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A pilot study of loving-kindness meditation for the negative symptoms of schizophrenia

David P. Johnson [a,*], David L. Penn [a,1], Barbara L. Fredrickson [a], Ann M. Kring [b], Piper S. Meyer [a], Lahnna I. Catalino [a], Mary Brantley [c]

[a] Department of Psychology, University of North Carolina, Chapel Hill, Chapel Hill, NC 27599-3270, USA
[b] Department of Psychology, University of California, Berkeley, Berkeley, CA, USA
[c] Duke Integrative Medicine, Duke Center for Living Campus, Duke University, Durham, NC, USA

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ABSTRACT

This pilot study examined loving-kindness meditation (LKM) with 18 participants with schizophrenia-spectrum disorders and significant negative symptoms. Findings indicate that the intervention was feasible and associated with decreased negative symptoms and increased positive emotions and psychological recovery.

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1. Introduction

There is a significant need for research regarding how best to treat the negative symptoms of schizophrenia given these symptoms' association with poor prognosis and the limited efficacy of existing treatments (Buchanan, 2007). Anhedonia, in particular, has a strong association with impaired functioning (e.g., Herbener et al., 2005). Neurobehavioral models supported by animal research suggest distinct types of pleasure as well as unique emotion-regulation systems for different kinds of pleasure. First, regarding the types of pleasure, anticipatory or appetitive pleasure is linked to dopamine and associated with a subjective experience of wanting and desire. Whereas, consummatory pleasure is linked to endogenous opiates and associated with gratification and satiety (see review by Depue and Morrone-Strupinsky, 2005). Studies of individuals with the negative symptoms of schizophrenia demonstrate a deficit in anticipatory pleasure, which has been found to correlate with difficulties in goal oriented behavior and social functioning (Gard et al., 2007; Horan et al., 2006). Indeed this may also explain the common loading of anhedonia, asociality, and avolition on a single factor (Blanchard and Cohen, 2006). Other models of pleasure conceptualize both a drive-excitement system and soothing-contentment system, with implications for different types of positive emotions leading to either activation of incentive motivation/energy or affiliation and safeness (see review by Gilbert, 2010).

Basic affective science provides insight into a potential intervention for targeting negative symptoms, especially anhedonia. The broaden-and-build theory posits that positive emotions broaden an individual's thoughts and behavioral urges; the accrual over time of these broadened mindsets leads an individual to think and behave in ways that build personal resources, such as mindfulness, purpose in life, and social support (Fredrickson, 1998; Fredrickson, 2001). Fredrickson et al. (2008) evaluated whether loving-kindness meditation (LKM; Salzberg, 1995) would facilitate increased positive emotions. The results indicate that those randomized to LKM experienced significantly increased positive emotions compared to a wait-list control group. Additionally, the increase in positive emotions accounted for increases in distinct personal resources, such as the ability to savor the future (i.e. anticipatory pleasure) and psychological well-being (i.e. environmental mastery and self-acceptance). Other studies with non-clinical samples (Hutcherson et al., 2008; Sears and Kraus, 2009) and chronic pain patients (Carson et al., 2005) have replicated the positive impact of LKM on mood and well-being. Likewise, Compassion-Focused Therapy (CFT; Gilbert, 2010), which also emphasizes recognition of self-critical patterns and emotions followed by strategies to enhance self-compassion, was found to have positive results for the well-being of individuals with psychosis (Laithwaite et al., 2009; Mayhew and Gilbert, 2008). Therefore, in accordance with the broaden-and-build theory and existing studies, LKM would be expected to be associated with an increase in participants' experience of positive emotions, which would then be linked to a

* Corresponding author.
E-mail addresses: dpj@unc.edu (D.P. Johnson), dpenn@email.unc.edu (D.L. Penn).
[1] Tel.: +1 919 843 7514.

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reduction in negative symptoms and an improvement in psychological well-being.

The purpose of this pilot study was to conduct an initial evaluation of LKM regarding its feasibility and potential clinical utility for individuals with schizophrenia with persistent negative symptoms. We hypothesized that LKM would be 1) *feasible* and *favorably received*; and associated with improvements in 2) *positive affect*; 3) *negative symptoms*, particularly anhedonia (especially *anticipatory pleasure*), avolition, and asociality, and 4) *psychological recovery* (i.e. finding hope, re-establishing identity, finding meaning, and taking responsibility for recovery; Andresen et al., 2003).

2. Methods

2.1. Participants

The sample included 18 outpatients with schizophrenia-spectrum disorders based on chart review (44% schizophrenia, 33% schizoaffective disorder, and 22% psychosis NOS or schizophreniform disorder) and significant negative symptoms based on a score of moderate on one domain of the beta version of the Clinical Assessment Interview for Negative Symptoms (CAINS beta; Forbes et al., 2010). The mean age was 29.4 years (SD = 10.2) with 83% male. Self-reported ethnicity was 72% Caucasian and 28% African-American or Bi-racial. The mean education level was 14.2 years (SD = 2.0) with a mean IQ of 112.0 (SD = 14.5), measured with the Wechsler Abbreviated Scales for Intelligence (Wechsler, 1999). Fifty five percent of the sample was unemployed with 94% never married. The research study was approved by a local IRB and participants signed informed consent while continuing on previously prescribed psychotropic medications.

2.2. Design and procedures

This study used an uncontrolled design recommended to evaluate feasibility and initial benefits of a pilot psychosocial intervention (Mueser and Drake, 2005). Two different groups of nine participants attended the LKM group weekly for six sessions, lasting one hour each as well as a single follow-up booster session six weeks later. Participants were assessed at baseline, post-treatment, and 3-month follow-up on outcomes described below.

2.3. Intervention

LKM is a technique used to increase feelings of warmth and caring for self and others which originated in the ancient Buddhist meditative practice of metta (Salzberg, 1995). We developed a secularized version of LKM intended to systematically cultivate and focus attention on kindness toward self and others to change the orientation to life experiences and result in a broadening of the range of emotional responses and choices available (Brantley and Hanauer, 2008). The weekly group sessions incorporated 3 major components: discussion, skill teaching, and practice. The practice began with mindfulness to focus attention in the present. Participants then contemplated a person for whom they already feel compassion or a social situation when they felt kindness. Over the next several weeks, participants were led in guided meditations to sequentially extend these feelings to themselves as well as others (e.g. neutral persons, those who have caused difficulty or harm, all people of the world) through phrases using the format "May I/they be happy/peaceful/healthy/safe". Participants were encouraged to practice LKM formally by listening daily to an assigned meditation CD similar to the guided meditations in group and informally by meditating periodically throughout the day or during distressing situations. The intervention was conducted by a masters-level therapist with extensive meditation experience (MB) (see Johnson et al. (2009) for further description of the intervention and illustrative case examples).

2.4. Measures

Feasibility and acceptance of the intervention were tracked using group attendance and self-report of meditation practice outside the session. Participants provided quantitative and qualitative feedback on a treatment satisfaction questionnaire at post-treatment to assess perceived benefits and challenges of LKM.

Positive emotions were assessed with: 1) the Modified Differential Emotions Scale (mDES; Fredrickson et al., 2003): Participants reported how frequently they experienced each of 20 emotions in "the past 2 weeks" which yielded a 13-item positive emotions subscale that includes amusement, awe, gratitude, hope, inspiration, interest, joy, love, pride, and serenity. 2) the Day Reconstruction Method (DRM; Kahneman et al., 2004), a self-report method known to reduce reporting biases: Participants divided their entire afternoon "yesterday" into a series of contiguous episodes (e.g., "playing videogames," "calling a friend"), and then completed a mDES for each episode.

Negative symptoms were assessed with the beta version of the Clinical Assessment Interview for Negative Symptoms (CAINS beta; Blanchard et al., 2011; Forbes et al., 2010), a semi-structured interview currently undergoing psychometric development. Using the beta version of the CAINS, the current study found that the subscales had adequate internal reliability except for the avolition subscale, which was not used alone in further analyses.

Anticipatory and consummatory pleasure was assessed using the Temporal Experience of Pleasure Scale (TEPS; Gard et al., 2006). Anticipatory pleasure was also assessed with the Savoring Beliefs Inventory-Future subscale (SBI; Bryant, 2003).

Psychological recovery was assessed using the following measures: 1) subscales from the Scales of Psychological Well Being (SPWB; Ryff, 1989): Environmental Mastery, Self-acceptance, Purpose in Life 2) the Trait Hope Scale (THS; Snyder et al., 1991), 3) and the Satisfaction with Life Scale (SWLS; Diener et al., 1985).

2.5. Data analyses

Paired samples t-tests were conducted and within-group effect sizes reported for changes between: 1) baseline and post-test, and 2) baseline and 3-month follow-up. Qualitative feedback from the open-ended treatment satisfaction questionnaire was reviewed for themes related to perceived benefits and challenges of the meditation.

3. Results

The following results are based on the intent-to-treat sample, which included both treatment completers (n = 16) and non-completers (n = 2) (attending < 50% of the sessions). Two participants did not complete the 3-month follow-up; results are therefore based on a last observation carried forward procedure.

3.1. Feasibility and acceptability

The attendance rate was 84% for the intent-to-treat sample and 91% for treatment completers. Based on weekly self-report, the treatment completers practiced LKM for a mean of 3.7 days per week (SD = 1.4) at an average of 19.1 min per practice (SD = 14.6).

Participants provided positive ratings for the ease, perceived utility, and enjoyment of LKM. The majority of participants reported LKM led to a sense of peace and relaxation (n = 10) while many enjoyed the social aspects such as feeling supported and less distracted while meditating together (n = 8). A few participants experienced challenges with sending loving-kindness to all people of the world (n = 3).

Table 1
Means (M), standard deviation (S.D.), and within-group effect sizes (Cohen's *d*) for clinical outcomes ($n = 18$).

	Baseline		Post-txt		*d*	3-mo f/up		*d*
	M	S.D.	M	S.D.		M	S.D.	
mDES — positive emotions frequency	1.50	0.59	1.78	0.66	0.78	1.82	0.69	0.78
DRM — positive emotions intensity[a]	2.05	0.50	2.37	0.88	0.96	2.22	0.70	0.50
CAINS beta — negative symptom total	60.83	11.17	44.89	15.40	1.68	46.28	13.86	1.54
CAINS beta — anhedonia	20.94	5.88	14.11	4.81	1.88	15.11	4.32	1.50
CAINS beta — asociality	7.78	2.96	6.67	3.14	0.53	6.83	2.91	0.50
TEPS — anticipatory pleasure	4.01	0.67	4.03	0.79	0.06	3.87	0.67	-0.31
TEPS — consummatory pleasure	3.84	0.99	4.30	0.75	0.93	4.04	0.86	0.38
SBI — anticipatory pleasure	4.39	8.48	8.11	8.44	0.75	8.89	9.04	0.77
SPWB — environmental mastery	29.56	8.05	33.17	9.22	1.05	32.17	9.41	0.50
SPWB — self-acceptance	25.67	8.40	30.56	10.67	0.80	28.67	10.72	0.47
SPWB — purpose in life[b]	32.33	9.22	33.11	8.88	0.20	31.94	8.32	−0.07
THS — hope	20.59	3.86	21.70	5.13	0.47	21.29	6.16	0.19
SWLS — satisfaction with life[b]	13.94	6.03	16.82	6.42	0.86	17.29	7.26	0.71

Note: A positive effect size indicates improvement and a negative effect size indicates deterioration.
mDES = Modified Differential Emotions Scale; DRM = Day Reconstruction Method; CAINS beta = beta version of the Clinical Assessment Interview for Negative Symptoms; TEPS = Temporal Experience of Pleasure Scale; SBI = Savoring Beliefs Inventory; SPWB = Scales of Psychological Well-Being; THS = Trait Hope Scale; SWLS = Satisfaction with Life Scale.
[a] $n = 16$.
[b] $n = 17$.

3.2. Clinical outcomes

Table 1 provides means and standard deviations for the clinical variables as well as within-group effect sizes for differences between baseline/post-treatment and baseline/3-month follow-up assessments.

Analyses revealed large improvements in participants' frequency and intensity of positive emotions at both post-test and 3-month follow-up, supporting the first hypothesis. Participants also showed a large decrease in total negative symptoms and anhedonia (corresponding to large effect sizes) as well as asociality (corresponding to a medium effect size) at post-treatment and 3-month follow-up, supporting the second hypothesis. Further analyses of anhedonia's components (anticipatory and consummatory pleasure) revealed mixed findings. Analyses of the SBI future subscale revealed large positive effect sizes through 3-month follow-up. However, analyses of the TEPS anticipatory pleasure subscale revealed almost no change at post-treatment and a small negative effect size at 3-month follow-up. Analyses of consummatory pleasure yielded a large positive effect size at post-treatment.

Environmental mastery, self-acceptance, and satisfaction with life all improved, with large effect sizes at post-treatment, and medium to large effect sizes at 3-month follow-up. Smaller or no changes were found in hope and purpose in life.

4. Discussion

Participants reported large increases in the frequency and intensity of positive emotions and decreases in overall negative symptoms, specifically anhedonia. We found seemingly contradictory results when comparing changes in anticipatory pleasure on the TEPS and SBI. However, the TEPS is a focal measure of physical pleasure (e.g. smell), which was not a specific target in LKM, while the SBI future subscale captures non-specific anticipatory pleasure (i.e. for various aspects of life), which is more of a target in LKM. Participants reported increased self-acceptance and felt more in control and satisfied with their lives. No changes were found in participants' purpose in life. It is possible that this more distal outcome requires a longer intervention before changes are observed.

The current study has several limitations. First, the uncontrolled study design precludes any causal inferences about the efficacy of LKM (i.e. the mechanism may be another variable such as social interaction within a group setting). Second, the small sample size precluded analyses to test whether increased positive emotions mediated decreased negative symptoms and improved psychological recovery. Third, the study sample may not be representative of the broader population of individuals with schizophrenia particularly with respect to the sample's higher average education and intelligence. Fourth, the primary measure of negative symptoms was a semi-structured interview administered by an assessor non-blind to the study hypotheses, which may over-estimate treatment effects. Finally, not all measures used are validated with this population and self-report measures are susceptible to demand effects, social desirability, and recall bias. However, LKM does appear to be a promising intervention for individuals with persistent negative symptoms of schizophrenia as it yielded high attendance, low attrition, regular meditation practice, favorable treatment satisfaction ratings, and perceived clinical benefits.

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Contributors
DP and DJ designed the study. LC helped with measure selection and analysis of specific measures. DJ collected/analyzed data and wrote the first draft of the manuscript. MB facilitated the intervention. DP, AK, BF, PM supervised the research project and critically revised the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest
All authors report no conflicts of interest relevant to the subject of this article.

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