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ARTICLE

Engagement with arts and culture activities in the Danish general population: Longitudinal associations with new onset or persistent depression and mental wellbeing

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Abstract

Objectives: International literature suggests that arts and culture activities may benefit mental health, however, such survey studies conducted in the Danish population are scarce. Further, studies have investigated the associated risk for incident depression, but not for persistent depression. The objective of the current prospective study was to assess associations of engagement in arts and culture activities with incident/persistent depression and also mental wellbeing among Danish adults in the general population.

Design: Observational prospective study.

Methods: Data stem from a Danish nationally representative panel study of 5000 adults (aged 15+ years) conducted in 2019 and 2020, which was linked to Danish register data. An exposure variable was constructed for frequency of attending concerts, theatres, museums, and cinemas. Validated scales were used to assess the presence of depression (PHQ-8) and levels of mental wellbeing (SWEMWBS). Binary logistic regression analyses were conducted to assess the risk of incident depression (among participants free of depression at baseline), as well as the risk of persistent depression (among participants with depression at baseline), while multinomial logistic regression was used to assess odds for moderate and high mental wellbeing (low as base outcome) while adjusting for baseline values.

Result: In terms of incident depression, quarterly engagement in arts and culture activities (compared to never) was associated with an OR of .43 (95%CI .23–.80), while 8 times or more was associated with an OR of .53 (.29–.97). In terms of persistent depression, quarterly engagement was associated with an OR of .30 (.10–.90), while 8 times per year or more was associated with an OR of .26 (.07–.92). Similar to the patterns for incident/persistent depression, associations with moderate mental wellbeing showed higher odds for quarterly engagement and 8 times per year or more. Quarterly engagement was also associated with higher odds for high mental wellbeing but did not reach statistical significance.
Conclusions: The results support the involvement of the cultural and creative sectors in health strategies. Mental health promotion initiatives as well as arts and culture sectors may encourage the general public to engage in arts and culture activities with frequencies of at least once per quarter.

KEYWORDS
arts on prescription, arts and culture activities, depression, health promotion, mental health

Statement of contribution

What is already known about this subject?

- A growing body of literature suggests that arts and culture activities, such as going to a concert, theatre show, cinema, or visiting a museum or exhibition may benefit mental health and wellbeing.
- Various studies, for example, from England and Norway have demonstrated that arts and culture activities can protect against the onset of depression in the general population.
- Although international literature suggests that arts and culture activities may benefit mental health, such survey studies conducted in the Danish population are scarce. Further, studies have investigated the associated risk for incident depression, but not for persistent depression.

What does this study add?

- This study explored associations of engagement in arts and culture activities (attending concerts, theatres, museums and cinemas) with incident/persistent depression and mental wellbeing among Danish adults in the general population.
- Engaging in arts and culture activities at least quarterly was associated with reduced odds for incident/persistent depression. Associations between cultural engagement and moderate mental wellbeing were similar to the results for incident/persistent depression, while the associations for high mental wellbeing did not reach statistical significance.
- The results support the involvement of the cultural and creative sectors in health strategies.

INTRODUCTION

There has been an alarming increase in the global burden of mental illness over the past three decades (GBD 2019 Mental Disorders Collaborators, 2022). Depressive disorders account for the largest proportion of disability adjusted life years due to mental disorders, and is also a leading contributor to global disability (GBD 2019 Mental Disorders Collaborators, 2022; WHO, 2017). Similar declines in mental health over the past few decades have been documented for specific country settings such as Denmark (SST, 2022). The COVID-19 pandemic has also taken a toll on mental health, further intensifying the situation (Thygesen et al., 2021; Vistisen et al., 2022). Recently, experts have emphasized the need to make prevention, recognition and treatment of depression an immediate global priority (Herrman et al., 2022). This also includes a focus on promoting positive aspects of mental health, i.e., mental wellbeing (Fusar-Poli & Santini, 2021). It is apparent that clinical treatment alone is not a sufficient solution, implying the need for cross-disciplinary and cross-sectoral approaches to tackle the issue (Campion et al., 2012; Patel et al., 2018). This includes innovative strategies to utilize resources in the civil society and local communities that may help both in preventing depression, alleviating symptoms among those currently suffering from depression, and to promote mental wellbeing in the general population.

While creative activities such as the visual arts, music and choir participation have been used for some time to treat or manage mental ill-health in the clinical context (McCrary et al., 2022), a growing body of literature suggests that arts and culture activities, such as going to a concert, theatre show, cinema, or visiting a museum or exhibition, can enhance and protect mental health and wellbeing in the general population setting (Dow et al., 2023; Fancourt & Finn, 2019; Gordon-Nesbitt, 2017; Lackoi et al., 2020; Zbranca et al., 2022). Engagement in arts and culture activities is considered innate to human lifestyle, reflecting quality of life, traditions and beliefs (Dissanayake, 1980), and can be done for enjoyment and entertainment, learning or recreation (Davies et al., 2016). Various observational and intervention studies have documented a protective role of engagement in various arts and culture activities in terms of mental illness prevention (Cohen et al., 2006; Coulton et al., 2015; Fancourt & Tymoszuk, 2019; Jensen & Bonde, 2018).

Three studies in particular are relevant to consider in the context of the current study. First, Cuypers et al. (2012) conducted a cross-sectional study with a sample of 50,797 adults of 20 years old and above in Norway. They found that higher frequencies of engaging in arts and culture activities were associated with low depression scores (Cuypers et al., 2012).

Next, Fancourt and Steptoe (2019) utilized a larger sample from the English Longitudinal Study of Ageing (ELSA) survey, consisting of 8780 older adults, restricted to those free from depression at baseline, and followed them over a period of 12 years. Similar to the aforementioned study, they found that compared to infrequent arts and culture engagement (once or twice per year or less), frequent arts and culture engagement (every few months or more) was associated with a 19% reduced risk of developing depression (Fancourt & Steptoe, 2019). An earlier study on cultural activities and depression using a smaller sample of the same dataset also showed similar results (Fancourt & Tymoszuk, 2019).

The current study is based on an analysis of data from a nationally representative sample of the Danish general population in 2019 and 2020. We have focused our study on four types of arts and culture activities: attending concerts, theatres, museums and cinemas. The four activities in this study are often considered or referred to as 'receptive'; these activities differ from 'active' activities, where participants themselves sing, play, paint or act. We wanted to avoid the often-used adjective 'passive', although the term 'receptive' may also be considered insufficient or inaccurate since participants' minds may be very 'active', even if their bodies are 'passive' most of the time (Davies et al., 2012; McCrary et al., 2022). We have focused on receptive activities because the Danish Health and Wellbeing Survey included items specifically pertaining to those. While active arts and culture activities may also work differently to impact mental health and wellbeing, we were, in this study, particularly interested in types of arts and culture activities that people may engage in without requiring much more effort than simply attending or visiting. The aim of the current study was to assess associations between arts and culture activities and (1) incident depression and (2) persistent depression on a large representative sample of adults in the Danish popula-

tion. Additionally, the study aimed to (3) assess associations between arts and culture activities and mental wellbeing. Based on previous literature, we proposed three hypotheses: (1) engaging in arts and culture activities would be associated with reduced risk of incident depression, (2) engaging in arts and culture activities would be associated with reduced risk of persistent depression and (3) engaging in arts and culture activities would be associated with higher odds for higher levels of mental wellbeing (as compared to a low level of mental wellbeing).

METHODS

Sampling

The Danish Health and Wellbeing Survey (Rosendahl Jensen et al., 2021) is the Danish part of the European Health Interview Survey (EHIS). Everyone with residence in Denmark has a personal identification number which is used throughout administrative registers and stored in the Civil Registration System (Pedersen, 2011; Thygesen, Daasnes, et al., 2011). From the Civil Registration System, 14,000 individuals aged 15 years or more were randomly selected and invited to complete a self-administered questionnaire (on paper or web-based) in 2019 (data collected between 5 September and 31 December 2019). Hence, these data were collected just before the COVID-19 pandemic reached Europe and Denmark. In all, 6629 individuals (47.4%) completed the questionnaire. Subsequently, all individuals from the 2019 survey who were still living in Denmark in mid-August 2020, were invited to participate in a follow-up survey during the COVID-19 pandemic (data collection between 4 September and 8 November 2020). Thus, 13,474 eligible individuals were invited to the follow-up survey in 2020. In all, 6712 individuals completed the self-administered questionnaire in 2020, out of which precisely 5000 had also completed the questionnaire in 2019 (resulting in 75.4% participating in the follow-up survey). This sample of 5000 individuals was used for the prospective survey analysis. The study design and the data collection methods have been described in detail elsewhere (Rosendahl Jensen et al., 2021).

In Denmark, a national lockdown was declared in March 2020 with restricted travel and closing of schools, shops, working places and cultural institutions. A gradual reopening was started in April 2020. In June to August of 2020, most restrictions were lifted, but a general request to work from home was still in place. In August 2020 the number of COVID-19 cases increased. During the following months, various restrictions were reintroduced, including travel restrictions and limits on the number of people in public gatherings and privately held events.

The survey data were linked on an individual level to registers at Statistics Denmark research servers, which allows for the merging of data on health status, healthcare utilization and social service use, among other variables. Ethical approval is not required for surveys according to Danish legislation. The study complies with the Helsinki 2 Declaration on Ethics and is registered with the Danish Data Protection Authority; all confidentiality and privacy requirements were met. The participants' voluntary completion and return of the survey questionnaires constituted implied consent.

Outcome 1: Case depression based on the PHQ-8 screening tool

The eight-item Patient Health Questionnaire depression scale (PHQ-8) was developed to screen for core symptoms of depression and has been validated with satisfactory sensitivity and specificity in terms of capturing depressive disorders (Kroenke et al., 2009). The total scale ranges from 0 to 24, with higher scores indicating more depression symptoms. The suggested cut-point is ≥10, which indicates clinical depression (Kroenke et al., 2009). The 2019 (baseline) case depression variable was used for stratification (those with and without depression at baseline), and the 2020 (follow-up) variable provided the case depression outcome variable.

Outcome 2: Mental wellbeing

The Short Warwick–Edinburgh Mental Wellbeing Scale (SWEMWBS) is a 7-item measure used to monitor mental wellbeing in the general population and is based on a conceptualization of mental wellbeing as feeling good and functioning well. The Danish translation of the scale has been validated in Denmark (Koushede et al., 2019). SWEMWBS consists of seven positively worded questions pertaining to mental wellbeing experienced within the past 14 days. Response options were: 1. none of the time; 2. rarely; 3. some of the time; 4. often; 5. all of the time. Summing item scores leads to a score between 7 and 35, the higher the score, the higher mental wellbeing. The final scores are then commonly transformed to a metric score to enhance scaling properties (for more information, see Stewart-Brown et al., 2009).

Further, cut-points for SWEMWBS have been proposed in prior research (Santini et al., 2020; Stewart-Brown et al., 2015) for three population groups in the Danish general population: a low mental wellbeing category, a moderate mental wellbeing category and a high mental wellbeing category. These cut-points have recently been shown to significantly predict differential risk for common mental disorders (Santini et al., 2022). The cut-points for SWEMWBS are as follows (on the transformed metric score): low mental wellbeing 7.00–19.98 (or 7–22 without conversion to metric score); moderate mental wellbeing 19.99–29.30; and high mental wellbeing 29.31–35.00. SWEMWBS was included in both surveys, and for this study, we utilized the SWEMWBS categorical variable measured in 2020 (low wellbeing as base outcome or reference category), while the 2019 categorical variable was used for adjustment.

Exposure: Engagement in arts and culture activities

Engagement in arts and culture activities was assessed in the baseline survey using four items. These four items and their response categories were similar to those used in previous related studies (Fancourt & Steptoe, 2019; Fancourt & Tymoszuk, 2019; Løkken et al., 2020). Participants were asked how often they typically engaged in the following arts and culture activities: (a) going to a concert, a musical event or a festival; (b) going to see a theatre show or other performing arts; (c) visiting a museum or another form of exhibition and (d) going to the cinema. There were five response options: 1. Never; 2. At least once per year; 3. At least once every third month; 4. At least once per month and 5. At least once per week. A new variable for each activity (four in total) was created, each coded in the following way according to the frequency of arts and culture activities in a year: never = 0; At least once per year = 1; at least once every third month = 4; at least once per month = 12; at least once per week = 52. These four variables were then summed up. Finally, a combined variable was created for the frequency of engaging in the four activities as follows: 0 = no arts and culture activity; 1 = 1–2 times per year (once per year or every 6 months); 2 = 3–7 times per year (about once every quarter to about every second month); 3 = 8 times per year or more (about once every 6 weeks or more). Cronbach's alpha for the four items was .74 indicating acceptable internal consistency.

Covariates

The selection of covariates was based on previous literature (Cuypers et al., 2012; Fancourt & Steptoe, 2019; Fancourt & Tymoszuk, 2019). The sociodemographic covariate variables were: age; sex (female, male); country of origin (Denmark; other); marital status (never married or in a registered partnership; married or registered partnership; widowed or divorced) and educational level (primary/10th grade; high school or vocational; tertiary education). Three variables pertaining to health status were included. To classify the presence of chronic conditions, we used the Charlson Comorbidity Index (CCI). The CCI is based on 19 different medical conditions (myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer disease, mild liver disease, diabetes mellitus, hemiplegia, moderate/severe renal disease, diabetes mellitus with

chronic complications, any tumour, leukaemia, lymphoma, moderate/severe liver disease, metastatic solid tumour and AIDS), each weighted and assigned 1–6 points according to its potential impact on mortality, derived from relative risk estimates (Thygesen, Christiansen, et al., 2011). The CCI score was categorized into three comorbidity levels: CCI = 0, CCI = 1–2, CCI≥3. Activity limitations were assessed by asking about physical limitations in terms of difficulty walking or climbing stairs. Respondents were categorized as having difficulty with walking if they responded positively to having problems with walking 500 meters on a flat surface without aids or problems climbing 12 steps of stairs. The items for assessing difficulty walking or climbing stairs came from the Budapest Initiative – Mark 2 (UN, 2013). Participants were also asked the extent to which they had experienced physical pain within the past 4 weeks. Responses ranged from 1 to 6 and were as follows: 1 'no pain', 2 'very light pain', 3 'light pain', 4 'moderate pain', 5 'severe pain' and 6 'very severe pain'. The item for assessing physical pain came from the SF-36 Health Survey (Ware Jr, 1999). Finally, in terms of social network size, participants were asked 'How many persons are so close to you, that you can count on them, if you have serious personal problems?'. Response options were none, one to two persons, three to five persons, and six persons or more. The item for social network size came from the Oslo Social Support Scale (OSS-3) (Kocalevent et al., 2018).

Statistical analysis

STATA version 16 was used to perform all analyses. First, a descriptive analysis was conducted to describe the characteristics of the sample. These analyses included frequencies, proportions, means, and standard deviations (SD). Next, multivariable logistic regression analysis was used to assess the associations between arts and culture engagement and depression. As stated above, cultural engagement (exposure variable) was based on data collected at baseline (2019), with the two outcomes of incident depression and persistent depression collected in 2020. Incident depression was assessed among those without depression at baseline (i.e. a PHQ-8 score below 10), and referred to new cases of depression (i.e. a PHQ-8 score of ≥10) at follow-up. Thus, those with depression at baseline were omitted from the analysis on incident depression. On the other hand, persistent depression was evaluated only among those who had depression at baseline (i.e. a PHQ-8 score of ≥10), and was defined as the presence of depression at follow-up. Our models adjusted for sex, age, educational level, country of origin, CCI, pain, physical limitations and social network size based on information obtained in the baseline survey. Further, because many studies linking cultural engagement and depression have been conducted on samples with older adults (Fancourt & Steptoe, 2019; Fancourt & Tymoszuk, 2019), and because gender differences (Cuypers et al., 2012; Ekholm et al., 2016; Løkken et al., 2020) and a social gradient generally can be observed for cultural engagement (Fancourt & Steptoe, 2019), we tested for interaction by including product terms of cultural engagement and age (below 65 years old vs. 65 years old or above), which is generally considered standard retirement age, cf. (Herzog et al., 1991; Majer et al., 2011; Ryan & Sinning, 2010; Vermeer et al., 2019), gender as well as educational level (primary–high school vs. tertiary education) in the model. Finally, similarly to previous studies (Santini et al., 2020), we conducted multinomial logistic regression model across the entire sample (not stratified by depression/no depression), with the categorical SWEMWBS variable as the outcome. The model was adjusted for sex, age, educational level, country of origin, CCI, pain and physical limitations, and the SWEMWBS categorical variable in 2019. In all analyses, a statistical weight based on age and gender was taken into account to minimize non-response and attrition bias (Rosendahl Jensen et al., 2021).

RESULTS

The mean age of the study sample was 50.4 years, and 52.8% were females (see Table 1 for descriptives). Frequencies for engaging in arts and culture activities were: no activity, 406 (6.9%); 1–2 times per year, 881 (18.2); 3–7 times per year, 1857 (40.3%); 8 times per year or more, 1670 (34.5%). Figure 1 shows preva-

lence of depression by frequencies of arts and culture engagement in 2019 (cross-sectional only and no stratification by depression or no depression), while Figure 2 shows the mental wellbeing proportions in 2019 (cross-sectional only). A clear trend of favourable mental health status for each increase in arts and culture engagement was observed. This was particularly the case for depression and low mental wellbeing.

Regarding incident and persistent depression from baseline (2019) to follow-up (2020), the numbers were as follows: among participants that did not screen positive for depression at baseline (N = 4413), there were 212 (5.6%) new cases of depression at follow-up. Among participants that screened positive for depression at baseline (N = 334), 183 (63.1%) screened positive for depression at follow-up.

Table 2 shows the logistic regression models estimating associations [shown as odds ratios (ORs)] between cultural engagement at baseline and incident or persistent depression at follow-up. In terms risk of incident depression, engaging in cultural activities 3–7 times per year (compared to never) was associated with reduced risk (OR = .43, 95%CI .23–.80), while 8 times per year or more was similarly associated with reduced risk (OR = .53, 95%CI .29–.97). In terms risk of persistent depression, 3–7 times per year (compared to never) was associated with reduced risk (OR = .30, 95%CI .10–.90), while 8 times per year or more was also similarly associated with reduced risk (OR = .26, 95%CI .07–.92). Both in terms of incident and persistent depression, ORs for 1–2 times per year did not reach statistical significance.

Table 3 shows the multinomial logistic regression with mental wellbeing levels at follow-up as the outcome variable. The results for moderate mental wellbeing (as compared to low) were similar to the results for incident/persistent depression, where cultural engagement of 3–7 times per year was associated with increased odds (OR = 1.83, 95% CI 1.14–2.94), and 8 times per year or more was also associated with increased odds but to a lesser extent (OR = 1.65, 95%CI 1.01–2.68). The results for high mental wellbeing did not reach statistical significance, although cultural engagement of 3–7 times per year also showed increased odds (OR = 1.24, 95%CI .68–2.26) for high mental wellbeing.

Finally, the interaction terms between cultural engagement and gender, age and educational level, were not significant with regard to the incidence or persistence of depression or mental wellbeing at follow-up (results not shown).

DISCUSSION

In this study, using a representative sample of adults in the Danish general population, we set out to investigate the association between arts and culture activities (going to a concert, musical event, or festival, a theatre show, a museum or exhibition, or a cinema) in 2019 and incident/persistent depression in 2020 as well as mental wellbeing in 2020. We found that engaging in receptive arts and culture activities, particularly quarterly or more was associated with reduced risk of incident and persistent depression, as compared to no arts and culture engagement.

Our first hypothesis concerning incident depression was supported. Aligning with previous research (Cuypers et al., 2012; Fancourt & Steptoe, 2019; Fancourt & Tymoszuk, 2019), we found that quarterly (3–7 times per year) arts and culture engagement was associated with reduced risk of depression among participants free of depression at baseline. Our second hypothesis was also supported. Quarterly arts and culture engagement was associated with lower risk of depression among those with depression at baseline as compared to no cultural engagement. Finally, our last hypothesis concerning mental wellbeing levels was partly supported. The association between cultural engagement and moderate mental wellbeing were very similar to those with incident and persistent depression, indicating the same overall pattern in ORs. This was also the case for high mental wellbeing when the frequency for cultural engagement was at least once per quarter, although these results did not reach statistical significance. The results suggest that arts and culture engagement among the general population is more robustly associated with preventing poor mental health (the low end of a mental wellbeing continuum), than it is with promoting high mental wellbeing (the high end of a mental wellbeing continuum). It is possible that although arts and culture activities may promote mental wellbeing, other factors are necessary as well to promote high levels, such as the fostering of close social ties and social connectedness (Santini et al., 2020). In this study, we adjusted

TABLE 1 Characteristics of the study sample in the Danish Health and Wellbeing Survey at baseline (2019).

		Unweighted N (weighted %)	Unweighted N (weighted %)	Unweighted N (weighted %)	Unweighted N (weighted %)
		Arts and culture engagement			
Characteristic	**Category**	**No activity**	**1–2 times per year**	**3–7 times per year**	**8 times per year or more**
	Total	406	881	1857	1670
Age ($p < .001$)	Mean (SD)	65.2 (15.5)	55.2 (18.0)	52.3 (17.4)	56.2 (17.2)
Gender ($p < .001$)	Female	192 (44.5)	479 (50.2)	1097 (54.1)	1050 (58.7)
Marital status ($p < .001$)	Never married/ registered partnership	48 (14.1)	105 (14.5)	254 (17.2)	229 (17.2)
	Married or in registered partnership	257 (63.3)	639 (72.3)	1355 (71.7)	1152 (67.9)
	Widowed or divorced	101 (22.6)	137 (13.2)	248 (11.1)	289 (14.9)
Country of origin ($p = .046$)	Other (not Denmark)	38 (8.4)	62 (6.8)	113 (6.3)	115 (7.4)
Education[a] ($p < .001$)	Primary-10th grade	157 (37.8)	191 (20.6)	227 (11.7)	161 (10.1)
	High school or vocational	158 (38.9)	419 (47.6)	718 (38.7)	510 (30.5)
	Tertiary	75 (20.3)	266 (31.4)	893 (49.6)	986 (58.6)
Physical limitations[b] ($p < .001$)	Any limitation	173 (36.3)	202 (18.5)	232 (10.1)	221 (11.2)
Charlson comorbidity index ($p < .001$)	CCI = 0	94 (27.7)	307 (41.4)	816 (52.1)	695 (49.3)
	CCI = 1–2	85 (22.4)	233 (26.8)	456 (23.4)	430 (24.9)
	CCI≥3	214 (49.9)	326 (31.8)	541 (24.5)	495 (25.9)
Pain[c] ($p < .001$)	Mean (SD)	2.7 (1.5)	2.5 (1.4)	2.4 (1.3)	2.2 (1.2)
Social network size[d] ($p < .001$)	None	31 (5.8)	17 (1.4)	18 (0.9)	25 (1.4)
	1–2 persons	169 (40.7)	292 (30.5)	408 (19.9)	328 (18.0)
	3–5 persons	138 (35.4)	335 (39.5)	787 (42.5)	668 (40.7)
	6 persons or more	66 (18.1)	233 (28.6)	641 (36.7)	649 (39.9)
Case depression[e,f] ($p < .001$)	Present	48 (11.8)	83 (7.9)	107 (5.5)	80 (4.8)
Mental wellbeing[g,h] ($p < .001$)	Low	96 (22.1)	178 (19.9)	238 (12.4)	183 (11.7)
	Moderate	179 (55.7)	468 (60.0)	1160 (66.8)	944 (60.5)
	High	76 (22.1)	183 (20.1)	398 (20.7)	480 (27.8)

Note: Data are unweighted n (weighted %) unless otherwise specified. *p*-values were obtained by Chi-squared tests for categorical valuables and one-way ANOVA for continuous variables.

[a]Missing data for education: no activity 16 (3.9); 1–2 times per year 5 (.6); 3–7 times per year 19 (1.0); 8 times or more 13 (.8).

[b]Missing data for physical limitations: no activity 3 (.7); 1–2 times per year 6 (.7); 3–7 times per year 9 (.5); 8 times or more 15 (.9).

[c]Missing data for pain: no activity 4 (1.0); 1–2 times per year 2 (.2); 3–7 times per year 1 (.1); 8 times or more 4 (.3).

[d]Missing data for social network size: no activity 2 (.5); 1–2 times per year 4 (.5); 3–7 times per year 3 (.2); 8 times or more 0 (.0).

[e]Based on the PHQ-8 depression screening tool.

[f]Missing data for depression: no activity 41 (10.7); 1–2 times per year 25 (2.8); 3–7 times per year 51 (2.8); 8 times or more 52 (3.1).

[g]Based on the SWEMWBS scale.

[h]Missing data for mental wellbeing: no activity 55 (13.6); 1–2 times per year 52 (5.9); 3–7 times per year 61 (3.3); 8 times or more 63 (3.8).

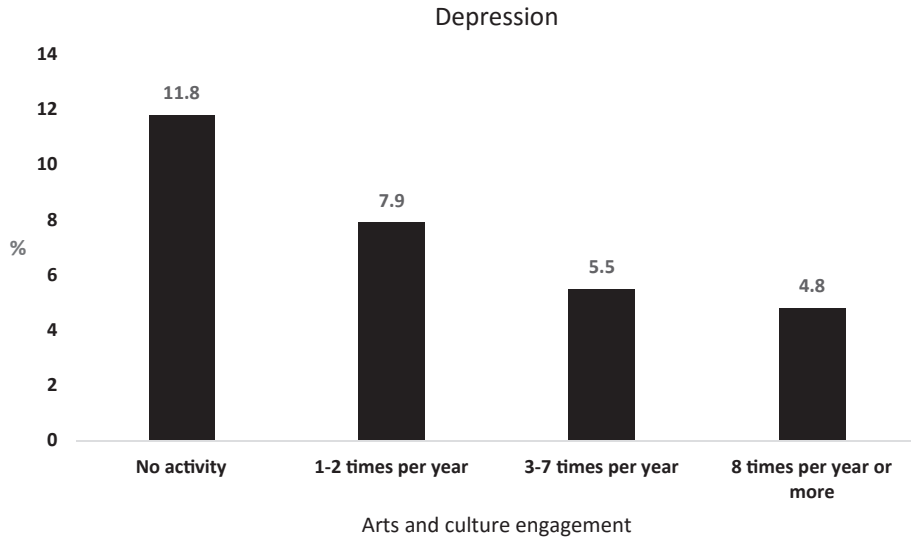

FIGURE 1 Cultural activities and depression prevalence in 2019. The y-axis shows the weighted percentage of depression in each group. Prevalence proportions were significantly different ($p < .001$). *p*-values were obtained by Chi-squared tests.

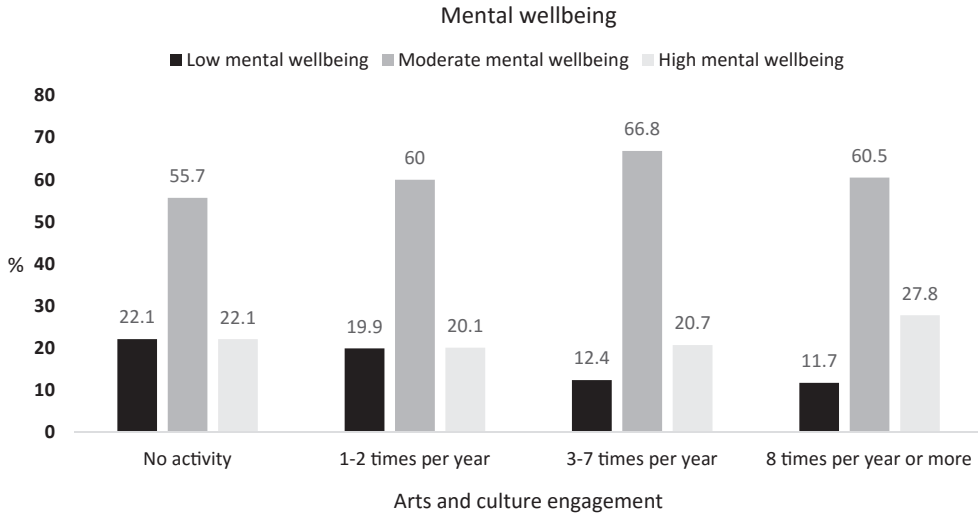

FIGURE 2 Cultural activities and mental wellbeing prevalence in 2019. The y-axis shows the weighted percentage of mental wellbeing categories in each group. Prevalence proportions were significantly different ($p < .001$). *p*-values were obtained by Chi-squared tests.

for social network size (the number of close social ties) at baseline, since people may be more likely to engage in arts and culture activities if they have a close friend or family member with whom they can engage in such activities. The associations remained significant after this adjustment, suggesting that arts and culture activities in and of themselves may benefit mental health regardless of social network size. That said, having a good network of close social ties provides an ongoing resilience factor (i.e., through social suport) as well as regular opportunity for social activity (Christakis & Fowler, 2011; Dunbar, 2022), and arts and culture activities may lead to enhanced social connectedness over time (Cohen, 2006; Cotter & Pawelski, 2022; Pearce et al., 2015, 2016; Vogelpoel & Jarrold, 2014; Wilson et al., 2017). It is possible

TABLE 2 Associations between arts and culture engagement at baseline and incident or persistent depression at follow-up in the Danish general population.

	Logistic regression		
	OR	**95% CI**	***p*-value**
Incident depression[a]			
Arts and culture engagement (2019)			
No activity (reference category)	1		
1–2 times per year	.66	.34, 1.27	.202
3–7 times per year	.43	.23, .80	.008
8 times per year or more	.53	.29, .97	.040
Persistent depression[b]			
Arts and culture engagement (2019)			
No activity (reference category)	1		
1–2 times per year	.55	.17, 1.75	.313
3–7 times per year	.30	.10, .90	.033
8 times per year or more	.26	.07, .92	.036

Abbreviations: CI, confidence interval; OR, odds ratio.

[a]Sample restricted to those without depression at baseline (N = 4413). Adjusted for age, gender, country of origin, marital status, education, chronic conditions, physical limitations, pain and social network size at baseline.

[b]Sample restricted to those with depression at baseline (N = 334). Adjusted for age, gender, country of origin, marital status, education, chronic conditions, physical limitations, pain and social network size at baseline.

TABLE 3 Associations between arts and culture engagement at baseline and mental wellbeing at follow-up in the Danish general population.

	Multinomial logistic regression		
	OR	**95% CI**	***p*-value**
Moderate mental wellbeing[a]			
Arts and culture engagement (2019)			
No activity (reference category)	1		
1–2 times per year	1.53	.89, 2.40	.092
3–7 times per year	1.83	1.14, 2.94	.012
8 times per year or more	1.65	1.01, 2.68	.044
High mental wellbeing[a]			
Arts and culture engagement (2019)			
No activity (reference category)	1		
1–2 times per year	.93	.50, 1.75	.831
3–7 times per year	1.24	.68, 2.26	.476
8 times per year or more	1.01	.55, 1.86	.976

Abbreviations: CI, confidence interval; OR, odds ratio.

[a]Estimates for outcomes on moderate and high mental wellbeing were made relative to low mental wellbeing as part of the same multinomial regression model. The entire sample was used (N = 5000). Adjusted for age, gender, country of origin, marital status, education, chronic conditions, physical limitations, pain, social network size and mental wellbeing categories at baseline.

that arts and culture activities in combination with subsequent improvements in social connectedness could lead to higher mental wellbeing levels. To our awareness, this has yet to be investigated.

Overall, our results align with previous literature suggesting that arts and culture engagement has preventative properties, both among the population without depression and among the population segment that is suffering from depression. Research suggests that the inverse relationship between arts and

culture engagement and depression operates via a combination of psychological, social and behavioural factors. Arts and culture engagement can for example support emotion regulation (e.g. distraction from stress, worry and rumination; facilitate problem solving, foster self-esteem and positive emotions) (Cotter & Pawelski, 2022; Crone et al., 2018; Fancourt et al., 2019; Fancourt & Williamon, 2016; Hoffmann & Russ, 2012; Ivcevic & Brackett, 2015; McCrary et al., 2022), provide health promoting cognitive and intellectual stimulation (e.g. facilitating reflective thought or contemplative states, feelings of being immersed or absorbed in an artwork) (Bone & Fancourt, 2022; Camic & Chatterjee, 2013; Fancourt & Steptoe, 2018a; Wang & Blazer, 2015), build resilience and enhance coping mechanisms (Bolwerk et al., 2014; Fancourt & Steptoe, 2018b; Hutchinson et al., 2003; Perkins et al., 2018), provide opportunities for social interaction (conducive to social support and the buffering of stress) (Cohen, 2006; Cotter & Pawelski, 2022; Pearce et al., 2015, 2016; Vogelpoel & Jarrold, 2014; Wilson et al., 2017), reduce sedentary behaviours and promote health behaviours and interaction with the outside world (in contrast to the social withdrawal and isolation associated with depression) (Clift et al., n.d.; Clift et al., 2008; Løkken et al., 2020; Teychenne et al., 2010). Furthermore, a recent meta-analysis across 26 studies of music-interventions found that engaging with music – whether actively (music making) or receptively (music listening) – has similar effects on mental health (albeit at the low end of the range) as other established non-pharmaceutical and medical interventions (e.g. exercise or weight loss) (McCrary et al., 2022). Thus, there is good reason to include cultural and creative sectors in prevention and mental health promotion strategies and to encourage arts and culture engagement universally.

However, whereas other types of mental health promoting activities may readily be engaged in with high frequency as a means to prevent depression and poor mental health (e.g. weekly or daily physical activity, regularly spending time with friends and close social ties), our results show that the frequency of arts and culture engagement can be a minimum of just once per quarter. This finding makes practical sense, since arts and culture engagement is usually not something that people can or tend to engage in with high frequencies (e.g. it is uncommon to go to a cinema or a museum on a weekly basis). Again, higher frequencies are also associated with reduced risk for depression and poor mental health, but ORs were similar regardless of frequencies being quarterly or more. Thus, public mental health promotion and prevention strategies, social inclusion initiatives, or mental health campaigns can, based on our findings, recommend engaging in arts and culture activities on an average of at least once or twice every quarter.

Relevant mental health campaigns to encourage mentally healthy behaviours and lifestyles in the whole population exist and can be readily implemented as a means to encourage arts and culture engagement (Koushede & Donovan, 2022). Specifically, such campaigns seek to promote behaviours and lifestyles known to be associated with good mental health through (1) active lifestyles, (2) social connectedness and (3) meaningful commitment or contribution to society. While there is a multitude of behavioural factors that may benefit mental health, a number of studies have shown that these three behavioural domains – known as *Act-Belong-Commit* or *the ABCs of Mental Health* – are associated with favourable positive mental health outcomes (Santini et al., 2018) as well as being negatively associated with risk for depressive disorders and other mental health problems (Santini et al., 2017). Act-Belong-Commit is a mental health campaign and framework for mental health promotion, which is currently developing in various countries and settings, including Denmark (Donovan et al., 2021; Koushede & Donovan, 2022).

The use of arts and culture activities for mental health and wellbeing is now commonplace in some parts of the world (Tomlinson et al., 2018) and we have recently seen a development in Denmark (Jensen, 2019; Jensen et al., 2016, 2020) where Arts on Prescription (AoP) programmes are used as a component in social or mental health care, and usually involve a number of consecutive weeks with high frequencies of engaging in a variety of arts and culture activities. AoP is delivered in a similar approach to that of exercise on prescription (Bungay & Clift, 2010) and is a model where participatory arts and culture activities are offered for health and wellbeing purposes and often to individuals with mental health challenges (Jensen, 2022). Studies show that AoP can, among other things, benefit mental health and wellbeing as well as promote social connectedness and positive social relationships for people struggling with poor mental health (Jensen, 2019). Given the decline in mental health in the Danish population and the need for more non-pharmaceutical approaches, as well as recent research suggesting that arts and culture

engagement in Scandinavia is important for mental health and wellbeing throughout the life-course (Jensen et al., 2020), we see a potential in building robust links between the health sector and the arts sector. Linking public mental health and wellbeing strategies to regional and local policies can help to ensure implementation of arts and culture activities in local communities and delivery of such in supportive and appropriate frameworks (Dow et al., 2023; WHO, 2022). An example of such practice is seen in Scania in southern Sweden where a regional Arts & Health Strategy (2022–2030) was been developed in collaboration between different political committees and boards (Region_Skåne, 2022), which also ensures that arts and culture activities are commonplace for health promoting and healthcare initiatives.

Strengths and limitations

Some strengths and limitations should be kept in mind when interpreting the results. Major strengths include the nationally representative survey, the prospective design (including the adjustment for confounders such as chronic conditions, physical limitations and pain), the use of a validated depression scale, and the link with national registers (as a means to link to relevant participant data such as country of origin and educational level). Some limitations are as follows: First, the response rate was not ideal (47.7%), and although common in survey-based research, non-response bias cannot be ruled out. Unit non-response was associated with male sex, younger age, being unmarried and lower educational level (Rosendahl Jensen et al., 2021). In terms of the longitudinal survey-based analyses, the proportion of baseline participants that took part in the follow-up survey was relatively high (75.4%), but there is a possibility for attrition bias in this part of the study. We have applied non-response and attrition weights in all analyses to reduce this potential bias. Second, this is an observational study which precludes causality inference, and we cannot rule out unmeasured confounding.

Finally, it may be noted that the follow-up survey took place in 2020, which was the first year of the COVID-19 pandemic. Numerous studies have shown that the pandemic and the subsequent lockdown had a negative impact on the mental health of many individuals (Thygesen et al., 2021). Thus, we cannot exclude the possibility that the associations would differ to some extent if the assessment of depression at follow-up had taken place in times without a pandemic. Lockdowns during the pandemic also precluded arts and culture engagement in these relatively short periods in 2020, although it should be kept in mind that our predictor pertained to arts and culture engagement before the pandemic. Arts and culture activities in 2019 may in and of themselves have conferred some mental health resilience against the coming pandemic. Even in periods of lockdown 2020, it is also possible that those with higher levels of arts and culture engagement in 2019 may have maintained activities in other ways that were not affected by lockdowns (e.g. outdoor activities and online/virtual activities).

CONCLUSION

In this study, we utilized a representative sample of the Danish adult population to investigate the association between arts and culture activities (going to a concert, a musical event, or a festival, a theatre show, a museum or an exhibition, or a cinema) in 2019 and incident or persistent depression in 2020. The results showed that engaging in arts and culture activities at least once per quarter was associated with reduced risk of incident and persistent depression. Associations between cultural engagement and moderate mental wellbeing were similar to the results for incident/persistent depression, namely showing higher odds of moderate mental wellbeing (as compared to low) for arts and culture activities at least once per quarter. The results for high mental wellbeing also indicated higher odds with quarterly arts and culture activities, however, these estimates did not reach statistical significance. Our results support the involvement of the cultural and creative sectors in prevention strategies, for example through partnerships in mental health promotion campaigns. Mental health initiatives as well as arts and culture sectors may encourage the general public to engage in arts and culture activities with frequencies of at least once per quarter.

AUTHOR CONTRIBUTIONS

Ziggi Ivan Santini: Conceptualization; formal analysis; methodology; writing – original draft; writing – review and editing. **Lau Caspar Thygesen:** methodology; supervision; writing – review and editing. **Steinar Krokstad:** writing – review and editing. **Lars Ole Bonde:** writing – review and editing. **Robert J. Donovan:** methodology; writing – review and editing. **Vibeke Koushede:** writing – review and editing. **Anita Jensen:** writing – review and editing. **Ai Koyanagi:** methodology; supervision. **Ola Ekholm:** Conceptualization; formal analysis; methodology; supervision; writing – review and editing.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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