descriptives about the control group. Table 2 summarises the quality of the evidence quality for the outcomes included in the meta-analyses. Eight studies were determined to have low risk of bias [1,12–18] and three with a high risk of bias [19–21] (Supplementary Material A3).

Population

Across 11 studies our total sample size was 1,412 older adults (age range: 60–80+ years). Seven studies explored the effect of dance on cognition with healthy older adults [1,12,16–20] and four with older adults with MCI [13–15,21] defined using the Peterson criteria for MCI [11]. Participants were recruited from the community ($n = 7$), retirement homes ($n = 2$) and clinical settings ($n = 2$).

Intervention

The frequency of the dance interventions varied from one to three times per week. Only two studies [14,15] explicitly stated dance intervention intensity target to be 60–80% maximum heart rate measured by wrist worn monitors and supervised by physical therapist, and one study [18] stated dance was of moderate intensity (i.e. intensity level that makes participants breathe somewhat harder than normal). Typical sessions followed an inverted 'u' progression in intensity (e.g. low–high–low intensity) with a warm-up (5–15 minutes), dance steps (20–45 minutes) and cool-down (5 minutes). The total time ranged from 60 to 120 minutes per week. Intervention phases ranged from 3 to 12 months (3–4 months [$n = 6$]; 6–9 months [$n = 2$], 10–12 months [$n = 3$]). All classes include time for socialization. The majority of studies utilised a ballroom dance type intervention that increased in motor complexity. Across studies dance interventions had a primary emphasis to improve lower body coordination (video game dance [$n = 1$] [19] and dance movement therapy [$n = 1$] [17]), dynamic balance (ballroom dance [$n = 6$]; [1,13,16,20,21]) and endurance (aerobic dance [$n = 2$] [14,15] and folk dance [$n = 1$] [18]). Video game dance and dance movement therapy had lower adherence rates when compared with ballroom, aerobic or folk dance.

Comparator

Four studies included a control group of participants that were waitlisted. In the other studies, the comparators were group-based activities with the same total dose and included walking ($n = 2$), socialization ($n = 1$), health education ($n = 3$) and aerobic exercise training ($n = 1$). Dance did not result in greater improvements in cognitive function when compared with walking [1,19] or aerobic exercise training [17] in healthy older adults.

Outcomes and quality

Global cognitive function

Global cognitive function was assessed with the Mini Mental State Examination (MMSE; 2/11 studies) and Montreal Cognitive Assessment (MOCA; 5/11 studies). Our meta-analysis findings exceed the MMSE minimal clinically important difference (MCID) of 1.4 points [22] with the pooled with a MD of 1.58 (95% CI = 0.21–2.95; $P = 0.02$) (Figure 2A: moderate-certainty evidence). These studies were only in older adults with MCI. The pooled results of the MOCA including both healthy older adults and those with MCI yielded a larger effect with an MD of 1.95 (95% CI = −0.34 to 4.23; $P = 0.10$) (Figure 2B: low-certainty evidence) and the subgroup analysis restricted to older adults with MCI revealed an even greater effect in MOCA scores with an MD of 6.10 (95% CI = 4.70–7.50, $P < 0.001$; low-certainty evidence) exceeding the MCID of 1.0 points [23] for higher dance doses (Lazarou *et al.* [21] with 43 hours of dance [60 minutes, 1× weekly, 10 months]) but not at lower doses (i.e. Zhu *et al.* [15] and Qi *et al.* [14] with 23 hours of dance [35 minutes, 3× weekly, 3 months]. However, the large effect size may be due to imbalance in prognostic factors across intervention/comparison groups in Lazarou *et al.* [21]. See Supplementary Material A4 for raw scores before and after dance for all studies included in our meta-analysis.

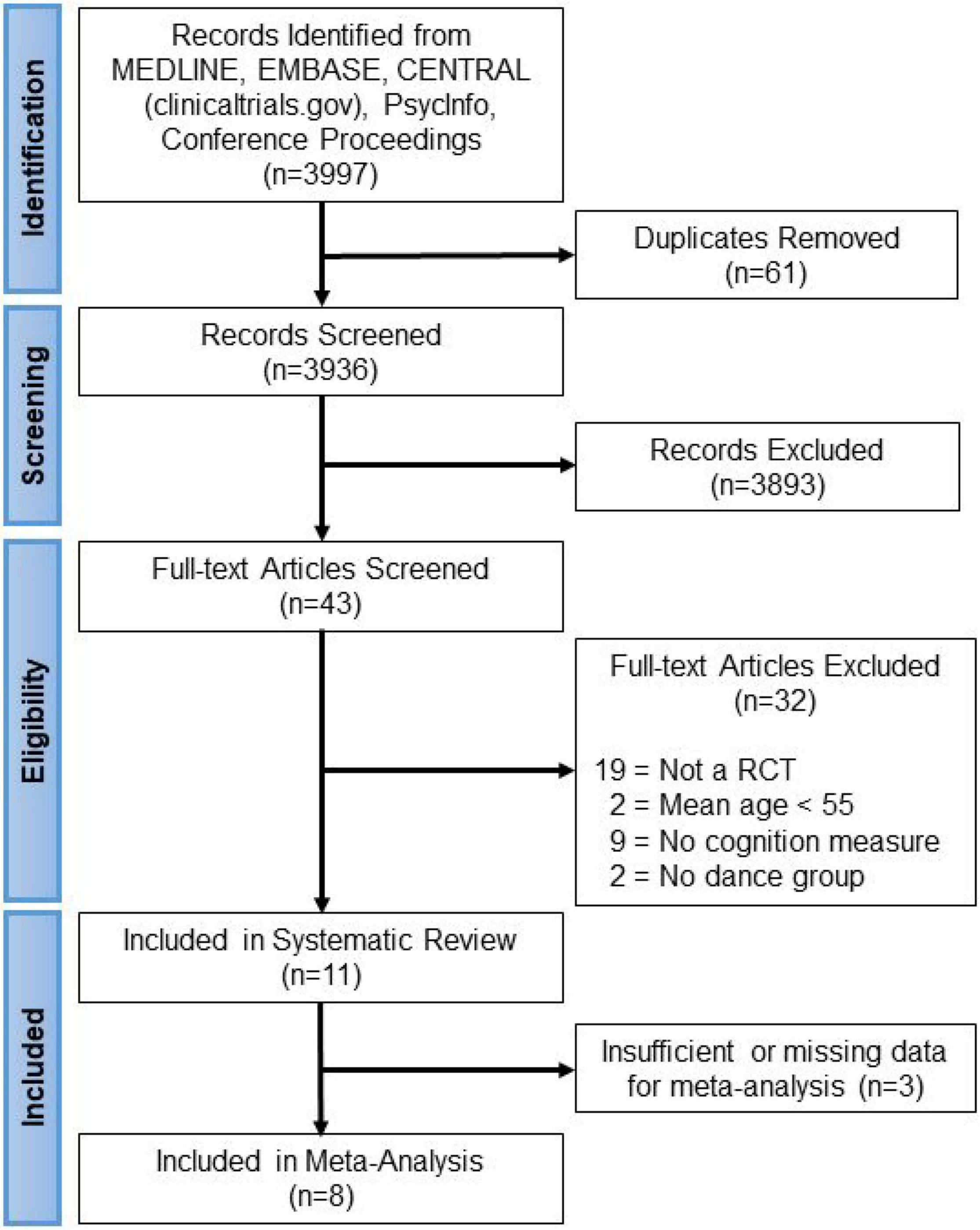

Figure 1. PRISMA diagram.

Executive function

Executive function was assessed as cognitive flexibility (Trail Making Test B [TMT-B] in 8/11 studies; Trail Making Test B–A in 1/11 studies) and response inhibition (Stroop Test in 2/11 studies; Digit Stroop Test in 1/11 studies; Wisconsin Card Sorting Test [WCST] in 1/11 studies). Our meta-analysis in four studies including both healthy older adults and those with MCI revealed little to no effect in cognitive flexibility scores on the paper and pencil TMT-B in the dance and control groups with an MD of −4.12 (95% CI = −21.28 to 13.03; $P = 0.64$, where less time means improvement; Figure 2C: moderate-certainty evidence). A subgroup meta-analysis across studies of older adults with MCI [14,15] found an MD of −19.33 (95% CI = −39.42 to 0.76; $P = 0.06$; low-certainty evidence)—a reduction of ~19 seconds. Due to insufficient data for meta-analysis for response inhibition, we conducted a narrative synthesis,

Table 1. Publication, population and intervention characteristics

A. Publication and population characteristics							
Author	Year	Country	Primary indication	N	Cognitive status	Setting	Age, M (SD)
Eggenberger *et al.* [19]	2015	The Netherlands; Switzerland	Cognitive	89	Healthy	Community	77.3 (6.3)
Merom [1]	2016	Australia	Cognitive	115	Healthy	Retirement home	60+
Merom [12]	2016	Australia	Motor and cognitive	530	Healthy	Retirement home	80+
Kosmat [16]	2017	Croatia	Psychosocial and cognitive	24	Healthy	Community	80.0 (6.2)
Marquez *et al*. [20]	2017	United States	Cognitive	57	Healthy	Community	64.8 (6.0)
Doi *et al*. [13]	2017	Japan	Cognitive	201	MCI[a]	Community	75.7 (4.1)
Lazarou *et al*. [21]	2017	Greece	Cognitive	154	MCI[a] and moderate cognitive impairment[b]	Community	65.9 (10.8)
Zhu *et al.* [15]	2018	China	Cognitive	60	MCI[a]	Clinic	70.3 (6.7)
Qi *et al.* [14]	2019	China	Cognitive	38	MCI[a]	Clinic	70.6 (6.2)
Esmail [17]	2020	Canada	Cognitive	62	Healthy	Community	67.5 (5.4)
Franco *et al.* [18]	2020	Brazil	Motor	82	Healthy	Community	60+

B. Dance group intervention characteristics								
Author	Frequency	Intensity	Time	Duration	Total dose	Type	Adherence	Control group*
Eggenberger *et al.* [19]	2× weekly	–	60 minutes	6 months	52 hours	Video game	50%	Dual-task; walking
Merom [1]	2× weekly	–	60 minutes	8 months	68 hours	Ballroom	67%	Walking
Merom [12]	2× weekly	–	60 minutes	12 months	104 hours	Ballroom; folk	88%	Waitlisted
Kosmat [16]	1× weekly	–	45 minutes	3 months	9 hours	Ballroom	100%	Social
Marquez *et al.* [20]	2× weekly	–	60 minutes	4 months	34 hours	Ballroom	066%	Health education
Doi *et al.* [13]	1× weekly	–	60 minutes	9 months	39 hours	Ballroom	82%	Health education
Lazarou [21]	1× weekly	–	60 minutes	10 months	43 hours	Ballroom	74%	Waitlisted
Zhu *et al.* [15]	3× weekly	60–80% HR Max	35 minutes	3 months	21 hours	Aerobic	93%	Waitlisted
Qi *et al.* [14]	3× weekly	60–80% HR Max	35 minutes	3 months	21 hours	Aerobic	84%	Waitlisted
Esmail [17]	3× weekly	–	60 minutes	3 months	36 hours	Therapeuti	52%	AET; waitlisted
Franco *et al.* [18]	2× weekly	moderate intensity	60 minutes	3 months	24 hours	Folk	85%	Education

PT, physiotherapist; AET: aerobic exercise therapy; HR Max = Heart rate maximum. See additional descriptives of the control group in Supplementary Material A2.
[a]MCI was defined using the Peterson criteria for MCI [11] [b]Cut-off scores in the standardised MOCA training (10–17 MOCA total score)

which showed some improvement with dance when assessed with the WCST [16], but little to no improvement when assessed with the Stroop test [1,17,20].

Learning and memory

Learning and memory were assessed as visuospatial learning and memory (Paired Associates Learning PAL in 1/11 studies; Brief Visuospatial Learning Memory Test in 1/11 studies; Rey–Osterrieth Complex Figure Test in 1/11 studies; Symbol Digit Modalities Test [SDMT] in 3/11 studies), memory battery (Wechsler Memory Scale [WMS] in 2/11 studies), immediate memory span (digit span and word recall in 4/11 studies and recent recall (story recall in 2/11 studies; subsets of the Rivermead Behavioural Memory Test in 3/11 studies; Rey Auditory Verbal Learning Test [RAVLT] in 1/11 studies; N Back Test in 1/11 studies).

For visuospatial learning and memory, the pooled results revealed little to no difference in SDMT scores between the dance and control groups with an MD of 2.29 (95% CI = −1.79 to 6.38; $P = 0.27$) (Supplementary Material A5: low-certainty evidence). This analysis included only studies in older adults with MCI. Furthermore, in two studies of older adults with MCI, pooled meta-analysis results also found little to no difference on the WMS; MD was 3.02 (95% CI = 1.38–4.65; $P < 0.001$) (Supplementary Material A5: low-certainty evidence),

Table 2. Summary of evidence from meta-analyses

Certainty assessment							No. of patients		Effect		Certainty
No. of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Dance	Control	Relative (95% CI)	Absolute (95% CI)	
Global function (assessed with: MMSE)											
2	RCTs	Not serious	Not serious	Not serious	Serious[a]	None	156	132	–	MD 1.58 higher (0.21 higher to 2.95 higher)	⊕⊕⊕◯ Moderate
Global function (assessed with: MOCA)											
5	RCTs	Serious[b]	Not serious	Not serious	Serious[a]	None	181	162	–	MD 1.95 higher (−0.34 lower to 4.23 higher)	⊕⊕◯◯ Low
Executive function (assessed with: TMT-B)											
4	RCTs	Not serious	Serious[c]	Not serious	Not serious	None	364	337	–	MD 4.12 lower (−21.28 lower to 13.03 higher)	⊕⊕⊕◯ Moderate
Learning and Memory (assessed with: SDMT)											
2	RCTs	Not serious	Not serious	Not serious	Very serious[d]	None	45	47	–	MD 2.29 higher (−1.79 lower to 6.38 higher)	⊕⊕◯◯ Low
Learning and Memory—Battery (assessed with: WMS)											
2	RCTs	Not serious	Not serious	Not serious	Very serious[d]	None	45	47	–	MD 3.02 higher (1.38 higher to 4.65 higher)	⊕⊕◯◯ Low
Complex Attention (assessed with: TMT-A)											
4	RCT	Not serious	Not serious	Not serious	Not serious	None	364	337	–	MD 3.07 higher (−0.81 lower to 6.95 higher)	⊕⊕⊕⊕ High

[a]Small sample size <400 and some inconsistency in results [b]Imbalance in prognostic factors across intervention/comparison groups [c]Heterogeneity across studies that may be due to greater effects in older adults with MCI [d]Very small sample size <100

A narrative review was conducted for immediate memory span and recent recall due to in insufficient data for a meta-analysis. There was little to no improvement in immediate memory span with dance across studies; however, recent recall memory showed some improvement in the ability to recall an unrelated list of words (RAVLT) [16,21] or stories with meaning and purpose [13,19].

Complex attention

Complex attention was assessed as processing speed (Trail Making Test A [TMT-A] in 7/11 studies), reaction time (Dual-task Assessment in 1/11 studies) and battery of selective and sustained attention (Test of Everyday Attention [TEA] in 1/11 studies). In the meta-analysis of four studies, including both healthy older adults and those with MCI, there was no important difference in TMT-A scores between the dance and control groups with an MD of 3.07 (95% CI = −0.81 to 6.95; $P = 0.12$) (Supplementary Material A5: high-certainty evidence). A subgroup analysis that included only those with MCI also found no important differences in TMT-A scores between the dance and control groups with an MD of −1.38 (95% CI = −10.94 to 8.17; $P = 0.78$) low-certainty evidence). Lazarou *et al.* [21] was the only study to utilise a battery assessment of selective and sustained attention and demonstrated greater improvement in TEA scores in the dance group than the control group ($P < 0.05$).

Language

Expressive language was assessed with the Word Fluency Test (1/11 studies) and Verbal Fluency F-A-S Test (1/11 studies). There was incomplete data to conduct a meta-analysis. The dance group showed a large improvement in expressive language in Lazarou *et al.* [21] in older adults with MCI (control group was waitlisted), but little to no difference in Marquez *et al.* [20] in healthy older adults (control group received health education).

Social cognition and perceptual–motor function

No studies assessed the effect of dance on social cognition or perceptual–motor function.

Discussion

This systematic review and meta-analysis explored the effect of dance across seven cognitive domains: global cognitive function, executive function, learning and memory, complex attention, language, social cognition and perceptual–motor function. Seven studies explored the effect of dance on cognition with healthy older adults [1,12,16–20] and four with older adults with MCI [13–15,21] defined using the Peterson criteria for MCI [11]. GRADE certainty of evidence was moderate for global cognitive function and executive function. For the secondary cognitive outcomes,

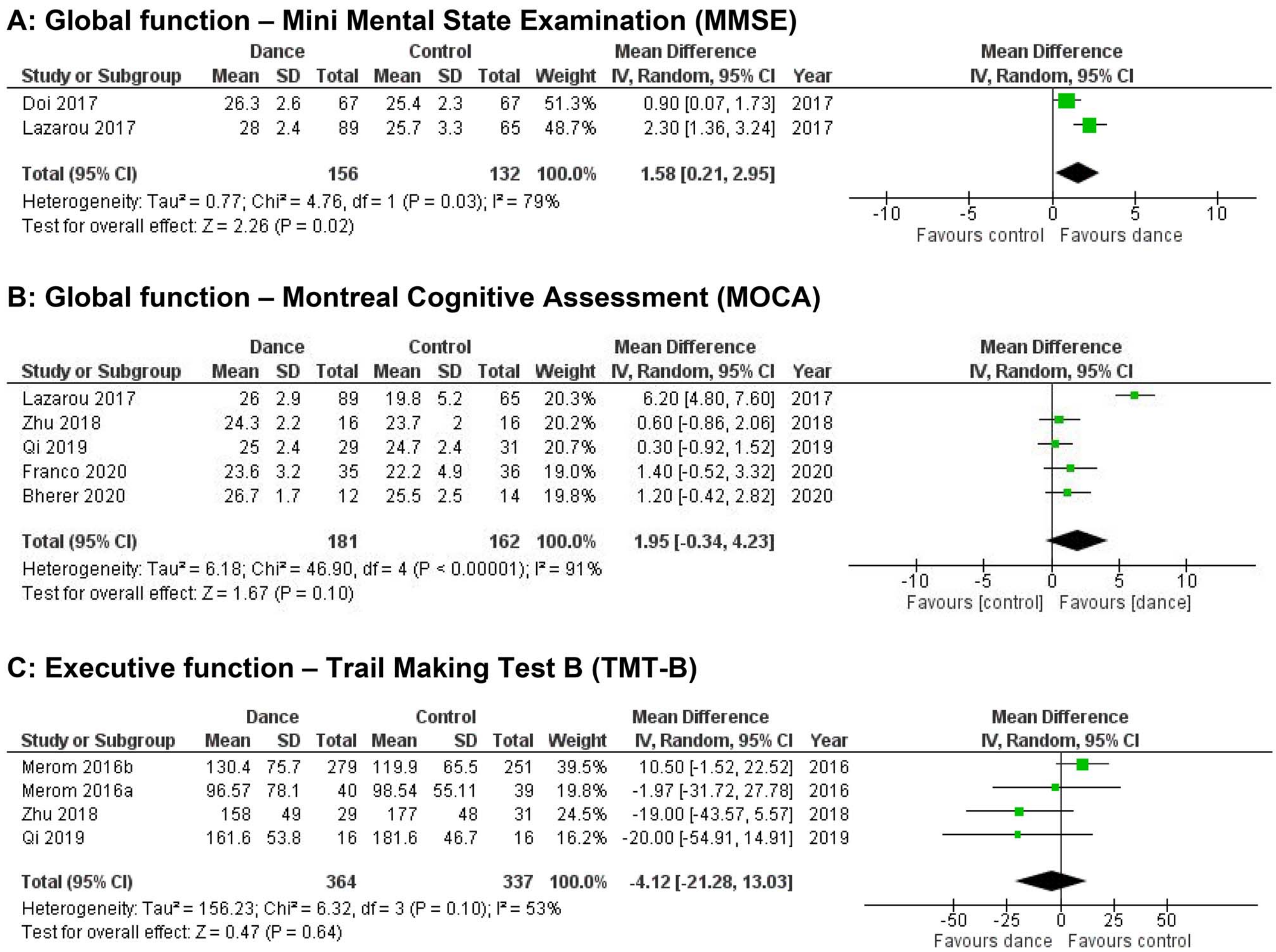

Figure 2. Forest plots of meta-analysis of primary outcomes. (A) Global function—MMSE. (B) Global function—MOCA. (C) Executive function—TMT-B. Dance is associated with an improvement in cognitive test score, increase in MMSE and MOCA and decrease in TMT-B. See Supplementary Material A5 for additional forest plots of secondary outcomes (learning and memory, SDMT; memory and learning, WMS; complex attention, TMT-A).

GRADE certainty of evidence ranged from low (learning and memory) to high (complex attention). We found that dance likely improves global cognitive function but has no effect on complex attention. It probably has little to no effect on executive function, although there may be an improvement in older adults with mild cognitive function. Data were only available for learning and memory in older adults with MCI, and it showed no difference with dance. The effect on language is still uncertain, and no studies evaluated the effect of dance on social cognition or perceptual–motor function. Future research is needed to determine the optimal dose and if dance results in greater cognitive benefits than other types of physical activity and exercise.

Designing and reporting therapeutic dance interventions

There was no clear consensus in dance intervention frequency, intensity, time and type to improve cognitive function in older adults. Our results suggest that longer durations and higher intensity may result in greater cognitive benefits. However, no studies conducted a head-to-head comparison on the effectiveness of dance types (e.g. ballroom versus aerobic; partnered versus non-partnered dances). We hypothesise that partnered dances may evoke greater effort/motivation to learn movement patterns to enhance their partner's experience and subsequently result in greater cognitive benefits when compared with individualised dance. However, partnered dances may also lead to discomfort for some participants who are learning dance for the first time or due to personal/cultural reasons. As well it is important to design therapeutic dances with meaning and purpose—such as integration of cultural dances and appropriate music choice—which may lead to empowering/energising effects, social connectivity and increase exercise adherence. To help improve research quality and bridge the 'knowledge to practice' gap, it is recommended evidenced-based reporting guidelines are used such as the Consensus on Exercise Reporting Template [24] with standardised reporting for better interpretation and replication of exercise programmes.

Core outcome set for cognition and dance

Within the literature, the effect of exercise on cognitive function is most commonly assessed by global cognitive function using the MOCA or MMSE [25]. Baseline cognitive status may influence the direction and magnitude of post-intervention scores as healthy older adults may leave little room for improvement when compared with those with MCI. Our results demonstrate that dance exceeded the MCID on the MMSE of 1.4 points [22] in older adults with MCI. However, the effects of dance on cognitive function could also positively impact other cognitive domains—such as immediate memory to memorise dance sequences, sustained attention to keep to the beat, social cognition to socialise appropriately in a group setting and perceptual–motor function to execute dance steps with precision. However, within these cognitive domains, there was large variability in assessment tools used or no evaluation, which limited the ability to perform a meta-analysis. Therefore, a comprehensive and standardised collection of outcomes for measuring and reporting cognitive function in dance clinical trials is recommended to reduce heterogeneity and facilitate meta-analysis of all cognitive domains in the dance and broader exercise literature.

Dance compared with other types of physical activity and exercise

Exercise has been shown to have a neuroprotective effect on later life cognitive function. Clinical practice guidelines on MCI by the American Academy of Neurology recommend that regular exercise (twice/week) should be included as a part of an overall approach to improve cognitive function of individuals with MCI (evidence level B) [27]. However, there is no clear consensus about which type of exercise is most beneficial to improve cognitive function in older adults [28]. A large meta-analysis of 46 trials involving 5,099 participants revealed that aerobic exercise attenuates global cognitive decline (standardised MD = 0.44, 95% CI = 0.27–0.61, I^2 = 69%) [25] and strength training has a neuroprotective effect [29]. Dance is an aerobic exercise that involves multicomponent training with physical, cognitive, and social dimensions and may have synergetic benefits when delivered in combination. Although in this review the benefits of dance were not superior to walking, both studies included healthy older adults without cognitive impairment with little room for improvement on the clinical cognitive assessments. Dance resulted in similar improvements in global cognitive function as measured by the MMSE with an MD of 1.58 (95% CI = 0.21–2.95) and when compared with a meta-analysis of 13 trials involving 673 older adults with cognitive impairment who took part in aerobic exercise of moderate intensity with a MD on the MMSE of 1.12 (95% CI = 0.66–1.59) [26]. Future research is needed to conduct a head-to-head comparison of the effect of different types of exercise on cognitive function (e.g. when evaluating the effectiveness of mind–body interventions, does a therapeutic dance intervention result in greater cognitive benefits than Tai Chi or meditation?).

Limitations

Our broad inclusion criteria of age 55+ may have masked larger intervention effects in the old–old (over age 85) when compared with the young–old (65–74) or middle–old (75–84) groups. However, this allowed us to include more trials in a relatively new research area. Three of our pooled meta-analyses had sufficient data to include both healthy older adults and those with MCI (MOCA, TMT-B and TMT-A). In contrast, the pooled meta-analysis for learning and memory [SDMT and WMS] only included older adults with MCI as no studies investigated this cognitive domain in healthy older adults. Individuals who agree to take part in dance trials may be more motivated than the general population. Therefore, it is possible dance may only be effective in individuals who enjoy dancing and actively participate in the classes.

Conclusions

Dance is a promising therapeutic intervention for older adults looking to improve their cognitive health. There is moderate certainty evidence that dance improves some global cognitive function and in addition, likely improves executive function. A core outcome set for cognition and dance is needed to facilitate meta-analysis of all cognitive domains. Future research is needed to determine the optimal dose and if dance results in greater cognitive benefits than other types of physical activity and exercise.

Supplementary Data: Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

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Declaration of Conflicts of Interest: None.

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