



Does arts engagement and cultural participation impact depression outcomes in adults: A narrative descriptive systematic review of observational studies

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SCHOLARONE™
Manuscripts

Search Terms	Search Syntax
<ul style="list-style-type: none"> • “depress* ” or “malaise inventory” or “MDD” (major depressive disorder) or mental health or mental wellbeing; • AND • “arts engagement” or “cultural engagement” or “cultural participation” or “cultural engagement” or “psychosocial interventions” or “non-clinical intervention” or “creative interventions” • AND • “cohort stud*” or “epidemiology study’ or “case-control study” or “population-based study” 	<pre>((depress*.ti. or malaise inventory.af. or depressive disorder.af. or mental wellbeing.af. or mental health.af.) and (cultural participation.af. or arts engagement.af. or creative intervention.af. or social prescri*.af. or cultural engagement.af. or psychosocial interventions.af. or non-clinical interventions.af.) and (cohort study.af. or epidemiology stu*.af. or case-control stud*.af. or population-based stud*.af.))) remove duplicates from 1 from 2 keep 1,3-6,8-11,14,16- 17,21,24,29-30,32-33,35</pre>

Figure I. Literature search terms and strategy

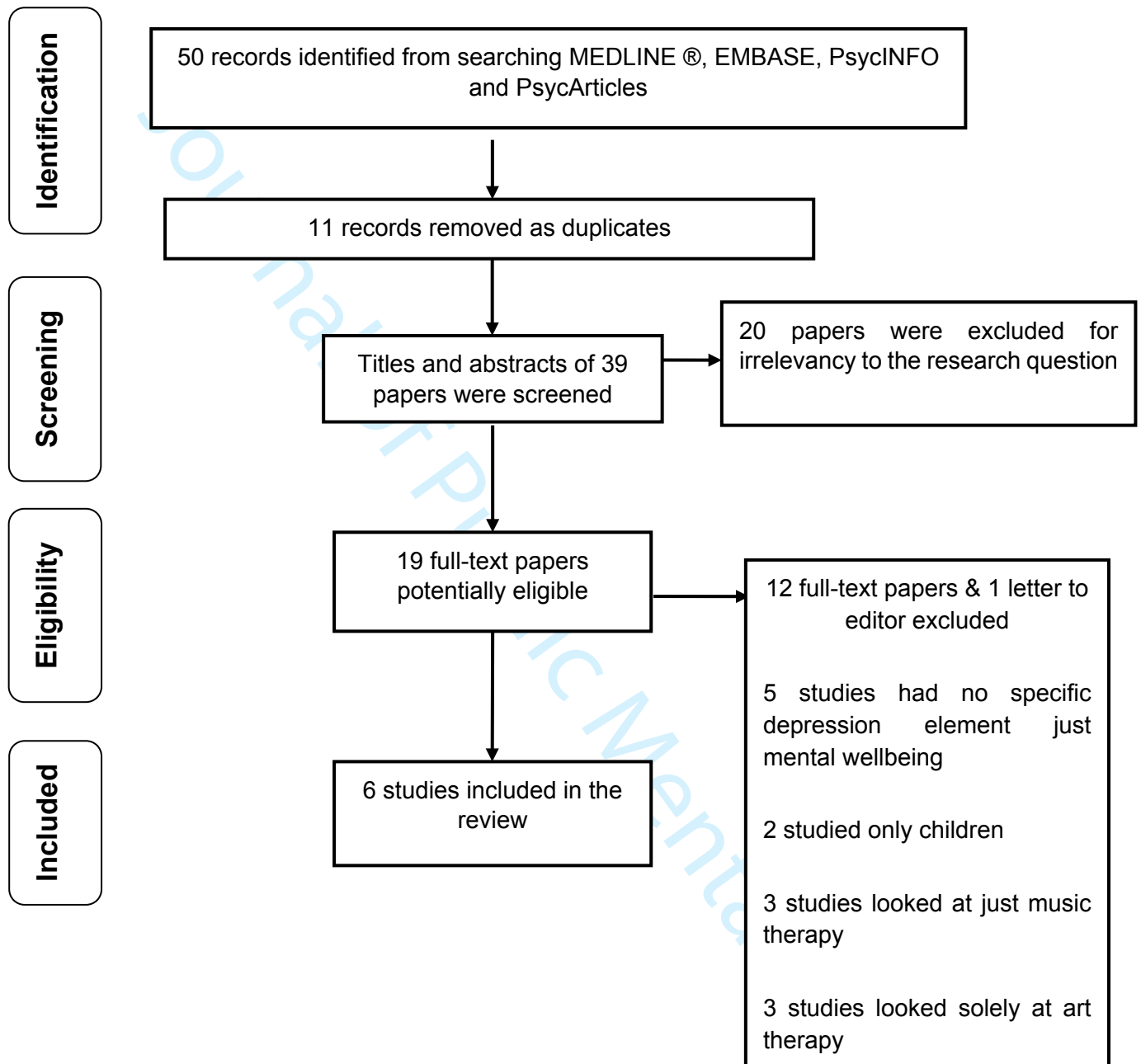


Figure II. PRISMA Flowchart

Table 1: Results generated from search terms (April 2020)

Search terms	Database			
	MEDLINE®	EMBASE	APA PsycINFO	APA PsycArticles
All search terms combined	9	8	32	1
All search terms combined, deduplicated	1	8	31	0
Final Papers Included	1	2	3	0

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Journal of Public Mental Health

Study number and reference	Country	Study design	Time of data collection	Data collection method	Sample size	Sample Mean Age (SD); Range	Sample Gender Breakdown	Depression Outcome Measure	Arts Engagement: Type	Frequency of Arts Engagement	Data Analysis
Cuypers et al. (2012)	Norway	Cross-sectional report from a Cohort Study (HUNT)	Wave 3: 2006-2008	Questionnaire survey	32,860	NR 20 or older	Female N=17,932; Male N=14,928	Hospital Anxiety and Depression Scale (HADS)	Receptive Cultural Activities: a museum, or art exhibition, a concert/theatre/film, a church/chapel, sport events Creative Cultural Activities: an association activity or club meeting, music/singing/theatre, parish work, outdoor activities, dance, worked out/sports	How many times in the last 6 months? Frequency from 1 (never) to 4 (more than 3 times this month).	Logistic Regression
Renton et al. (2012)	England	Cross-sectional Study	2008	Questionnaire survey	2,077	NR	NR	EuroQoL5	Active Participation: painting, photography, music and other performance Receptive Participation: theatre, festivals and films	How many of the arts and creative activities had they participated in during the last 12 months?	Fixed-Effects Regression & Logistic Regression
Grossi et al. (2011)	Italy	Cross-sectional Study	2001	Questionnaire survey	1,500	46.54 years (17.24 SD); 15-92 years	Female N=779 (52%); Male N=721, (48%)	Psychological General Well Being Index (PGWBI)	Jazz music concerts, Classic music concerts, Opera/ballet, Theatre, Museums, Rock concerts, Disco dance, Paintings exhibition, Social activity, watching sport, Sport practice, Book reading, Poetry reading, Cinema, Local community development	How many days in the last 12 months did you access to all the above activities?	Unpaired t test, Auto Contractive Map (AutoCM), Principle Component Analysis
Pinxten & Lievens (2014)	Belgium	Cross-sectional Study	Feb 2011-Jan 2012	Questionnaire survey	1,832	14-80 years	Female N=919, (50.2%); Male N=913, (49.8%)	SF-12	Cultural activities: attending a concert; attending a musical, show, revue or stand-up comedy; attending a play, ballet or dance performance; visiting a museum or exhibition.	Respondents could answer on a seven-point scale, ranging from 'not in the past 6 months' to 'daily'.	ANOVA, Welch F-Tests, Ordinary Least Squares Regression, R2-Change F-tests
Fancourt & Tymoszuk (2019)	England	Cohort Study (ELSA)	Wave 2: 2004/5 to Wave 7: 2015/16 (6 waves included in analysis)	Questionnaire survey	2,148	62.9 years; 52-89 years	Female N=1,108, (51.6%); Male N=1,040, (48.4%)	Centre for Epidemiologic Studies Depression Scale (CES-D)	Receptive cultural engagement: theatre, concerts or opera, the cinema, an art gallery, exhibition or museum.	never, less than once a year, once or twice a year, every few months, about once a month or twice a month or more.	Logistic Regression + Sensitivity Analyses

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3	Fancourt	England	Cohort	Wave 2:	Questionnaire	8,780	66.9 years	Female	Centre for	Receptive cultural engagement: theatre,	never, less than once a	Study 1:
4	& Steptoe		Study	2004/5	survey		(SD 10.1),	N=4829,	Epidemiologic	concerts or opera, the cinema, an art	year, once or twice a	Logistic
5	(2019)		(ELSA)	to			52–99 years	(55%);	Studies	gallery, exhibition or museum.	year, every few months,	Regression
6				Wave 8:				Male	Depression		about once a month or	Study 2:
7				2016/17				N= 3,951,	Scale (CES-		twice a month or more.	Propensity
8				(7 waves				(45%)	D)			Score
9				included								Matching
10				in								Study 3:
11				analysis)								Fixed-effects
12												Regression
13												+
14												Sensitivity
15												Analyses

Table 2: Characteristics of the included studies

Appendix I. PRISMA reporting statement

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3-5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6-7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6-7
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	6-7
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6-7

Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	7
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	7-8
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	8
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	8
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	8
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	8
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8 and 24
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8-9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	12
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8-11
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	12
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	12-14

Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	15
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A

Journal of Public Mental Health

Does arts engagement and cultural participation impact depression outcomes in adults: A narrative descriptive systematic review of observational studies

Introduction

Depression is the most common mental health disorder in the U.K. (Baker, 2018).

Consequently, the demand for mental health services has increased, with a fifth of the population having increasingly reported depressive symptoms during the COVID-19 pandemic (ONS, 2020; Pierce *et al.* 2020). Forty percent of primary care appointments deal with a psychosocial matter, such as poor mental health (Mind, 2018), highlighting the need to prioritise and diversify mental health services.

Recently, the NHS Long-Term Plan (2019) recommended addressing mental health through personalised care by developing social prescribing. This involves a link worker in the local community prescribing an activity such as sports, gardening or arts and creative activities to help alleviate some of the psychosocial problems a person may be having (Polley *et al.*, 2017). With loss of access to cultural and arts establishments during the pandemic, it is evermore imperative to establish the societal benefit a diverse engagement in arts and culture contributes to public mental health.

Over the last 10 years, many research studies have been intervention-focused on delivering creative art sessions and cultural engagement through museums and galleries, with aims to improve a multitude of both physical and mental health outcomes across diverse populations (APPG Creative Health Report, 2017; Gordon-Nesbitt & Howarth, 2020). Emerging evidence may help to establish that engaging in

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3 the arts and participation in cultural activities could be considered a protective mental
4 health behaviour (Fancourt and Finn, 2019). However, limitations of empirical
5 studies in this area include small sample sizes, no control groups, with shorter
6 follow-ups and usually focused on a single art activity intervention (Fancourt & Finn,
7 2019; Chatterjee, Chatterjee, Camic, Lockyer & Thomson, 2017). Diversity of
8 activities included allow a wider sample of the population to be investigated and does
9 not limit to only those who partake in choirs or another singular arts activity. Wang,
10 Mak & Fancourt (2020) also call for further research into mental health and the
11 protective effect arts and cultural engagement can have using larger sample for
12 generalizability. Accordingly, this left a gap for population-level studies with larger
13 sample sizes, diverse art/cultural participation and longer follow-ups to be able to
14 establish associations over time (NHS Confederation, 2018).

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33 A systematic review conducted by Leckey (2011) explored the therapeutic benefits of
34 creative activities on mental well-being and outlined possible protective effects
35 ranging from promoting relaxation, reducing stress, decreasing blood pressure,
36 boosting the immune system, and improving self-esteem by increased self-
37 expression. Leckey did state that evidence to conclude why or how this protective
38 benefit worked was weak. However, a more recent systematic review conducted by
39 Dunphy *et al.* (2019) synthesised 10-years more of evidence that has emerged in
40 this growing field. They focused primarily on the range of mechanisms that might
41 underpin protective mental health benefits and focused on empirical studies that
42 investigated the association between depression and arts/cultural participation in
43 older adult populations. Their rationale was based on a higher prevalence of
44 depression affecting later stages of the lifespan. The majority of their included
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3 studies were small-scale single activity interventions with low sample sizes.
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5 Consequently, a wider population remains to be addressed; adults aged 18 and
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7 above across a larger population with diverse arts engagement included. A search of
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9 PROSPERO (2020) for registered systematic reviews identified no current review in
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11 this area. This systematic review aimed to address this gap in the evidence base.
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19 **Review Approach and Methodology**

21 *Review Question*

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27 Does engaging with arts and culture affect depression in adults?
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30 *Review Objectives*

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34 1. To identify if adults engaging with arts and culture effects depression.
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37 2. To identify published observational research studies that have investigated
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39 engagement with arts and culture in adults and depression in a large
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41 population.
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45 *Systematic Review Protocol*

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48 The methods and reporting of this systematic review have been guided by the
49
50 PRISMA statement (Moher *et al.*, 2009; Appendix 1; Figure 1).
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54 *Search Strategy*

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57 The advanced search function on OVID was used to include databases: OVID
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59 MEDLINE® (1946-present April 2020) and Epub Ahead of Print, In-Process and
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3 Other Non-Indexed; EMBASE (1974-present April 2020); APA PsychArticles Full
4 Text, APAPsychINFO (1806-present April 2020). The Cochrane Library of
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6 Systematic Reviews was searched to identify any relevant published reviews.
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10 Search terms and strategy are included in Figure 1.
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19 *Selection Process: Inclusion/Exclusion Criteria*

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22 Fifty potential publications were identified (Table 1). Once deduplicated, 39 records
23 remained (Figure 2). Following screening of titles and abstracts, 19 publications
24 remained. These were rigorously screened using full papers according to
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26 inclusion/exclusion criteria below:
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33 Inclusion Criteria:

- 34 • Epidemiological and observational studies
- 35 • Adults - 18 years and above.
- 36 • Depression measured using a validated depression measure, or depression
37 component score.
- 38 • A diverse range of arts and cultural engagement activities, to capture wide
39 scope of arts engagement (not looking solely at individual music or art therapy
40 interventions).
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49 Exclusion Criteria:

- 50 • Empirical experimental studies
- 51 • Non-empirical publications
- 52 • Children
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Search Outcome

Studies for inclusion and exclusion were independently checked by two reviewers and agreement reached through discussion and consensus, with an additional reviewer available if required (Figure 2).

Insert Figure 2 here

Data Extraction and Quality Appraisal

Data were extracted for each study using a bespoke data extraction form based on the STROBE combined observational studies checklist as guidance (von Elm *et al.*, 2020). Quality appraisal of included studies was undertaken using the NIH Quality Assessment Tool for Observational, Cohort and Cross-sectional studies with total risk of bias rated “poor”, “fair” or “good” according to a 14-item scale/checklist (National Institute of Health, 2014). Both the STROBE checklist for appraising the quality of reporting, and NIH quality assessment tool used to appraise each of the study’s methodological quality, were used in accordance with Cochrane Review guidelines (Higgins *et al.* 2019). Data extraction and quality appraisal scores were independently checked by two reviewers, discussed and agreement reached by consensus, with an additional reviewer available if required.

Data Synthesis

Due to heterogeneity of included studies, extracted data have been synthesised as a descriptive narrative summary, to compare study design, characteristics, populations and key results relating arts and cultural engagement to depression outcomes (Ryan, 2013). Although all studies investigated depression at the population-level,

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3 not all used the same measures, therefore a meta-analysis was not possible, neither
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5 were additional sensitivity analyses.
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8 9 **Findings**

10 *Characteristics of Studies*

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12 All included studies were observational quantitative designs; two cohort studies
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14 (Fancourt and Tymoszuk, 2019; Fancourt and Steptoe, 2019) and four cross-
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16 sectional (Cuypers *et al.*, 2012; Renton *et al.*, 2012; Grossi *et al.*, 2011; Pinxten and
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18 Lievans, 2014; Table 2) Three were conducted in England (Renton *et al.*, 2012;
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20 Fancourt and Tymoszuk, 2019; Fancourt and Steptoe, 2019), one Norway (Cuypers
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22 *et al.*, 2012), one Belgium (Pinxten and Lievans, 2011) and one in Italy (Grossi *et*
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24 *al.*, 2011; Table 2). Duration of studies ranged between one year and ten years;
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26 typically one year for the cross-sectional studies (Renton *et al.*, 2012; Grossi *et al.*
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28 2001; Pinxten & Lievans, 2014) while the cohort studies had data collected across a
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30 two year and ten year period respectively; (two: Cuypers *et al.*, 2012; ten: Fancourt &
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32 Steptoe, 2019; Fancourt & Tymoszuk, 2019). However, Cuypers *et al.* (2012) only
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34 analysed one wave making it a cross-sectional design by analysis. Data collected for
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36 all studies ranged from 2001 to 2017.
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44 *Aims of the Included Studies*

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46 Four studies aimed to analyse associations between participating in arts
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48 engagement and depression (Cuypers *et al.*, 2012; Renton *et al.*, 2012; Fancourt
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50 and Tymoszuk, 2019; Fancourt and Steptoe, 2019). Grossi *et al.* (2011) investigated
51
52 psychological well-being, with a special focus on patterns of cultural access via type.
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54 Pinxten and Lievans (2014) explored the extent cultural capital could explain
55
56 differences in mental health after controlling for socioeconomic status and other
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3 health determinants. This was comparable to Fancourt and Steptoe (2019), Renton
4 *et al.* (2012) and Grossi *et al.* (2011) who focused on whether socioeconomic status
5 or social capital and position might explain any association. Fancourt and Tymoszuk
6 (2019) was the only study that aimed to explore the association between cultural
7 engagement in older adults with a reduced risk of developing depression over a
8 decade.
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23 *Populations*

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25 One study provided a breakdown of ethnicity of participants with 0.9% (n=19) being
26 from black and minority ethnic groups, this is because the English Longitudinal Study
27 of Ageing (ELSA) is predominantly White British (Fancourt and Tymoszuk, 2019).
28 Renton *et al.* (2012) reported the frequency of arts engagement by ethnicity group but
29 did not provide an overall breakdown of participant demographics. There was a large
30 variation in studies' sample sizes ranging from 1,500 to 32,860 (Table 2). The total
31 number of participants cumulatively across the studies was 49,197. Only three studies
32 reported mean age, which was 58.78 years, range of 15 to 99 years (Table 2; Fancourt
33 & Steptoe, 2019; Fancourt & Tymoszuk, 2019; Grossi *et al.*, 2012). Gender breakdown
34 was reported by five studies, totalling 52.7% (n=24,689) female and 47.6% (n=22,439)
35 male (Table 2; Fancourt & Steptoe, 2019; Fancourt & Tymoszuk, 2019; Cuypers *et al.*,
36 2012; Grossi *et al.*, 2012; Pinxten & Lievens, 2014).
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56 *Outcome Measures*

57 *Arts Engagement* 58 59 60

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3 Arts engagement was diverse across all studies with no standardisation. Most
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5 studies included the theatre, concerts or opera, cinema, going to an art gallery,
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7 exhibition or museum (Cuypers et al. 2012; Grossi et al. 2012; Pinxten & Lievens,
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9 2014; Fancourt & Tymoszuk, 2019; Fancourt & Steptoe, 2019). All studies asked
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11 participants to self-report their type and frequency of arts engagement. Frequency
12
13 was measured either in the last 6 months (Pinxten and Lievens 2014; Cuypers *et al.*,
14
15 2012), where frequency was measured on 7- or 4-point scales respectively; or in the
16
17 last 12 months (Renton *et al.*, 2012.; Grossi *et al.*, 2011) where frequency was either
18
19 *engaged* or *did not engage* in the list of arts engagements. Both Fancourt and
20
21 Tymoszuk (2019) and Fancourt and Steptoe (2019) looked at frequency on a 5-point
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23 scale ranging from *never* to *about once or twice a month* (Table 2).
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29 *Depression*

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31 Four studies used depression-specific validated measures. The Centre for
32
33 Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) was used by
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35 Fancourt and Tymoszuk (2019) and Fancourt and Steptoe (2019) (Table 2).
36
37 Fancourt and Tymoszuk (2019) found that higher frequencies of arts/cultural
38
39 engagement were associated with 32% lower odds of developing depression over 10
40
41 years (OR=0.68, 95% CI 0.47-0.99, P=0.046), with those engaging at the highest
42
43 frequency having a 48% lower odds of developing depression (OR = 0.52, 95% CI
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45 0.34–0.80, P = 0.003). Fancourt and Steptoe (2019) found using logistic regression
46
47 analysis, when adjusted for age, gender, *socio-economic status* and baseline
48
49 depression, that those who engage frequently versus infrequently in cultural
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51 engagement had 15% lower odds of developing depression over 12 years (OR= 0.85
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53 95% CI 0.75-0.98, P = 0.026). Their fixed-effects regression analysis found that
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55 individuals who engaged frequently in arts/cultural activities had 38% lower odds
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3 (OR=0.62 95% CI 0.57-0.86, P<0.001) of experiencing depression, compared to
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5 those who did not engage.
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10 Cuypers *et al.* (2012) used the Hospital Anxiety and Depression Scale (Zigmond and
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12 Snaith, 1983). They found women were 10% more likely to have lower depression
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14 scores if they engaged in receptive and creative activities (OR= 1.1 95% CI 1.06-
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16 1.13), while men were 12% more likely to have lower depression scores (OR 1.12
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18 (95% CI 1.08-1.16), p values were not given, but as the 95% confidence intervals did
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20 not span 1 their significance can be inferred. This study analysed lower depression
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22 score per activity, both men and women were significantly more likely to have lower
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24 depression scores if they engaged in going to a museum/exhibition,
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26 concert/theatre/film, sports event or association club/meeting.
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33 Renton *et al.* (2012) used EuroQoL-5D (Rabin and de Charro, 2001). The univariate
34
35 regression analysis found creative active participation and cultural attendance was
36
37 associated with 40% reduced odds of self-reported depression (OR = 0.6 95% CI
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39 0.5-0.7, P<0.001). However, after adjusting for age, gender, ethnicity, employment
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41 status, housing tenure, ease of managing household income and educational
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43 attainment the association did not persist.
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49 Pinxten and Lievens (2014) used the SF-12 health measure (Ware *et al.*, 1996).
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51 Their analysis used an ANOVA test which compared the mean Mental Component
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53 Scores of the three categories within cultural participation. There was a significant
54
55 difference between groups (F(2,931)=4.3, p<0.05); *those that participated in cultural*
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57 *activities* (22.2) have a higher mean Mental Component Score (MCS) than *those*
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3 *who did not* (21.7). In the SF-12 the higher the score the better reported overall
4 health is. Interestingly there was no significant difference in mean scores between
5 participants engaging frequently versus occasionally (22.2 for both).
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12 Grossi *et al.*, (2011) used the Psychological Well-being Index Score (Italian version)
13 which was not depression specific but included 2 questions that alluded to
14 depressive mood. They did not report any results other than descriptive statistics of
15 prevalence (Dupuy, 19990) (Table 2).
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22 *Quality of Studies Included*

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26 All studies were rated as 'Fair', however their strengths and weaknesses differed
27 which mainly related to study design, and reporting (Table 3). *No studies justified*
28 *their sample size.*
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36 **Discussion**

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40 This systematic review has located and synthesised observational studies of arts or
41 cultural engagement on depression, mental health or psychological well-being. The
42 exposure to arts or cultural engagement was measured throughout all the studies via
43 leisure questionnaires, with four studies focusing on either receptive or creative
44 cultural activities' impact on depression (Cuypers *et al.*, 2012.; Renton *et al.*, 2012;
45 Fancourt and Tymoszuk, 2019; Fancourt and Steptoe, 2019). This is comparative to
46 the recent systematic review conducted by Dunphy *et al.*, (2019), that found a
47 diverse range of receptive and creative arts engagement benefited older populations
48 through observed lowered depression outcomes. However, our review investigated
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3 larger population-based studies in adults, the strength of the evidence to deduce
4 whether arts engagement has an impact on lowering depression scores was
5 established in four studies utilising regression analyses (Cuypers *et al.*, 2012,
6 Renton *et al.*, 2012, Fancourt and Tymoszuk 2019, Fancourt and Steptoe 2019). Of
7 note, quality appraisal and strength of evidence for the six included studies was
8 judged as fair.
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19 Pinxten and Lievens (2014) found a significant difference between non-engaged
20 versus engaged participants using ANOVA test. However, the amount of
21 participation did not seem to mediate any further increase in significance. Grossi *et*
22 *al.*, (2011) also claimed that cultural access, not levels of engagement was the
23 determinant of psychological well-being but how there is a link is unclear. None of
24 the studies gave possible underlying mechanisms for why the association between
25 arts engagement and lowered depression scores might be happening other than
26 controlling for socioeconomic status and social capital outcomes.
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40 A critique of the arts in health research is that benefits might be due to participating
41 in a social group or space – such as in a choir or going to a gallery (Reeves, 2015;
42 Burls, 2007). This would corroborate with Cuypers *et al.*, (2012) who found more
43 significant associations between improved depression scores and creative activities
44 that have a social element. This echoes the positioning of arts engagement in both
45 systematic reviews as having a protective social role in improving self-esteem and
46 social connections (Dunphy *et al.*, 2019; Leckey, 2011). Some studies included
47 outdoor activities as part of arts/cultural engagement, however this might have
48 skewed the association to be more positive as these activities, although out of the
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3 realms of true arts/culture, have been well established in having mental and physical
4 health benefits (Shanahan *et al.*, 2019). This has been applied to social prescribing
5 where methodological rigour has hampered concluding meaningful inferences on
6 how arts activities mediate improved health outcomes (Bickerdike *et al.*, 2017).
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8 Establishing and understanding the association between arts engagement and
9 decreasing depression incidence in a population is relevant to healthcare providers,
10 the general population and policy makers alike. As it would enable the diversification
11 and targeting of mental health services, especially at the primary care level, and give
12 the general population autonomy in protecting their own health and provide robust
13 evidence for policymakers to inform and develop policy.
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27 *Limitations of the systematic review and included studies*

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30 Limitations of this systematic review are in its choice of only observational studies
31 with diverse arts engagement, so cause and effect cannot be established. The cross-
32 sectional studies included were limited by design as they were descriptive, moment
33 in time, not always guaranteed to be representative of populations nor do they
34 enable a comparison of associations across the lifespan (Renton *et al.*, 2012; Grossi
35 *et al.*, 2011; Pinxten and Lievans, 2014).
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47 Further limitations of the studies were lack of repeated arts engagement measures
48 that could establish frequency/duration of engagement alongside type of activity via
49 more sensitive questionnaires. However, there are challenges with creating more
50 sensitive and precise repeated measures questionnaires as cohort studies want to
51 maintain their participants, not over-burden them and reduce attrition levels.
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3 Some final limitations of the arts engagement variable are that recall bias may have
4 skewed the results as most questionnaires asked if the participant had engaged in
5 the last 6 or 12 months. They did not ask duration but rather general engagement on
6 the last 6 or 12 months. They did not ask duration but rather general engagement on
7 one occasion from a list of activities. Furthermore, none of the studies stated how
8 they justified their sample size.
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20 **Conclusion**

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22 Overall this systematic review found emerging evidence that arts and cultural
23 engagement benefitted mental health in adult populations. Five studies found
24 positive outcomes in lowered depression scores or a reduction of depression
25 incidence in populations that engaged with arts, although the quality of evidence was
26 judged as fair due to weaknesses in reporting. However, the synthesis from this
27 review has implications for delivery of mental health services in primary care and the
28 potential for social prescribing cultural and arts engagement/ participation. Future
29 research with standardisation of depression scales in observational studies enabling
30 meta-analyses to be conducted are warranted. If causality for why and how arts
31 engagement impacts depression randomised control trials would need to be
32 conducted with similar standardised depression scales, however this may prove
33 difficult with heterogenous arts engagement activities. This review has synthesised
34 studies identifying associations between cultural/arts engagement and lowering of
35 depression which merits further investigation to why and how.
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