**Does mental imagery affect paranoia, anxiety and core beliefs?**

**A pilot experimental study in an analogue sample**

**Abstract**

**Background:** Mental imagery is implicated in the maintenance and treatment of persecutory delusions, yet there is little experimental evidence for the effects of imagery on paranoia, anxiety and core beliefs – key therapeutic targets in CBT for psychosis.

**Aims:** This pilot study examined the impact of a repeated imagery task in people with high levels of non-clinical paranoia, to determine whether a fully powered study is warranted.

**Method:** Twenty-four people participated in a 3x3 mixed model design comparing paranoia, anxiety and core beliefs between imagery conditions (positive/negative/neutral) and across time-points (pre/post/follow-up).

**Results:** The imagery task yielded large effects on paranoia, anxiety and core self-beliefs.

**Conclusions:** Rehearsing interpersonal imagery in which the person experiences themselves as safe, secure, and able to trust others, may have large, sustained effects. A fully powered clinical study is warranted.

**Introduction**

Most people with persecutory delusions experience distressing imagery, typically associated with beliefs about threat of harm or humiliation (Schulze, Freeman, Green & Kuipers, 2013), often linked to trauma memories (Morrison et al., 2002). Importantly, the more anxiety associated with the imagery, the more distressing the persecutory fears (Schulze et al., 2013).

Clinical case studies show that imagery interventions can reduce both frequency (Serruya & Grant, 2009) and distress (Morrison, 2004) of persecutory beliefs. Initial experimental studies have examined the impact of imagery on paranoia, affect and self-beliefs in non-clinical groups, and indicate that compassion-focused or interpersonal imagery in which the person feels safe, leads to reduced paranoia, compared with neutral or interpersonal imagery in which the person feels threatened (Bullock, Newman-Taylor & Stopa, 2016; Lincoln, Hohenhaus & Hartmann, 2013; Newman-Taylor, Kemp, Potter, & Au-Yeung, 2018). This research is limited by an emphasis on self-beliefs, despite other-beliefs being implicated in clinical studies (Morrison et al., 2002; Schultz et al., 2013), and a lack of follow-up data.

Paranoia, mood and self/other beliefs are key therapeutic targets in CBT for psychosis. If imagery effects change in these areas, therapy might be improved by routinely incorporating imagery interventions targeting interpersonal beliefs.

This pilot aimed to determine whether a fully powered study examining the impact of repeated imagery on paranoia, anxiety and self/other beliefs, is warranted. Using an analogue sample, we predicted that positive/safe interpersonal imagery would reduce paranoia, anxiety and negative self/other beliefs, and increase positive self/other beliefs, compared with negative/threat imagery.

**Materials and methods**

***Design***

We used a 3x3 mixed model design, with one between-participants factor (imagery: positive/negative/neutral) and one within-participants factor (time: pre/post/one week follow-up)[[1]](#footnote-1). Dependent variables were measures of paranoia, anxiety and self/other beliefs.

***Participants***

Participants were 24 university students. The majority were female (79%) and white (70.8%), with a mean age of 20.54 (*SD*=4.93). Participants received a small monetary payment or course credit.

***Measures***

The *Adapted Paranoia Checklist* (Lincoln, Lange, Burau, Exner & Moritz, 2010) assesses state paranoia, and has good internal consistency (*α*=.84).

The *Paranoia Scale* (Fenigstein & Vanable, 1992) measures trait paranoia, and has good internal consistency (*α*=.84).

The *State and Trait Anxiety Inventory* (Spielberger, 1983) yields two subscales, with excellent reliability (*α*s>.90).

The *Brief Core Schema Scales* (Fowler et al., 2006) measure positive and negative beliefs about self/others, with acceptable to good internal consistency (*α*s>.70).

***Imagery manipulation***

Participants are asked to recall a situation in which they felt secure and trusting (positive) or suspicious and mistrusting (negative) of other(s). The control condition uses neutral faces from the NimStim© database (Tottenham et al., 2009). Participants hold the image in mind, and describe this in detail to achieve a vividness rating >60 (0=not at all; 100=extremely). Brief self-practice scripts, standardised for time, are recorded for daily rehearsal.

***Procedure***

Participants were recruited via adverts and screened using the Paranoia Scale; those above the 84th percentile (+1*SD* of non-clinical mean≥53) were invited to take part. An online randomiser allocated eight people to each condition. At an initial lab session, participants completed the measures, were guided through the imagery task, and then repeated the measures. They practised the image daily for six days and then returned to the lab to complete the measures once more.

***Statistical analyses***

We used IBM SPSS Statistics 24. Baseline differences were calculated using one-way ANOVAs/ Chi-Square. Impact of imagery was assessed using 3x3 mixed model ANOVAs with bootstrap function set to 1000 samples (BCa 95% CIs). We used a Bonferroni corrected *p*<.017 for three-way post-hoc comparisons.

**Results**

All participants reported rehearsing the image for all six non-lab days. Table 1 shows there were no pre-manipulation differences on demographic variables, initial measures, or vividness of images (*p*s*>*.05). Table 2 gives the interaction effects.

Table 1

*State paranoia:* The interaction effect was due to change in paranoia in positive and negative conditions; paranoia reduced in the positive group from pre-imagery to follow-up (*p*<.001). Post-hoc tests did not reach significance for the negative group (*p*s>.017).

Table 2

*Trait paranoia:* The interaction effect was due to change in paranoia in the positive condition; paranoia reduced in this group from pre-imagery to follow-up (*p*=.003).

*State anxiety:* The interaction effect was due to change in anxiety in the negative condition; anxiety increased in this group from pre to post-imagery (*p*=.005).

*Trait anxiety:* The interaction effect was due to change in anxiety in positive and negative conditions. Post-hoc tests did not reach significance (*p*s>.017).

*Positive self-beliefs:* The interaction effect was due to change in self-beliefs in the positive condition. Post-hoc tests did not reach significance (*p*s>.017).

*Positive other-beliefs:* The interaction effect was due to change in other-beliefs in the neutral condition. Post-hoc tests did not reach significance (*p*s>.017).

*Negative self- and other-beliefs:* No interaction effects were found.

**Discussion**

This pilot was designed to determine whether a fully powered study of the impact of imagery on paranoia, anxiety and self/other beliefs, is warranted. This is the first study to investigate repeated imagery on paranoia, and the impact on core beliefs.

Positive/safe interpersonal imagery reduced state and trait paranoia, and trait anxiety, and increased positive self-beliefs. Negative/threat imagery increased state paranoia, and state and trait anxiety. Neutral imagery reduced positive other-beliefs.

The results partially replicate previous studies and show that the large effects on paranoia may be maintained over time with repeated practice. Positive/safe imagery had an impact on positive self-beliefs – a novel finding and consistent with the hypothesis that imagery effects change via core beliefs (Holmes, Arntz & Smucker, 2007). Contrary to our hypotheses, we found no effects for other-beliefs in the valenced conditions, possibly due to insufficient power. Alternatively, it may be that negative appraisals of others, characteristic of paranoia in clinical and non-clinical groups (Freeman et al., 2005), are better explained by core beliefs about the *self* than others.

The impact of neutral imagery on positive other-beliefs was unexpected. The data suggest a similar pattern of results to the negative/threat condition. It may be that initially neutral stimuli were subsequently construed negatively by people prone to paranoia. Immediate pre/post imagery effects of previous studies were not replicated, and several post-hoc tests did not reach significance, probably due to insufficient power.

In conclusion, repeated interpersonal imagery affects paranoia, anxiety and positive self-beliefs, with large effect sizes. A fully powered clinical study is now warranted. Interpersonal imagery in which the person experiences themselves as safe, secure and able to trust others may be a valuable addition to therapies for persecutory delusions.

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1. This study was linked to a wider project, available on request [↑](#footnote-ref-1)