



## Themed Paper – Original Research

# Active and receptive arts participation and their association with mortality among adults in the United States: a longitudinal cohort study



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## ARTICLE INFO

## Article history:

Received 29 September 2020

Received in revised form

26 January 2021

Accepted 27 May 2021

Available online 15 July 2021

## Keywords:

Adults  
Arts participation  
Music listening  
Mortality

## ABSTRACT

**Objectives:** The aim of the study was to explore associations between active and receptive arts participation and all-cause mortality among adults in the United States population.

**Study design:** This was a prospective cohort study.

**Methods:** Data were derived from the Health and Retirement Study. Separate Cox proportional hazards models were constructed for two cohorts (2012 and 2014) to examine associations between arts participation and mortality.

**Results:** Independent of sociodemographic and health factors, participants aged  $\geq 65$  years had a higher mortality risk if they did not engage in music listening, hazard ratio (HR) 1.39 (95% confidence interval [CI]: 1.12–1.71); singing/playing an instrument, HR 1.49 (95% CI: 1.07–2.0); or doing arts and crafts, HR 1.39 (95% CI: 1.00–1.92). For participants aged  $< 65$  years, there was a higher mortality risk if they did not listen to music, HR 1.79 (95% CI: 1.07–3.01). Older participants from the 2014 cohort had a higher mortality risk if they did not engage in active arts, HR 1.73 (95% CI: 1.08–2.77).

**Conclusions:** Engagement in the arts was associated with lower risk of mortality even after risk adjustment, especially for adults aged  $\geq 65$  years. Greater access and integration of arts in everyday life is recommended.

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## Introduction

Arts engagement can span from the experience of music and art in everyday life to the use of music therapy and art therapy for clinical outcomes. Regardless of the type of engagement, one commonality is the individual's relationship with the arts, central to which is access and participation. Research literature has reflected positive outcomes from creative arts therapies with clinical populations. For example, elderly nursing home residents showed

reduced depressive symptoms following a 10-week intervention of group music therapy.<sup>1</sup> And a systematic review of Art Therapy and Music Therapy for breast cancer patients showed a reduction of negative emotional states, reduced anxiety, and improvements in quality of life.<sup>2</sup> Engagement in the arts outside of therapy may also increase well-being in the general population.<sup>3</sup> Large population studies, primarily from Europe, have examined associations between the arts and health, finding positive outcomes from cultural participation and active engagement with the creative arts.<sup>4–8</sup> Fancourt and Steptoe studied a cohort of 6710 older adults from the United Kingdom and found a protective association between attending arts events and mortality over a 14-year period.<sup>7</sup> Similarly, Swedish studies found an association between attending cultural events and mortality<sup>6</sup> but failed to show a relationship

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<https://doi.org/10.1016/j.puhe.2021.05.034>

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between active arts participation and mortality.<sup>9</sup> Arts epidemiology studies are rare in the United States and have focused on the effects of receptive arts participation, such as attendance of cultural events<sup>10</sup> and music listening,<sup>11</sup> rather than the effects of active engagement (e.g., singing).

To date, there have been no published epidemiological reports from the United States that address associations between arts participation and mortality. The aim of this study was to examine that association among a representative US sample. The hypotheses were that (1) participation in the arts will be associated with improved survival after adjustment for sociodemographic and health factors and (2) the relationship between active arts participation (e.g., making music) and survival will be more robust than the relationship between receptive arts experiences (e.g., attending cultural events) and survival.

## Methods

The Health and Retirement Study (HRS) is a longitudinal panel survey that follows a representative of Americans over the age of 50 years, and their spouses of any age, into retirement to answer questions related to aging.<sup>12</sup> Core data are collected biennially through in-person or telephone interviews and internet surveys. In addition to demographics, questions about changing health, economics, and social structures are collected. A Consumption and Activities Mail Survey (CAMS), distributed on the off years from the core data, includes questions related to time use, including arts participation. Special topic modules, such as the Culture and the Arts Module used in this study, are also sent to a random subsample of respondents and collected with the core data. For this analysis, two samples were taken from data spanning 2012–2016, forming two groups that are referred to as the 2012 and 2014 cohorts.

Eligible participants for the 2012 cohort completed the 2012 HRS and the 2013 CAMS. Demographics and baseline health characteristics were obtained from the 2012 HRS and arts participation from the 2013 CAMS. The 2014 cohort completed the Culture and the Arts Module included with the 2014 biennial core interview. The module gathered nuanced information related to active arts engagement. Baseline characteristics were taken from the 2014 HRS core data. Participants from both cohorts were followed through 2016. To examine differences that may occur in older adults who are passed the typical US age of retirement, cohorts were stratified by age <65 years and ≥65 years.

## Measures

The four arts variables included receptive (attending cultural events and listening to music) and active (singing or playing an instrument and doing arts and crafts) arts participation. Cultural events included concerts, movies, lectures, or attending museums. Participants were asked about activity during the last week for music listening and the last month for all other arts variables. Responses were dichotomized into no or yes to reflect responses of no participation or any participation. Active arts participation was examined for the 2014 cohort and dichotomized into no or yes responses for engagement in any of the following active arts categories: painting, sculpting, pottery, or ceramics, singing or playing an instrument, acting in theater or film, creative writing, and handwork crafts (weaving, crochet, knitting, jewelry, leatherwork, woodwork, metalwork).

Demographic and socio-economic covariates included age, gender, race/ethnicity, and educational attainment. Health and behavioral covariates included self-reported health, number of chronic conditions, dementia, history of smoking, and physical activity.

The primary outcome was all-cause mortality. The date of death was extracted from the HRS file, and time to death was calculated from the baseline date for each cohort (2012 or 2014) to the date of death.

## Statistical analysis

Baseline characteristics were summarized for each cohort and compared between the two age groups. Baseline characteristics were also examined by arts participation. The means and standard deviations (SDs) were presented for continuous variables and compared using *t*-tests. Frequency and percentages were presented for categorical variables and compared using chi-square or Fisher's exact tests. The Kaplan–Meier method was used to estimate the survival function. Cox proportional hazards models were built to generate unadjusted and adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) to evaluate associations of arts variables and mortality. Baseline characteristics included in the adjusted model were selected on the basis of *a priori* clinical judgment and by examining the bivariate relationships ( $P < 0.1$ ). Separate Cox models were constructed for both age groups and for each of the five arts variables. Participants who dropped out of the study or who were still alive in 2016 were censored. All analyses were conducted in SAS Version 9.4 2016 (Cary, NC).

## Results

### Baseline characteristics

The 7301 participants comprised individuals >50 years of age and their spouses of any age. There were 5805 participants in the 2012 cohort with a median age of 66 years and a range of 27–102 years. The 2014 cohort was comprised of 1496 participants, median age of 66 years with a range of 30–98 years. The baseline characteristics of both cohorts are presented in [Table 1](#). Most participants were White. Approximately 50% of participants had some college-level education. Those aged <65 years were more likely to be working part time or full time and to have a higher household income. More than 71% of participants reported being in excellent, very good, or good health, with greater than 83% stating no difficulties with activities of daily living (ADLs). There were significant differences by age group for number of ADLs and chronic conditions. In both cohorts, approximately 62% of participants were engaging in physical activity at least once per week but less than every day.

### Engagement in the arts

Younger participants were more likely to listen to music (86.9% vs 71.3%;  $P < 0.001$ ), attend cultural events (27.5% vs 23.4%;  $P < 0.001$ ), or sing or play an instrument (21.5% vs 24.5%;  $P < 0.001$ ). Younger and older cohort members were similar in terms of arts and crafts participation (19.9% vs 20.2%;  $P = 0.805$ ) and active art-making (52.2% versus 50.2%;  $P = 0.450$ ). Arts participation by race and ethnicity, education level, and income are presented in [Supplemental Table 2](#). Engagement differed by race with Black participants more likely than White participants to listen to music and to sing or play an instrument. All areas of arts participation and engagement were higher for participants with some college education vs participants with less education. Cultural event attendance and music listening were higher for participants with high income compared with those with middle or low income.

**Table 1**  
Baseline characteristic percentages and frequencies of 2012 and 2014 cohort stratified by age.

Characteristic	2012 cohort				2014 cohort			
	Whole cohort (N = 5805)	Age < 65 years (N = 2694)	Age ≥ 65 years (N = 3111)	P value	Whole cohort (N = 1496)	Age < 65 years (N = 680)	Age ≥ 65 years (N = 816)	P value
	N (%)	N (%)	N (%)		N (%)	N (%)	N (%)	
<b>Age (years), mean (SD)</b>	66.9 (11.0)	57.0 (4.9)	75.4 (6.9)	<0.001	67.5 (11.2)	57.6 (5.1)	75.8 (7.4)	<0.001
<b>Gender</b>								
Male	2362 (40.7%)	1068 (39.6%)	1294 (41.6%)	0.131	578 (38.6%)	261 (38.4%)	317 (38.8%)	0.854
Female	3443 (59.3%)	1626 (60.4%)	1817 (58.4%)		918 (61.4%)	419 (61.6%)	499 (61.2%)	.
<b>Race/ethnicity</b>								
Hispanic	665 (11.5%)	426 (15.8%)	239 (7.7%)	<0.001	196 (13.1%)	123 (18.1%)	73 (8.9%)	<0.001
White	3959 (68.2%)	1516 (56.3%)	2443 (78.5%)		952 (63.6%)	353 (51.9%)	599 (73.4%)	.
Black	1005 (17.3%)	646 (24.0%)	359 (11.5%)		298 (19.9%)	173 (25.4%)	125 (15.3%)	.
Other	175 (3.0%)	105 (3.9%)	70 (2.3%)		50 (3.3%)	31 (4.6%)	19 (2.3%)	.
<b>Education</b>								
Some high-school/GED	2930 (50.5%)	1192 (44.2%)	1738 (55.9%)	<0.001	734 (49.1%)	294 (43.2%)	440 (53.9%)	<0.001
Some college and above	2875 (49.5%)	1502 (55.8%)	1373 (44.1%)		762 (50.9%)	386 (56.8%)	376 (46.1%)	.
<b>Marital status</b>								
Married/partnered	3818 (65.8%)	1897 (70.4%)	1921 (61.8%)	<0.001	914 (61.1%)	456 (67.1%)	458 (56.2%)	<0.001
Divorced/separated	759 (13.1%)	449 (16.7%)	310 (10.0%)		237 (15.9%)	150 (22.1%)	87 (10.7%)	.
Widowed	925 (15.9%)	139 (5.2%)	786 (25.3%)		282 (18.9%)	34 (5.0%)	248 (30.4%)	.
Never married	301 (5.2%)	209 (7.8%)	92 (3.0%)		62 (4.1%)	40 (5.9%)	22 (2.7%)	.
<b>Employment status</b>								
Full time	1439 (25.8%)	1247 (48.3%)	192 (6.4%)	<0.001	375 (26.3%)	330 (51.9%)	45 (5.7%)	<0.001
Part time	806 (14.4%)	434 (16.8%)	372 (12.4%)		192 (13.4%)	103 (16.2%)	89 (11.2%)	.
Retired	3039 (54.5%)	645 (25.0%)	2394 (79.9%)		801 (56.1%)	153 (24.1%)	648 (81.8%)	.
Unemployed or disabled	296 (5.3%)	256 (9.9%)	40 (1.3%)		60 (4.2%)	50 (7.9%)	10 (1.3%)	.
<b>Household income, mean (SD)</b>	67514.9 (94684.6)	81510.9 (110111.9)	55394.9 (76912.9)	<0.001	73964.3 (158768.8)	86534.9 (199085.7)	63488.9 (113915.3)	0.005
<b>Self-reported health</b>								
Excellent/very good/good	4305 (74.2%)	1995 (74.1%)	2310 (74.3%)	0.833	1070 (71.6%)	498 (73.3%)	572 (70.1%)	0.166
Fair/poor	1496 (25.8%)	698 (25.9%)	798 (25.7%)		425 (28.4%)	181 (26.7%)	244 (29.9%)	.
<b>ADLs</b>								
No difficulty	4921 (84.8%)	2327 (86.4%)	2594 (83.4%)	0.006	1249 (83.5%)	588 (86.5%)	661 (81.0%)	0.004
1–2 difficulties	646 (11.1%)	271 (10.1%)	375 (12.1%)		183 (12.2%)	62 (9.1%)	121 (14.8%)	.
≥3 difficulties	238 (4.1%)	96 (3.6%)	142 (4.6%)		64 (4.3%)	30 (4.4%)	34 (4.2%)	.
<b>Dementia, yes</b>	103 (1.8%)	33 (1.2%)	70 (2.3%)	0.002	19 (1.3%)	6 (0.9%)	13 (1.6%)	0.217
<b>Sum of chronic conditions, mean (SD)</b>	2.1 (1.5)	1.7 (1.4)	2.5 (1.4)	<0.001	2.3 (1.5)	1.8 (1.5)	2.6 (1.5)	<0.001
<b>Ever smoke, yes</b>	3280 (56.8%)	1520 (56.6%)	1760 (57.1%)	0.714	805 (54.0%)	370 (54.4%)	435 (53.6%)	0.765
<b>Physical activity</b>								
Never or <1× week	1693 (29.2%)	669 (24.8%)	1024 (32.9%)	<0.001	439 (29.3%)	171 (25.1%)	268 (32.8%)	0.002
At least 1× week	3594 (61.9%)	1810 (67.2%)	1784 (57.3%)		920 (61.5%)	451 (66.3%)	469 (57.5%)	.
Every day	518 (8.9%)	215 (8.0%)	303 (9.7%)		137 (9.2%)	58 (8.5%)	79 (9.7%)	.
<b>Active arts</b>	.	.	.		764 (51.1%)	355 (52.2%)	409 (50.2%)	0.450
<b>Listen to music</b>	4473 (78.5%)	2300 (86.9%)	2173 (71.3%)	<0.001	.	.	.	.
<b>Attends cultural events</b>	1452 (25.3%)	735 (27.5%)	717 (23.4%)	<0.001	.	.	.	.
<b>Sing/play instrument</b>	1228 (21.5%)	652 (24.5%)	576 (18.9%)	<0.001	.	.	.	.
<b>Arts and crafts</b>	1146 (20.0%)	530 (19.9%)	616 (20.2%)	0.805	.	.	.	.

SD, standard deviation; ADLs, activities of daily living.

*Multivariable modeling of mortality*

The estimated HRs for the association between demographic, health, arts variables, and all-cause mortality are provided in

**Supplemental Table 1.** Male sex and greater number of chronic conditions were associated with increased risk of mortality. Better self-reported health at baseline was associated with lower risk of mortality. For older participants, the risk of mortality was higher with

**Table 2**  
Multivariable modeling: arts variables and predictors of mortality.

	Unadjusted model				Adjusted model			
	Age <65 years HR (95% CI)	P value	Age ≥65 years, HR (95% CI)	P value	Age <65 years, HR (95% CI)	P value	Age ≥65 years HR (95% CI)	P value
<b>Listen to music</b> (no vs yes)	2.51 (1.52, 4.15)	<0.001	2.11 (1.73, 2.57)	<0.001	1.79 (1.07, 3.01)	0.027	1.39 (1.12, 1.71)	0.003
<b>Attend cultural event</b> (no vs yes)	1.74 (0.97, 3.10)	0.062	2.06 (1.54, 2.76)	<0.001	0.99 (0.54, 1.82)	0.975	1.16 (0.85, 1.58)	0.361
<b>Sing/play instrument</b> (no vs yes)	1.23 (0.71, 2.14)	0.455	1.84 (1.36, 2.51)	<0.001	0.99 (0.57, 1.74)	0.979	1.49 (1.07, 2.07)	0.019
<b>Arts and crafts</b> (no vs yes)	1.22 (0.67, 2.22)	0.513	1.95 (1.44, 2.66)	<0.001	0.81 (0.44, 1.51)	0.513	1.39 (1.00, 1.92)	0.049
<b>Active arts<sup>a</sup></b> (no vs yes)	1.27 (0.46, 3.50)	0.648	1.89 (1.21, 2.95)	0.005	1.11 (0.38, 3.21)	0.919	1.73 (1.08, 2.77)	0.025

HR, hazard ratio; CI, confidence interval.

<sup>a</sup> Active arts included any participation in: painting, sculpting, pottery, or ceramics, singing or playing an instrument, acting in theater or film, creative writing, and handwork crafts.

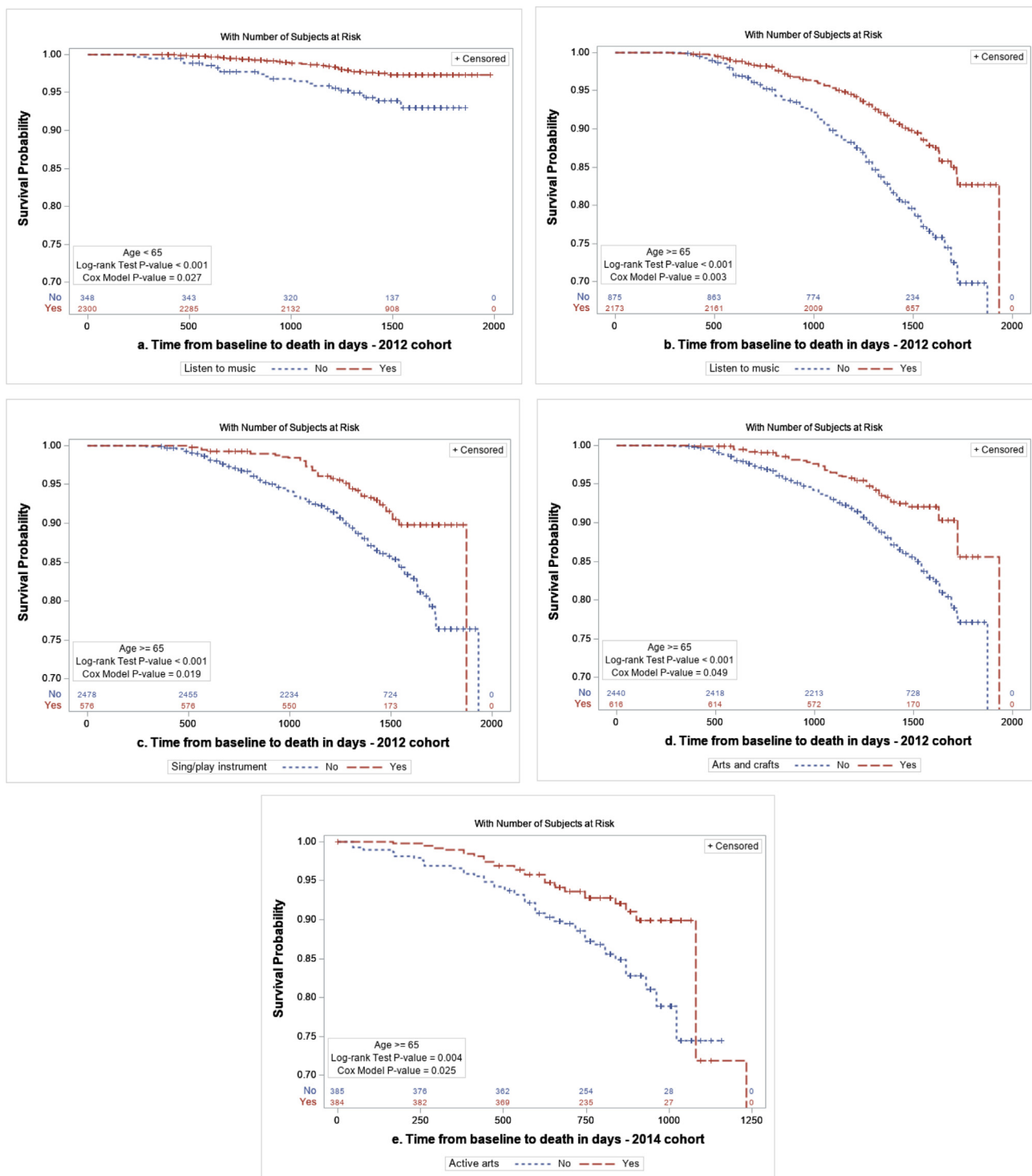


Fig. 1. Kaplan–Meier plots for mortality, which show survival probability by type of arts engagement, stratified by age and adjusted for confounders.

increasing age, lower education attainment, less physical activity, and dementia. There was a decreased risk of mortality for younger participants who identified as Hispanic compared with younger participants who identified as White, Black, or other. Among the 2014 cohort, those who never exercised or exercised less than once per week had a higher mortality risk than those who exercised at least once per week. There was a lower mortality risk for older participants who never smoked and for those with fewer chronic conditions.

Unadjusted and adjusted associations between arts variables and mortality are provided in Table 2. In the unadjusted model, not listening to music was associated with a higher mortality risk among both younger and older participants. The unadjusted mortality risk was also approximately twofold higher for older participants who did not attend cultural events, did not sing or play an instrument, and did not engage in arts and crafts. After adjustments for baseline characteristics, non-music listeners had a higher

mortality risk than those who listened to music: HR 1.79 (95% CI: 1.07–3.01) for those aged <65 years and HR 1.39 (95% CI: 1.12–1.71) for those aged ≥65 years. For older participants, there was also increased mortality risk for those who did not sing or play an instrument, HR 1.49 (95% CI: 1.07–2.0), and those who did not engage in arts and crafts, HR 1.39 (95% CI: 1.00–1.92). Older participants who did not engage in any active arts had a higher mortality risk than those who did engage in active arts, HR 1.73 (95% CI: 1.08–2.77). Kaplan–Meier plots in Fig. 1 and Supplemental Fig. 1 illustrate the survival probability and time from baseline to death: these plots demonstrate that the survival curves split relatively early after baseline for cohort participants who engaged in active art-making versus those who did not.

## Discussion

This study explored associations between arts participation and survival among a representative sample of US adults. An analysis of the longitudinal relationship between arts participation and all-cause mortality demonstrated better survival rates with specific types of arts participation across age groups. Decreased mortality risk was associated with adults who listen to music. For older adults, singing or playing an instrument and participating in arts and crafts were also associated with decreased mortality risk. For older adults, engaging in any type of active arts was associated with a decreased mortality risk.

As hypothesized, the association between *active* arts engagement and survival was robust, particularly for older participants. One explanation may be that in addition to a high level of focus and engagement, mastery and social interaction are often present in active arts activities and are identified factors that benefit older adults.<sup>13</sup> Playing in a community band, for instance, requires reaching a certain skill level on an instrument and interacting with others musically to produce a cohesive sound that is aesthetically pleasing. Older adults who experience social isolation have a higher mortality risk,<sup>14–18</sup> but active arts participation provides opportunity for social interaction and can reduce feelings of loneliness,<sup>19</sup> thereby mitigating some challenges of aging.

Unanticipated study results included the strong association between music listening and survival. In this cohort, music listening was the only arts activity that was significantly associated with mortality risk for younger participants. Music listening in the clinic and in everyday life has demonstrated effects on psychological and physiological responses.<sup>20</sup> For instance, Linnemann et al. found that listening to relaxing music decreased subjective stress levels and cortisol concentrations in healthy adults.<sup>21</sup> Ethnographic studies have detailed the health benefits of using self-selected music for adults with long-term illness.<sup>22,23</sup> DeNora maintains that music is implicated in social agency and may shape how individuals present themselves, feel about themselves, and interact with others.<sup>24</sup> Although seemingly a passive and solitary activity, listening to music can facilitate empathy and be an agent for cultural understanding, forging connections with cultures that are different from one's own.<sup>25</sup> This has implications for feelings of social connectedness, which is especially challenged during times of increased isolation, whether from issues connected to aging or from imposed isolation during times of pandemic.

This study builds on previous results that found positive outcomes associated with active arts participation<sup>4,5</sup> but differs from epidemiological studies that demonstrated health benefits from attendance of cultural events.<sup>6,7,10,26</sup> Among participants in this study representative of the US population, no evidence was found to support an association between attending events and better survival. One possible explanation may be that participants in this study were primarily >50 years of age, but aside from Fancourt

et al.,<sup>7</sup> other studies included all participants over the age of 15 years.<sup>9,26</sup> Perhaps, health benefits from attending cultural events are greater when participation, and one's relationship to the arts, begins at a younger age. Another explanation for dissimilar findings may be cultural differences in importance and value placed on attendance. For instance, in Nordic countries where there is an emphasis on arts participation through programs such as 'arts on prescription' or 'social prescribing,'<sup>27</sup> the rates of cultural attendance are >80%,<sup>28</sup> compared with 54% in the United States.<sup>29</sup> Social prescribing programs prioritize access to the arts as an integral part of communities and uphold arts engagement as a social determinant of health. There is great value placed on the arts when participation is seen as a vehicle to engage marginalized groups, promote well-being, and prevent premature mortality.<sup>30</sup>

A strength of this study was its large longitudinal cohort representative of the US population. Data included comprehensive sociodemographic and health information and multiple variables related to active and receptive arts participation. This study provides new perspective on arts participation and public health in the US population, building support for greater inclusion of the arts in everyday life, particularly among older adults. The main limitation is that this was a cross-sectional assessment. Because the questions were based on participation during a specific time, it is unknown how that may have changed over time, and not possible to determine the cause–effect relationships. The data were limited in terms of quality of engagement. Details about genre of music listening choices, purpose of art-making, desired outcomes and perceived benefits were not gathered. Further exploration of the quality of engagement, such as the purpose of music listening, or level of mastery would allow more granular examinations of the change mechanisms involved in everyday arts participation and its implications for public health. This study focused on mortality as the outcome, but future studies might also explore other issues older adults face, in particular how different forms of arts engagement may benefit specific ADLs or chronic conditions. Examination of differences in arts engagement by race and ethnicity is another potential area for future research. The present study found that a higher percentage of Black and Hispanic participants listened to music than White or other participants, and Black participants were the highest percentage of participants who sing or play an instrument. These types of arts engagement are potential resources for minority groups who are facing social disparities.

In conclusion, an association was found between arts engagement and decreased risk of mortality among US adults. This association was especially robust for older adults. The results from this study add to a growing body of literature that advocates for greater access and inclusion of the arts in everyday life. Future research might explore lifetime participation in the arts and how changes in arts participation influence outcomes over time, the association between arts engagement and other health factors, and the benefits of arts engagement for different racial and ethnic groups. Based on the findings from this study, greater access and integration of arts in everyday life is recommended.

## Author statements

### Ethical approval

These data have been released to the public and is not individually identifiable. Ethical approval was not required.

### Funding

This work was supported by the United States (US) Department of Veterans Affairs (VA) Health Services Research & Development

Service (HSRD), Precision Monitoring to Transform Care (PRISM) Quality Enhancement Research Initiative (QUERI) (QUE 15–280). The contents do not represent the views of the U.S. Department of Veterans Affairs or the United States Government. The funding agency had no role in the design or conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the article; or the decision to submit the article for publication.

### Competing interests

The authors declare that they have no competing interests.

### Availability of data

Data used in this study has been publicly released and is available from the Health and Retirement Study website: <https://hrs.isr.umich.edu/>.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhe.2021.05.034>.

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