

Exploring the impact of choral singing on mindfulness

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Abstract

A wealth of academic research demonstrates an empirical link between choral singing and well-being. This study investigated the construct of state mindfulness as a potential generative mechanism by which this link exists. A within-subject design measured levels of state mindfulness in choristers before and after a choir rehearsal. Assessing state mindfulness before and after listening to a piece of music at home acted as the control condition. State mindfulness was assessed by the Mindful State Questionnaire (MSQ) among a sample of 83 adult amateur choristers (65 females, mean age 51.9 years). The development and psychometric properties of the MSQ are described. Paired *t*-tests revealed significant increases in levels of state mindfulness for both conditions (choir singing; $t = 10.82$, $p < .001$, $\eta^2 = 0.58$; listening to music; $t = 4.48$, $p < .001$, $\eta^2 = 0.21$), however the effect sizes and confidence intervals indicated a far greater effect for the choral singing condition. Limitations and future recommendations are discussed, with examples of opportunities to incorporate these findings into the promotion of mental health in Ireland.

Keywords

choir, choral singing, mindfulness, state mindfulness, well-being

The incorporation of the performing arts in the development of modern clinical and community health interventions has revealed an exciting new means by which psychological and emotional health can be improved. Art, dance, poetry and drama have increasingly been integrated into therapies worldwide (Barnes, 2014; Collie, Bottorff, & Long, 2006; Goodill, 2005; Mazza, 2003). More recently, however, focus has been directed to an alternative activity: choral singing.

The benefits of choral singing

Research interest in the field of choral singing over the past decade has blossomed, with myriad benefits consistently reported in the literature. These include physiological (physical stress

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reduction, improved breathing and posture, increased blood circulation), cognitive (improved concentration and memory, raised self-esteem) and social benefits, as well as adding meaning and structure to daily life (Chorus America, 2009; Clift et al., 2010; Livesey, Morrison, Clift, & Camic, 2012; Vickhoff et al., 2013). The organisation and structure of a weekly rehearsal can act as an anchor for individuals upon which other various weekly activities may be built. The social support and sense of collective bonding through co-ordinated activity, the opportunity for development of personal contact with like-minded others, and a sense of contributing to something greater than the sum of its parts all purportedly lend themselves to an incredible increase in psychological well-being (Stewart & Lonsdale, 2016).

Studies examining the effects of group singing on psychological health and well-being have generally tended to focus on clinical or marginalised samples, such as the homeless (Bailey & Davidson, 2005), prisoners (Cohen, 2009; Silber, 2005), dementia patients (Camic, Williams, & Meeten, 2013), disadvantaged adults with chronic mental health problems (Dingle, Brander, Ballantyne & Baker, 2013) or the elderly (Cohen et al., 2006, 2007). Minimal research has explored how choir singing might improve the well-being of the general public, or a broad sample of amateur, adult singers with no significant mental health problems. To address this gap in the literature, this study will focus exclusively on a sample of amateur adult choristers not chosen or screened for any psychological difficulties.

Theoretical background for the study

A brief review of the links between choir singing and increased psychological well-being reveals a plethora of potential mechanisms by which this relationship exists. With the development of empirical research in this area still in its infancy, few theories have been pragmatically tested and the overall area lacks a comprehensive model by which this connection may be understood. Nonetheless, the following are conceptually relevant and may provide a starting point for future research.

Sense of coherence. The sense of coherence (SOC) model (Antonovsky, 1987) is one defined by a mixture of optimism and control, where one feels thoroughly confident that their environment is predictable and that things will turn out the way they expect them to. It has been suggested that choir singing (by way of reducing stress, meeting spiritual needs, and improving social and individual resources) contributes to this sense of optimism and control (Livesey et al., 2012).

Social capital. The most prominent social theory contributing to this area is the concept of social capital, by which a realm of benefits are expected to be derived from the engagement of an individual in community, personal and formal social networks, in addition to trust and reciprocity within these social networks (Putnam, 2001). Being a member of a chorale, experiencing collective bonding through co-ordinated activity and the feeling of contributing to the wider community through performance is likely to enhance one's social capital, which itself has been associated with an overall reduction in mental health problems (De Silva, McKenzie, Harpham, & Huttly, 2005). In support of this framework, Ryan and Deci's (2002) self-determination theory suggests that an individual's intrinsic drive to engage in a particular activity must also be sustained and supported by his or her wider social environment.

Concept of flow. Nakamura and Csikszentmihalyi (2002) claim that a state of "flow" is achieved when focused concentration engages with a clear set of proximal challenges at a level appropriate to the individual's capabilities, along with immediate feedback regarding the performance

or activity. A particularly convincing case has been proposed for the relevance of this theory to choral singing. Choir singing (particularly in more than two-part harmony) demands considerable awareness and focused attention from the chorister and the conductor provides regular, constructive feedback throughout the rehearsal to improve the performance. Bailey and Davidson (2005) reiterate the relevance of this concept with regard to choral singing in their research. Walker (2010) reports flow as being more prominent in social situations than solitary situations, supporting the hypothesis that singing in a choir may provide the optimal setting for creating a sense of flow in the individual. Livesey and colleagues (2012) liken the concept of flow with the construct of mindfulness. Both bear resemblance in their discussion of attention and awareness and both recognise the adaptive value of employing consciousness on subjective experience, behaviour and the immediate environment. The body of research on mindfulness shall comprise the theoretical background for this study.

Mindfulness

Originally derived from Buddhist traditions, the concept of mindfulness in the psychological literature has gained momentum since the turn of the millennium. Through the innovative work of Jon Kabat-Zinn (1982, 1990), mindful practice was slowly introduced into settings across counselling psychology (Christopher & Maris, 2010; Shapiro, Brown, & Biegel, 2007), social and personality psychology (Niemic et al., 2010), neuroscience (Creswell, Way, Eisenberger, & Lieberman, 2007), organisational psychology (Dane & Brummel, 2013; Giluk, 2010) and education (Napoli, Krech, & Lynn, 2005). It now occupies a central place in Western clinical practice, with Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990), Dialectical Behaviour Therapy (DBT; Linehan, 1993), Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) and Acceptance Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) all heavily relying on the basic tenets of mindfulness.

Such mindfulness-based interventions (MBIs) have proved their efficacy time and time again – primarily in clinical settings. However in the case of most MBIs (particularly MBSR), mindfulness is cultivated through instruction in formal meditative practice. Although the formal practice has been associated with a wide range of benefits and completely freed of the cultural, religious and ideological factors associated with the Buddhist origins of mindfulness, it is possible that many people are not ready for, or interested in, such an activity. Limited research has investigated methods of mindful practice other than that of the sitting practice of meditation. It thus appeared useful to examine whether mindfulness could be cultivated (if only briefly) in an informal setting, during a regular activity such as choir practice.

Defined by its pioneer as “the awareness that emerges through paying attention on purpose, in the present moment and nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145), mindfulness is widely associated with the mitigation of stress and enhancement of emotional well-being in non-clinical samples (Bishop et al., 2004). For this reason, it is hypothesised that mindfulness might be the generative mechanism through which choral singing influences well-being, as discussed previously. Indeed, in reviewing earlier studies, aspects of mindfulness (i.e. focused attention) were among the most frequently reported perceived benefits of choral singing, e.g. “Singing in a choir puts troubles on hold, as concentrating on the music requires all one’s attention” (Clift et al., 2010, p. 29; Livesey et al., 2012). Combined, the lack of an empirically tested mechanism by which choral singing and well-being may be linked and the qualitative accounts provided by participants form a strong argument for the development of the hypothesis of this study.

State or trait?

Consistent with the absence of an overarching theoretical framework in the area, there is a lack of consensus as to whether mindfulness should be construed as a state or a trait. Many validate mindfulness as a dispositional trait, a tendency to adhere to a mindful way in one's daily life. Others have emphasised the state-like quality of mindfulness, depicting it as a flexible way of paying attention to what is occurring in that moment and accepting that moment non-judgmentally. More recently, theory suggests that the two are intricately related, and heightening state mindfulness with regular meditation practice eventually increases trait mindfulness (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015). For the sake of clarity, in attempting to ascertain whether choral singing may impact upon one's mindfulness, the interpretation of mindfulness as a state shall be employed.

This concept of state mindfulness has largely been excluded from the literature to date, with only two questionnaires endeavouring to measure the construct; the Toronto Mindfulness Scale (TMS; Lau et al., 2006) and the State Mindful Attention Awareness Scale (State-MAAS; Brown & Ryan, 2003). As the dimensionality and structure of the above scales did not accurately represent the perceived multi-faceted nature of mindfulness that the researchers wished to convey, a novel questionnaire was developed – the Mindful State Questionnaire (MSQ). The development and psychometric properties of the MSQ are described in the Methods and Results sections.

Many of the reports linking choral singing and well-being are of an exploratory nature and are small in scale. The diversity and variation in quality of the available literature makes it particularly difficult to draw evidence-based conclusions and many studies have reported the need for replicable, quantitative, large-scale studies. With regard to mindfulness, despite the exponential growth of empirical research in the area, the literature suffers various limitations. An operational, working definition is yet to be explicated, differences in content and structure between measures still exist and the dimensionality of mindfulness itself is ambiguous. Under such circumstances, the best option is to clearly explicate the approach to mindfulness this study will be taking and in doing so, allow others to replicate or contradict the chosen method. This study intends to amalgamate the two alternative research areas and address the gaps identified in the literature from both; extracting quantitative data from a large sample, attempting to delineate the construct of state mindfulness and suggesting a mechanism by which choral singing and well-being may be linked.

The present study

The purpose of this research is to evaluate state mindfulness as a potential empirical link between choral singing and well-being. Levels of state mindfulness will be measured before and after a choir rehearsal by the MSQ. It is predicted that a period of choral singing will influence levels of state mindfulness. Levels of state mindfulness will also be measured before and after a period of listening to music as a control, to determine the existence of a “choir” effect as distinctly separate to the more general positive impact of music on health and well-being (e.g. MacDonald, Kreutz, & Mitchell, 2012).

Method

Design

An experimental, within-subjects design was employed for the purpose of this research. A pre-post test methodology was employed to measure the degree of change in self-reported levels of

state mindfulness occurring as a result of active participation in a choir rehearsal. Participants completed the MSQ before choir rehearsal and after choir rehearsal. For the control condition, participants completed the MSQ before and after a listening exercise later that week in their own home.

Sample

Participants were adults enrolled in two community choirs in urban Ireland. These choirs were chosen due to a perceived similar performance level and method of rehearsal. Neither choirs audition for membership, however a basic level of sight-reading is deemed necessary. Contact was made with the choirs through personal communication, and contact with potential participants (choristers) was achieved by attending one of their weekly rehearsals. Prior consent was obtained from both the conductor and board of directors of each choir. Participation in the study was completely voluntary, with no monetary reward or incentive offered to participants. Analysis is based on 83 choristers (18 males, 65 females, $M = 51.9$ years old). The sample is predominantly of Irish origin, with one German, one Australian, two American and four British participants.

Materials

Demographics. Gender, nationality and age of participants were gathered at the beginning of data collection, specifically before filling out the Mindful Attention Awareness Scale (MAAS).

Mindful State Questionnaire (MSQ). Given the preliminary focus of the research on *state* mindfulness, a novel questionnaire was developed to assist in the gathering of appropriate data. Items from a realm of existing scales measuring trait mindfulness were considered in their relevance to the specific research context and after careful deliberation and discussion, a final list of 20 items was derived to represent the new Mindful State Questionnaire (see Table 1 for questionnaire items). Consistent with the emphasis on mindfulness as a state of the present moment, these items were rephrased to the present tense. For example, Item 5 of the MSQ is derived from the Kentucky Inventory of Mindfulness Skills (Baer, Smith, & Allen, 2004), originally phrased as "I don't pay attention to what I am doing, because I'm daydreaming, worrying or otherwise distracted". This item was restated in the MSQ as "I am not paying attention to what I am doing, because I'm daydreaming, worrying or otherwise distracted". Items included in the final version of the MSQ are considered to be equally balanced across three fundamental constructs of mindfulness as discussed in the literature; attention, awareness and acceptance. Items were responded to by placing an "X" on a line scale ranging from 0 (*Strongly Disagree*) to 10 (*Strongly Agree*). The marking scheme however ranged from 1 to 9, with the line broken down into nine sections. If the participant's "X" fell into section four for example, the score would be marked "four" for that item. It is acknowledged that this form of marking is slightly subjective, however answers were regularly cross-referenced with colleagues, and inter-rater reliability was 98%.

Mindful Attention Awareness Scale (MAAS). The MAAS is the most frequently employed scale in mindfulness research; this 15-item scale is geared towards assessing the construct of mindfulness across a variety of settings and audiences (Brown & Ryan, 2003). Items are responded to on a 6-point Likert scale, ranging from 1 (*Almost Always*) to 6 (*Almost Never*). This measure was administered at the very beginning of data collection, and having demonstrated high reliability and validity in previous studies (Black, Sussman, Johnson, & Milam, 2012), served primarily to

Table 1. Factor loadings for the four-item solution of the MSQ obtained from principal axis factoring with direct oblimin rotation.

	Factor 1 Attention	Factor 2 Awareness	Factor 3 Acceptance	Factor 4 Non-judgment	Communalities
I feel as though I am running on automatic, without much awareness of what I am doing right now (R)	.742				.698
I am aware of my feelings without getting lost in them	.698				.561
I am currently distracted (R)	.684				.645
I am finding it easy to concentrate on what I am doing	.675				.649
I am finding it easy to stay focused on what is happening in the present	.619				.527
I am not paying attention to what I am doing, because I am daydreaming, worrying or otherwise distracted (R)	.574				.586
I am able to describe how I feel at the moment in considerable detail	.512				.437
I am fully aware of what is going on around me and inside me	.496	.413			.685
I am paying attention to sounds around me, such as cars passing, birds chirping, etc.		.959			.751
I am noticing all sorts of little things and details in the world around me		.781			.634
I am paying attention to whether my muscles are tense or relaxed		.584			.465
I am currently aware of what thoughts are passing through my mind	.330	.359			.457
There are things I am currently trying not to think about (R)			.784		.711
I am currently preoccupied with something that happened in the past/will happen in the future (R)			.755		.555
I am trying to put problems out of my mind (R)			.724		.585
If I were to feel an unpleasant emotion right now, I would try to distract myself somehow (R)			.379		.370
I am accepting the thoughts and feelings that I am having				.736	.550
I am noticing my thoughts without judging them				.672	.529

Table 1. (Continued)

	Factor 1 Attention	Factor 2 Awareness	Factor 3 Acceptance	Factor 4 Non-judgment	Communalities
I am intentionally staying aware of my feelings				.514	.389
I am confident in my ability to accept things I cannot change			.314	.426	.437

Note. (R) = reverse scored item.

determine concurrent validity of the MSQ. The scale demonstrated high internal consistency within this sample (Cronbach's alpha = .891).

Audio CD. The piece of music provided on the CD for the listening exercise (control condition) was a 30-minute excerpt from Gabriel Fauré's *Requiem*, Op. 48. Chosen for its incorporation of choral work, passively listening to this piece of music was considered an appropriate standard against which actively singing at choir rehearsal could be measured. Choristers rarely get to choose the song they will perform, and so, were not given a choice as to the song they would listen to. Measures were taken to ensure that neither choir had previously performed this Requiem, or were in the process of learning it.

Procedure

University ethical approval was obtained, then written informed consent was sought. Testing took place in each choir's respective place of rehearsal, in both instances a church. The researcher left the premises for the duration of the rehearsal, so as not to intrude on their progress or serve as a potential distraction. Participation in this research occurred in two stages.

First stage. Prior to the choir rehearsal, participants filled out one copy of the MAAS and one copy of the MSQ and returned it to the researcher. Following the rehearsal, participants filled out one more copy of the MSQ and returned it to the researcher. The various copies of the MSQ were clearly labelled "BEFORE CHOIR PRACTICE" and "AFTER CHOIR PRACTICE" to reduce confusion and error. Participants received a brown envelope upon leaving the rehearsal, inside of which were two copies of the MSQ and an audio CD.

Second stage. At some point during the next week (before their next choir rehearsal), participants were required to carry out the control exercise in their own home. This entailed filling out the MSQ, listening to the CD, then filling out the MSQ again. Questionnaires were clearly labelled "BEFORE CD" and "AFTER CD". Participants were asked to bring the completed measures to their next rehearsal for collection.

Results

Psychometric properties of the MSQ

Internal consistency. Inter-item correlations fall into the recommended optimal range of 0.2 and 0.4 (Briggs & Cheek, 1986). High internal consistency of the scale was demonstrated by a

Table 2. Variable descriptives.

	Means	Trimmed means	Standard deviations
Before Choir	108.72	108.5	18.97
After Choir	129.22	128.92	15.42
Before Listening	108.49	108.5	19.94
After Listening	117.92	118.52	19.41

Cronbach's alpha of .869. Item-total statistics output indicated no substantial increase of Cronbach's alpha if item deleted, so the questionnaire retained the initial 20 items.

Concurrent validity. Concurrent validity between the MSQ and the well-validated MAAS was assessed using Pearson's r correlation coefficients. A moderately strong correlation was found ($r = .622$).

Face validity. The MSQ demonstrated high face validity, with all 20 post-graduate mental health professionals contacted identifying the questionnaire as measuring mindfulness.

Factor analysis of the MSQ

The 20 items of the MSQ were subjected to exploratory factor analysis (EFA) using the principal axis factoring method on SPSS version 22. Prior to performing factor analysis, suitability of the data was assessed. Despite the low item-to-participant ratio, the correlation matrix revealed the presence of many coefficients above 0.3. Factorability of the matrix was further supported by the Kaiser-Meyer-Olkin measure of sampling adequacy of 0.783 and the statistical significance of Bartlett's Test of Sphericity, $\chi^2(190) = 805.25$, $p < .001$. Communalities were all above .3 further confirming common variance between items (see Table 1).

Principal axis factoring revealed the presence of five components exceeding an eigenvalue of 1, explaining 30.1%, 14.2%, 8.6%, 7.3% and 5% of the variance respectively. Inspection of the scree plot and the results of Parallel Analysis supported the retention of only four components for further investigation. The resulting four-component solution explained a total of 51.9% of the variance. Direct Oblimin rotation was subsequently carried out to reveal the presence of a simple structure. Questionnaire items and corresponding factor loadings are presented in Table 1.

In interpreting the rotated factor pattern from Table 1, an item was said to load on a given component if the factor loading was .30 or greater for that component. In the case where the item loads on to more than one component, the strength of the factor loading was taken into consideration, and the Structure Matrix referred to. Using this criterion, items 3, 4, 12, 7, 1, 5, 9 and 13 were found to load onto the first component, which was labeled *attention*. Items 19, 18, 20 and 14 were found to load onto the second component, which was labeled *awareness*. Items 16, 2, 17 and 15 strongly loaded onto the third component, labelled *acceptance*, with items 11, 10, 6 and 8 loaded onto the component labeled *non-judgment of internal feelings*.

Repeated measures t-test

Table 2 provides the means and standard deviations of the experimental variables.

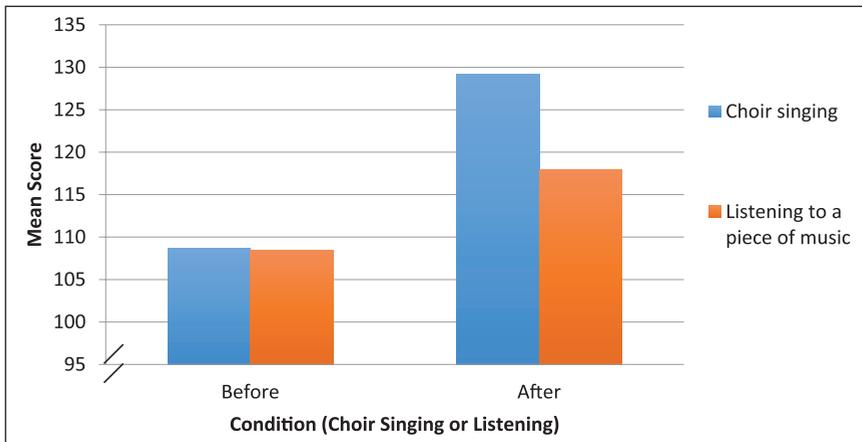


Figure 1. Mean difference pre–post test and between conditions.

The data were checked for normality and given the relatively large sample size, it was deemed appropriate to use parametric tests.

A repeated measures *t*-test was conducted to evaluate the impact of choral singing and listening on state mindfulness scores of the MSQ. There was a statistically significant increase in MSQ scores from *Before Choir* ($M = 108.72$, $SD = 18.97$) to *After Choir* ($M = 129.22$, $SD = 15.42$), $t(85) = 10.92$, $p < .001$ (two-tailed). The mean increase in MSQ scores was 20.5 with a 95% confidence interval ranging from 16.76 to 24.23. There was also a statistically significant increase in MSQ scores from *Before Listening* ($M = 108.49$, $SD = 19.94$) to *After Listening* ($M = 117.92$, $SD = 19.41$), $t(72) = 4.48$, $p < .001$ (two-tailed). The mean increase in MSQ scores was 9.42 with a 95% confidence interval ranging from 5.23 to 13.61. These results are presented graphically in Figure 1.

As observed from Figure 1 and from examination of the confidence intervals, singing during a choir rehearsal produced a substantially larger effect size ($\eta^2 = 0.58$) than listening to a piece of music ($\eta^2 = 0.21$).

Discussion

This study investigated the impact of choral singing on well-being and explored the mechanism of mindfulness as the potential underlying construct of the association. The results lend support to the hypothesis that levels of state mindfulness would be influenced by a period of choral singing. Results demonstrated a significant increase in levels of self-reported mindfulness following the choir rehearsal, and also a significant increase in levels of mindfulness after the period of listening to music. This result was not surprising, as the literature had previously indicated that listening to music can be an enjoyable experience, eliciting positive affect and heightening arousal (Lesiuk, 2005) and reducing levels of stress and anxiety (Kreutz, Bongard, Rohrmann, Hodapp, & Grebe, 2004). Nonetheless, the effect size of the increase in levels of mindfulness was much greater for the choral singing condition than it was for listening to music.

This finding supports the hypothesis that eliciting a mindful state is a plausible generative mechanism between choral singing and the sense of well-being choristers report following a rehearsal. Previous qualitative reports have cited the presence of a focused concentration

throughout practice, blocking preoccupation with sources of worry (Clift & Hancox, 2010). The call for attention to numerous details such as watching the conductor, listening to the other voices in harmony, reading the music and/or remembering the words all contribute to reaching this attentive, aware and accepting state, one that is truly indicative of mindfulness. In the development and distribution of a state mindful scale, this research confirms earlier qualitative findings and supports the existence of a specific “choir effect”.

Construction of the MSQ

The results of the study would indicate that the MSQ is appropriate for assessing the presence or absence of a mindful state in the general population, given its psychometric soundness.

The dimensionality of the MSQ was derived from an exploratory factor analysis, which resulted in a four-factor structure. Upon close examination, it became clear that item loadings reflected the three predominant factor labels proposed during the literature review: attention, awareness and acceptance. One more factor was extracted. Although the corresponding items of this factor appeared indicative of *acceptance*, the loadings were clearly defined onto separate factors, therefore “*non-judgment of internal feelings*” was elected. Baer et al. (2008) discuss a similar factor – “non-reactivity to inner experience, referring to taking a non-evaluative stance toward thoughts and feelings” (p. 330) in their endeavour to validate the construct of mindfulness. Attempting to accurately cover all aspects of a construct that does not yet have a widely accepted operational definition proved to be a substantial issue in the construction of this questionnaire. It was noted from previous research that examining a construct too narrowly leads to an issue with content validity, however looking at the construct with too much breadth leads to one essentially “measuring a construct of more versus less pathology” (Rosch, 2007, p. 262). The four-factor solution presented here hence leaves itself open to criticism and disapproval, both from those arguing the uni-dimensionality of the construct, or on the other hand, the suitability of a larger factor solution, incorporating facets such as *observing, describing, etc.*

A revision of ambiguous items could, in turn, potentially strengthen each of the factors. The developers of the MAAS (Brown & Ryan, 2003) make a good point when they argue that statements reflecting mindlessness are likely to be more accessible to people untrained in mindfulness, given the fact that *mindless* states are much more common than *mindful* states (McIntosh, 1997). The incorporation of statements relating to mindlessness may therefore be a viable option but the empirical equivalence of mindfulness and mindlessness must also be kept in mind (Hofling, Moosbrugger, Schermelleh-Engel, & Heidenreich, 2011).

Limitations

Despite the encouraging findings outlined above, it is important to take into consideration several constraints throughout the research process. First, a crossover design would have been optimal, to reduce the risk of the choir rehearsal having any impact on the results of the subsequent listening condition. Second, mindfulness is far from a unitary construct and the lack of an operational definition inhibits the development of psychometrically sound measures and complicates the ability to aggregate research findings into a coherent whole. Considerable effort is being expended to better grasp the concept and facets of mindfulness, but until such time as this transpires, progress in the area will undoubtedly be restricted. Third, the use of a self-report questionnaire poses multiple issues, with differences among participants in semantic understanding of scale items, and discrepancies between how mindful someone *thinks* they are and how mindful they *really* are (Grossman, 2008). Fourth, the MSQ fails to quantify state

mindfulness at the facet level – this is deemed necessary for clarifying potential relationships between the target construct and other variables (Smith, Fischer, & Fister, 2003).

It is possible that some individuals may be more mindful than others as a result of specific experiences they have accrued, and it is acknowledged that this study did not enquire about any previous mindfulness experience, potentially skewing results. In addition to this, both choir rehearsals took place in a religious setting – a church. Research has demonstrated that certain features of one's environment may "cue" mindfulness (Dane & Brummel, 2013). Although unlikely, it is possible that the setting in this case might have induced a more mindful state in some of the individuals, as the study was carried out in a venue where they might usually come to be mindful and pray. Finally, the accuracy or commitment to the listening exercise at home could be deemed questionable – a supervised condition with the researcher present might have been optimal.

Strengths and implications

Despite the various limitations of the research, it is generally considered that the appropriate population for the construct of mindfulness was chosen. Many studies in the literature have tended to employ an undergraduate population for the validation of their mindfulness questionnaires. Grossman (2008) claims this is akin to validating a self-report questionnaire of "shame" with a sample of sociopaths. Students may be unfamiliar with the construct of mindfulness, and hence as a rule should be excluded from any of its validating research.

This study contributes to a process of addressing the shortcomings described in the current literature by attempting to define a mechanism by which choral singing and well-being may be linked, and by delineating the construct of state mindfulness, using quantitative methodology and a large sample size. The newly developed MSQ provides researchers who view state mindfulness as a multidimensional construct with a valuable measurement tool.

The findings contribute to an existing evidence base to support increased public investment into choral development by local governments. For example, the "Vision for Change Project" implemented by the Irish government in 2006 to improve mental health services around Ireland discusses the lack of resources to *promote* mental health/early intervention programs. A simple, straightforward, cost-effective and sustainable activity such as choir singing appears an attractive choice. The empirical evidence is there, as is a widespread passion from musicians, conductors and choristers nationwide. Choirs are an extraordinary way of maintaining social and emotional well-being and they deserve to be recognised as such.

Innovative methods of promoting healthy development across the lifespan are essential. Further research in this domain could encourage the development and incorporation of choral singing across primary and secondary school education, as well as areas such as workplaces, communities and nursing homes. With life expectancy in Ireland having increased by 15 years since 1950 (Cullen, 2015), there is a greater need for resources to encourage older populations to remain socially, emotionally and physically healthy. Research in this area has already begun to generate optimistic results (Cohen et al., 2006), providing infinite opportunities for the health service to incorporate both findings of choral singing and mindfulness into something relatable and tangible to people of all ages.

Conclusion

The present study builds on existing research by advancing understanding of the latest phenomenon in self-help and positive psychology: mindfulness. The literature on mindfulness has

been amalgamated into that of choral singing and its impact on well-being, with the prediction that a choir rehearsal would influence levels of state mindfulness. The process of measuring state mindfulness required the development of a novel questionnaire, the Mindful State Questionnaire, which should be further evaluated to shed some light on the trait/state dilemma. The increased levels of mindfulness reported in this study only add to the plethora of reported benefits of choral singing, and it is high time that the realm of social, emotional and psychological benefits reaped from choir singing is recognised, and thoroughly incorporated into the promotion of mental health worldwide.

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