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Associations between participation in community arts groups and aspects of wellbeing in older adults in the United States: a propensity score matching analysis

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ABSTRACT

Objectives: There is a social gradient in both arts engagement and wellbeing that may have led to an overestimation of the impact of arts engagement on wellbeing. We tested whether participation in community arts groups was associated with wellbeing after removing confounding by demographic, socioeconomic, and health-related factors.

Methods: Using propensity score matching, we analyzed data from 12,055 older adults in the Health and Retirement Study. We measured community arts groups participation and concurrent life satisfaction (evaluative wellbeing), positive and negative affect (experienced wellbeing), and purpose in life, constraints on personal control, and mastery (eudaimonic wellbeing).

Results: After matching, arts group participation was associated with higher positive affect (average treatment effect on the treated [ATT] = 0.18, 95% CI = 0.12–0.24), life satisfaction (ATT = 0.09, 95% CI = 0.04–0.15), purpose in life (ATT = 0.07, 95% CI = 0.02–0.13), and mastery (ATT = 0.07, 95% CI = 0.01–0.14) than not participating. Participation was not associated with negative affect or constraints on personal control. In sensitivity analyses, these associations were maintained four years later.

Conclusion: Arts group participation was associated with the positive elements of evaluative, experienced, and eudaimonic wellbeing. Facilitating participation in community arts groups could help to promote healthy aging, enabling a growing segment of the population to lead more fulfilling and satisfying lives.

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Cultural engagement; community groups; quality of life/wellbeing; music and arts; epidemiology; mental health

Introduction

In recent years, definitions of healthy aging have been broadened beyond the absence of physical and mental health problems to emphasize the importance of wellbeing in several domains (Bowling & Dieppe, 2005; World Health Organization, 2015). Wellbeing is often divided into hedonic wellbeing, which relates to attaining pleasure and avoiding pain, and eudaimonic wellbeing, which relates to finding meaning and flourishing (Ryan & Deci, 2001). Hedonic wellbeing can be further divided into evaluative wellbeing (life satisfaction) and experienced wellbeing (positive and negative affect; Stone & Mackie, 2013). In contrast, types of eudaimonic wellbeing include control, mastery, autonomy, and personal growth (Hyde et al., 2003). According to this framework, the three overarching domains of wellbeing are evaluative, experienced, and eudaimonic wellbeing (Stone & Mackie, 2013). The multidimensional structure of wellbeing reflects the range of priorities for healthy aging (Vanhoutte, 2014). Enhanced wellbeing is also associated with better mental and physical health outcomes and higher social engagement in older adults, as well as longer life expectancies (Cohen et al., 2016; Ryff, 2017; Steptoe & Fancourt, 2019). Identifying ways to support wellbeing in older adults has thus been labelled a public health priority (World Health Organization, 2015).

There is increasing interest in the potential benefits of referring older adults to engage in community leisure activities (social prescribing) to help promote wellbeing, with particular attention on the arts (Fancourt et al., 2020; Fancourt & Finn, 2019; Fraser et al., 2015). Arts activities are commonly split into those that are receptive, involving art that has been created and is now experienced by an audience, and those that are participatory, requiring the creation of and participation in the arts (Fancourt & Finn, 2019; Tymoszuk et al., 2021). Participatory arts activities might be particularly beneficial for wellbeing as they can be done in community-based groups and involve a range of active ingredients that are health promoting, including opportunities for creative expression, cognitive stimulation, physical activity, social interactions, collaborative learning, and developing self-esteem (Dunphy et al., 2018; Fancourt et al., 2021; Noice et al., 2014).

Although previous research has demonstrated that arts engagement can enhance wellbeing in general (Fancourt et al., 2020; Fancourt & Finn, 2019; Fraser et al., 2015; Noice et al., 2014), there is limited evidence on engagement in participatory arts activities in older adults. A systematic review found that regular participation in community-based music and singing interventions can enhance and maintain subjective wellbeing for older adults (Daykin et al., 2018). For example, in one randomized trial, participating in a choir enhanced interest in life for older adults ($n = 390$; Johnson et al., 2020). Additionally, engaging in arts-based projects such as dance, music, and visual arts enabled older adults to experience more positive

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affect, personal growth, and increased meaningful social interactions ($n = 470$; Groot et al., 2021). However, findings from larger population-based studies of older adults have been inconsistent. Older adults who participated in choirs reported better social wellbeing than those who were not choir members, but there were no differences in quality of life or depression in this small cross-sectional study ($n = 162$; Pentikäinen et al., 2021). In a longitudinal study, engaging in creative hobbies, music, art, theatre, reading, or writing was associated with happiness but not life satisfaction six years later ($n = 1{,}208$; Menec, 2003). Another study found an association of participating in community education, arts, or music classes with lower negative affect and higher life satisfaction, but not positive affect or eudaimonic wellbeing, measured 10 years later ($n = 2{,}548$; Fancourt & Steptoe, 2018). Yet, in another observational study, access to a wide range of cultural resources was the second most important determinant of general psychological wellbeing, exceeding income, age, employment, and education ($n = 1{,}500$; Grossi et al., 2012).

Previous research has a number of limitations. There is a social gradient in participatory arts engagement, with factors such as socioeconomic position, education, and race/ethnicity associated with lower frequency of engagement and structural barriers to engaging in the arts (Bone et al., 2021; Fluharty et al., 2021). Population-based studies have generally adjusted for these sociodemographic factors in ordinary least squares regression models. Not doing so could have led to an overestimation of the impact of arts engagement on wellbeing, as wellbeing may be similarly socially patterned (Ryff, 2017). However, even after adjusting for potential confounders, residual imbalance between those who do and do not engage in the arts can still bias results (Shah et al., 2005). Additionally, the inconsistent longitudinal evidence may be due to reverse causality, as enhanced wellbeing leads to higher subsequent social engagement, including in arts and cultural activities (Steptoe & Fancourt, 2019). This is likely to be a bidirectional relationship. Although some trials have randomized participants to overcome confounding and reverse causality (Daykin et al., 2018), intervention studies have generally included small samples that are prone to selection bias and only have short follow-up periods (e.g. Perkins & Williamon, 2014; Poulos et al., 2019). Other observational studies have employed more sophisticated methods to address confounding, such as fixed effects regression and propensity score matching, but these have all been in younger adults (Ho et al., 2019; Wang et al., 2020; Węziak-Białowolska, 2016). It therefore remains unclear whether any beneficial effects of participatory arts engagement for older adults are independent of the well-known protective effects of broader structural, functional, and social factors. Additionally, most observational research has been based in the United Kingdom (UK) and Europe, limiting its generalizability to the very different social, cultural, and demographic contexts of the United States (US).

This study aimed to explore the associations between participation in local community arts groups and concurrent evaluative, experienced, and eudaimonic wellbeing in older adults. Community groups involved participatory arts activities such as a choir, dance, photography, music, or theatre group. We used data from a large cohort study of older adults in the US (the Health and Retirement Study; Sonnega et al., 2014). To address the issue of confounding by demographic, socioeconomic, and health-related factors, data were analyzed using propensity score matching (PSM). To explore the concept of wellbeing in depth, we examined each domain of wellbeing using validated measures of life satisfaction (evaluative wellbeing), positive and negative affect (experienced wellbeing), and purpose in life, perceived constraints on personal control, and perceived mastery (eudaimonic wellbeing). We hypothesized that arts group participation would be associated with enhanced wellbeing across all domains.

Methods

Sample

Participants were drawn from the Health and Retirement Study (HRS), a nationally representative study of more than 37,000 individuals over the age of 50 in the US (Sonnega et al., 2014). The study was initiated by the National Institute on Aging and conducted by the Institute for Social Research at the University of Michigan to track the Baby Boom generation's transition from work to retirement. The initial HRS cohort was interviewed for the first time in 1992 and followed-up every two years, with other studies and younger cohorts merged with the initial sample. Together, these studies create a fully representative sample of individuals over the age of 50 in the United States. Further details on study design are reported elsewhere (Sonnega et al., 2014). In this study, we combined five HRS public datasets generated by the RAND Center for the Study of Aging for the Institute for Social Research at the University of Michigan (Longitudinal File 2018 (V1); Detailed Imputations File 2018 (V1); 2014–2018 Fat Files).

We used data from HRS waves at which participation in a local community arts group was measured (2014–2016). At each wave, a rotating random 50% subsample of participants were invited to an enhanced interview and given a Leave-Behind Psychosocial and Lifestyle Questionnaire to complete and return by mail, which included questions on participation in community arts groups and wellbeing (Smith et al., 2017). Participants were eligible to complete this psychosocial questionnaire every four years. In 2014, 9,549 were eligible and 7,541 (79%) participated. In 2016, 10,238 were eligible and 6,370 (62%) participated. We restricted the sample to participants with complete data on participation in community arts groups, wellbeing outcomes, and all covariates. This produced a final sample size of 12,055 participants, 6,569 of whom participated in 2014 and 5,486 in 2016 (no participants completed both years). All participants were included in this study, regardless of existing health conditions (e.g. dementia, cognitive impairment), and all participants were included in propensity score matching (PSM; see statistical analysis section for more details).

Exposure

As part of the social engagement measure in the psychosocial questionnaire, participants were asked one question on how often they participated in a local community arts group in the last month. Participants were provided with examples of these groups such as a choir, dance, photography, theatre, or music group (Smith et al., 2017). This question was the only measure of arts group participation in HRS. Responses were recorded on a seven-point frequency scale, ranging from never to daily. As the majority of participants reported never participating in community arts groups or not participating in the last month (Table 1), we collapsed responses into a binary variable. Categories represented no participation (never, not in the last

Table 1. Frequency of participation in arts groups for the whole sample ($n = 12,055$).

Participation frequency	Proportion
	N (%)
Never	9053 (75%)
Not in the last month	1752 (14%)
At least once a month	318 (3%)
Several times a month	227 (2%)
Once a week	440 (4%)
Several times a week	217 (2%)
Daily	48 (<1%)

month) or participation at least once in the last month (at least once a month, several times a month, once a week, several times a week, daily).

Outcomes

We analyzed six aspects of wellbeing, grouped within the three domains of wellbeing (evaluative, experienced, and eudaimonic wellbeing; Stone & Mackie, 2013). These were all measured in the psychosocial questionnaire. For evaluative wellbeing, life satisfaction was measured with the five-item Satisfaction with Life Scale (Diener et al., 1985; Pavot & Diener, 1993). Scores ranged from one to seven, with higher scores indicating greater life satisfaction. For experienced wellbeing, positive affect was measured with a list of 13 single-word items describing affect during the last 30 days, and negative affect was measured with 12 single-word items. This measure was developed for HRS (Smith et al., 2017) and mostly included words from the Positive and Negative Affect Schedule Expanded Form (Watson & Clark, 1994). Scores ranged from one to five and higher scores indicated more positive or negative affect. For eudaimonic wellbeing, three scales were used. Purpose in life was measured using the seven-item purpose subscale of the Ryff Measures of Psychological Wellbeing (Ryff & Keyes, 1995). Scores range from one to six and higher scores indicated greater purpose in life. Two five-item measures of perceived control were included, the perceived constraints on personal control and perceived mastery scales (Lachman & Weaver, 1998). For both measures, scores ranged from one to six. For constraints, higher scores indicated more constraints (lower perceived control). For mastery, higher scores indicated greater mastery (higher perceived control).

We followed the HRS instructions on coding and index creation; for each outcome, summary scores were calculated as the average of responses to each item and were set as missing if responses on more than half of the items were missing (Smith et al., 2017). All outcomes were then standardized within our analytical sample (mean = 0, standard deviation = 1). A standardized score represents the number of standard deviations each participant's raw score is from the overall mean of that measure. Participants who did not complete all items of the wellbeing questionnaires had worse scores on these measures (i.e. lower life satisfaction, positive affect, purpose in life, and mastery and higher negative affect and constraints; Table S1). However, excluding these participants from our analyses did not influence our findings (Table S2).

Covariates

We chose covariates based on the construction of a directed acyclic graph (DAG), which involves the graphical representation of proposed causal effects between variables to determine whether bias is potentially reduced or increased when including covariates (Shrier & Platt, 2008). Demographic covariates were age (years), gender (men, women), marital status (married, divorced/separated, widowed, never married), and race/ethnicity (White [including Caucasian], Black [including African American], Other [including American Indian, Alaska Native, Asian or Pacific Islander, Other]). In the public HRS data, more detailed information on race/ethnicity was collapsed to protect participant confidentiality, and this variable indicated the race/ethnicity as which participants primarily identified. Socioeconomic covariates were educational attainment (less than high school, high school, college, postgraduate), employment status (employed, unemployed, disabled, retired, homemaker), total household income (US Dollars), neighborhood safety (excellent, very good, good, fair, poor), and frequency of socializing with friends or family (<1 time a year, 1–2 times a year, every few months, 1–2 times a month, 1–2 times a week, ≥3 times a week).

Health-related covariates included difficulties relating to activities of daily living (ADLs). Participants were asked whether, because of a health or memory problem, they had any difficulty with each of: dressing; bathing or showering; eating; getting in or out of bed; and walking across a room (yes, no). We also measured difficulties relating to instrumental activities of daily living (IADLs): making phone calls; managing money; taking medications; shopping for groceries; and preparing hot meals (yes, no). Participants reported whether they had any long-term physical conditions, including diabetes, lung disease, cancer, heart conditions, high blood pressure, arthritis, or complications from stroke (yes, no). Finally, we included a measure of cognition, which was a summary of immediate and delayed recall test scores (range 0–20; Bugliari et al., 2020).

Statistical analysis

We investigated whether participating in community arts groups was associated with better concurrent wellbeing. To do this, and to address the issue that certain types of individuals may be more likely to participate in community arts groups, we used PSM. This involves estimating a propensity score for each participant, indicating how likely they are to participate in arts groups based on covariates. Propensity scores are then used to match individuals who participated in arts groups (the 'treatment' group) with those who did not participate (the 'control' group; Guo & Fraser, 2015). Matched participants should have almost identical distributions on all observed covariates, removing any confounding by these covariates. Assuming that the treatment group can be determined as a function of these covariates and there are no unobserved confounders, PSM simulates a trial with the measured covariates randomized between groups. We used PSM to estimate the difference between the average outcome for arts group participants and the average outcome for the same group under the hypothetical scenario that they did not participate in arts groups (the average treatment effect on the treated; ATT).

Propensity scores were estimated using demographic, socioeconomic, and health-related covariates. Quadratic forms of continuous covariates were tested but there was no evidence ($p > 0.05$) that these should be included. Where there was evidence that interactions between covariates improved the prediction of treatment group ($p < 0.05$), interaction terms were added. We assessed the propensity score model specification using Hosmer and Lemeshow's goodness-of-fit test, a link test, and Tjur's coefficient of discrimination (D; Tjur, 2009).

We implemented PSM using Stata 16 (StataCorp, 2019) and the user-written kmatch command (Jann, 2017). We used kernel-based matching which includes all available observations and constructs a weighted average of counterfactuals for each observation in the treatment group. More information is taken from matches whose propensity scores are closer to each other and less information from matches whose propensity scores are further apart (Guo & Fraser, 2015). We estimated the ATT using an Epanechnikov kernel and automatic bandwidth selection, meaning the bandwidth was determined by cross-validation using the propensity score (bandwidth = 0.003; Jann, 2017). We also imposed the common support condition to improve the quality of matches. Normal-based 95% confidence intervals and p values were estimated using bootstrapping with 500 replications.

Sensitivity analyses

Analytical approach. We tested how robust our results were to different specifications of bandwidth values (0.01, 0.05) in the PSM models. We then tested PSM models without the common support condition. We also used entropy balancing, which can improve the balance of covariates by reweighting the treatment and control group, to assess the sensitivity of our results to the approach used (Hainmueller, 2012). We then compared our findings to results from an alternative analytical approach; each wellbeing outcome was analyzed in a separate linear regression model, and all models are presented before and after adjustment for covariates.

Selection bias. Given that our approach assumed that there were no unobserved confounders, we performed sensitivity analyses to assess how sensitive our findings were to hidden bias (Rosenbaum, 2002). We explored Rosenbaum's bounds using the Stata user-written rbounds command (Markus Gangl, 2004), which calculates bounds for the ATT at different levels of unobserved confounding, as indicated by Γ. We report the value of Γ at which inferences from the study findings would be altered, illustrating the size of the hidden bias that might explain our findings. However, this sensitivity analysis uses only matched pairs (Markus Gangl, 2004), so is not directly applicable to kernel-based matching, which includes all available observations.

To assess whether self-selection may have influenced our findings, we compared the characteristics of participants who were eligible for, but did not complete, the psychosocial questionnaire to those who were included in our final analytic sample. We then repeated our main analyses including the HRS psychosocial questionnaire weights, meaning our sample was weighted to account for non-response, age, gender, and race/ethnicity, making the sample representative of all non-institutionalized individuals in the US population aged over 50 (Ofstedal et al., 2011; Smith et al., 2017).

Frequency of arts group participation. Our definition of no arts group participation included those who reported participating both 'never' and 'not in the last month'. Using this definition, individuals who usually attended arts groups but had not been able to do so in the last month may have been wrongly categorized as never participating in arts groups. We thus repeated our main analyses limiting the control group to those who reported never participating in arts groups, excluding individuals who reported not participating in the last month.

We also tested whether limiting the treatment group to individuals who participated in arts groups more frequently altered our findings. To do this, we repeated our main analyses with a new binary treatment indicator of no participation (never/not in the last month) versus participation weekly or more frequently. Individuals who participated monthly were excluded from this analysis.

To test whether there was a dose-response relationship between the frequency of participation in community arts groups and wellbeing outcomes, we used inverse-probability-weighted regression adjustment (IPWRA). This is a doubly robust approach computed using weighted regression coefficients where the weights are the inverse of the propensity score. We compared monthly (at least once a month, several times a month) and weekly participation (once a week, several times a week, daily) to no participation (never, not in the last month).

Longitudinal associations. Finally, we investigated whether associations between arts group participation and wellbeing were maintained longitudinally. In HRS, participants were eligible for the psychosocial questionnaire every four years. Half of our sample were thus eligible to complete additional measures of wellbeing in 2018. We identified participants who completed all six measures of wellbeing in 2018 and repeated PSM models using arts group participation and covariates measured in 2014, with wellbeing four years later as the outcome. In total, 3,874 participants completed the arts group participation measure in 2014 and wellbeing outcomes in 2018.

Results

In our sample ($n = 12{,}055$), 59% were women, 75% were of White or Caucasian race/ethnicity, 48% were retired, and a large proportion had at least one long-term physical condition (Table 2). There were small but significant differences in the characteristics of the older adults who were eligible for the HRS psychosocial questionnaire, but did not complete it, and those in our final analytic sample (Table S8). Those in our sample were more likely to be of White or Caucasian race/ethnicity, married, retired, to have higher education, and have difficulties with fewer ADLs and IADLs. In our sample, reported life satisfaction (evaluative wellbeing), positive and negative affect (experienced wellbeing), and purpose in life, constraints and mastery (eudaimonic wellbeing) spanned the full range of potential scores before standardization (Table S3) and were moderately correlated ($r = 0.34$–0.59; Figure S1).

In total, 1,250 (10%) participants reported engaging in a community arts group at least once in the last month (Table 1). In contrast, 10,805 (90%) individuals never participated in a community arts group or had not participated in the last month. Before matching, there were differences across most covariates between those who did and did not participate in arts groups (Table 2). However, the propensity score model fitted the data well ($\chi^2(68)=540.38$, $p < 0.001$, pseudo $R^2 = 0.07$, Tjur's $D = 0.05$) with no evidence of misspecification. Using this propensity score resulted in high quality matching (Figure S2) and corrected the balance of covariates between those who did and did not participate in arts groups (standardized mean difference range = 0.00004–0.02; Table S4).

Table 2. Characteristics of the total sample and those who participated in arts groups at least once in the last month (treatment) versus those who did not participate in arts groups (control).

	Overall (*n* = 12,055)	**Treatment** (*n* = 1,250)	**Control** (*n* = 10,805)	**Group difference**
		N (%)		p (χ^2)
Gender				
Women	7131 (59%)	820 (66%)	6311 (58%)	<0.001
Men	4924 (41%)	430 (34%)	4494 (42%)	
Race/ethnicity				
White/Caucasian	9006 (75%)	803 (64%)	8203 (76%)	<0.001
Black/African American	2087 (17%)	366 (29%)	1721 (16%)	
Other (AI, AN, API, other)	962 (8%)	81 (6%)	881 (8%)	
Education				
Less than high school	1744 (14%)	130 (10%)	1614 (15%)	<0.001
High school	6343 (53%)	562 (46%)	5781 (54%)	
College	2633 (22%)	341 (27%)	2292 (21%)	
Postgraduate	1335 (11%)	217 (17%)	1118 (10%)	
Marital status				
Married	7051 (58%)	709 (57%)	6342 (59%)	0.101
Divorced/Separated	2126 (18%)	212 (17%)	1914 (18%)	
Widowed	2224 (19%)	263 (21%)	1961 (18%)	
Never married	654 (5%)	66 (5%)	588 (5%)	
Employment status				
Employed	4049 (34%)	462 (37%)	3587 (33%)	0.024
Unemployed	280 (2%)	25 (2%)	255 (2%)	
Disabled	1199 (10%)	108 (9%)	1091 (10%)	
Retired	5812 (48%)	596 (47%)	5216 (48%)	
Homemaker	715 (6%)	59 (5%)	656 (6%)	
Neighborhood safety				
Excellent	3843 (32%)	396 (32%)	3447 (32%)	0.927
Very good	4115 (34%)	437 (35%)	3678 (34%)	
Good	2688 (22%)	269 (21%)	2419 (22%)	
Fair	1151 (10%)	119 (10%)	1032 (10%)	
Poor	258 (2%)	29 (2%)	229 (2%)	
Socializing frequency				
Less than once a year	362 (3%)	17 (1%)	345 (3%)	<0.001
1–2 per year	498 (4%)	27 (2%)	471 (4%)	
Every few months	1027 (9%)	67 (5%)	960 (9%)	
1–2 per month	2906 (24%)	273 (22%)	2633 (24%)	
1–2 per week	4491 (37%)	512 (42%)	3979 (38%)	
3+ per week	2771 (23%)	354 (28%)	2417 (22%)	
Difficulty with ADLs				
Bathing	713 (6%)	30 (2%)	683 (6%)	<0.001
Eating	320 (3%)	21 (2%)	299 (3%)	0.024
Dressing	1117 (9%)	68 (5%)	1049 (10%)	<0.001
Walking	735 (6%)	42 (3%)	693 (6%)	<0.001
Getting in/out of bed	681 (6%)	36 (3%)	645 (6%)	<0.001
Difficulty with IADLs				
Making phone calls	382 (3%)	19 (2%)	363 (3%)	<0.001
Taking medication	326 (3%)	24 (2%)	302 (3%)	0.071
Managing money	647 (5%)	52 (4%)	595 (6%)	0.045
Shopping for groceries	988 (8%)	53 (4%)	935 (9%)	<0.001
Preparing hot meals	643 (5%)	35 (3%)	608 (6%)	<0.001
Long-term conditions				
High blood pressure	7456 (62%)	752 (60%)	6704 (62%)	0.194
Diabetes	3010 (35%)	274 (22%)	2736 (25%)	0.009
Cancer	1970 (16%)	187 (15%)	1783 (17%)	0.163
Lung disease	1261 (10%)	80 (6%)	1181 (11%)	<0.001
Heart condition	3033 (25%)	261 (21%)	2772 (26%)	<0.001
Stroke	836 (7%)	70 (6%)	766 (7%)	0.050
Arthritis	7354 (61%)	729 (58%)	6625 (61%)	0.040
		Mean (SD)		**p (t-test)**
Age (years)	68.07 (10.31)	67.24 (9.93)	68.17 (10.35)	0.003
Household income (USD)	73,692 (105,268)	80,523 (114,560)	72,902 (104,117)	0.015
Cognition	9.76 (3.26)	10.21 (3.31)	9.71 (3.25)	<0.001

Note. AI: American Indian. AN: Alaska Native. API: Asian or Pacific Islander. ADLs: activities of daily living. IADLs: instrumental activities of daily living.

In the matched sample, we found evidence that arts group participation was associated with several aspects of wellbeing (Table 3). The strongest evidence was for the association with positive affect (experienced wellbeing), as arts group participation was associated with a 0.18 standard deviation higher positive affect score compared to not participating in arts groups (ATT = 0.18, 95% CI = 0.12–0.24). Given that the ATT was standardized, this represents a small effect size. Participating in arts groups was also associated with higher life satisfaction (evaluative wellbeing; ATT = 0.09, 95% CI = 0.04–0.15), purpose in life (eudaimonic wellbeing; ATT = 0.07, 95% CI = 0.02–0.13), and perceived mastery (eudaimonic wellbeing; ATT = 0.07, 95% CI = 0.01–0.14) than not participating. However, there was no evidence that arts group participation was associated with negative affect (experienced wellbeing) or perceived constraints on personal control (eudaimonic wellbeing).

Table 3. Concurrent associations between arts group participation and standardized wellbeing outcomes using propensity score matching.

Outcome	ATT	95% CI	p value
Evaluative wellbeing			
Life satisfaction	0.09	0.04 to 0.15	0.001
Experienced wellbeing			
Positive affect	0.18	0.12 to 0.24	<0.001
Negative affect	0.06	0.00 to 0.11	0.065
Eudaimonic wellbeing			
Purpose in life	0.07	0.02 to 0.13	0.011
Constraints	0.02	−0.03 to 0.08	0.417
Mastery	0.07	0.01 to 0.14	0.018

Note. ATT estimates from PSM models using Epanechnikov kernel matching with a bandwidth of 0.003 and the common support condition imposed. The ATT represents the difference between the average outcome for those who participated in arts groups and their average outcome under the hypothetical scenario that they did not participate in arts groups in standard deviation units. After matching, treatment $N = 1,245$ (5 unmatched) and control $N = 10,756$ (49 unused).

Table 4. Longitudinal associations between arts group participation and standardized wellbeing outcomes four years later using propensity score matching.

Outcome	ATT	95% CI	p value
Evaluative wellbeing			
Life satisfaction	0.18	0.08 to 0.28	<0.001
Experienced wellbeing			
Positive affect	0.22	0.11 to 0.32	<0.001
Negative affect	0.07	−0.04 to 0.18	0.218
Eudaimonic wellbeing			
Purpose in life	0.10	−0.01 to 0.21	0.074
Constraints	−0.02	−0.13 to 0.09	0.731
Mastery	0.11	0.00 to 0.22	0.044

Note. ATT estimates from PSM models using Epanechnikov kernel matching with a bandwidth of 0.006 and the common support condition imposed. After matching, treatment $N = 420$ (4 unmatched) and control $N = 3,254$ (196 unused).

Sensitivity analyses

Analytical approach

Our results were not substantially altered in sensitivity analyses using a kernel bandwidth of 0.01 or 0.05, when the common support requirement was removed, or when using entropy balancing instead of kernel-based matching (Table S5). We then compared our findings to results from linear regression models. In the fully adjusted regression models, there was similar evidence that participation in arts groups was associated with higher life satisfaction, positive affect, purpose in life, and mastery but not associated with negative affect or constraints (Table S6).

Selection bias

Next, we tested how sensitive results were to unobserved confounders using Rosenbaum's bounds. To explain the observed association between participation in a community arts group and each outcome, an unobserved confounder would need to increase the odds of group participation by a factor of between 1.15 and 1.58 ($\Gamma = 1.15–1.58$; Table S7). As our findings become sensitive to unobserved confounders at relatively small values, they could be altered by relatively small levels of unobserved confounding. However, as shown in Table S7, the results when including only the 1,245 matched pairs differ to those from our main analyses, indicating that the calculation of Rosenbaum's bounds may not be suitable for kernel-based matching.

Given the differences in the characteristics of the older adults who were eligible for the HRS psychosocial questionnaire and those in our final analytic sample (see above), we repeated our main analyses after weighting for non-response, age, gender, and race/ethnicity. This did not alter our findings (Table S9). Although the evidence for the associations between arts group participation, purpose in life (ATT = 0.07, 95% CI = 0.00–0.14), and mastery (ATT = 0.07, 95% CI = 0.00–0.15) was slightly attenuated, the ATTs for all outcomes remained similar.

Frequency of arts group participation

Next, we limited the control group to individuals who never participated in arts groups, meaning those who reported that they had not participated in the last month were excluded from analyses. This did not alter our findings, except that participating in arts groups was then associated with higher negative affect (ATT = 0.07, 95% CI = 0.01–0.13: Table S10). However, the evidence for this association was weak and the ATT very similar to the ATT in our main analyses.

We then limited the treatment group to those with at least weekly participation in arts groups, meaning the treatment and control groups were more distinct. In the matched sample, participating in arts groups weekly or more often was associated with higher positive affect (ATT = 0.21, 95% CI = 0.13–0.28), life satisfaction (ATT = 0.12, 95% CI = 0.05–0.19), and purpose in life (ATT = 0.10, 95% CI = 0.03–0.17) compared to not participating (Table S11). There was no evidence for associations with negative affect or constraints. In contrast to monthly participation, there was little evidence that weekly arts group participation was associated with higher mastery (ATT = 0.06, 95% CI = −0.02–0.14). However, the ATT was similar to monthly participation so this could be a result of the reduction in sample size in this sensitivity analysis.

Using IPWRA, we found evidence for a dose-response relationship of arts group participation with positive affect, life satisfaction, and purpose in life (Table S12, Figure S3). Compared to not participating, monthly and weekly participation in arts groups was associated with higher positive affect (monthly: ATT = 0.14, 95% CI = 0.07–0.22; weekly: ATT = 0.19, 95% CI = 0.11–0.26). For both life satisfaction and purpose in life, there was limited evidence for an association with monthly participation, but weekly participation was associated with higher life satisfaction (ATT = 0.10, 95% CI = 0.02–0.19) and purpose in life (ATT = 0.08, 95% CI = 0.00–0.16). In contrast, only monthly participation was associated with higher mastery (ATT = 0.09, 95% CI = 0.01–0.18).

Longitudinal associations

Finally, we investigated whether associations between arts group participation and wellbeing were maintained longitudinally (Table 4). Levels of arts group participation were similar in 2014 (11%) and 2018 (10%) but only 54% of those participating in 2014 were still participating in 2018. In the matched sample, participating in arts groups in 2014 was associated with higher positive affect (ATT = 0.22, 95% CI = 0.11–0.32), life satisfaction (ATT = 0.18, 95% CI = 0.08–0.28), and mastery (ATT = 0.11, 95% CI = 0.00–0.22) four years later compared to not participating. There was also some weak evidence for an association with higher purpose in life four years later (ATT = 0.10, 95% CI = −0.01–0.32).

Discussion

This study explored the associations between participation in a local community arts group (such as a choir, dance, photography, theatre, or music group) and a range of wellbeing outcomes. After matching on a range of demographic, socioeconomic, and health-related factors, we found evidence that arts group participation was associated with higher levels of the positive elements of evaluative, experienced, and

eudaimonic wellbeing. Participation in arts groups had the largest association with positive affect, followed by life satisfaction, purpose in life, and perceived mastery cross-sectionally and longitudinally. Comparing our finding for monthly and weekly arts group participation suggests that there could be a dose-response relationship for life satisfaction, positive affect, and purpose in life, as the effects on wellbeing were larger for weekly then monthly participation. We did not find evidence that participation was associated with negative aspects of experienced wellbeing (negative affect) and eudaimonic wellbeing (perceived constraints on personal control).

Our findings are consistent with previous population-based studies of older adults that have found associations between participatory arts engagement and wellbeing (Fancourt & Steptoe, 2018; Grossi et al., 2012; Menec, 2003; Pentikäinen et al., 2021; Tymoszuk et al., 2020, 2021). Despite matching older adults who did and did not participate in arts groups, we found small but significant effects of sizes comparable to those from previous studies. For example, a randomized trial of a community choir had standardized effect sizes of 0.23 on positive affect and 0.39 on interest in life, similar to our findings (Johnson et al., 2020). However, reviews have found that insufficient studies have investigated these associations in large enough samples to be meaningful, and more research using standardized measures is needed (Daykin et al., 2018; Noice et al., 2014). The larger effects of more frequent group participation are consistent with previous evidence that both the level and frequency of activities are associated with enhanced health outcomes (Hughes et al., 2013), and more frequent sustained engagement may be needed to enhance wellbeing (Tymoszuk et al., 2020).

The relationship between arts group participation and wellbeing is likely to be bidirectional, as enhanced wellbeing also leads to higher subsequent social engagement (Steptoe & Fancourt, 2019). As this study is observational and uses mainly cross-sectional data, we have not attempted to show the direction of this association. We have focused instead on building on previous research by using more sophisticated statistical techniques; although arts group participation is associated with broader aspects of social and cultural capital and socioeconomic position (Bone et al., 2021), which are themselves associated with wellbeing (Ryff, 2017), the relationship also exists independent of these factors in older adults. In a sensitivity analysis (albeit with a substantially reduced sample size), the associations between arts group participation and wellbeing were maintained over four years. This suggests that participatory arts activities could have sustained benefits for wellbeing independent of wider structural, functional, and social factors, and it is not just that those who engage in arts groups have higher socioeconomic position or social capital. However, given that half of those who were initially members of arts groups were no longer participating in these groups four years later, it is possible that the longitudinal associations were a result of other factors. Arts engagement may be a 'perishable commodity'; if people cease engagement the associated benefits may atrophy. Future research should explore the dynamic longitudinal associations between arts group participation and wellbeing.

In this study, participating in arts groups was associated only with the positive aspects of experienced and eudaimonic wellbeing. It is unclear why this occurred, particularly as participation was associated with evaluative wellbeing. Positive and negative affect are separate domains, and not just opposite states of experienced wellbeing. Positive affect includes feeling enthusiastic, alert, and pleasurable engagement in activities, whereas negative affect generally includes distress, anger, disgust, and fear (Watson & Clark, 1994). Arts group participation may thus increase positive affective experiences, without decreasing negative affect resulting from other sources. However, this could still lead to an enhanced ratio of positive to negative affect that would improve experienced wellbeing overall, particularly given that negative affect may decline in older age (Carstensen et al., 2000).

In terms of eudaimonic wellbeing, arts group participation was associated with purpose in life and perceived mastery but not perceived constraints on personal control. Alongside the health-promoting activities involved in participation, the act of participating in arts groups may directly provide a sense of purpose for individuals. Perceived mastery and constraints, in contrast, are two aspects of perceived control (Lachman & Weaver, 1998). Mastery relates to beliefs about abilities to achieve desired outcomes whereas constraints are beliefs about having obstacles that interfere with goal achievement. People's levels of mastery may be more likely to impact their ability to attain desired outcomes, whereas constraints could be more likely to influence their ability to control life circumstances (Infurna & Mayer, 2015). Participating in arts groups may therefore increase older adults' self-efficacy, promoting beliefs that they can achieve their goals, without altering their beliefs about external factors that may influence their lives. It is also possible that this distinction reflects the bidirectional nature of the association between arts group participation and wellbeing, as individuals who feel more able to achieve their goals may be more likely to join groups.

In this study, community arts groups were broadly defined, including activities ranging from choirs to photography groups to anything else that participants perceived as relevant. This is consistent with definitions used in previous observational studies, which were similarly broad (Fancourt & Steptoe, 2018; Fraser et al., 2015; Groot et al., 2021; Grossi et al., 2012). However, this means that there is likely to be heterogeneity in the types of groups that individuals participated in. It is therefore difficult to identify the mechanisms through which arts group participation could influence wellbeing. For example, groups may offer varied opportunities for cognitive stimulation, physical activity, social interactions, emotional bonding, collaborative learning, pursuit of collective goals, and developing self-esteem (Dunphy et al., 2018; Fancourt et al., 2021). As HRS asks about the overall frequency of participation in these groups, rather than frequency by group type, we were unable to explore the different types of participatory arts engagement further. Future research could thus consider more specific types of community arts groups and more detailed characteristics of the groups, such as personal interest or enjoyment, the role of the group facilitator, the purpose of the group (e.g. socializing, learning, or creative expression), and whether individuals are limited by the availability of groups in their area.

This study has a number of strengths. HRS is a large nationally representative cohort of older adults in the US. The rich data allowed us to match participants on a large set of covariates, which minimized the risk of bias caused by unobserved heterogeneity. We used validated measures of six aspects of wellbeing, within three domains (Stone & Mackie, 2013), and a clearly defined measure of arts engagement. However, our study also has several limitations. Our main analyses were cross-sectional, so we cannot interpret the direction of the relationship between participation in arts groups and

wellbeing or infer causality. This remains to be explored in future studies of older adults. PSM cannot control for any unobserved factors which may have influenced both arts group participation and wellbeing. But, given the wide range of covariates we included in our models, any remaining unobserved heterogeneity should be relatively small. Our sample may have been biased due to self-selection, as participants differed to others who were eligible for, but did not complete, the HRS psychosocial questionnaire. Nevertheless, weighting sensitivity analyses adjusted the distribution of the sample, making it nationally representative, and did not influence our findings. Additionally, monthly arts group participation was not very common, meaning a relatively small proportion of the sample (10%) was included in the treatment group. Despite this, using kernel-based matching meant that nearly all participants were retained in the PSM models. Although we tested more frequent (weekly) arts group participation in sensitivity analyses with comparable results, this resulted in even smaller groups. Future studies could include larger samples or more prevalent forms of arts engagement to confirm our findings.

Furthermore, we recognize that we performed PSM using an overly simple race/ethnicity variable (White, Black, Other), as defined in the HRS public data. This approach conflates experiences across diverse racial/ethnic groups, which might be particularly problematic as these groups may not have equal access to community arts groups and race/ethnicity may also be associated with wellbeing (Ryff, 2017). As in previous research, most participants in this study were White. In addition, the way in which race/ethnicity was reported, using only participants' primary race/ethnicity, led to the erasure of multiracial persons in this study. Future research should thus use more diverse samples and collect more detailed data on race/ethnicity, while considering that racial and ethnic discrimination is a psychosocial stressor for historically racialized populations that adversely affects mental health (Ryff, 2017), and may only be alleviated by the eradication of racism.

In this study, participation in local community arts groups (e.g. choirs, dance, photography, theatre, music groups) was associated with higher levels of life satisfaction (evaluative wellbeing), positive affect (experienced wellbeing), and purpose in life and perceived mastery (eudaimonic wellbeing). Our findings highlight the importance of future research that investigates the characteristics of community arts groups that are most beneficial for older adults. Considering ways to promote and facilitate participation in community arts groups could help to promote healthy aging, enabling a growing segment of the population to lead healthier and more satisfying lives. This is particularly important given that wellbeing is likely to not only be a product of arts engagement, but also to contribute to future health-related behaviors.

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Authors' contributions

JKB, DF, and FB designed the study. JKB conducted the analyses and drafted the manuscript. JKB, DF, MF, EP, JKS, and FB contributed to the writing, made critical revisions, and approved the final manuscript.

Disclosure statement

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Data availability statement

Raw data were generated at the RAND Center for the Study of Aging (https://hrsdata.isr.umich.edu/data-products/rand). Derived data supporting the findings of this study are available from the corresponding author JKB on request.

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