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Running head: ENCOUNTERS WITH ART AND WELL-BEING

An Investigation of the Impact of Encounters with Artistic Imagination on Well-Being

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Abstract

Evidence about the impact of art on well-being is confined to studies of participatory arts and receptive arts that involve attending cultural events. This investigation examined the impact of art on well-being by framing people's engagement with art as encounters with artistic imagination. These encounters include traditional forms of cultural activity, such as a gallery or theatre visit, but also encompass everyday activities, such as watching a screen drama or reading fiction. Three studies examined how such encounters affect emotional well-being, life satisfaction, meaning in life, and mental well-being. A survey study ($N = 544$) found that participants on average spent over 4hr engaged with art the previous day. This study and an experience-sampling study ($N = 50$), in which participants completed a questionnaire via their smartphones twice daily for 10 days (854 responses), revealed that variety of encounters with art and accompanying elevating emotional experiences were associated with well-being. Live arts engagement was positively associated with all aspects of well-being, and visual and literary arts with greater meaning in life, whereas screen arts, audio arts and sports spectating (for comparison) were not positively associated. A third study using (live) arts attendance and well-being data ($n = 27,918$) from two waves (3-yr interval) of a large longitudinal panel survey showed that frequency of attendance predicted subsequent well-being, whereas arts participation did not. Overall, the evidence indicates that encounters with artistic imagination contribute to people's well-being, with effects varying according to the art form and the type of well-being assessed.

Keywords: Art, Culture, Imagination, Well-Being, Meaning

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“We spend our days, each one of us, in looking for the secret of life.

Well, the secret of life is in art”

(Oscar Wilde, 1882/2016)

What did the arts ever do for us? From the perspective of the artist, art enables expression of feelings and ideas, and from the perspective of the audience, it provides encounters with those feelings and ideas, but do those encounters enhance how people feel during and about their lives? Research concerning the effects of art on well-being has largely been confined to participatory art activities (i.e., creating or taking part in art) and selective receptive art activities (i.e., hearing, reading or viewing art). In a series of three studies, we investigate what engaging with others’ artistic imagination and associated emotional experiences contribute to people’s well-being.

Aesthetic Emotion and Well-Being

A pertinent way in which engaging with art might confer personal benefits for well-being is through the emotional experiences that it provides. Mastandrea, Fagioli and Biasi (2019) recently proposed that aesthetic experience, which is the appreciation of aesthetic objects, promotes health and well-being. They contend that the psychological distancing involved in aesthetic experience enables a pleasurable reward irrespective of the emotional valence of the object’s content. Aesthetic experiences can arise from human objects including artworks but also from natural objects such as forests and mountains. Pleasurable experiences arising from time spent immersed in nature have helped explain its hedonic impact on well-being (Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015).

Emotions that commonly occur in response to aesthetic objects, including emotions such as awe and surprise, have been termed aesthetic emotions and are differentiated by the cognitive appraisals that bring them about (Fayn, MacCann, Tiliopoulos, & Silvia, 2015). Awe experienced in response to nature has been shown to explain positive changes in well-being beyond other emotions

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(Anderson, Monroy, & Keltner, 2018). This may in part be due to the capacity of awe to expand time perceptions thereby making life seem less rushed (Rudd, Vohs, & Aaker, 2012). Silvia, Fayn, Nusbaum, and Beaty (2015) characterized awe as part of a family of elevating states involved in profound experiences and showed that these experiences covary across nature and art domains. According to Huta and Ryan (2010), elevating feelings involve feeling connected with a broader level of functioning and represent a “higher range” of well-being experiences. Elevating feelings – such as inspiration and awe – have been identified as having an impact on eudaimonic well-being in response to an aesthetic experience (Capaldi et al., 2015).

Accounts of personal well-being can be divided into three types according to whether they emphasize: having pleasant experiences in daily life (hedonic/emotional well-being), a life of meaning and personal growth (eudaimonic well-being), or a positive cognitive evaluation of one’s life (life satisfaction). The term subjective well-being (SWB) has been used to refer to the combined evaluations that people make of their life including their life satisfaction and emotional well-being (i.e., having frequent or intense pleasant feelings and infrequent or weak negative feelings) (e.g., Diener, 1984). Some measures of personal well-being combine its eudaimonic and hedonic aspects, and sometimes focus on symptoms of social functioning or mental health (e.g., Goldberg, 1972; Tennant et al., 2007). Concerning activities that are likely to lead to well-being, research indicates that typically hedonic pursuits (e.g., activities aimed at seeking fun) relate to experiencing pleasant affect, while eudaimonic pursuits (e.g., activities aimed at seeking an ideal) relate to having meaning in life, and both are related to life satisfaction (Huta & Ryan, 2010). The relative effects of engaging with art on these three types of well-being is not yet clear.

The Psychological Impact of Art

Much of the relevant research pertaining to the psychological impact of art has conceptualized the arts as cultural engagement and leisure, including activities such as visits to

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museums, libraries and historical sites, and leisure activities such as visiting friends and pursuing hobbies. Psychological explanations offered for the positive effects of cultural engagement and leisure on physical and mental health and cognition have included: affect-enhancement, stress-reduction, and social contact (Fancourt & Steptoe, 2018), needs gratification, arousal, communication, and enriched environment (Konlaan, Bygren, & Johansson, 2000), recovery, autonomy, mastery, meaning and affiliation (Newman, Tay, & Diener, 2014), and preparation for future events (Brygen, Konlaan, & Johansson, 1996). In a review of arts engagement and health-related research, Gordon-Nesbitt (2015) categorized the principal explanations as involving effects of increased social capital, improved cognition, protection from strain, and enriched environment.

Relevant empirical studies have usually investigated participatory art activities rather than receptive art activities or have not distinguished between the two types. When receptive activities have been studied, they have usually been studied as a single entity or restricted to attendance at cultural events (e.g., theatre, concert, opera, cinema) (see Fancourt & Steptoe, 2018; Gordon-Nesbitt, 2015). Studies have found positive effects of cultural engagement on a range of outcomes, including prosociality (Van de Vyver & Abrams, 2018), cognitive function (Fancourt & Steptoe, 2018), self-reported health (Johansson, Konlaan, & Bygren, 2001), physiology (Konlaan, Björby, Bygren et al., 2000), stress reduction (Clow & Fredhoi, 2006), protection against obesity (Cuypers et al., 2012) and dementia (Wang, Karp, Winblad, & Fratiglioni, 2002), cancer-related mortality (Brygen et al., 2009), coronary related morbidity and mortality (Sundquist, Lindström, Malmström, Johansson, & Sundquist, 2004), and survival (Brygen et al., 1996; Konlaan, Bygren, & Johansson, 2000; Vaananen et al., 2009). In relation to cultural attendance, not all studies have found positive effects (e.g., Lennartsson & Silverstein, 2001) and effects can depend on the specific cultural activity involved. For example, Konlaan et al. (2000) found positive effects of more frequent cinema, concert and art exhibition attendance on survival, but no equivalent effects for theatre

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attendance or reading.

Art and well-being. Research concerning the effects of art specifically on well-being has mostly been confined to participatory art activities and has often occurred in the context of healthcare. That research has typically found positive changes in well-being such as reduced stress and anxiety following a range of participatory arts interventions including painting, creative writing, dance, drama, and singing (Staricoff, 2004; Stuckey & Nobel, 2010), but the quality of studies has often been limited and effects are sometimes short-term (e.g., Esterling, L'Abate, Murray, & Pennebaker, 1999).

We have identified four studies examining the link between receptive arts and well-being outside of health-care settings. First, Wheatley and Bickerton (2017) examined the impact of engagement in arts and sport on well-being. Using data from a large national annual survey (wave 2 of the “Understanding Society” dataset) they found that attendance at arts events was positively associated with well-being even when attendance occurred less than once a week. Second, using the same data, Fujiwara, Kudrna, and Dolan (2014) concluded that attendance at arts events affects health positively but participation in arts does not. Their analysis found that attendance at cinemas, exhibitions, plays, and music concerts was linked with greater life satisfaction. Third, a study by Leadbetter and O’Connor (2013) found that attendance at cultural places and events (museums, cinema, and dance) was associated with higher levels of life satisfaction. Fourth, a study by Cuypers et al. (2011) of both receptive and participatory art activities found significant associations between receptive art activities, such as attending art exhibitions, concerts, theatre and film, and aspects of well-being including greater life satisfaction and lower depression and anxiety.

Longitudinal research on the impact of art. The aforementioned four studies of cultural engagement and well-being were cross-sectional in design, but longitudinal studies of cultural engagement do exist for other types of outcome variable (e.g., prosociality – Van de Vyver &

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Abrams, 2018). Gordon-Nesbitt (2015) identified 14 studies stemming from Scandinavia that demonstrate the longitudinal impact of cultural participation and cultural attendance on health outcomes (including some psychological outcomes) in non-clinical settings over long periods of time (i.e., years). However, none of these studies examined within-person associations between cultural engagement and outcomes over time. Such an approach would enable comparisons between occasions (e.g., occasions with no engagement vs. occasions with engagement) rather than comparisons between individuals which may be confounded by individual and demographic differences (see Gordon-Nesbitt, 2015, p. 55).

Current Research Investigation

The current investigation offers an alternative to predominant cultural perspectives on art that have focused on its intrinsic and instrumental merits (e.g., Vuyk, 2010). Instead we have sought to understand and assess the prevalence and psychological value of the arts to well-being in everyday life by conceptualizing receptive arts activity as encounters with artistic imagination. This conception encompasses the full range of possible art forms (visual, literary, audio, screen, performance/live) and includes what might be deemed “low art” (e.g., soap opera) as well as “high art” (e.g., opera), and on-demand art (e.g., music streaming) as well as event art (e.g., art exhibition). In alignment with scholars who have identified aesthetic experience as central to the contribution of art to well-being, we have examined how people’s emotional responses to encounters with artistic imagination contributes to their well-being by studying their elevating feelings.

We conducted three studies to elucidate the variety, duration, and emotional impact of people’s everyday encounters with artistic imagination, and their effects on well-being. The three studies used different research methods and different timescales. Study 1 was a survey of 500+ adults that examined their encounters with artistic imagination and well-being across the course of

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one day. This research design was used to test associations between encounters with art and well-being based on between-person comparisons. Study 2 was an experience-sampling study of 50 adults who reported their encounters with artistic imagination and their well-being twice a day for 10 days. This research design was used to test associations between encounters with arts and well-being based on within-person comparisons (i.e., how well-being varied in relation to arts engagement from half-day to half-day). Study 3 was a longitudinal survey of 27,000+ adults that tested whether their annual frequency of attendance at live arts events was associated with their well-being three years later. The size of this dataset enabled inclusion of a large set of control variables. We included several other features in the design of the studies that add value to extant research: the diversity of receptive arts studied, the inclusion of people's emotional response to their encounters with art, the range of well-being measures used, and the inclusion of benchmark activities for comparison.

Diversity of receptive arts. Studies of cultural engagement involving the receptive arts have mostly looked at events that are attended (i.e., performance/live arts). Some studies have included other types of activity (such as reading or watching TV) but the nature of these activities is rarely specified (e.g., whether they involved imagined worlds or real events) and the range of activity studied is usually quite restricted. In Studies 1 and 2, we have included a wide range of receptive arts activities that span visual, live, audio, screen and literary arts, and have looked at the separate effects of these categories.

Emotional response to art. Our studies examined the effects of variety and duration of encounters with art on well-being. However, according to Wheatley and Bickerton (2017), it may be the quality rather than the quantity of cultural experiences that is crucial to deriving positive experiences and obtaining effects on well-being. In line with this view, Djikic and Oatley (2014) proposed that individuals who resonate more strongly with art, as indicated by strong emotions, are

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more likely to incorporate other people's experience into their own and thereby produce changes to themselves. Consequently, in Studies 1 and 2, we examined the effect of elevating experiences (Huta & Ryan, 2010) in response to encounters with art, as well as looking at the effects of variety and duration on well-being.

Types of well-being. When people appreciate art it can contribute to their well-being in a fashion that is not just hedonistic (Oliver & Bartsch, 2010) but also extends to meaningfulness (e.g., Oliver & Raney, 2011). Yet the contribution of different categories of receptive art activities to different types of well-being is unknown. We therefore included measures of emotional well-being, life satisfaction, and eudaimonic well-being (meaning in life) in Studies 1 and 2 to examine these different relations.

Benchmark activities. Some studies of cultural engagement have included alternative activities against which the effects of cultural activity could be compared. Sports attendance (Konlaan, Bygren, & Johansson, 2000) and sports participation (Van de Vyver & Abrams, 2018; Wheatley & Bickerton, 2017) have both been used for this purpose. Sports attendance provides a good comparison activity for encounters with art because both entail participants being an audience to the activity. We therefore included sports attendance in Studies 1 and 2 but extended its reach to include all forms of sports spectating to make it comparable to a wider range of receptive arts (not just live events). For Study 3, we switched to using frequency of participation in sports as our comparison activity because taking part in exercise is firmly established as having positive associations with well-being (e.g., Downward & Rasciute, 2011).

Study 1

Method

Participants. A total of 544 participants took part in the study ($M_{age} = 32.45$ years, $SD = 12.93$, Range: 18-75). Of the sample, 70% were female and 29% were male; the remainder of the

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sample did not identify with either gender or opted not to say. The majority of the sample consisted of students (40%) and full-time workers (36%) but also included part-time workers (11%), those who are self-employed (4%), retired (3%), employed casually/occasionally (2%), unemployed (2%), volunteers (1%) and homemakers (1%). Nearly all participants (97%) reported currently living in the UK for most of the time. Fifty-three percent of the sample reported a household income below the UK median (less than GBP 35,200), 37% reported a household income above the UK median and the remainder of the sample opted not to answer. Participants were invited to take part in the online survey through a variety of means including a University staff and student mailing list, via social media (twitter, facebook), and leafleting at a sporting event. The study was described as an investigation into how people engage with the arts in daily life and how arts engagement is related to well-being and personality. Participants who completed the survey were entered in a prize draw to win a GBP 50 Amazon voucher. Ethics approval was obtained from the host university.

Measures.

Encounters with the arts.

Type of arts activity and duration. Participants were asked to think back to the previous day and consider “how you experienced and engaged with the arts such as through TV, radio, online (e.g., websites) or by attending various events”. The previous day for the majority (51%) of responses was Thursday. Fifteen percent of the responses were answered about Sunday, 10% about Monday, 7% about Tuesday, 7% about Saturday, 5% about Friday, and 5% about Wednesday. Participants selected all the arts activities that they had engaged with the previous day from a list of 10 activity groups which were later assembled into five broader arts categories as follows: (1) Visual arts (two activity groups: drawings/paintings/photography/video art, ceramics/sculpture/conceptual art), (2) Live arts (three activity groups): live music, dance, theatre (including opera, stand-up, verse), (3) Literary arts (two activity groups):

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book(fiction)/novel/story/comic, poetry, (4) Screen arts (two activity groups): film/movie, drama (including soaps and sitcoms), and (5) Audio arts (one activity group): recorded music. For comparative purposes, participants also indicated whether they watched, listened to or attended any sports activities the previous day. Participants recorded the amount of time they had spent on each activity the previous day to the nearest quarter of an hour.

Elevating experience of arts activity. Participants were asked to think about how the content of one of the activities – randomly selected from those that they had indicated they had engaged with the previous day (including sport) – had made them feel. They responded using the 8-item elevating experience scale (Huta & Ryan, 2010, Study 2). Elevating experience was a term used by Huta and Ryan (2010) to describe the “higher” range of well-being experiences which involve connection with and elevation to a broader level of functioning. The scale, which has been associated with eudaimonic pursuits, encompasses experiences of Inspiration (*inspired, enriched, morally elevated*), Awe (*in awe, deeply appreciating, emotionally moved*) and Transcendence or sense of connection with a greater whole (*connected with a greater whole, part of something greater than yourself*). Responses were made on a 5-point scale from 1(*not at all*) to 5(*a great deal*). Items were averaged such that higher scores represented greater elevating experience during the activity ($\alpha = .91$).

Well-being. After reporting on their arts encounters the previous day, participants rated various aspects of their well-being with reference to the previous day. When rating their well-being, participants were instructed to think back to everything that happened the previous day and consider the day as a whole. The scales were presented in a random order and the items in each scale were also individually randomized.

Emotional well-being. Emotional well-being was measured using the Multi-Affect Indicator (Warr, Bindl, Parker, & Inceoglu, 2014) which provides an index of both valence and arousal

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dimensions of core affect (Remington, Fabrigar, & Visser, 2010). Each of four subscales were measured using three items: a) high activation pleasant affect (*enthusiastic, joyful, excited*), b) low activation pleasant affect (*at ease, calm, laid back*), c) high activation unpleasant affect (*anxious, tense, worried*), and d) low activation unpleasant affect (*dejected, depressed, hopeless*). Participants rated the extent to which they felt each of the feelings described the previous day on a 5-point scale from 1(*not at all*) to 5(*a great deal*). The subscales for unpleasant affect were reverse scored and an overall score for emotional well-being was created from the mean of the four subscales ($\alpha = .81$).

Life satisfaction. Life satisfaction was measured using the 5-item Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) which was adapted to refer to the previous day (e.g., “*I was satisfied with my life yesterday*”, “*In most ways yesterday was close to my ideal*”). Participants rated their agreement with each item on a 7-point scale from 1(*strongly disagree*) to 7(*strongly agree*). Items were summed to provide an overall score where higher values indicate greater satisfaction with life the previous day ($\alpha = .88$).

Meaning in life. Presence of meaning in life the previous day was measured using two items adapted from the Meaning in Life Scale (Steger, Frazier, Oishi, Kaler, & Mallinckrodt, 2006). Participants rated their agreement to the two items (“*Yesterday my life felt meaningful*”, “*Yesterday I felt like my life had purpose*”) on a 7-point scale from 1(*strongly disagree*) to 7(*strongly agree*). Items were averaged to provide an overall score where higher values indicate greater presence of meaning in life the previous day ($\alpha = .85$).

Mental well-being. The 14-item Warwick-Edinburgh Mental Well-being scale (WEMWBS; Tennant et al., 2007) was used to provide an overall indication of general mental well-being. The scale was designed to capture both hedonic and eudaimonic aspects of well-being including affective-emotional aspects, cognitive-evaluative dimensions and psychological and social functioning. Participants read each of the statements about feelings and thoughts and chose the

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response that best described their experience over the previous day on a 5-point scale from 1(*none of the time*) to 5(*all of the time*). Example items included: “*I felt optimistic about the future*”, “*I felt close to other people*”, and “*I was interested in new things*”. Items were summed to provide an overall score where higher values indicated greater mental well-being the previous day ($\alpha = .92$).

Results

Arts activities. *Table 1* shows the variety and duration of the participants’ encounters with the five broader arts categories. On average, participants engaged with 2.60 ($SD = 1.11$, *Range*: 1-6) arts activities and spent 4.21 hours engaging with the arts the previous day. Of the arts categories, screen arts were engaged with most frequently, followed by audio arts, literary arts, visual arts and live arts. Eighteen participants (3.3%) had no engagement with arts activities the previous day. Participants engaged with sports more frequently than live arts but less frequently than any other any other arts category. On average, participants spent the most time engaged in screen and audio arts, followed by literary, visual and live arts. Participants spent less time engaged with sports compared to all the arts categories.

Insert Table 1 About Here

Arts encounters and well-being. To examine the potential impact of the arts on well-being we ran a series of regression models for each well-being variable. We examined the following as predictors of well-being: (1) the variety of arts activities engaged with (i.e., the number of different activities), (2) the total time spent engaged with the arts, and (3) the time spent in each of the arts categories. In all analyses age and income (0 = less than 35,200 and 1 = more than 35,200; split based on median UK household income GBP) were entered as control variables. Income was measured dichotomously because of its personally sensitive nature. Of the demographic and weekday variables tested, only age and income showed consistent relationships with the well-being variables (a minimum of two significant correlations). They also have potential to influence

people's opportunity and preference for engaging with different arts so may confound any apparent relationship between art activity and well-being. A sensitivity analysis indicated that regression models with eight predictors including these control variables would be able to detect a small effect ($f^2 = .03$) with power = 0.80 at $\alpha = .05$ for $N = 544$.

Do variety of engagement and total time spent engaged with arts activities predict well-being? Regression models for the four well-being variables showed that variety of arts activities was a positive predictor of life satisfaction ($B = 0.63$, $SE = 0.27$, $\beta = 0.11$, $t = 2.30$, $p = .022$, 95%CI[0.09, 1.17]) and meaning in life ($B = 0.12$, $SE = 0.06$, $\beta = 0.10$, $t = 2.13$, $p = .034$, 95%CI[0.01, 0.23]), suggesting that people who had engaged in a greater variety of arts activities also reported greater life satisfaction and meaning in life for that day (see *Table 2*). In contrast, total time spent engaged with arts activities (when used instead of the variety variable) was not a significant predictor of any aspect of well-being for that day.

Insert Table 2 About Here

Does time engaged in each arts category and sports spectating predict well-being? A multivariate general linear model with the five arts categories and sport as predictors (see *Table S1* in the supplementary materials) showed significant multivariate effects on well-being for live arts ($F(4, 432) = 3.77$, $p = .005$, $\eta^2_p = .03$) and screen arts ($F(4, 432) = 2.68$, $p = .031$, $\eta^2_p = .02$). More time engaged with live arts predicted higher levels of emotional well-being ($B = 0.11$, $SE = 0.04$, $\eta^2_p = 0.02$, $t = 2.91$, $p = .004$, 95%CI[0.03, 0.18]), higher levels of life satisfaction ($B = 1.22$, $SE = 0.34$, $\eta^2_p = 0.03$, $t = 3.57$, $p < .001$, 95%CI[0.55, 1.89]), higher levels of meaning in life ($B = 0.15$, $SE = 0.07$, $\eta^2_p = 0.01$, $t = 2.18$, $p = .030$, 95%CI[0.02, 0.29]), and higher levels of mental well-being ($B = 1.40$, $SE = 0.70$, $\eta^2_p = 0.01$, $t = 2.01$, $p = .045$, 95%CI[0.03, 2.77]). In contrast, more time engaged with screen arts predicted lower levels of meaning in life ($B = -0.10$, $SE = 0.05$, $\eta^2_p = 0.01$, $t = -2.23$, $p = .026$, 95%CI[-0.20, -0.01]). Time engaged with sport was not a significant predictor

of any of the well-being variables.

Elevating experience.

Does elevating experience during arts engagement predict well-being? Elevating experience (in response to the randomly chosen art activity) was a significant positive predictor of all the well-being variables: emotional well-being ($B = 0.08$, $SE = 0.04$, $\beta = 0.10$, $t = 2.20$, $p = .029$, 95%CI[0.01, 0.16]), life satisfaction ($B = 1.50$, $SE = 0.36$, $\beta = 0.20$, $t = 4.21$, $p < .001$, 95%CI[0.80, 2.19]), meaning in life ($B = 0.37$, $SE = 0.07$, $\beta = 0.23$, $t = 5.10$, $p < .001$, 95%CI[0.23, 0.51]), and mental well-being ($B = 2.94$, $SE = 0.71$, $\beta = 0.19$, $t = 4.13$, $p < .001$, 95%CI[1.54, 4.34]) (see *Table 2*).

Are different arts categories associated with greater levels of elevating experience compared to sports spectating? To test this question, we conducted a one-way ANOVA with activity category (visual, literary, live, screen, audio, sports) as the independent variable and elevating experience as the dependent variable. Mean levels of elevating experience for each arts category are presented in *Table 1*. There was a significant main effect of activity category, $F(5, 501) = 8.10$, $p < .001$, $\eta^2_p = .08$. Pairwise comparisons to examine differences in elevating experience between the art categories and sport showed that, on average, visual arts ($M_{diff} = 0.46$, $SE = 0.18$, $p = .011$, 95%CI [0.11, 0.81]), live arts ($M_{diff} = 0.67$, $SE = 0.22$, $p = .002$, 95%CI [0.24, 1.10]), and literary arts ($M_{diff} = 0.45$, $SE = 0.16$, $p = .006$, 95%CI [0.13, 0.77]) were associated with higher levels of elevating experience. Levels of elevating experience did not differ between screen arts and sports ($M_{diff} = -0.11$, $SE = 0.16$, $p = .487$, 95%CI [-0.42, 0.20]) or between audio arts and sport ($M_{diff} = 0.20$, $SE = 0.16$, $p = .198$, 95%CI [-0.11, 0.52]).

We also examined whether levels of elevating experience differed between the arts categories. Live arts were associated with significantly higher levels of elevating experience compared to both screen ($M_{diff} = 0.78$, $SE = 0.18$, $p < .001$, 95%CI [0.42, 1.14]) and audio arts (M_{diff}

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= 0.46, $SE = 0.19$, $p = .013$, 95%CI [0.10, 0.83]). Literary arts were also associated with significantly higher levels of elevating experience compared to both screen ($M_{diff} = 0.56$, $SE = 0.11$, $p < .001$, 95%CI [0.33, 0.78]) and audio arts ($M_{diff} = 0.24$, $SE = 0.12$, $p = .040$, 95%CI [0.01, 0.47]). Visual arts were associated with significantly higher levels of elevating experience compared to screen (but not audio) arts ($M_{diff} = 0.57$, $SE = 0.14$, $p < .001$, 95%CI [0.30, 0.83]). Audio art was associated with significantly higher levels of elevating experience compared to screen arts ($M_{diff} = 0.31$, $SE = 0.11$, $p = .004$, 95%CI [0.10, 0.53]).

Summary of findings. The results suggest that people spend a substantial amount of time (over 4 hours) each day engaging with the artistic imagination of others, and only a minority of people (about 3%) had no such encounters. Spending more of the day engaged with art was not associated with well-being, whereas engaging with more kinds of art was associated with greater satisfaction and meaning in life. Experiencing greater elevating feelings in response to art was positively associated with all forms of well-being. With respect to different categories of art, live arts and visual arts produced the strongest elevating experiences and spending more time on them had positive associations with well-being (unlike sports spectating); yet they were less frequently engaged with than audio and screen arts, even though these had a null or negative association with well-being.

Study 2

Study 1 examined whether individuals who engaged more with art on a single day experienced higher levels of well-being than those who engaged less. The purpose of Study 2 was to use an experience-sampling method to examine whether individuals experience higher levels of well-being on occasions when they engage more with art compared to occasions when they engage less. Use of an experience-sampling method also made it feasible to examine: how often individuals engage with art, differences in well-being between occasions when they do and do not engage with

art, and whether well-being also acts as a precursor of arts engagement. Another advantage of the method was that it relied less on individuals' ability to accurately recall and aggregate past events than Study 1.

Method

Participants. Fifty participants took part in the study ($M_{age} = 36.80$ years, $SD = 11.75$, Range: 20-69) which was described to them as an exploration of arts engagement and well-being in daily life. The study was advertised on social media, through mailing lists and by word of mouth. Participants were provided with a GBP 10 high-street voucher in exchange for their participation. Of the sample, 39 participants (78%) were female. In terms of ethnicity, 88% of the sample were white, 10% came from a mixed/multiple ethnic background, and 2% were Asian/Asian British. The sample mainly consisted of full-time workers (28%), part-time workers (20%) and students (28%) but also included those who are retired (8%), self-employed (6%), employed occasionally/causally (4%), unemployed (4%), and volunteers (1%). Fifty-eight percent of the sample reported a household income of less than GBP 35,200 (UK household median), 18% reported a household income above GBP 35,200 and the remainder of the sample opted not to disclose this information. Ethics approval was obtained from the host university.

Experience-sampling protocol. Participants' encounters with the arts and their momentary well-being were sampled twice daily for 10 days. The selection and balance of sample size and number of sampling points was based on recommendations by de Kreft and de Leeuw (1998) for testing multi-level models. Both elements contribute to power but sample size makes the greater contribution. The study was administered using participants' own smartphones in conjunction with *SurveySignal* software (Hofmann & Patel, 2015).¹ Participants received each signal as a text

¹ Participants could borrow a smartphone from the researchers if they did not own one, but one participant preferred to receive signals via email.

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message with a link to an online survey created in Qualtrics. Signals occurred at the same time each day and participants chose whether to receive the signals at either 13:00 and 21:00, 14:00 and 22:00 or 15:00 and 23:00 depending on their waking hours. Signals were timed so that each response about arts engagement covered approximately a half-day period. Reminder surveys were sent after 30 minutes if participants had not responded and participants were given 3 hours to answer the survey before the link expired (meaning that they were no longer able to provide a response). Participants started the study on either a Thursday or Friday so that the sampling period spanned two weekends. Participants individually provided $M = 17.08$ ($SD = 2.64$) responses (of maximum 20) and together completed 854 out of a possible 1000 responses corresponding to an 85% response rate. Compliance at each response point was $M = 42.70$ ($SD = 12.43$) (of maximum 50).

Measures.

Encountered art: Type and duration. Participants selected all the art forms they had encountered so far that day or since their last signal (for the first and second text message of each day respectively). If they missed the first signal they were asked to reflect on their encounters with art in the period from the first signal (e.g., 13:00) to when answering the survey. Participants selected which art forms they had encountered from the same activities and categories (visual, live, literary, screen, audio) as Study 1. Participants recorded the amount of time they had engaged with each activity over the last half-day (to the nearest quarter of an hour).

Engagement with sport. For comparative purposes participants also indicated how long they had watched, listened to or attended any sports activities during the sampling period.

Most recent arts encounter. Participants selected the encounter with art that occurred most recently. If the time they had spent engaged with that most recent activity was different from the duration estimate given previously (because they had engaged with that activity more than once in the half day) then participants recorded how long the most recent encounter had lasted. Participants

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also indicated approximately how long ago that activity occurred (if we interrupted them during the activity they would indicate this by specifying 0 hours 0 minutes) and whether they had engaged with that arts activity alone or with other people. If participants had previously indicated that they had not encountered any art forms during the last half-day, the survey skipped to questions about their current well-being.

Elevating experience of most recent arts encounter. With reference to their most recent encounter with art, participants rated six items from the elevating experience scale (Huta & Ryan, 2010, Study 2): *inspired, enriched, deeply appreciating, emotionally moved, connected with a greater whole, part of something greater than yourself*. Ratings were made on a 7-point scale from 1(*strongly disagree*) to 7(*strongly agree*) and were averaged to create an overall score such that higher values indicated greater elevating experience during the most recent arts activity (within-person reliability = .80; see Shrout & Lane, 2012).

Current well-being. Participants rated how they felt in the moments before answering the survey. All items were answered on a 7-point scale from 1(*not at all*) to 7(*extremely*). Items were individually randomized for each presentation.

Emotional well-being. Participants rated four items concerning their feelings in the moment taken from the Multi-Affect Indicator (Warr et al., 2014) to measure high-activation and low-activation pleasant affect and high-activation and low-activation unpleasant affect (*enthusiastic, calm, tense, depressed*). The two negative emotion items were reversed scored and combined with the two positive emotion items to create an average score for emotional well-being such that higher scores indicated greater emotional well-being (within-person reliability = 0.51).

Life Satisfaction. Participants rated a single item: “*Satisfied with your life*” concerning their feelings in the moment adapted from the Satisfaction with Life Scale (Diener et al., 1985).

Meaning in life. Participants rated two items “*That your life has purpose*”, “*That your life*

feels meaningful” concerning their feelings in the moment adapted from the Meaning in Life Scale (Steger et al., 2006). Items were averaged to provide an overall score where higher values indicate greater presence of meaning in life (within-person reliability = .65).

Procedure. Participants attended a training session where they were given written and verbal instructions for the study. They were told that the study sought to understand how people engaged with the arts in their daily lives and how this might relate to well-being. A broad definition of the arts was included to capture encounters with artistic imagination, and participants were told to exclude any personal involvement in creating art (participatory art) in their answers. The researcher explained the meaning and response to each item in the experience-sampling questionnaire and provided a demonstration of the signaling method. Participants were provided with the researcher’s contact details in case they had any problems with the study or signaling method and the researcher contacted the participant after 3-4 days of the experience-sampling period to check on progress.

Analysis overview. Most analyses were conducted using the mixed procedure in IBM SPSS due to the nested structure of our data (e.g., arts encounters and well-being (level-1) nested within individuals (level-2)). Continuous level-1 predictor variables were group-mean centered (and associated models also included the subtracted group mean as a variable; de Kreft & de Leeuw, 1998); continuous level-2 predictors (i.e., age) were grand-mean centered. As per Study 1, all models included age and income as predictor variables. Intercepts but not slopes were allowed to vary and the non-independence of observations within individuals was modelled by fitting an autoregressive correlation structure to the level-1 residuals. For multi-level models with binary outcomes we used generalized estimation equations (GEE; Liang & Zeger, 1986).

Results

Descriptive statistics. Data for time spent in each activity category were aggregated to

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Level 2. We calculated two types of aggregate scores. The first type reflected the average time spent by participants per sampling point (i.e., every half day) in each arts category and overall, when they had engaged with arts activities. This data did not include the 280 occasions (32.8%) when there was no engagement with an arts activity (i.e., 0 hours) and so reflected the time that participants typically spent engaged with an arts activity when it was encountered. The second type reflected the average time spent by participants per sampling point (i.e., every half day) in each arts category and overall, including time when they had not engaged with arts activities. Descriptive statistics for time spent in each art category are presented in *Table 1*. Depending on the type of score used, the results indicate that participants on average spent 3.64 or 2.34 hours a day engaged with arts. Data from the participants' most recent arts activity showed that they engaged with the activity with other people on 48.1% occasions, but this varied depending on the category (live arts 82.9%, screen arts 65.5%, visual arts 45.5%, audio arts 38.9%, literary arts 8.3%).

Arts encounters and momentary well-being. To examine the potential impact of the arts on momentary well-being we ran a series of multi-level regression models for each type of well-being (emotional well-being, life satisfaction, and meaning in life). We examined the following as predictors of well-being: (1) the total time spent engaged with arts, (2) engaging vs. not engaging with arts (coded 1, 0 respectively), and (3) engaging vs. not engaging with each arts category (also coded 1, 0). For comparison, duration and engagement with sports were included as predictor variables in the models involving time and engagement respectively.

Does total time spent engaged with arts predict momentary well-being? The total time people spent engaged with arts in the past half-day positively predicted all aspects of their well-being: emotional well-being: ($\beta = 0.08$, $SE = 0.02$, $t(658) = 3.71$, $p < .001$, 95%CI[0.04, 0.13]), life satisfaction: ($\beta = 0.09$, $SE = .02$, $t(685) = 3.77$, $p < .001$, 95%CI[0.04, 0.14]), and meaning in life: ($\beta = 0.05$, $SE = 0.02$, $t(710) = 2.68$, $p = .008$, 95%CI[0.01, 0.09]). Time spent engaged with sport

did not predict any aspect of well-being. See *Table S2* in supplementary materials.

Does engaging with arts (vs. not engaging) predict momentary well-being? Engaging with arts was a significant predictor of greater emotional well-being ($\beta = 0.23$, $SE = 0.07$, $t(687) = 3.45$, $p = .001$, $95\%CI[0.10, 0.36]$) and meaning in life ($\beta = 0.13$, $SE = .06$, $t(724) = 2.26$, $p = .024$, $95\%CI[0.02, 0.24]$) and was a marginal predictor of greater life satisfaction ($\beta = 0.13$, $SE = 0.07$, $t(708) = 1.77$, $p = .077$, $95\%CI[-0.10, 0.28]$). In contrast, engaging with sports was not a significant predictor of any of the well-being variables. See *Table S2* in supplementary materials.

Does engaging (vs. not engaging) with each arts category predict momentary well-being? Fixed effects from the relevant multi-level models for the three well-being variables (see *Table 3*) showed that engagement with live arts was a significant positive predictor of all aspects of well-being: emotional well-being ($\beta = 0.47$, $SE = 0.13$, $t(656) = 3.58$, $p < .001$, $95\%CI[0.21, 0.74]$), life satisfaction ($\beta = 0.30$, $SE = 0.15$, $t(679) = 2.07$, $p = .038$, $95\%CI[0.02, 0.59]$), and meaning in life ($\beta = 0.25$, $SE = 0.11$, $t(698) = 2.17$, $p = .030$, $95\%CI[0.02, 0.47]$). Engaging with visual arts ($\beta = 0.18$, $SE = 0.09$, $t(765) = 2.05$, $p = .041$, $95\%CI[0.01, 0.35]$) and literary arts ($\beta = 0.16$, $SE = 0.08$, $t(756) = 1.96$, $p = .050$, $95\%CI[0.00, 0.31]$) were significant positive predictors of meaning in life. Engagement with audio arts and screen arts did not predict any of the well-being measures.

Insert Table 3 About Here

Elevating experience.

Does elevating experience during arts engagement predict well-being? Elevating experience (in response to participants' most recent arts activity) was a significant positive predictor of all aspects of well-being (see *Table S2* in the supplementary materials): emotional well-being ($\beta = 0.16$, $SE = 0.04$, $t(468) = 3.85$, $p < .001$, $95\%CI[0.08, 0.23]$), life satisfaction ($\beta = 0.17$, $SE = 0.04$, $t(478) = 4.02$, $p < .001$, $95\%CI[0.09, 0.25]$), and meaning in life ($\beta = 0.21$, $SE = 0.03$, $t(484) =$

6.39, $p < .001$, 95%CI[0.14, -0.27]).

Are some arts categories associated with greater levels of elevating experience? To test this question, we used a multi-level regression model with participants' most recent arts category as a predictor of elevating experience. Descriptive statistics for each arts category are provided in *Table 1*. Overall, engaging with an arts category had a significant effect on elevating experience ($F(4, 485) = 8.76$, $p < .001$). Specifically, engaging with live arts ($\beta = 0.86$, $SE = 0.17$, $t(488) = 4.96$, $p < .001$, 95%CI[0.52, 1.20]), visual arts ($\beta = 0.34$, $SE = 0.13$, $t(482) = 2.58$, $p = .010$, 95%CI[0.08, 0.60]), and literary arts ($\beta = 0.47$, $SE = 0.13$, $t(484) = 3.71$, $p < .001$, 95%CI[0.22, 0.72]) were significantly associated with greater levels of elevating experience than engaging with screen arts (reference category), but audio arts was not ($\beta = 0.11$, $SE = 0.11$, $t(480) = 1.01$, $p = .314$, 95%CI[-.10, 0.32]).

Does engaging with arts with other people (vs. alone) predict momentary well-being and elevating experience? The presence of other people during participants' most recent arts activity was a significant positive predictor of emotional well-being ($\beta = 0.22$, $SE = 0.08$, $t(486) = 2.79$, $p = .006$, 95%CI[0.06, 0.37]) and life satisfaction ($\beta = 0.29$, $SE = 0.08$, $t(489) = 3.47$, $p = .001$, 95%CI[0.13, 0.45]), but not meaning in life ($\beta = 0.10$, $SE = 0.07$, $t(489) = 1.57$, $p = .117$, 95%CI[-0.03, 0.23]) or elevating experience ($\beta = 0.11$, $SE = 0.09$, $t(524) = 1.22$, $p = .224$, 95%CI[-0.06, 0.28]).

The effect of prior well-being on arts engagement.

Does prior well-being predict engagement with the arts? To examine whether prior well-being predicted engagement with arts we first ran a multi-level regression model with the (first-order) lags of the well-being variables as predictors of total time in arts engagement. The lags of the well-being variables did not significantly predict total time engaged in arts activities: lag of emotional well-being ($\beta = -0.02$, $SE = 0.02$, $t(173) = -1.00$, $p = .321$, 95%CI[-0.07, 0.02]), lag of

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life satisfaction ($\beta = -0.03$, $SE = 0.03$, $t(162) = -1.06$, $p = .290$, $95\%CI[-0.08, 0.02]$), and lag of meaning in life ($\beta = 0.03$, $SE = 0.03$, $t(169) = 1.02$, $p = .309$, $95\%CI[-0.03, 0.08]$). Next, using generalized estimation equations, we examined whether the lag of the well-being variables predicted: (1) engagement with the arts in general (0 = no, 1 = yes), and (2) engagement with each of the arts categories (e.g., visual arts: 0 = no, 1 = yes). The lag of life satisfaction (but not emotional well-being or meaning in life) was a significant negative predictor of engaging with the arts in general ($B = -0.49$, $SE = 0.21$, $Wald Z(1) = 5.49$, $p = .019$, $95\%CI[-0.90, -0.08]$). The lag of life satisfaction was also a negative predictor of engaging with live arts ($B = -0.76$, $SE = 0.32$, $Wald Z(1) = 5.78$, $p = .016$, $95\%CI[-1.38, -0.14]$). Engagement with the other arts categories was not predicted by any of the well-being lag variables.

Summary of findings. The experience-sampling method used in Study 2 showed that individuals had encounters with art on over two thirds of sampled half-days and spent a daily average of 2.3 hours engaging with the artistic imagination of others, which was substantial but less than in Study 1. Engaging with art (vs. not engaging) during a half-day, spending more of a half-day engaged with art, and experiencing greater elevating feelings in response to art during a half-day were all positively associated with all aspects of well-being, unlike sports spectating. Like Study 1, live arts produced the strongest elevating experiences and had positive associations with well-being, as did visual and literary arts; yet as in Study 1 they were less frequently engaged with than audio and screen arts which showed no significant associations with well-being. An assessment of whether well-being also acts as a precursor of arts engagement showed no significant association between any well-being variable and the amount of time subsequently spent on arts engagement and found that lower (not higher) levels of life satisfaction were associated with

subsequent acts of engagement with the arts in general and live arts in particular.

Study 3

Having established in Studies 1 and 2 that encounters with live arts have reliable relationships with all aspects of well-being, our third study used a large publicly archived dataset to examine whether frequency of attendance at live arts events during a year had a longitudinal relationship with well-being three years later. Study 3 compared this relationship with those arising from frequency of participation in creative arts (i.e., participatory art) and sports of moderate intensity, and examined whether well-being led to attendance (i.e., reverse causal path). An advantage of the large-scale nature of the dataset was that it enabled us to exclude potential confounding influences by including a large set of control variables. For this purpose, we replicated the set used by Wheatley and Bickerton (2017) who used the same data source to examine the cross-sectional relationship between arts engagement and well-being. For our well-being measure, we extended their selection of one item from the General Health Questionnaire to use all items from the available scale (GHQ-12; Goldberg, 1972).

Method

Participants. We used data from participants who took part in Waves 2 (2010-2011) and 5 (2013-2014) of the “Understanding Society” longitudinal panel survey. Understanding Society is a research initiative funded by the UK Economic and Social Research Council and various Government Departments, with scientific leadership by the Institute for Social and Economic Research (ISER), University of Essex, and survey delivery by NatCen Social Research and Kantar Public. The research data are distributed by the UK Data Service ([doi:10.5255/UKDA-SN-6614-8](https://doi.org/10.5255/UKDA-SN-6614-8); University of Essex, 2016). The dataset is a nationally representative annual survey of 40,000 households, gathered via face-to-face and telephone interviews. Waves 2 and 5 were used because, unlike other waves, both contained data on the arts (participatory and receptive) and well-being,

allowing us to test for longitudinal associations whilst considering a large set of control variables. Our sample consisted of 27,918 individuals (57% female, 43% male) who had completed the well-being measure at both waves, with a mean age of 47.55 years ($SD = 17.12$, Range: 16-98). Of the sample, the majority (58%) were working, 14% were economically inactive (e.g., unemployed, long term illness/disability), 6% were in education or training, and 22% were retired.

Measures.

(Live) arts engagement. Participants indicated their attendance (yes vs. no) at 14 art events (film at a cinema or other venue; exhibition or collection of art, photography, sculpture or a craft exhibition; event which included video or electronic art; event connected with books or writing; street arts or a public display or installation; carnival or festival; circus; play/drama, pantomime or musical; opera; ballet; contemporary dance; african or south asian and chinese dance; rock, pop or jazz performance; classical music performance) over the past 12 months. If they answered affirmatively, they indicated how frequently they had attended events like that (as a whole) during the past 12 months from 1(*at least once a week*) to 5(*once in past year*). We recoded the frequency score to include participants who had not attended any arts activities (6 = *did not do activity*). Lower scores therefore represent greater engagement with (live) arts events over the past year.

Arts participation. Participants indicated their participation (yes vs. no) in 14 arts activities (danced; sang; played a musical instrument; wrote music; painting, drawing, printmaking or sculpture; photography, film or video making; used a computer to create artwork; rehearsed/performed in a play/drama, opera/opera or musical theatre; performed in a carnival or street arts event; learned or practised circus skills; crafts; read for pleasure; took part in a book club; wrote story, play or poetry) over the past 12 months. If they answered affirmatively, they indicated how frequently they had taken part in activities like that (as a whole) during the past 12 months from 1(*at least once a week*) to 5(*once in past year*). We recoded the frequency score to include

participants who had not participated in any arts activities (6 = *did not do activity*). Lower scores therefore represent greater participation in arts activities over the past year.

Sports participation (moderate intensity sports). Participants indicated their participation (yes vs. no) in 29 sporting activities (e.g., gymnastics, boxing, martial arts, netball, hockey, ice-skating, yoga or Pilates) over the past 12 months. If they answered affirmatively, they indicated how frequently they had taken part in those sports (as a whole) during the past 12 months from 1(*3+ times a week*) to 6(*once in past year*). We recoded the frequency score to include participants who had not taken part in any sports (7 = *did not do activity*). Lower scores therefore represent greater participation in moderate intensity sports over the past year.

Well-being. Well-being was indexed with the 12-item General Health Questionnaire (GHQ-12; Goldberg, 1972), which is a scale used to detect psychiatric disorder in the general population. Participants rated whether they have experienced a particular symptom or behavior recently compared to usual. Items included positive and negative symptoms/behaviors (e.g., “*Have you recently felt capable of making decisions about things?*” and “*Have you recently lost much sleep over worry?*”). Responses were made on four-point scales which differ according to the specific question type (e.g., 1(*more so than usual*) to 4(*much less capable*) and 1(*not at all*) to 4(*much more than usual*) for the example items given above). Items were recoded into a 0 to 3 scale and items were summed to create an overall score (ranging from 0 to 36) where higher scores indicate more psychological distress and lower scores indicate better psychological well-being.

Control variables. We selected the same control variables that were used in a previous research study examining arts and well-being with the Understanding Society dataset (Wheatley & Bickerton, 2017). The following control variables from Wave 2 were included: age, gender (0 = female, 1 = male), long term illness or disability (0 = no, 1 = yes), highest educational qualifications (reference = no qualifications), marital status (reference = single/never married or in a civil

partnership), dependent children (0 = no, 1 = yes), government office region (reference = London), current economic activity (reference = economically inactive), annual labor income, working hours, and overtime hours.

Results

Does arts engagement predict well-being? We were primarily interested in whether (live) arts engagement would show a longitudinal relationship with well-being. We therefore ran a regression model with W2 arts engagement predicting W5 well-being (GHQ). W2 arts engagement was entered in Block 1 and W2 well-being, W2 sports participation and our control variables were entered in Block 2. Results showed that arts engagement at W2 was a significant predictor of later well-being at W5, even after accounting for well-being at W2, sports participation and control variables (summarized in *Table 4*). More frequent arts engagement was associated with less psychological distress/greater well-being ($B = .07$, $SE = .02$, $\beta = .02$, $t = 3.00$, $p = .003$, 95%CI[.03, .12]).

Insert Table 4 About Here

Reverse causation: Does well-being predict arts engagement? We were also interested in whether well-being would predict later (live) arts engagement. We ran a regression model with W2 well-being predicting W5 arts engagement. W2 well-being was entered in Block 1, and W2 arts engagement, W2 sports participation and the control variables were entered in Block 2. Results showed that well-being at W2 was a significant predictor of subsequent arts engagement at W5, even after accounting for prior arts engagement at W2, sports participation and control variables. Greater W2 well-being predicted more frequent live arts engagement at W5 ($B = 0.01$, $SE = 0.01$, $\beta = 0.02$, $t = 4.25$, $p < .001$, 95%CI[.00, .01]). See *Table S3* in supplementary materials.

Is arts engagement a stronger predictor of well-being than arts participation? Finally, we were interested in whether (live) arts engagement would show a stronger longitudinal

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relationship with well-being compared to participating in arts (i.e., encountering vs. creating art). To examine this, we ran a regression model with W2 arts engagement and participation predicting W5 well-being. W2 arts engagement and participation were entered in Block 1 and W2 well-being, W2 sports participation and our control variables were entered in Block 2. Results showed that arts engagement at W2 was a significant predictor of later well-being at W5 ($B = 0.08$, $SE = 0.03$, $\beta = 0.02$, $t = 3.09$, $p = .002$, $95\%CI[0.03, 0.12]$) whereas arts participation at W2 was not a significant predictor of later well-being ($B = -0.01$, $SE = 0.02$, $\beta = -.01$, $t = -0.70$, $p = .485$, $95\%CI[-.05, .02]$). These results suggest that more frequent engagement with live arts was predictive of greater well-being but frequency of participation in arts was not. We compared the regression weight for arts engagement with those for arts participation and sports participation (Paternoster, Brame, Mazerolle, & Piquero, 1998). The regression weight for arts engagement was significantly greater than that for arts participation ($Z = 2.50$, $p = .010$). There was no difference between the regression weights of arts engagement and sports participation ($Z = 0.91$, $p = .360$).

Summary of findings. Greater frequency of attendance at live arts events during a year predicted less psychological distress three years later (and vice versa). The magnitude of this salutogenic effect was found to be equivalent to the effect of frequent participation in sports of moderate intensity, and greater than the effect of frequent participatory art activity.

General Discussion

Using three different types of study, we investigated the extent to which people encounter artistic imagination in daily life and how those encounters and associated emotional responses relate to different aspects of their well-being. The findings contribute to existing research concerning the impact of cultural engagement on psychological outcomes, which has mostly focused on participatory rather than receptive art activities.

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The duration and variety of encounters with artistic imagination was found to be substantial. Participants in Study 1 spent more than 4 hours per day on average engaged with artistic imagination, and in Study 2 participants reported encounters with artistic imagination on more than two thirds of sampled occasions (half-days). Research has estimated that people spend between 30% and 50% of their waking hours preoccupied with the internal imaginative world of their daydreams (Killingsworth & Gilbert, 2010; Klinger & Cox, 1987), and our findings suggest that they may be spending a further sizeable portion (perhaps with some overlap) engaged with other people's imagination too. However, some caution is warranted because the level of arts encounters that we found may have been inflated by the type of participants who volunteered. The studies may have appealed more to those with an interest in the arts. In Study 1, we tried to partially offset this problem by recruiting some of the sample at a multi-day sports event. In Study 2, the commitment involved in taking part in an experience-sampling study means that self-selection is likely to have been a greater issue here, but the recorded levels of arts engagement across 10 days were lower than in Study 1.

The results of the three studies were consistent in showing that encounters with art had reliable positive associations with different types of well-being, including eudaimonic, hedonic, and life satisfaction. Although these relationships were statistically significant, some caution is warranted regarding their practical significance because the effect sizes were small. Small effect sizes in Study 3 were not surprising because it used a long general-purpose survey so "noise" in the data was expected, but even in Study 1 encounters with art explained less than 8% of the variance in well-being. That said, Study 3 found that frequency of attendance at arts events had a positive association with subsequent mental well-being that was: equivalent or greater than the effects of employment, marriage and education; stronger than the effect of participative arts; and equivalent to

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the well-established positive effect of participation in moderate intensity sport (Fox, 1999). Studies 1 and 2 found that watching or listening to sports did not relate to any well-being measure.

The findings show that the emotional quality of the experience is important when considering the effects of engaging with different art activities. Previous studies of cultural engagement have mostly focused on frequency of activity (Gordon-Nesbitt, 2015, p. 56). In this investigation, we looked at whether the variety of different art activities, incidence of activity (engage vs. not engage) and duration of activity had effects on well-being, but we also examined and found robust effects of experiencing elevating feelings (e.g., *inspired*, *enriched*, *emotionally moved*) in response to encounters with art. Other research has noted that being moved appears to be linked to meaning-making (Koopman, 2015) and relates to perceived closeness with others (Schubert, Zickfeld, & Seibt, & Fiske, 2018). Research on fiction indicates that emotional engagement and transportation into a narrative are necessary for fiction to produce socio-emotional benefits (Djikic, Oatley, & Moldoveanu, 2013; Johnson, 2012; Oatley, 2016), which may hold for other forms of artistic imagination.

The results of the first two studies showed that the associations with well-being depended on the type of art activity involved. Live arts (e.g., music concerts and theatre) had the most consistent positive relationship with all aspects of well-being. This may stem from the social nature of live arts because people are likely to attend and observe live events in the company of others. In Study 2 participants engaged with art in general in the presence of other people on just under half of occasions but on over 80% occasions for live arts. In a study of leisure activities, Iwaski (2006) found that social/cultural leisure was the best predictor of mental health, whereas relaxing leisure such as listening to music or reading was the best predictor of coping with stress. Cultural activities that have social aspects have been observed to increase happiness (Wheatley & Bickerton, 2017). This relationship was reinforced by Study 2 which found that engaging with the arts activity in a

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social (vs. non-social) context was associated with hedonic well-being and life satisfaction (but not eudaimonic well-being). Participatory art in Study 3 involved a spectrum of activities so it may be that effects on well-being would be found if participatory activities with social content were examined separately. That is not to say that social cultural activities are always associated with the strongest positive effects on outcomes. For example, Vaananen et al. (2009) found that *solitary* cultural activity had a more robust effect for decreased all-cause mortality. The effect of live arts can also be explained in other ways because it is consistent with enriched environment theory (see Spencer, 1997) and could also be due to the mental and physical investment required to attend live events.

Furthermore, on the issue of arts activity, the most common encounters with artistic imagination in Studies 1 and 2 involved audio and screen arts, yet these activities seemed least able to yield positive effects on well-being, even though engagement with screen arts frequently occurred in a social context. This lack of association could stem from habituation owing to greater time spent on those categories, or from passive consumption that may occur within them (e.g., watching or listening through habit). It may also be necessary to look at sub-categories of activity, at genres, and at quality or complexity of content to reveal effects that may be hidden when content is aggregated.

Limitations

A limitation of all three studies is that conclusive causal inferences about the discovered relationships between encounters with art and well-being cannot be drawn because they are based on associations rather than changes in well-being in response to manipulations of encounters with art. Studies 2 and 3 provide stronger but not definitive evidence of causality. The multi-level models in Study 2 used an autocorrelative structure which means that well-being on the previous occasion was accounted for. In Study 3, live arts attendance was used to predict well-being at a later

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timepoint (i.e., the measures were not simultaneous) and baseline well-being was controlled for. Nevertheless, the association between encounters with art and well-being could be due to the former being a proxy of the latter. Gordon-Nesbitt (2015, p. 33) observes that the gender differences found in previous related research suggest that a proxy explanation is unlikely to be the case, at least for health effects. The causal direction could be the reverse of that supposed (Gordon-Nesbitt, 2015, p.55), meaning that poor well-being may reduce arts engagement. One of the analyses in Study 2 directly examined the impact of previous well-being on arts engagement, finding no evidence of a relationship except for life satisfaction which had a negative association suggesting that dissatisfaction may have prompted more (not less) arts engagement. There was some evidence of a bidirectional positive relationship between live arts attendance and well-being in Study 3.

A further limitation of our investigation concerns its conception of receptive arts which included video art but was otherwise insufficiently inclusive of interactive arts (e.g., computer games, virtual reality). The boundaries of our conception could also have been extended to include artefacts that are not traditionally seen as art yet arise from and stimulate people's imagination (e.g., toys; architecture). Alternatively, the conception of receptive arts may prove to be more productive if it is completely changed so that it is based on underlying processes rather than the form/medium of the art (e.g., Brown, 2018).

Our examination of well-being was limited by not distinguishing between the presence and search for meaning in life (Steger, Kashdan, Sullivan, & Lorentz, 2008). These two components of eudaimonic well-being may have different relations with arts engagement. Specifically, engagement with art could be used to pursue a perceived lack of meaning in life without necessarily providing it.

Notwithstanding these limitations, this investigation provides the first longitudinal examination of the impact of the receptive arts on well-being. The findings show that: engagement with the receptive arts is a substantial feature of daily life that is associated with different types of

well-being; the emotional experience arising from arts engagement contributes to its impact; and its precise effect on well-being depends on the nature of the art activity which may in part be due to the social context in which it occurs. Our investigation also provides a unique conceptualisation of receptive arts which we believe may open a new line of research.

Future Research

We framed our investigation around the idea that receptive art activities represent encounters with artistic imagination that influence people's emotional experiences and well-being. Here we extend that notion to theorize that engaging with artistic imagination affects well-being because it instigates a process of mental simulation, in which people connect their own experiences to those imagined in the art, and consequently experience an aesthetic emotional and cognitive response. Mental simulation is "the process of self-projection into alternate temporal, spatial, social, or hypothetical realities" (Waytz, Hershfield, & Tamir, 2015, p.336) and as such might be involved in both creating and engaging with (viz. receiving) art.

According to Baumeister and Masciampo (2010), people use mental simulations to understand themselves and others. In support of this view, Zhou, Majka, and Epley (2017) found that mentally simulating other people's perspective provides greater accuracy in emotional understanding than inferring their perspective. Simulations enable people to learn about social situations by allowing them to process cultural information (Baumeister & Masciampo, 2010). This cultural information can be transmitted through art (Oatley, 2016). For example, Tamir and colleagues (Tamir, Bricker, Dodell-Feder, & Mitchell, 2016) found that frequent fiction readers had better social cognitive performance, an association mediated by the neural networks underpinning mental simulation. Similarly, Vessel, Starr, and Rubin (2013) used neurophysiological evidence to support the proposition that art "moves people from within" through stimulating self-relevant neural processing. Engaging in mental simulation has been related to personal well-being in the form of

experiencing a greater sense of meaning in life (Waytz et al., 2015). However, our investigation did not test whether simulation occurs or is responsible for the effects of arts engagement on well-being. This omission offers an exciting research initiative to pursue in future.

Part of that initiative should explore whether both mental simulation and allied aesthetic responses are needed to account for the effects of arts engagement on well-being, or whether one alone is both necessary and sufficient to explain its effects. A difficulty for a simulation account is that it does not locate a felt response, but a difficulty for an aesthetic emotion account is that it does not locate the source of a personal aesthetic. Other accounts have emphasized that responses to art are based on vicarious rather than actual experience (Kawakami, Furukawa, & Okanoya, 2014) or require people to distance themselves prior to embracing the stimulus (Mennighaus et al., 2017). According to Mennighaus and colleagues, embracing art entails an interplay of positive emotions and negative emotions and meaning-making that renders it moving and profound. These accounts may offer alternative or complementary explanations of our findings.

Future research should also consider individuals' motivations for engaging with art. Wilson et al. (2014) found that people do not typically find the company of their own thoughts pleasurable, even though they can derive personal benefits from using their own imagination, including enhancing well-being through daydreaming (Mar, Mason & Litvack, 2012; Poerio, Totterdell, Emerson & Miles, 2015). It seems that people prefer to engage in leisure activities, such as reading or watching television (Fox, Thompson, Andrews-Hanna, & Christoff, 2014), rather than just think when given the choice. However, such activities may provide a straightforward means through which people engage with others' imagination and thereby enrich their own. Individual differences in choice and outcome of such engagement is likely. For instance, what individuals classify as art differs (Pelowski, 2015) and therefore their expectations of it in relation to themselves and its effects are likely to differ. Individuals' choice of art activity is also likely to differ according to their

emotional motives. For example, Miu, Pitur, and Szentágotai-Tatar (2016) found that music is used more frequently than paintings to repair emotions.

Conclusion

The potential contribution of the arts to health and well-being has been recognized in recent national policy reports that have reviewed relevant research and interventions (e.g., UK: Gordon-Nesbitt, 2015; Australia: Mills, 2011). A cultural attendance program, for example, involved health trainers referring people to events happening at local cultural institutions to aid their mental health (Froggett & Roy, 2014). The findings of our investigation vindicate the development and expansion of such interventions to include other receptive arts. Moreover, the research makes it apparent that encounters with artistic imagination are part and parcel of everyday life for good psychological reason.

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Table 1. Descriptive statistics for art/sport activities and elevating experiences in Study 1 ($N = 544$) and Study 2 ($N = 50$; 854 occasions).

	Study 1	Study 1	Study 1	Study 2	Study 2	Study 2
	Incidence	Duration	Elevating	Duration	Duration	Elevating
Category of			Experience	per half day	per half day	Experience
Activity	n	M (SD) hr.	M (SE) 1-5	M (SD) hr.	M (SD) hr.	M (SE) 1-7
Screen Arts	398	1.40 (1.52)	2.55 (.07)	1.53 (.60)	0.49 (.36)	4.15 (.11)
Audio Arts	374	1.48 (1.75)	2.86 (.08)	1.14 (.58)	0.33 (.31)	4.25 (.12)
Literary Arts	298	0.70 (1.07)	3.11 (.08)	0.88 (.51)	0.14 (.22)	4.62 (.14)
Visual Arts	195	0.34 (0.74)	3.12 (.12)	0.94 (.67)	0.13 (.20)	4.49 (.14)
Live Arts	83	0.29 (0.94)	3.33 (.17)	1.56 (.82)	0.09 (.15)	5.01 (.18)
Sports	89	0.20 (0.56)	2.66 (.14)	0.93 (.42)	0.16 (.26)	–
All Arts	–	4.21 (2.74)	–	1.82 (.70)	1.17 (.56)	–
				(excludes zero	(includes zero	
				engagement)	engagement)	

Note. Sports refers to spectating (not partaking). Means for elevating experience in Study 2 are multi-level model estimates.

Table 2. Multiple regression analysis testing the predictive effect of A) variety of arts engaged with and B) elevating experience in response to art, on well-being in Study 1 ($N = 544$).

Variables in Models	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	CI-L	CI-U
A)							
Emotional Well-Being	$R^2 = .01, F(3, 450) = 2.09, p = .100$						
- Age	-0.01	0.01	-0.01	-0.23	.815	-0.01	0.01
- Income	0.16	0.07	0.11	2.29	.022	0.02	0.30
- Variety of arts	0.03	0.03	0.05	1.12	.262	-0.02	0.09
Life Satisfaction	$R^2 = .02, F(3, 450) = 3.29, p = .021$						
- Age	<0.01	0.03	<0.01	0.02	.983	-0.05	0.05
- Income	1.47	0.67	0.10	2.18	.030	0.14	2.79
- Variety of arts	0.63	0.27	0.11	2.30	.022	0.09	1.17
Meaning in Life	$R^2 = .05, F(3, 449) = 7.14, p < .001$						
- Age	0.01	0.01	0.12	2.61	.009	0.00	0.02
- Income	0.36	0.14	0.12	2.63	.009	0.09	0.64
- Variety of arts	0.12	0.06	0.10	2.13	.034	0.01	0.23
Mental Well-Being	$R^2 = .02, F(3, 452) = 3.29, p = .021$						
- Age	0.10	0.05	0.09	1.90	.058	0.00	0.20
- Income	2.21	1.36	0.08	1.63	.104	-0.46	4.89
- Variety of arts	0.81	0.55	0.07	1.48	.141	-0.27	1.90
B)							
Emotional Well-Being	$R^2 = .02, F(3, 435) = 3.18, p = .024$						
- Age	-0.01	0.01	-0.02	-0.35	.728	-0.01	0.01
- Income	0.15	0.07	0.10	2.14	.033	0.01	0.29
- Elevating experience	0.08	0.04	0.10	2.20	.029	0.01	0.16
Life Satisfaction	$R^2 = .05, F(3, 432) = 7.33, p < .001$						
- Age	-0.01	0.03	-0.01	-0.05	.962	-0.05	0.05
- Income	1.34	0.68	0.10	1.98	.049	0.01	2.67
- Elevating experience	1.50	0.36	0.20	4.21	<.001	0.80	2.19
Meaning in Life	$R^2 = .09, F(3, 432) = 14.09, p < .001$						
- Age	0.02	0.01	0.13	2.79	.005	0.01	0.03
- Income	0.32	0.14	0.11	2.34	.020	0.05	0.59
- Elevating experience	0.37	0.07	0.23	5.10	<.001	0.23	0.51
Mental Well-Being	$R^2 = .05, F(3, 435) = 8.22, p < .001$						
- Age	0.11	0.05	0.10	2.11	.036	0.01	0.21
- Income	1.77	1.35	0.06	1.30	.193	-0.90	4.43
- Elevating experience	2.94	0.71	0.19	4.13	<.001	1.54	4.34

Note. 95% Confidence Interval: Lower (CI-L), Upper (CI-U) bounds. Coding: Income (household) – below UK median (0), above UK median (1).

Table 3. Multi-level regression analysis testing the fixed effects of engaging (vs. not engaging) with different art/sport activities on well-being in Study 2.

Variables in Model	β	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI-L	CI-U
Emotional Well-Being							
- Age	0.01	0.01	1.52	49	.134	-0.01	0.03
- Income	0.11	0.21	0.51	48	.615	-0.33	0.54
- Visual arts	0.16	0.10	1.50	751	.133	-0.05	0.35
- Live arts	0.47	0.13	3.58	656	<.001	0.21	0.74
- Literary arts	0.08	0.09	0.86	737	.388	-0.10	0.27
- Audio arts	0.13	0.08	1.66	756	.096	-0.02	0.27
- Screen arts	0.08	0.03	1.29	642	.196	-0.04	0.21
- Sports (spectating)	-0.02	0.06	-0.23	744	.822	-0.22	0.17
Life Satisfaction							
- Age	0.01	0.01	1.02	47	.311	-0.01	0.04
- Income	0.53	0.28	1.89	47	.065	-0.03	1.09
- Visual arts	0.20	0.11	1.74	765	.082	-0.02	0.42
- Live arts	0.30	0.15	2.07	679	.038	0.02	0.59
- Literary arts	0.15	0.10	1.44	752	.150	-0.05	0.35
- Audio arts	-0.05	0.08	-0.66	766	.513	-0.22	0.11
- Screen arts	0.10	0.07	1.46	665	.146	-0.04	0.24
- Sports (spectating)	-0.01	0.11	-0.05	758	.957	-0.22	0.21
Meaning in Life							
- Age	0.17	0.13	1.38	47	.174	-0.01	0.04
- Income	0.45	0.28	1.58	47	.121	-0.12	1.03
- Visual arts	0.18	0.09	2.05	765	.041	0.01	0.35
- Live arts	0.25	0.11	2.17	698	.030	0.02	0.47
- Literary arts	0.16	0.08	1.96	756	.050	0.01	0.31
- Audio arts	-0.08	0.06	-1.21	763	.228	-0.20	0.05
- Screen arts	0.05	0.05	0.99	686	.321	-0.05	0.16
- Sports (spectating)	0.04	0.09	0.42	760	.675	-0.13	0.20

Note. 95% Confidence Interval: Lower (CI-L), Upper (CI-U) bounds. Coding: Income (household) – below UK median (0), above UK median (1); engaged with activity – not engaged (0), engaged (1).

Table 4. Multiple regression analysis testing the predictive effect of Wave 2 frequency of arts attendance on Wave 5 mental well-being in Study 3.

Predictor Variables in Model	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	95% <i>CI</i>	
Block 1	$R^2 = .005, F(1, 24718) = 114.52, p < .001$						
Arts frequency (W2)	0.26	0.02	0.07	10.70	<.001	0.21	0.30
Block 2 (all W2)	$R^2 = .23, F(30, 24718) = 240.76, p < .001$						
Arts frequency	0.07	0.02	0.02	3.00	.003	0.03	0.12
Well-being	0.44	0.01	0.43	72.99	<.001	0.43	0.45
Sports frequency	0.05	0.01	0.02	3.62	<.001	0.02	0.08
Age	-0.02	0.00	-0.05	-4.89	<.001	-0.02	-0.01
Gender (0 female, 1 male)	-0.59	0.07	-0.05	-8.95	<.001	-0.72	-0.46
Long term illness/disability (0 no, 1 yes)	2.25	0.21	0.07	10.95	<.001	1.85	2.65
Highest qualification (vs. none)							
- Degree or equivalent	-0.24	0.11	-0.02	-2.12	.034	-0.46	-0.02
- A level	-0.25	0.12	-0.02	-2.15	.031	-0.49	-0.02
- GCSE	-0.09	0.11	-0.01	-0.78	.438	-0.31	0.13
Marital status (vs. single/never)							
- Married/civil partner	-0.17	0.09	-0.01	-1.77	.077	-0.35	0.02
- Separated/divorced/former civil partner	0.29	0.14	0.01	2.08	.037	0.02	0.57
- Widowed/surviving civil partner	-0.33	0.18	-0.01	-1.86	.063	-0.68	0.02
Dependent children (0 no, 1 yes)	-0.10	0.25	0.00	-0.41	.685	-0.59	0.39
Region (vs. London)							
- North East	0.22	0.19	0.01	1.19	.236	-0.15	0.60
- North West	0.12	0.14	0.01	0.88	.381	-0.15	0.40
- Yorkshire & Humber	0.22	0.15	0.01	1.42	.156	-0.08	0.52
- East Midlands	-0.07	0.15	0.00	-0.44	.661	-0.37	0.23
- West Midlands	0.17	0.15	0.01	1.11	.269	-0.13	0.47
- East of England	-0.35	0.15	-0.02	-2.36	.018	-0.63	-0.06
- South East	0.08	0.13	0.01	0.61	.542	-0.18	0.35
- South West	0.05	0.15	<0.01	0.35	.730	-0.24	0.34
- Wales	0.20	0.15	0.01	1.32	.186	-0.10	0.50
- Scotland	-0.01	0.14	<-0.01	-0.04	.965	-0.28	0.27
- Northern Ireland	-0.21	0.16	-0.01	-1.31	.192	-0.52	0.10
Current economic activity (vs. inactive)							
- Working	-0.20	0.13	-0.02	-1.57	.116	-0.46	0.05
- Education or training	-0.30	0.21	-0.01	-1.47	.141	-0.71	0.10
- Retired	-0.24	0.15	-0.02	-1.65	.099	-0.53	0.05
Annual income (GBP 000s)	<0.01	<0.01	<.01	.09	.926	<-0.01	<0.01
Working hours	<0.01	<0.01	0.01	1.06	.290	<-0.01	0.01
Overtime hours	<-0.01	0.01	<-0.01	-.01	.995	-0.01	0.01

Note. The labels in the Table refer to low well-being (GHQ-12) and low arts/sport frequency.

Supplementary Materials

Table S1. Multivariate general linear model testing the predictive effect of time spent engaged with different art/sport activities on well-being in Study 1 ($N = 544$).

Multivariate Effects	$F(4,432)$	p	η^2_p				
- Age	4.88	.001	.04				
- Income	2.78	.027	.03				
- Visual arts	1.81	.125	.02				
- Live arts	3.77	.005	.03				
- Literary arts	0.09	.985	<.01				
- Audio arts	1.02	.399	.01				
- Screen arts	2.68	.031	.02				
- Sports (observing)	1.26	.287	.01				

Parameter Estimates	B	SE	η^2_p	t	p	CI-L	CI-U
Emotional Well-Being							
$R^2 = .04, F(8, 435) = 2.14, p = .032$							
- Age	-0.01	<0.01	<0.01	-0.44	.658	-0.01	<0.01
- Income	0.18	0.07	0.01	2.48	.014	0.03	0.32
- Visual arts	0.05	0.04	<0.01	1.16	.248	-0.04	0.14
- Live arts	0.10	0.04	0.02	2.91	.004	0.03	0.18
- Literary arts	<0.01	0.03	<0.01	0.10	.922	-0.06	0.06
- Audio arts	<0.01	0.02	<0.01	0.17	.865	-0.04	0.04
- Screen arts	-0.01	0.02	<0.01	-0.04	.970	-0.05	0.05
- Sports (observing)	0.10	0.07	0.01	1.48	.139	-0.03	0.23
Life Satisfaction							
$R^2 = .05, F(8, 435) = 2.82, p = .005$							
- Age	-0.01	0.03	<0.01	-0.21	.834	-0.06	0.05
- Income	1.51	0.68	0.01	2.23	.026	0.18	2.84
- Visual arts	0.69	0.42	0.01	1.66	.098	-0.13	1.51
- Live arts	1.22	0.34	0.03	3.57	<.001	0.55	1.89
- Literary arts	0.13	0.30	<0.01	0.43	.671	-0.45	0.70
- Audio arts	0.15	0.20	<0.01	0.79	.433	-0.23	0.54
- Screen arts	-0.23	0.23	<0.01	-1.00	.319	-0.67	0.22
- Sports (observing)	0.41	0.64	<0.01	0.64	.523	-0.85	1.66
Meaning in Life							
$R^2 = .08, F(8, 435) = 4.56, p < .001$							
- Age	0.01	0.01	0.01	2.41	.016	<0.01	0.02
- Income	0.37	0.14	0.02	2.63	.009	0.09	0.64
- Visual arts	0.23	0.09	0.02	2.66	.008	0.06	0.40
- Live arts	0.15	0.07	0.01	2.18	.030	0.02	0.29
- Literary arts	0.02	0.06	<0.01	0.37	.709	-0.10	0.14
- Audio arts	0.05	0.04	<0.01	1.20	.249	-0.03	0.13
- Screen arts	-0.10	0.05	0.01	-2.23	.026	-0.20	-0.01
- Sports (observing)	-0.04	0.13	<0.01	-0.30	.764	-0.30	0.22

Parameter Estimates	<i>B</i>	<i>SE</i>	η^2_p	<i>t</i>	<i>p</i>	CI -L	CI-U
Mental Well-Being			$R^2 = .05, F(8, 453) = 2.77, p = .005$				
- Age	0.10	0.05	0.01	1.81	.071	-0.01	0.21
- Income	2.05	1.38	0.01	1.49	.138	-0.66	4.76
- Visual arts	1.42	0.85	0.01	1.66	.097	-0.26	3.09
- Live arts	1.40	0.70	0.01	2.01	.045	0.03	2.77
- Literary arts	0.24	0.60	<0.01	0.40	.692	-0.94	1.42
- Audio arts	0.56	0.40	0.01	1.41	.160	-0.22	1.34
- Screen arts	-0.89	0.46	0.01	-1.93	.054	-1.79	0.02
- Sports (observing)	1.52	1.30	<0.01	1.17	.243	-1.04	4.08

Note. 95% Confidence Interval: Lower (CI-L), Upper (CI-U) bounds. Coding: Income (household) – below UK median (0), above UK median (1).

Table S2. Multi-level model testing the fixed effects on well-being of A) time spent engaged with arts/sports, B) engaging (vs. not engaging) with arts/sports, and C) elevating experience in response to art in Study 2.

	β	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI -L	CI-U
A)							
Emotional Well-Being							
- Age	0.01	0.01	1.52	48	.136	-0.01	0.03
- Income	0.10	0.21	0.49	48	.627	-0.33	0.54
- Time spent on arts	0.08	0.02	3.71	658	<.001	0.04	0.13
- Time spent on sports	0.05	0.07	0.67	705	.501	-0.09	0.52
Life Satisfaction							
- Age	0.01	0.01	1.14	47	.261	-0.01	0.04
- Income	0.53	0.28	1.86	47	.069	-0.04	1.10
- Time spent on arts	0.09	0.02	3.77	685	<.001	0.04	0.14
- Time spent on sports	0.03	0.08	0.43	727	.671	-1.29	0.92
Meaning in Life							
- Age	0.02	0.01	1.59	47	.118	-0.01	0.05
- Income	0.47	0.29	1.63	47	.110	-0.11	1.06
- Time spent on arts	0.05	0.02	2.68	710	.008	0.01	0.09
- Time spent on sports	0.07	0.06	1.12	741	.264	-0.18	0.05
B)							
Emotional Well-Being							
- Age	0.01	0.01	1.50	48	.140	-0.01	0.03
- Income	0.11	0.21	0.52	48	.609	-0.32	0.54
- Engaged with arts	0.23	0.07	3.45	687	.001	0.10	0.36
- Engaged with sports	0.01	0.10	0.08	746	.938	-0.21	0.19

	β	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI -L	CI-U
Life Satisfaction							
- Age	0.01	0.01	1.13	47	.263	-0.01	0.04
- Income	0.52	0.28	1.88	47	.067	-0.04	1.09
- Engaged with arts	0.13	0.07	1.77	708	.077	-0.14	0.28
- Engaged with sports	0.01	0.11	0.07	757	.946	-0.21	0.22
Meaning in Life							
- Age	0.02	0.01	1.51	47	.138	-0.01	0.04
- Income	0.45	0.29	1.57	47	.122	-0.13	1.03
- Engaged with arts	0.13	0.06	2.26	724	.024	0.02	0.24
- Engaged with sports	0.05	0.09	0.57	759	.572	-0.12	0.22
C)							
Emotional Well-Being							
- Age	0.01	0.01	1.44	47	.157	-0.01	0.03
- Income	0.12	0.21	0.58	46	.563	-0.30	0.55
- Elevating experience	0.16	0.04	3.85	467	<.001	0.08	0.23
Life Satisfaction							
- Age	0.02	0.01	2.03	48	.048	<0.01	0.05
- Income	0.49	0.27	1.83	47	.074	-0.05	1.02
- Elevating experience	0.17	0.04	4.02	477	<.001	0.09	0.25
Meaning in Life							
- Age	0.02	0.01	2.03	48	.048	<0.01	0.05
- Income	0.46	0.26	1.73	47	.090	-0.07	0.99
- Elevating experience	0.21	0.03	6.39	484	<.001	0.13	0.89

Note. 95% Confidence Interval: Lower (CI-L), Upper (CI-U) bounds. Coding: Income (household)

– below UK median (0), above UK median (1); engaged with activity – not engaged (0), engaged (1).

Table S3. Multiple regression analysis testing the predictive effect of Wave 2 mental well-being on Wave 5 frequency of arts attendance in Study 3.

	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>95% CI</i>	
Block 1	$R^2 = .01, F(1, 26742) = 242.82, p < .001$						
Well-being (W2)	0.03	<0.01	0.09	15.58	<.001	0.02	0.03
Block 2 (all W2)	$R^2 = .36, F(30, 26742) = 508.54, p < .001$						
Well-being	0.01	<0.01	0.02	4.25	<.001	<0.01	0.01
Arts frequency	0.45	0.01	0.44	78.87	<.001	0.43	0.46
Sports frequency	0.06	<0.01	0.09	16.70	<.001	0.05	0.07
Age	<0.01	<0.01	0.03	3.83	<.001	<0.01	<0.01
Gender (0 female, 1 male)	0.13	0.02	0.04	8.20	<.001	0.10	0.16
Long term illness/disability (0 no, 1 yes)	0.18	0.05	0.02	3.89	<.001	0.09	0.28
Highest qualification (vs. none)							
- Degree or equivalent	-0.62	0.03	-0.20	-23.91	<.001	-0.67	-0.57
- A level	-0.45	0.03	-0.13	-16.60	<.001	-0.50	-0.40
- GCSE	-0.38	0.03	-0.11	-14.50	<.001	-0.43	-0.33
Marital status (vs. single/never)							
- Married/civil partner	-0.03	0.02	-0.01	-1.21	.226	-0.07	0.02
- Separated/divorced/former civil partner	<-0.01	0.03	<-0.01	-0.11	.915	-0.07	0.06
- Widowed/surviving civil partner	0.02	0.04	0.01	0.60	.546	-0.06	0.11
Dependent children (0 no, 1 yes)	-0.11	0.06	-0.01	-1.91	.057	-0.23	<0.01
Region (vs. London)							
- North East	-0.03	0.05	<-0.01	-0.74	.459	-0.12	0.05
- North West	0.02	0.03	<0.01	0.48	.629	-0.05	0.08
- Yorkshire & Humber	0.03	0.04	0.01	0.72	.469	-0.04	0.10
- East Midlands	0.01	0.04	<0.01	0.16	.870	-0.06	0.08
- West Midlands	0.02	0.04	<0.01	0.55	.584	-0.05	0.09
- East of England	-0.07	0.03	-0.01	-2.10	.035	-0.14	-0.01
- South East	-0.10	0.03	-0.02	-3.09	.002	-0.16	-0.04
- South West	-0.13	0.03	-0.03	-3.86	<.001	-0.20	-0.07
- Wales	0.09	0.04	0.02	2.58	.010	0.02	0.16
- Scotland	-0.09	0.03	-0.02	-2.68	.007	-0.16	-0.02
- Northern Ireland	-0.02	0.04	<-0.01	-0.62	.537	-0.09	0.05
Current economic activity (vs. inactive)							
- Working	-0.14	0.03	-0.05	-4.46	<.001	-0.20	-0.08
- Education or training	-0.21	0.05	-0.03	-4.21	<.001	-0.30	-0.11
- Retired	0.03	0.03	0.01	0.85	.397	-0.04	0.10
Annual income (GBP 000s)	<-0.01	<0.01	-0.04	-7.32	<.001	<-0.01	<-0.01
Working hours	<0.01	<0.01	0.04	4.18	<.001	<0.01	<0.01
Overtime hours	<-0.01	<0.01	-0.02	-2.24	.025	<-0.01	<-0.01

Note. The labels in the Table refer to low well-being (GHQ-12) and low arts/sport frequency.