

Turning the Curse into a Blessing: Using Mindfulness to Reduce Schizophrenia Vulnerability in Psychosis-Prone Individuals

The Fieldrose Charitable Trust PhD Scholarship 2017: Psychology Department, Institute of Psychiatry, Psychology and Neuroscience, Kings College London

Supervisor: Professor Paul Chadwick and Dr Elena Antonova.

Summary:

We are all confronted with an overwhelming array of sensory stimuli and are required to filter out what is most useful and salient, and discard unwanted information. Leading theorists have argued that schizophrenia may result in part from an inability to filter information. Yet, having a more open information processing style (i.e. less filtering) has also been linked to creativity and originality of thought, which is both an aesthetic and pragmatic blessing for an individual and society. Indeed, schizophrenia and creativity have been linked by previous research. Antipsychotic medication, the first line of psychosis prevention and treatment, is known to dampen down more open processing in people either with or vulnerable to schizophrenia, potentially reducing conditions promoting creativity in these individuals. Our research on expert meditators showed that mindfulness practice is associated with lower suspiciousness and paranoia (the strongest predictors of subsequent schizophrenia) in the presence of decreased filtering. We will examine if mindfulness training in psychosis-prone individuals reduces schizophrenia vulnerability (suspiciousness/paranoia), whilst preserving decreased filtering thought to underlie heightened creativity.

Research Student: Heather McDonald

I am a recent graduate of MSc Health Psychology at Northumbria University and am due to start my PhD in October 2017, supervised by Professor Paul Chadwick and Dr. Elena Antonova in the IOPPN of KCL. I am committed to the field of psychology and am greatly interested in research of clinical relevance. I have particular interest in mindfulness, creativity, neuroimaging and the role of neurotransmitters in psychology.

For my undergraduate BSc project in 2015 at Northumbria University, I investigated creative ability in relation to neurotransmitters, using ocular indices of neurotransmitter activity. This research was inspired by the early notion that disinhibited thinking style can drive creative ability in populations with a similar cognitive profile as schizophrenia patients. Results supported evidence suggestive of a link between dopamine, serotonin and creativity.

My 2016 MSc research thesis looked at using mindfulness in order to improve subjective pain through improved attentional control, using neuroimaging. Mindfulness meditation

was seen to increase attentional performance, inhibition (specifically, to distraction) and linked in to an improvement in subjective pain. There was also evidence of a link to a role of dopamine activity in this process, which mindfulness meditation may effect.

Outside of studying and research I have spent time teaching undergraduate psychology students, assisting in neuroimaging research at Northumbria University and volunteering within vocational rehabilitation for individuals with acquired brain injuries.

I am very excited about starting the current project at KCL. This great research opportunity has been awarded by Mental Health Research UK; The Fieldrose Charitable Trust PhD Scholarship.

Start Date: September 2017



Scientific goal:

To investigate the efficacy of mindfulness-based intervention in psychosis-prone individuals (high positive schizotypy) in reducing the risk factors for schizophrenia (suspiciousness/paranoia), whilst preserving the conditions promoting creativity.

Progress Report Year 4, 2021

It has been a pleasure to carry out this research, working closely with my supervisory team and with the volunteers who kindly came forward to take part. All studies have now been completed, the PhD thesis has been submitted, and I am awaiting my viva. My deepest gratitude goes to MHRUK and the Fieldrose Charitable Trust for making this research possible.

The first study has now been published in Schizophrenia Research:

McDonald, H., Babunashvili, M., Finn, A., Willard, A., Valmaggia, L., Chadwick, P., & Antonova, E. (2021). Positive schizotypy and the experience of creativity: The distinctive roles of suspiciousness and dispositional mindfulness. *Schizophrenia Research*, 228, 151-158.

A significant dampening effect of suspiciousness was found upon the otherwise positive relationship of magical thinking and unusual perceptual experiences with positive-affect/pleasurable flow-type creative experience. Further, higher dispositional mindfulness was significantly associated with lower suspiciousness, adding impetus for using mindfulness-based interventions for the reduction of suspiciousness/paranoia.

The second study also revealed several positive relationships were observed between magical thinking and unusual experiences and some (but not all) aspects of creativity. However, sensory information filtering (as indexed by acoustic startle habituation) and it did not mediate (underline) these positive associations, therefore sensory information filtering was not additionally examined as part of Study 3. In line with the findings of Study 1, there was evidence to suggest that suspiciousness attenuated the relationship between magical thinking and some - but not all - dimensions of creativity, providing further justification for reducing suspiciousness.

The final study examined the feasibility and acceptability of an online mindfulness-based intervention, using the Headspace app, in individuals with high positive schizotypy (with high suspiciousness/paranoia), with a further aim to examine whether it would lead to reductions in trait (using a self-report measure) and state (using an objective measure; virtual reality) paranoia. This study was interrupted due to the Covid-19 pandemic and some participants could not return to the lab to complete the full assessments.

Nonetheless,

the final sample size prior to the pandemic (N = 24) met a previously recommended minimum of 12 participants per group for this type of study. There was excellent retention rate (100%) and adherence. Larger reductions in state - but not trait - paranoid ideation were found in favour of the mindfulness-based intervention (as compared with an active control condition – reflective journaling via the app Reflectly). In their qualitative feedback, participants identified that their everyday interpersonal interactions were improved and less anxiety-inducing following mindfulness training, were able to let go of negative thoughts and be more accepting of themselves and their experiences relating to others. The study also identified interesting benefits of reflective journaling (the active control condition) for general anxiety.

The findings are consistent with the proposal that mindfulness training could be used to mitigate the association between higher levels of positive schizotypal traits and psychosis risk through reduction of suspiciousness/paranoia, and larger trials are warranted. Future research might explore whether the reduction of state experiences of paranoia, through mindfulness training, alters developmental trajectories towards psychosis. Further, the use of VR emerged as a suitable objective assessment of state paranoia as an outcome measure in future trials.

Future Directions:

This has been my final year working on the PhD - and what a journey it has been. Whilst I am exploring the next steps of my career path, I have been kindly granted an extension to the funding given by the Mind and Life European Varela Award (which I was awarded in 2019) until the end of this year. The intention of this extension is to fund open-access

publication of the manuscript for Study 3, which is currently being prioritised given its important feasibility and acceptability data which can inform future trials.

With a view to ease suffering and reduce the long-term risks associated with positive schizotypy whilst supporting the advantages associated with these traits (creativity), I hope that this project provides a stepping-stone toward developing low-cost and easily accessible mindfulness-based interventions in order to do so. I also hope that this and future work will aid de-stigmatisation schizophrenia-like experience and support human flourishing.

Progress Report Year 3, 2020

The data collection for all studies has been completed, and I am now in the analysis and writing-up stage of my PhD project. I am very grateful for the participants who kindly volunteered their time to help with the research.

I outline below a brief outline of the progress to date for each study:

Study 1: Investigating the link between aspects of positive schizotypy, dispositional mindfulness and subjective experience of creativity.

Progress: A manuscript reporting the results of the study has been submitted to the Schizophrenia Research journal (Impact Factor: 4.5) and is currently under review. Overall, the results add impetus for using mindfulness-based interventions for the reduction of suspiciousness/paranoia as a risk-factor for psychosis, whilst supporting otherwise favourable associations of other aspects of positive schizotypy (namely magical thinking and unusual experiences) with creativity. The results of this study were presented at the October 2019 Mind and Life Contemplative Science Symposium (Germany).

Study 2: Investigating the interrelationship between high positive schizotypy, creativity and sensory information filtering.

Progress: The target sample size of 80 for this study was exceeded, with a total sample of 101 participants - the largest sample to date for a study of this nature. Data analysis for this study is near completion, and the results will help further our understanding of the relationship between aspects of positive schizotypy and creativity, and the information processing mechanisms that might underlie this relationship.

Study 3: Using a Mindfulness-Based Intervention to reduce suspiciousness/paranoia in individuals with high positive schizotypy whilst preserving the conditions supporting creativity.

Due to the Covid-19 pandemic, the decision was reached to end the recruitment short of

the initial target sample of 40 completers. This decision was taken for two reasons: i) due to the social distancing rules, we could not continue with the lab-based testing for the startle habituation and VR aspects of the study; ii) it was deemed that the sub-samples might be not comparable for the participants undergoing mindfulness-based intervention using the Headspace app before and after the pandemic due to the extraordinary circumstances that pandemic has introduced. Nevertheless, the final sample size of 33 was achieved with an excellent retention rate for an online intervention study, with only one participant having dropped out of the active control group. Of the participants who completed the study, the final 8 were unable to return to the laboratory for the post- intervention assessments (virtual reality and sensory information filtering) due to the pandemic. These participants completed all the online assessments. We are mindful that the post-intervention responses for these participants might reflect the impact of Covid-19 - particularly in relation to anxiety, worry and stress, and this will be taken into consideration during data analysis..

Future directions:

The analysis and write-up of the PhD thesis is now ongoing with the aim to submit by the end of January 2021, and I am aiming to publish the results of Studies 2 and/or 3. I will be presenting results of Studies 1 and 2 at this years' international Mind and Life European Summer Research Institute conference (August, 2020).

As always, we would like to express our gratitude to MHRUK and the Fieldrose Charitable Trust for making this research project possible, and for the support from the European Mind and Life Institute.

Progress Report Year 2, 2019

Some exciting progress has been made over the past year. It is an ongoing pleasure to carry out this research, working closely with my supervisor team and with the volunteers who kindly come forward to take part.

Study 1: Investigating the link between positive schizotypy, dispositional mindfulness and subjective experience of creativity

Aim: To investigate the interrelationship between positive schizotypal traits, dispositional (trait) mindfulness and the phenomenological experience of the creative process.

Progress: The target sample size (N = 300) for this study has been exceeded, with 342 participants having completed the key online assessments for this study. I am currently in the process of analysing the data and preparing the paper for submission to the Schizophrenia Research Journal.

Study 2: Investigating the interrelationship between high positive schizotypy, creativity and sensory information filtering.

Aim: To empirically test the link between decreased information filtering and creativity in high positive schizotypy.

Progress: Recruitment for this study is progressing well, with only seven participants left to recruit to hit the target sample size. I will soon be able to start analysing the data for write-up. The combination of studies 1 and 2 will explore the link between positive schizotypy and the beneficial trait of heightened creativity, using a variety of methodologies to help understand the underlying mechanisms of this relationship.

Study 3: Using a mindfulness-based intervention (MBI) to reduce suspiciousness and paranoia in individuals high in positive schizotypy

Aim: To evaluate the potential of mindfulness training to reduce the aspects of high positive schizotypy known to be risk factors for psychosis and schizophrenia, namely suspiciousness/paranoia, whilst preserving the conditions promoting creativity (reduced information filtering).

Progress: The protocol for the third study has been finalised, received full ethical approval and is now well underway. The intervention design was considered carefully between myself and my supervisors to minimise burden on participants and make the intervention as accessible as possible. This has been reflected in the adherence rates we have seen so far, with no current dropouts for the full 40-day intervention. The general feedback and engagement thus far are promising, with participants have been completing between 80-100% of the daily meditations. The participants have been expressing keenness to continue practicing mindfulness even beyond taking part in the study, which has been great to hear. A further addition we made to this study is to consider the role of associated factors of suspiciousness/paranoia such as anxiety, worry and low self-compassion to gain a better understanding of the underlying mechanisms through which mindfulness may reduce suspiciousness/paranoia. Recruitment for this study will be ongoing for the coming months.

Changes to the supervisory team:

We have had the pleasure to welcome Dr Lucia Valmaggia to the research team as the first-joined supervisor, who's expertise lies in paranoia, virtual reality and psychosis.

Other achievements:

I was awarded the 2019 European Francisco J. Varela Research Award (European Mind and Life Institute) to the amount of £10,835.29 to support research costs for this project. The vision and purpose of the Varela Awards closely match those of the project – “to provide greater insight into contemplative practice and their application for reducing human suffering and promoting flourishing”. This award is contributing towards the research progress to a great extent, and we are very grateful to have this support alongside MHRUK

and the Fieldrose Charitable trust to help make this research successful.

Dissemination activities:

I presented the interim results for Study 1 at the Mind and Life European Summer Research Institute in August 2018 and the British Society for the Psychology of Individual Differences Conference at Brunel University in April 2019. I have registered to present the full results for this at the Contemplative Science Symposium to be held in October 2019, at Fürstfeldbruck, Germany (<https://europeansymposium.org/frontend/index.php>).

Progress Report Year 1, 2018

We are very grateful to MHRUK and the Fieldrose Charitable Trust for making this research possible.

This project aims to apply a Mindfulness-Based Intervention (MBI) in individuals with high positive schizotypy to reduce suspiciousness and paranoia – an aspect of positive schizotypy thought to be most strongly related to risk of psychosis - whilst maintaining attenuated sensory information filtering thought to support heightened creativity in these individuals.

A lot of progress has been made during this first year of the PhD. The project was firstly reviewed by service users through King's Biomedical Research Centre Service User Advisory Group. Very positive feedback was received on the project's aims & objectives, design and recruitment materials and strategy. The project outline was then further reviewed by service users through the King's Feasibility and Acceptability Support Team for Researchers (FAST-R), who seek to ensure research is respectful and relevant to the priorities of individuals with mental health problems. The positive feedback from this service is reflected in the final protocol and participant materials, and all three studies have gained Ethical approval.

The first 2 studies are currently well underway. The first study investigates the link between positive schizotypy, dispositional mindfulness and subjective experience of creativity. One hundred and seventeen participants have been recruited for this study so far, having been assessed on the key variables through an online survey. Preliminary results are promising and encouraging for the upcoming studies. I presented these preliminary results at the Mind Wandering and Mindfulness Conference at Northumbria University in June 2018.

The second study investigates the interrelationship between high positive schizotypy, creativity and sensory information filtering. Lab-based creativity measures and the paradigm designed to assess sensory information filtering have been piloted. I am now recruiting a sub-sample of participants who completed the online survey from Study 1.

Additionally, I am working on a systematic literature review of the field of schizotypy and creativity.

I have engaged in a variety of relevant training and events to enrich the PhD, such as mindfulness and statistics workshops. I have also gained funding to attend and present the preliminary findings from Study 1 at the annual Mind and Life European Summer Research Institute. This year's theme is very relevant to the project and it will be a fantastic opportunity to share ideas with experienced researchers of contemplative science, which could further inform and shape Study 3 (MBI).

Future Plans:

The plan for the following year is to complete the systematic review and continue data collection for the studies currently running, with the next round of recruitment commencing this Autumn. The protocol for Study 3 - using a Mindfulness-Based Intervention to reduce suspiciousness and paranoia in individuals high in positive schizotypy - will be finalised and recruitment for this can commence in my second year. I will also continue to attend useful training and plan to maintain personal engagement with mindfulness.