

**Tracking momentary experience in the evaluation of arts on prescription services:
Using mood changes during art workshops to predict global wellbeing change**

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Structured abstract

Aims: To measure the immediate impact of participating in arts on prescription workshops on multiple dimensions of mood and to evaluate whether improvement in mood is a mechanism for change, predicting improvements in global wellbeing before and after participation in arts on prescription programmes.

Methods: The evaluation drew upon the experience sampling method, asking participants to complete a six-item mood questionnaire at the beginning and end of each workshop in a twelve-week-long arts on prescription programme. Participants also completed a measure of global wellbeing at the beginning and end of the programme.

Results: Multi-level modelling was used to test hypotheses since the data was hierarchical (with 1491 mood reports nested within 66 participants). There was a significant increase in global wellbeing across participation in the arts on prescription programme. After each art workshop there was a significant increase on all dimensions of mood: hedonic tone (contentment); tense arousal (calmness); and energetic arousal (alertness). There was also a significant increase in these dimensions of mood, over time, upon arrival at the art workshops each week. Further, reduction in tense arousal after art workshops significantly predicted changes in global wellbeing.

Conclusions: The findings suggest that a reduction in tense arousal (feeling nervous, anxious and stressed) is a crucial component of arts on prescription services and make a direct link between experiences during art workshops and changes in global wellbeing for the first time. This strengthens the evidence base for arts on prescription and suggests that tracking experience across interventions is a useful evaluation tool, with much potential.

Keywords: Experience sampling, wellbeing, art on referral, mood, social prescribing

Introduction

There is increasing impetus to develop the evidence base for what has been called ‘arts on prescription’ or ‘arts on referral’, using the arts in primary care both to improve the mental health of patients and to reduce the burden on the NHS^{1,2,3}. The current paper reports on an evaluation of arts programmes run by Bristol Arts on Referral Alliance. The evaluation builds upon previous research using pre-post designs, which suggest that arts on prescription can improve wellbeing^{4,5,6,7,8}, but is novel in that it draws on the experience sampling method⁹, tracking reports of momentary wellbeing over the course of arts on prescription programmes. The aim is to evaluate the extent to which dimensions of mood (hedonic tone, tense arousal and energetic arousal) are affected by art-making, how these change over time, and whether this predicts any longer-term changes in wellbeing. A further aim is to test a novel evaluation tool (mood tracking) that is easy to deliver and useful for inferring mechanisms of change.

Arts on prescription forms part of the wider remit of social prescribing, where doctors, nurses or other primary care professionals prescribe non-clinical activities with the expectation that this will improve the health and health behaviours of participants, including the arts, as well as gardening, cookery, healthy eating advice, nature walks

and sport^{3,10,11}. Three benefits of social prescribing have been outlined³, which are not mutually exclusive: improved mental health; improved community wellbeing; and improved social inclusion. This model draws on a holistic definition of health that is impacted by social cultural factors¹². With an increasing burden on General Practice (GP), and since it is claimed that 1 in 5 visits to GPs are due to social rather than medical reasons¹¹, social prescription is being explored as a route to reducing the financial burden of patient care, decreasing visits to GPs¹. Indeed, in England, the NHS Long Term Plan aims to make social prescribing available at every GP practice^{11,13}. It is important to evaluate whether such interventions can improve wellbeing, since the primary driver for its use should be patient benefit¹¹. Evidence for the efficacy of such interventions is especially pressing since the costs of mental health care expected to surge in the next ten years¹⁴, and the World Health Organisation predict that by 2030 depression will be the main global cause of health loss².

Art is not prescribed as an alternative to other forms of treatment, but as a supplement⁴. People are usually referred by a primary care professional due to stress and anxiety, depression and low mood, to help with symptoms of chronic pain and/or to improve self-esteem and reduce loneliness.³ Art on prescription is not a form of psychotherapy and individuals participate in visual art and craft activities, in small

groups, led by a skilled arts practitioner rather than an arts therapist^{3,15}. Typically this consists of attending a weekly art-workshop, for about two hours, for ten to 12 weeks, after which there may be an opportunity to join 'move on' art groups⁵. Activities are structured according to individual need and interest and may include clay work, watercolour, mixed media, drawing, print work, collage, felting, etc. The emphasis is on process and enjoyment, exploring art materials in a safe, non-judgemental space, rather than solely on the development of artistic skill, a process in which the artist facilitator plays a key role.

Research on art and health more generally supports the view that art making is associated with a broad range of benefits such as: decreased depression, anxiety and stress; and increased engagement, meaning (eudemoinc happiness), empowerment, connection with others and self-esteem^{9,15,16}. Research on the impact of community art groups suggests an improvement in wellbeing over the duration of the workshops, in both pre-post designs and a waiting list control study^{16,17,18}. However, specific research on arts on prescription is more limited and consists of only a few research papers.^{4,5,6,7,8,19,20,21,22,23,24}

Quantitative outcomes, using pre-post designs, suggest that arts on prescription can improve wellbeing (assessed with global wellbeing scales at the beginning and end of

art programmes, usually the Warwick Edinburgh Mental Wellbeing Scale, WEMWBS)^{6,7,8}. Qualitative outcomes, from both comments on evaluation forms and interviews suggest that participants feel that they benefit through connecting with and being with others, 'losing themselves' in the art activities (and thereby being distracted from pain or anxieties) and forming positive identities (of self-confidence, agency, empowerment and positive self-regard in relation to 'being an artist')^{20,,21,22,24}. Further, econometric work suggests that arts on prescription can reduce the financial burden on primary care^{19,25}.

Despite these encouraging findings, overall, the evidence base is weak¹. The quantitative work has focused mainly on one cohort (Artlift), there is a lack of control groups (and randomised allocation to conditions), meaning that wellbeing change could be attributed to uncontrolled factors, and attrition rates are not accounted for in analyses^{1,26}. A further limitation relates to a lack of process evaluation, examining markers of change across the course of art workshops²⁶. Due to the ethical and practical complexities of 'wait-list' and other control groups in primary care, the current study focused on this latter issue, piloting a new method of evaluation that measured aspects of wellbeing *throughout* arts on prescription programmes.

It has been suggested that evaluations of arts interventions could profitably draw upon the experience sampling method and the use of state measures to capture the immediate impact that attending art workshops might have⁹. The current study built upon this suggestion, using a form of event-contingent sampling, where mood was assessed before and after each art workshop of a 12-week-long course. This approach draws on current recommendations for wellbeing measurement, using both global, evaluative retrospective scales and in-the-moment measures²⁷. Retrospective scales tend to measure beliefs about wellbeing, rather than actual experience. We forget nuances of our affective life and make errors in our recall (e.g. being biased to remember positive moods across a week-long period)^{28,29}. Measuring immediate experience can be a more reliable measure of well-being (but also has its own set of limitations, being temporary, contextual and labile). Based on best practice recommendations^{27,30}, both global and immediate aspects of wellbeing (mood) were measured in the current study.

It was hypothesised that: 1) Global wellbeing scores would increase over the course of the art programmes, replicating previous findings^{6,7,8}; 2) immediate measures of mood (calmness, alertness and contentment) would increase after taking part in each art workshop⁹; 3) mood would improve over the course of the art programmes; and 4)

that improvements in mood during the art workshops would predict improvements in global wellbeing.

Methods

Participants

This paper uses data collected from three arts on prescription groups over a two-year period (September 2017 to July 2019). Arts on prescription was delivered by two artists (JM and BD). JM led two groups and BD one. The data was contributed by 66 individuals (58 female), aged between 25 and 75 (mean age = 47), who were referred for a number of reasons, usually multiple, but predominantly due to anxiety and depression, as well as social isolation and chronic pain. A high proportion of participants identified as 'White British' and as being unemployed. Thirty participants attended for one 12-week-long programme, and 36 were given a 'repeat prescription' and completed two terms.

Design

This was a multi-level, repeated-measures design, with mood reports (level one – 'the experiential-level'), and wellbeing scores, nested within participants (level two – 'the

person-level'). The dependent variables were mood (hedonic tone, tense arousal and energetic arousal) and global wellbeing. Predicting factors were time, either: a) pre and post each art workshop; or b) repeated measurement points across the duration of the arts on prescription programmes.

Materials

*Short Mood Scale, SMS*³¹. A six-item scale, based on a three-factor model of the structure of mood, and longer versions of the scale, that include: hedonic tone (feeling happy and cheerful rather than sad or depressed); tense arousal (feeling anxious, tense and stressed rather than relaxed or calm); and energetic arousal (feeling active and energetic rather than sleepy and sluggish)³². Each item was presented with a line between two 'opposites' (content versus discontent; unwell versus well; agitated versus calm; relaxed versus tense; tired versus awake; and full of energy versus without energy). This line was 8.4 cm long and had a mark (a short perpendicular line) at the neutral mid-point, and marks at the ends of each line to denote extreme points clearly. This scale was designed to repeatedly sample individuals' mood and has been found to be reliable and sensitive to individual change^{31,33}.

*Warwick Edinburgh Mental Wellbeing Scale, WEMWBS*³⁴. A 14-item scale enquiring about psychological wellbeing over the previous two weeks, including connection to

others, self-esteem, positive affect and clarity of cognition. The scale has excellent psychometric properties and is responsive to change (a minimum 'meaningful change' being one of 3 points across measurement points). A score of 40 or below has been interpreted as indicative of probable depression, and 44 or below of possible depression³⁴.

Procedure

Each programme consisted of twelve weekly art workshops, led by a skilled arts and health practitioner. Participants were gently introduced to a range of art techniques and ideas to help them explore their own creativity and were supported to learn and explore new artistic skills at their own pace throughout the programme. Participants were invited to take part in the evaluation in the first workshop, read a participant information sheet about what this comprised and signed a consent form. They were asked to complete the WEMWBS at the start of the programme, before a half-term break, on their return from this break, and at the end of the programme. Participants were also invited to complete the SMS at the start and end of each art workshop. They were given a separate paper mood scale at each point, and forms were collected immediately to avoid direct comparison of scores. All data was contributed anonymously. No names or other identifying details were recorded on forms. Data was

cross-referenced with a unique code generated through responding to two questions on each form: “the first two letters of your mother’s first name” (e.g. Carol = CA); and “your birth date” (e.g. 31 for 31st May). The evaluation was given ethical approval by the University of the West of England’s Ethics Committee (Reference Number: HAS.17.07.197).

Results

Screening the data and analysis

Because the data are nested, multi-level modelling was used to account for the lack of independence of data.^{35,36} Multi-level modelling also allows for partial data across repeated-measurement points, which was the case in this study. The data consisted of 1491 mood reports (pre and post art workshops), with a mean of 23 mood reports per participant (ranging from 4 to 34), and 204 wellbeing scores (a mean of 3 per participant, ranging from 2 to 7). The impact of missing data on analyses was assessed and found to be negligible. Multi-level modelling has the further advantage of enabling random slopes analyses, where, for example, differential increases in wellbeing can be predicted by other variables (e.g., enjoyment of art workshops). Residuals of mood and wellbeing were normally distributed, meeting requirements for multi-level modelling.

Following standard recommendations, between-person predictors were centred around grand mean scores.³⁶

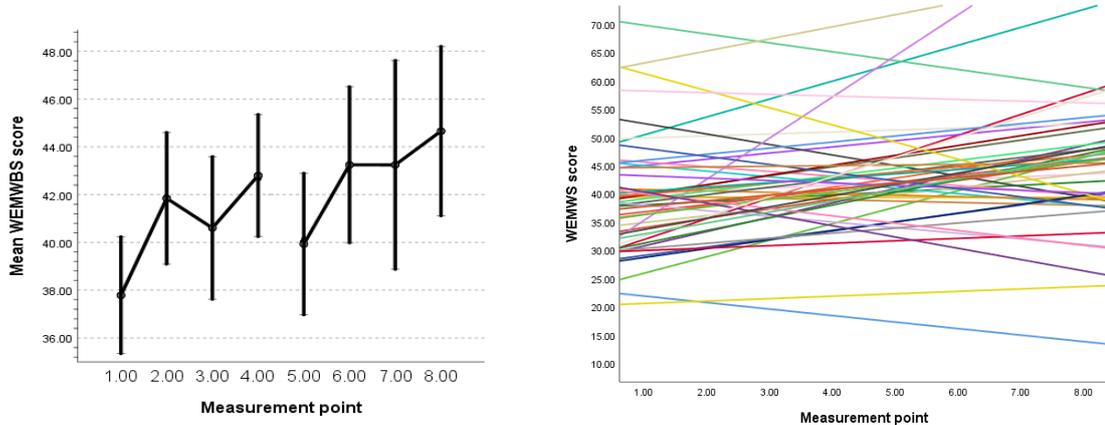
Wellbeing scores across the art programmes

The first hypothesis was that wellbeing would significantly increase over time. Mean wellbeing levels are illustrated in Figure 1 and indicate that across the first 12-week programme, wellbeing increased from 37.79 to 42.80, a mean increase of 5.01 units (above the minimum of 3 units indicative of ‘meaningful change’). For people returning for a second programme, wellbeing continued to improve, on average, rising from 39.93 to 44.66 (a mean increase of 4.73). It is of note, as illustrated in Figure 1a, that mean wellbeing scores decreased after a break from the arts programme (for example, from 42.80 to 39.93 [a difference of -2.87], between programmes). The mean interval between programmes was 4.2 weeks (29 people having a three-, and seven people a nine-, week-long interval between referrals due to the summer holidays).

Figure 1: Changes in global wellbeing for each level of Time

Figure 1a: Estimated mean global wellbeing scores (with 95% confidence intervals) across attendance at two arts on prescription programmes

Figure 1b: Spaghetti plot showing individual changes in wellbeing over time.



Note: Measurement points 1-4 are for programme one, where 1 = baseline, 2 = before half terms (6 weeks); 3 = after half term; 4 = end of the 12-week programme. Measurement points 5-8 are for programme two.

A multi-level model was conducted, with a random intercept (allowing intercepts to vary by participant). Wellbeing was the dependent variable and change in wellbeing was predicted with a fixed factor of Time, which had eight levels: The start and end of each twelve-week-long programme (term one and term two), and before and after a mid-term break (within each programme). Wellbeing scores significantly changed as a function of time $\beta = .85$ (SE = .20; 95% CI = .45 – 1.25; df = 164), $p < .001$. As can be seen in Figure 1b, which plots individual changes in wellbeing, not all individuals had upward slopes as predicted. Hence, random slopes were enabled in the model.

However, this variation in slopes was not statistically significant ($\beta = .35$, SE = .35, 95% CI = .05 – 2.28, $p = .29$). Pairwise contrasts suggested that the significant changes in

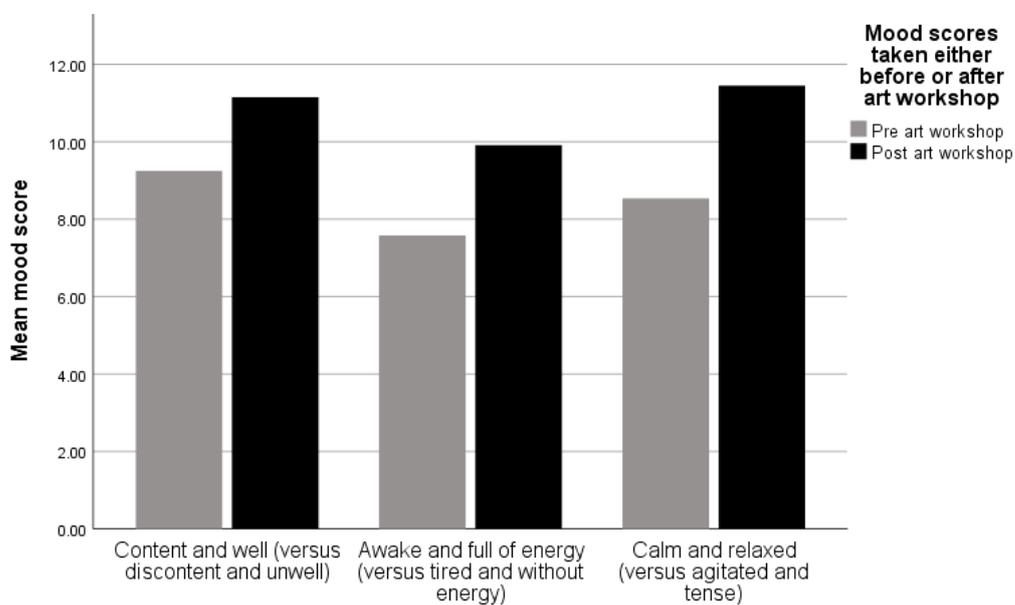
wellbeing were mostly between baseline levels (at the start of term one) and subsequent time points: at the end of the first six weeks ($t = -3.18, p = .002$); the end of the first programme ($t = -4.24, p < .001$); and the end of the second programme ($t = -3.89, p < .001$). There was also a significant increase in wellbeing from the start of the second programme to its end ($t = -2.49, p = .014$). None of the decreases in wellbeing reached statistical significance, the biggest decrease being between the end of term one and the start of term two, which was non-significant ($t = 1.96, p = .052$). The hypothesis that wellbeing scores would significantly increase over time was accepted.

Mood scores before and after the art workshops

It was hypothesised that after engaging in an arts on prescription workshop participants would report feeling more content, calm and energetic. Multi-level models were conducted, with each dimension of mood as a dependent variable, and with 'pre' and 'post' wellbeing as a fixed factor. For each of the three dimensions, mood was significantly improved after the art workshop compared to baseline mood scores. Participants reported being significantly more: calm and relaxed ($F_{(1264,1)} = 488.87, p < .001$); alert and energetic ($F_{(1269,1)} = 221.21, p < .001$); and content and well ($F_{(1269,1)} = 247.05, p < .001$). The largest effect was for a reduction in tense arousal (feeling more

calm and relaxed after art workshops). The hypothesis that participation in arts on prescription workshops would be associated with improved immediate subjective wellbeing was accepted.

Figure 2: Mean mood scores before and after art workshops



Changes in baseline mood over time

The second hypothesis regarding mood was that immediate subjective mood, on arrival at the art-workshop each week, would increase over the course of participation in the art programmes. Multi-level models were conducted (N = 66), with baseline mood as dependent variables, and with time as a fixed predictor (chronological week

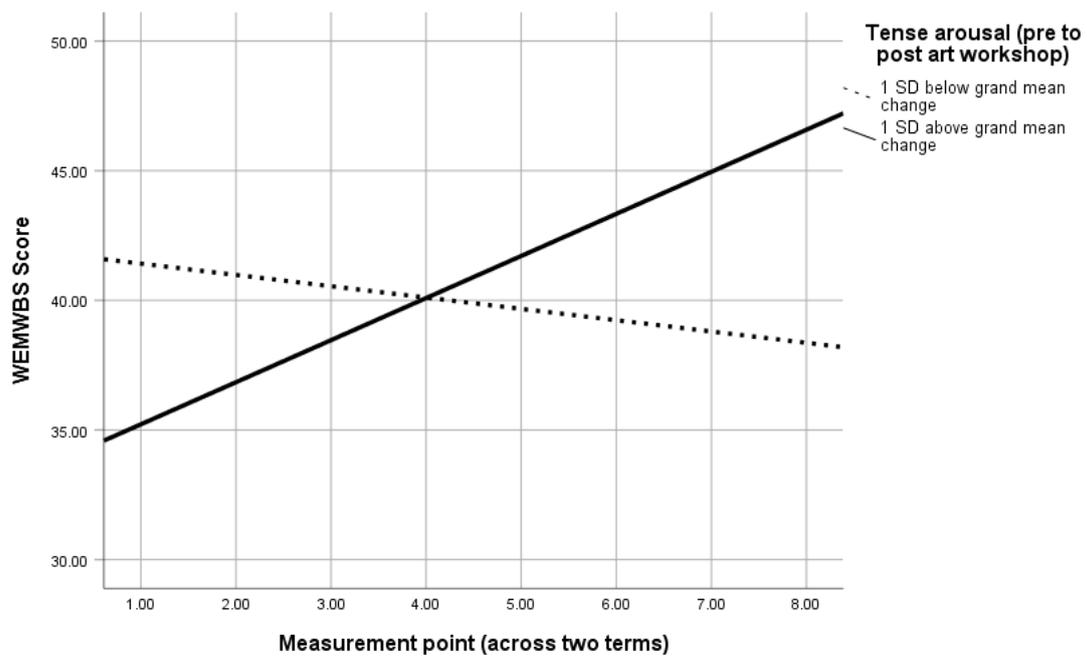
numbers across period of participation: 1-24). Mood was significantly predicted by time, for all three dimensions: hedonic tone (contentment) ($\beta = .03$, $SE = .013$, $p = .013$, 95% CI = .007 - .06); tense arousal (relaxation) ($\beta = .04$, $SE = .014$, $p = .006$, 95% CI = .01 - .07); and energetic arousal (alert) ($\beta = .04$, $SE = .015$, $p = .012$, 95% CI = .009 - .07). This suggested that not only global wellbeing, but immediate subjective wellbeing, feelings of contentment, calmness and alertness, improved over the referral time-frame.

Cross-level interactions between mood and wellbeing over time

The final hypothesis was that dimensions of mood (shifts into a positive mood after art making) would predict changes in longer-term wellbeing. By adding cross-level interactions to the initial wellbeing model (for hypothesis one), it was tested whether the relationship between wellbeing and time differed significantly according to participants' average increase in mood during the art workshops. Reporting a larger reduction in tense arousal after art making was associated with increases in global wellbeing over time ($\gamma = .41$, $SE = .17$, $p = .019$, 95% CI = .07 - .76). However, changes in energetic arousal and hedonic tone were not significant predictors ($\gamma = -.01$, $SE = .07$, $p = .84$, 95% CI = -.16 - .136; and $\gamma = -.29$, $SE = .24$, $p = .22$, 95% CI = -.76 - .18, respectively). As illustrated in Figure 3, there was an increase in global wellbeing scores

over time only for those participants who reported a large reduction in tense arousal after the art workshops. The final hypothesis was partially met: reduction in tense arousal during art workshops predicted increases in wellbeing over the course of the arts on referral programmes.

Figure 3: Association, with lines of best fit, between wellbeing change and time according to person-level mean reductions of tense arousal during art workshops



Discussion

The current research was innovative in that it applied mood tracking to the evaluation of an arts and health intervention for the first time. This approach enabled the immediate affective response to attending art workshops to be examined as a mechanism driving wellbeing change. The findings suggest that tracking immediate experience is a useful tool in the evaluation of public health interventions.

The significant increase in global wellbeing over the course of arts on prescription workshops supports previous research^{5,6,7,8}. Wellbeing (WEMWBS scores) was generally low at baseline (at a mean level indicative of probable depression, below 40), but was increased to levels above this threshold after participation in one programme. These findings support the efficacy of arts on referral programmes for improving wellbeing. However, it is not known what factors might be required to maintain such increases in wellbeing after the cessation of the arts programmes, and longitudinal research is required to explore this.

The most important outcome from the current study was the examination of the immediate impact of art making on mood and its relationship with wellbeing change. Mood is conceptualised as multi-dimensional, with orthogonal factors with different physiological underpinnings: hedonic tone (contentment and happiness); tense arousal (stress and anxiety); and energetic arousal (alertness and wakefulness)^{31,32}. For

example, previous research, sampling moods in everyday life, has reported that physical activity improves both energetic arousal and hedonic tone (but not tense arousal)³⁷. In the current study, participating in art workshops was associated with significant improvement on all three dimensions of mood. However, reduction of tense arousal appeared to be most important for global wellbeing. Participants who reported a larger increase in relaxation and calmness after the art workshops, had a larger increase in wellbeing across the arts on referral programmes. Increases in feelings of wakefulness and contentment did not have this effect. This finding is important because it suggests that reduction of tense arousal (agitation, tension, stress and anxiety) is one potential mechanism by which arts on prescription improves wellbeing, and suggests that engagement with visual arts and crafts is an appropriate prescription for people experiencing anxiety and depression. It provides a direct link between experience during the art workshops and wellbeing change (limiting the interpretation that change could be attributed to non-controlled factors or reporting biases). The finding also concurs with experimental research suggesting that art-making reduces stress and cortisol levels³⁸. Further research could seek to replicate and extend understanding of this effect and explore issues such as: why some participants may not have had a relaxation response to the art workshops; how this response could be

optimised in art workshops; and whether participants also use art making as a tool to manage anxiety in everyday life.

In addition to exploring the impact of mood change pre and post each art workshop, analyses of mood scores on arrival showed significant increases over time. Participants reported feeling more content, calm and energetic across the twelve-week-long arts on prescription programmes. This supports the increase in global wellbeing, and could be interpreted as being indicative of improved immediate subjective experience in everyday life. However, an alternative interpretation is that participants may have been feeling more relaxed in the art group only. Future work could sample mood at random points in everyday life, drawing on the experience sampling method⁹, in order to explore how long such boosts in mood last outside the safe space of the arts on prescription room and group. Such an approach has been used recently to explore the treatment impact of psychological interventions³⁹.

The findings of this study support the use of the arts on prescription as an effective intervention, reducing tense arousal and improving the wellbeing of participants referred with anxiety and depression. Nevertheless, the study had several limitations. In order to be minimally invasive, only mood was measured. However, other aspects of experience could also contribute to wellbeing change, such as feelings of mastery,

connection to others, or states of absorbed concentration in art making^{9,15,18,19}.

Further, it is possible that the completion of mood measures could be affected by demand characteristics. Participants may expect to feel better at the end of the workshops and mark the form accordingly. However, it is unlikely that response biases could explain either the interaction between mood and wellbeing scores, or change in mood across the art programmes, since this would require the memorisation of complex scoring patterns. Finally, it would be useful in future work to assess the impact of the number of sessions attended on wellbeing change, as well as to evaluate the efficacy of arts on prescription for different reasons for referral.

Future research could develop the approach outlined in this paper, using computerised experience sampling methods to explore the impact of arts on prescription on wellbeing in everyday life, both across and beyond the referral time-frame. There is also the potential to track physiological data with this approach to augment self-report data⁴⁰. However, perhaps the most crucial issue is to further explore who arts on prescription works best for, and why. For example, in relation to the current findings, what factors contributed to some people finding the art workshops relaxing, and others, not? Mixed methods approaches could be useful here, for example, interviewing people with different relaxation responses about their experiences of arts on prescription. Finally, it would be useful to apply theoretical models about why and

how arts on prescription might work to future research (e.g. stress reduction, distraction and social models). Appropriate state variables (such as absorption and social connection) could be included, but also further potential global outcomes, both for the individual (e.g. social isolation, being better able to manage care) and health and care system (e.g. reduced consultations with GPs)¹¹.

Conclusions

The current research supports the efficacy of arts on prescription programmes for improving the wellbeing of people referred for anxiety, depression and social isolation^{5,6,7,8}. The use of mood tracking component, drawing upon the experience sampling method⁹, was demonstrated to be a useful tool for the evaluation of public health interventions, helping to understand processes of change. The current study found improvements in immediate subjective experience after art workshops (contentment, wakefulness and calmness), experiences that are crucial components of psychological wellbeing^{27,30}. Reductions in tense arousal during the art workshops significantly predicted global wellbeing change, making a direct link between experiences during art workshops and subsequent wellbeing for the first time. This strengthens the evidence base for arts on prescription, and helps to suggest mechanisms for its efficacy. However, further work and more complex theoretical and

empirical work on mechanisms for change is required, as well as understanding of the longitudinal impact, of the arts on prescription.

Acknowledgements

Thanks must go to Julie Matthews and Barbara Disney, artists who led the arts on prescription workshops, through the Creativeshift service for Bristol Arts on Referral Alliance. The project also benefitted from student volunteer research assistants who helped to input data. Thank you for your help Susannah Disley, Flora Strange, Sophie Ashton and Abigail Rickards.

Funding Acknowledgement

Not applicable.

Ethical Approval Acknowledgement

This study was approved by the University of the West of England's Research Ethics Committee. (Reference Number: HAS.17.07.197.)

Declaration of conflicting interests

None.

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