**An online investigation of imagery to attenuate paranoia in college students**

**Abstract**

Onset of psychosis typically occurs in young adulthood, and is likely to be preceded by anxiety, low mood, suspiciousness and perceptual anomalies. Where these develop into mild or brief psychotic experience, and impact on functioning, young people are identified as being at risk of psychosis. Early intervention may reduce severity or delay transition to psychosis, and yield significant healthcare cost savings. This study examined the impact of an online attachment-based imagery task on paranoia, anxiety, mood and self-esteem, in college students. An experimental design was used to compare the effects of secure and anxious-ambivalent attachment imagery. A total of 301 college students, aged 18-48 years (*M*=20.1, *SD*=2.976), were randomly assigned to one of the two imagery conditions, and assessed pre and post imagery task on standardised measures of paranoia, anxiety, mood and self-esteem. A series of mixed model analyses of variance showed that participants in the secure attachment imagery condition reported lower levels of paranoia, anxiety and negative mood, and higher levels of positive mood and self-esteem, compared with those in the anxious-ambivalent attachment imagery condition. The study is limited by the lack of a neutral control condition and follow-up measures. Nevertheless, this is the first online study to demonstrate the impact of attachment-based imagery on paranoia. If these effects are replicated with ‘at risk mental state’ groups, and maintained at follow-up, online imagery may provide a safe and highly accessible means of attenuating paranoia in young people at risk of developing psychosis.

**Keywords:** Paranoia, ‘at risk mental states,’ imagery, attachment, college students

**An online investigation of imagery to attenuate paranoia in college students**

**Introduction**

Onset of psychosis typically occurs in adolescence and young adulthood, between 15 and 35 years (Kessler et al., 2007). Many do not seek treatment early, and duration of untreated psychosis (DUP) predicts severity of illness and likelihood of recovery (Birchwood et al, 1998; Drake, Haley, Akhtar, & Lewis, 2000; Melle et al., 2008). The World Health Organisation identified reduction in DUP as an international priority (WHO, 2001).

Paranoia is one of the defining symptoms of psychosis, and ranges from common social-evaluative concerns to persecutory delusions, typically associated with a diagnosis of schizophrenia, in which the person anticipates physical, social or psychological harm (Freeman & Garety, 2000). It is likely that clinical levels of paranoia develop from the cognitive and emotional processes associated with milder forms of paranoia in the general population (Freeman et al., 2005). Interventions that target these psychological ‘building blocks’ at an early stage may therefore be beneficial.

People with subclinical paranoia may be identified as having an ‘at risk mental state’ (ARMS) (Yung et al., 2003). There is growing evidence that early psychological interventions targeting these ‘prodromal signs’ may reduce psychotic symptoms (French, Shryane, Bentall, Lewis, & Morrison, 2007; McGorry et al., 2002; Morrison et al., 2012) and delay onset of transition to psychosis (Morrison et al., 2004; Yung et al., 1996). In their meta-analysis of prodromal interventions, Preti and Celia (2010) found that psychological treatments were effective in reducing risk of transition over 12 months, but that these gains were not be stable after cessation of intervention. Preti and Celia concluded that agreement is required on criteria for both ARMS and transition to psychosis, to achieve reliable results in this area and determine whether psychological interventions are clinically and cost effective. Notwithstanding these questions about longer-term impact, there is a clear economic case for early detection (Department of Health, 2011) and intervention (Valmaggia et al., 2009) in people with ARMS.

College students may be particularly vulnerable to mild forms of paranoia. Students face a number of ongoing stressors including perceived pressure to achieve academically, financial concerns and being away from family (Tosevski, Milovancevic, & Gajic, 2010), usually at an age associated with onset of psychosis and other mental health presentations (Kessler et al., 2007). Perhaps unsurprisingly, college students report higher levels of psychological problems than age matched peers (Andrew & Wilding, 2004), with up to a third regularly experiencing paranoid thoughts (Freeman et al., 2005). While many young people with anxiety, low mood and even mild psychotic symptoms do not go on to develop psychosis, a significant minority do. McGorry, Killackey, and Yung (2008) noted that the earliest signs of psychosis are non-specific and common to the initial stages of other mental health presentations; these authors argued for a stepwise approach to ensure safe, timely and appropriate levels of psychological intervention.

Cognitive models indicate that imagery, alongside verbal cognition, plays a role in the maintenance of paranoia (Freeman, 2007). Morrison et al. (2002) found that 74.3% of a sample of 35 people with psychosis reported mental imagery linked to feared catastrophes associated with their paranoia, traumatic memories, or the source or content of voices. While there is growing evidence for the impact of positive or attachment-based imagery on mood (Pictet, Coughtry, Mathews, & Holmes, 2011; Seebauer et al., 2016), anxiety and self-esteem (e.g. Stopa, Brown, & Hirsch, 2012), studies examining imagery interventions with psychotic type experience are rare. In the only study of imagery rescripting with psychosis, Ison, Medoro, Keen, and Kuipers (2013) reported reduced distress, negative affect and conviction in beliefs associated with intrusive images, in four people with psychosis. Improvements were maintained at one week follow-up and in three people at one month follow-up. Similarly, in the only study of positive or attachment-based imagery, Bullock, Newman-Taylor, and Stopa (2016) selected participants scoring highly on a measure of non-clinical paranoia, and asked them to recall an interpersonal situation when they had felt significantly secure and trusting (positive) or suspicious and mistrusting (negative). Simply holding the positive self-image in mind resulted in reduced paranoia, anxiety and negative affect, and increased positive affect, self-esteem and self-compassion, compared with the negative self-imagery group.

Positive or attachment-based imagery tasks may provide a simple, cost-effective intervention that is unlikely to cause harm to people with mild paranoia or others. If this was available and effective online, access could be increased considerably. In their review of online interventions, Àlvarez-Jiménez et al. (2012) found that these formats were acceptable to people with psychosis and their families, and were particularly valuable during the early ‘critical period’ when intervention may transform psychosis trajectories. More recently, preliminary studies have demonstrated viability of CBT-based online interventions targeting psychotic-type experience in clinical (Gottlieb, Romeo, Penn, Mueser, & Chiko, 2013) and non-clinical groups (Stafford, Hides, & Kavanagh, 2015).

This study used an experimental design to investigate the impact of attachment-based imagery, delivered online to college students, on paranoia, anxiety, mood and self-esteem. It was hypothesised that secure attachment imagery would result in lower levels of paranoia, anxiety and negative mood, and higher levels of positive mood and self-esteem, compared with the anxious-ambivalent imagery condition.

**Method**

***Participants***

A college student sample was recruited from a university pool. The university research recruitment system includes an online list of studies available, and students opt to participate in exchange for credits. A total of 301 participants were recruited. The majority were female (267 women, 33 men, one declined to answer) and identified as White British (70.5%). Participants’ ages ranged from 18 – 48 years (*M*=20.1, *SD*=2.976).

***Procedure***

Participants were invited to complete the online questionnaires after giving informed consent. The information provided assured people that their data would remain anonymous and that they could withdraw at any stage and without giving any reason. Participants were then asked to provide demographic information and complete the full set of trait and state measures. They were then randomly allocated to one of the two attachment-based imagery conditions in which they were asked to visualize and then describe a secure or anxious-ambivalent attachment relationship, as described above. Finally, the state questionnaires were repeated, and manipulation checks completed.

***Measures***

*Paranoia Scale (PS; Fenigstein & Vanable, 1992).* The PS is a 20-item measure designed to assess sub-clinical trait paranoia. Participants rate applicability of statements on a 4-point scale (from ‘not at all applicable to me’ to ‘extremely applicable to me’). The PS has fair to good (following Rosner, 2006) test-retest reliability (0.70) and acceptable internal reliability (0.72). Internal consistency in the current sample was excellent **(**α=0.93).

*State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).*The 40-item STAI comprises two questionnaires of 20 items each. Respondents rate state items on a 4-point scale (from ‘not at all’ to ‘very much so’) and trait items on a 4-point scale (from ‘almost never’ to ‘almost always’). Both have good to excellent internal consistency (state: 0.90-0.94; trait: 0.89-0.92) and the trait scale has excellent test-retest reliability (0.86). Internal consistency was excellent in the current sample (trait: α=0.93; state: α=0.93).

*Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965).* The RSE is a 10-item measure of global self-worth. Items are scored on a 4-point scale (from ‘strongly agree’ to ‘strongly disagree’). Positive and negative self-esteem sub-scores are combined to give a total (with negative items reversed). The RSE has excellent internal consistency (0.92) and excellent two-week test-retest reliability (0.88) (Corcoran & Fischer, 1987). Internal consistency was also excellent in the current sample (α=0.92).

*Experiences in Close Relationships (ECR; Brennan et al. 1998; adapted by Carnelley & Rowe, 2007)*. The 36-item questionnaire measures closeness to others (trait attachment). The attachment anxiety sub-scale (18-items) and attachment avoidance sub-scale (18-items) are rated on a 7-point scale (from ‘disagree strongly’ to ‘agree strongly’). The measure has excellent internal consistency for both subscales (αs >0.90) and fair to good test-retest reliability (0.50-0.75) (Mikulincer & Shaver, 2007). Internal consistency was excellent in the current sample (α=0.96).

*Paranoia Checklist (PC; Freeman et al., 2005; adapted by* *Lincoln, Lange, Burau, Exner, & Moritz, 2010).* The PC is an 18-item scale of paranoid ideation. Items are rated ‘at the moment’ on a 5-point scale (from ‘not at all’ to ‘very strongly’). The adapted version has good internal consistency (α=0.86), and this was excellent in the current sample (α=0.96).

*The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988).*The 20-item PANAS yields a positive affect sub-scale (10 items) and a negative affect sub-scale (10 items). Items are rated on a 5-point scale (from ‘very slightly / not at all' to 'extremely'). The measure has good to excellent internal consistency (positive: α=0.86-0.90; negative: α=0.84-0.87) and excellent test-retest reliability (positive: 0.81; negative: α=0.79). Internal reliability was excellent in the current sample (positive: α=0.91; negative: α=0.91).

*State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991).* The 20-item SSES measures current performance self-esteem, social self-esteem and appearance self-esteem. Items are scored on a 5-point scale (from 'not at all' to 'extremely'). The measure has excellent internal consistency (α=0.92) and good test-retest reliability (0.72). Internal consistency was excellent in the current sample (α=0.92).

*Priming instructions.*Attachment priming followed the guidance set out by Bartz and Lydon (2004); participants are instructed to bring to mind a close and comfortable relationship (secure attachment) or one in which the participant feels unliked or unloved (anxious ambivalent attachment). Participants are asked to visualize the relationship while writing for ten minutes about the relationship and associated feelings.

*Manipulation checks.* Participants are asked to rate *vividness of the image* on a 10-point scale (from 'not at all vivid' to 'extremely vivid'), and complete the *Felt Security* measure (Luke, Sedikides, & Carnelley, 2012) comprising 10-items assessing aspects of attachment on a 6-point scale (from 'not at all' to ' very much'). Internal consistency was excellent for the current sample (α=0.98).

***Data Analyses***

The data was analysed using IBM SPSS 22 for Windows. The hypotheses were tested using a series of mixed model analyses of variance (ANOVAs). All ANOVAs had one between-subjects factor (secure vs. anxious-ambivalent attachment condition) and one within-subjects factor (pre vs. post attachment condition). Post hoc t-tests with Bonferroni correction (α = 0.0125) were conducted to identify simple effects for each dependent variable.

**Results**

Table 1 shows demographic and trait information for participants in the two groups. These were compared for any initial differences using t-tests and chi-square analysis for gender. There were no differences in age (t(198.83)=1.78, p=0.08), gender (X2(2, N=301)=3.04, p=0.22), trait paranoia (t(299)=1.78 p=0.08, trait anxiety (t(298)=0.23, p=0.82), trait self-esteem (t(299)=0.52, p=0.60) or trait attachment (t(294)=0.17, p=0.86) between the two experimental conditions (secure attachment imagery and anxious-ambivalent attachment imagery).

Table 1 about here

Table 2 shows state measures before and after attachment imagery tasks, for the two attachment-based imagery conditions.

Table 2 about here

On the measure of state paranoia, there was no main effect of imagery, F(1, 299)=2.30, p=0.13, np2=0.01, or time, F(1, 299)=4.27, p=0.04, np2=0.01, and an imagery by time interaction, F(1,299)=11.96, p=0.001, np2=0.04 (see Figure 1). Post-hoc t-tests showed that the two groups did not differ at time 1, t(299)=0.44, p=0.66, and differed at time 2, t(299)=2.44, p=0.02. State paranoia decreased over time in the secure attachment condition, t(139)=3.84, p<0.001, but did not change in the anxious-ambivalent attachment condition, t(160)=1.01, p=0.32.

On the measure of state anxiety, there was a main effect of imagery, F(1, 296)=7.59, p=0.01, np2=.03, no main effect of time, F(1, 296)=0.002, p=0.97, np2<0.001, and an imagery by time interaction, F(1, 296)= 52.56, p<0.001, np2=0.15 (see Figure 2). Post-hoc t-tests showed that the two groups did not differ at time 1, t(297)=0.05, p=0.96, and differed at time 2, t(297.97)= 5.48, p<0.001. State anxiety decreased in the secure attachment condition, t(137)=5.00, p<0.001, and increased in the anxious-ambivalent attachment condition, t(159)=5.29, p<0.001.

On the measure of state positive affect, there was a main effect of imagery, F(1, 298)=19.43, p<0.001, np2=0.06, no main effect of time, F(1, 298)=0.000, p=1.00, np2<0.001, and a significant imagery by time interaction, F(1, 298)= 46.59, p<0.001, np2=0.14. Post-hoc t-tests showed that the two groups did not differ at time 1, t(299) =1.3, p=0.20, and differed at time 2, t(298)= 6.77, p<0.001. State positive affect increased in the secure attachment condition, t(138)= 4.80, p<0.001, and decreased in the anxious-ambivalent attachment condition, t(160)=4.90, p<0.001. This was a similar (inverse) pattern of results as seen for anxiety (see Figure 2).

On the measure of state negative affect, there was no main effect of imagery, F(1, 298)=2.42, p=0.12, np2=.01, or time, F(1, 298)=1.57, p=0.21, np2=0.01, and a significant imagery by time interaction, F(1, 298)= 25.53, p<0.001, np2=0.08. Post-hoc t-tests showed that the two groups did not differ at time 1, t(299)=0.78, p=0.44, and differed at time 2, t(298)=3.75, p<0.001. State negative affect decreased in the secure attachment condition, t(138)=4.60, p<0.001, and increased in the anxious-ambivalent attachment condition, t(160)=2.65, p<0.01. This was a similar pattern of results as seen for anxiety (see Figure 2).

On the measure of state self-esteem, there was no main effect of imagery, F(1, 299)=4.36, p=0.04, np2=0.01, a main effect of time, F(1, 299)=18.45, p<0.001, np2=0.06, and a significant imagery by time interaction, F(1, 299)=30.26, p<0.001, np2=0.09 (see Figure 3). Post-hoc t-tests showed that the two groups did not differ at time 1, t(299)=0.48, p=0.63, and differed at time 2, t(299)=3.40, p<0.001. State self-esteem increased in the secure attachment condition, t(139)=7.03, p<0.001, but did not change in the anxious-ambivalent attachment condition, t(160)=0.85, p=0.40.

To examine these effects in high and low paranoia subsamples, normative percentile scores from the Paranoia Scale (PS; Fenigstein & Vanable, 1992) were used to determine high and low paranoia groups identifying participants +/-1 SD (15.16) from the sample mean (43.84). Additional ANOVAs were then completed for the low (PS=<29) and high (PS>59) trait paranoia groups, with group (low vs high paranoia), imagery (secure vs anxious-ambivalent attachment) and time (pre vs post imagery) variables. The main effect of group was significant across all outcomes, and none of the interaction effects with group were significant. This suggests that people with low and high trait paranoia are affected in the same way by the imagery conditions and over time. Group was therefore removed from the analyses for simplicity.

There were no differences in reported vividness of image, t(298)=1.55, p=0.12, between the two experimental conditions (secure attachment imagery and anxious-ambivalent attachment imagery); the two conditions elicited comparably vivid images. The Felt Security measure showed that the two imagery conditions were also successful in manipulating felt security; participants in the secure attachment condition scored higher than those in the anxious-ambivalent condition, t(299)=14.945, p<0.001, following the imagery tasks.

**Discussion**

The current study aimed to assess the impact of an online attachment-based imagery task on paranoia, mood and self-esteem, in college students. As predicted, the analyses indicate that secure attachment imagery resulted in lower levels of paranoia, anxiety and negative mood, and higher levels of positive mood and self-esteem, compared with those in the anxious-ambivalent attachment imagery condition. The manipulation checks showed that both conditions elicited comparably vivid images, and were successful in effecting felt security.

These results are largely consistent with previous research showing that simple self-imagery tasks benefit college students vulnerable to anxiety (e.g. Stopa et al., 2012), and evidence the impact on non-clinical paranoia. This adds to the small body of literature showing that imagery based interventions may benefit people with psychotic-type experience (Ison et al., 2013; Bullock et al., 2016).

Importantly, the results also demonstrate that attachment-based imagery tasks can be delivered online. This is valuable given the time that college students spend online (Burns, Durkin & Nicholas, 2009) and the acceptability of these formats for people with psychosis and early psychotic-type experience Àlvarez-Jiménez et al., 2012; Gottlieb et al., 2013; Stafford et al., 2015).

The secondary analyses showed that high and low non-clinical paranoia subsamples responded in the same way as the whole sample. This suggests that the online imagery task has the potential to yield broad benefits to college students’ wellbeing, including those with high non-clinical paranoia. These results may also contribute to the development of safe and accessible interventions for the earliest, non-specific signs of psychosis, in the context of a wider stepwise clinical framework (McGorry, Killackey, & Yung, 2008). A simple online imagery task may provide an early step in such framework, with benefits to all, including those with high paranoia and more likely to transition to psychosis.

The study is limited by the mainly female sample, lack of a neutral control condition and follow-up measures. Nevertheless, this is the first online study to demonstrate the impact of attachment-based imagery on paranoia. If these effects are replicated with samples with a more equal gender balance, and ‘at risk mental state’ groups, and maintained at follow-up, online attachment based imagery tasks may provide a safe, highly accessible and cost effective means of attenuating paranoia in young people at risk of developing psychosis.

**Compliance with Ethical Standards**

***Disclosure of potential conflicts of interest***

The authors declare that they have no conflict of interest.

***Research involving Human Participants and/or Animals***

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

***Informed consent***

Informed consent was obtained from all individual participants included in the study.

***Ethical Approval***

The study received ethical approval from the University of Southampton, UK.

**Author Contributions**

KNT: designed the study, assisted with the data analysis, and wrote the paper. AK and HP: executed the study and collaborated with the design and writing of the study. SAY: analysed the data and wrote part of the results.

**Data Availability Statement**

All data are available on request.

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Table 1

*Descriptive statistics for demographic and trait characteristics*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Secure attachment imagery group  (N = 140) | | Anxious-ambivalent attachment imagery group  (N = 161) | |
| M | *SD* | *M* | *SD* |
| Age | 20.44 | 3.82 | 19.81 | 1.93 |
| Trait paranoia | 42.18 | 14.85 | 45.29 | 15.33 |
| Trait anxiety | 43.81 | 10.44 | 44.10 | 11.44 |
| Trait self-esteem | 20.53 | 5.72 | 20.88 | 5.96 |
| Trait attachment | 120.29 | 34.21 | 121.02 | 37.77 |

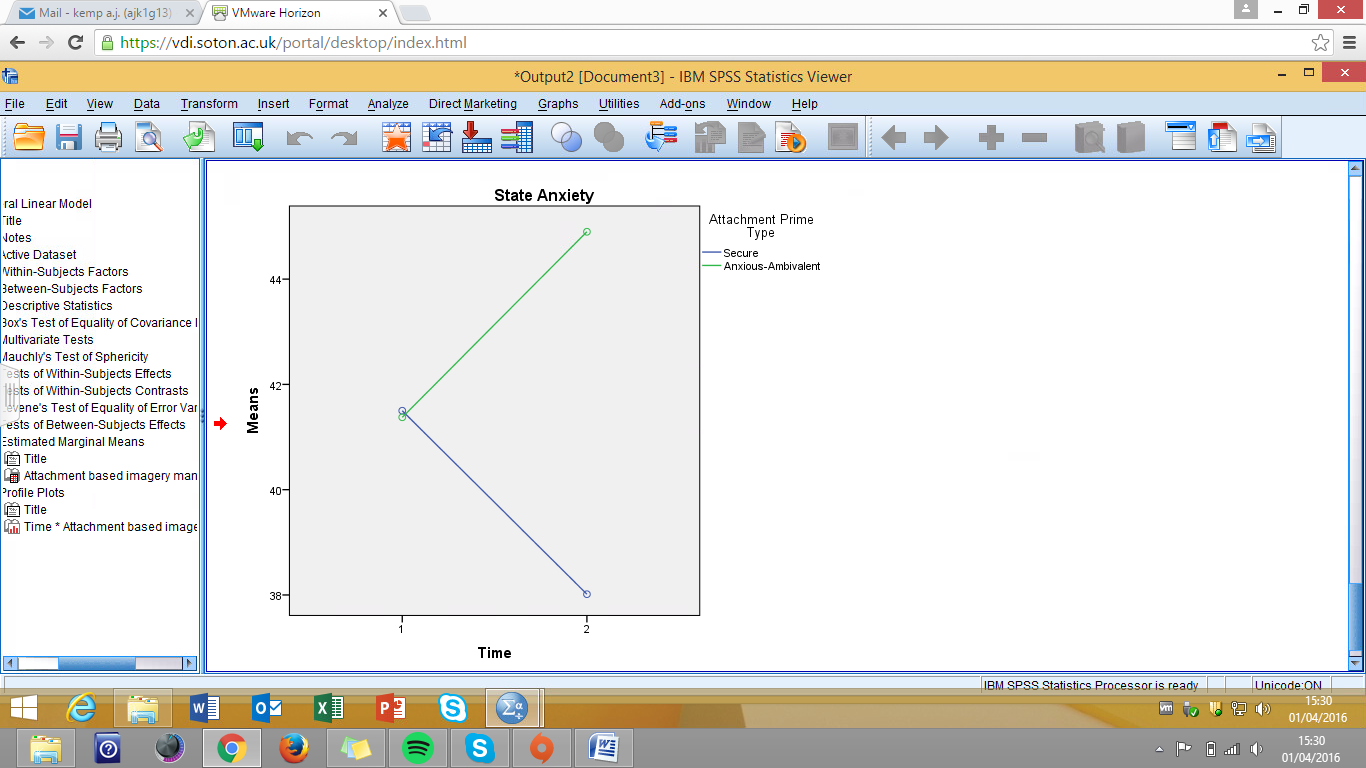
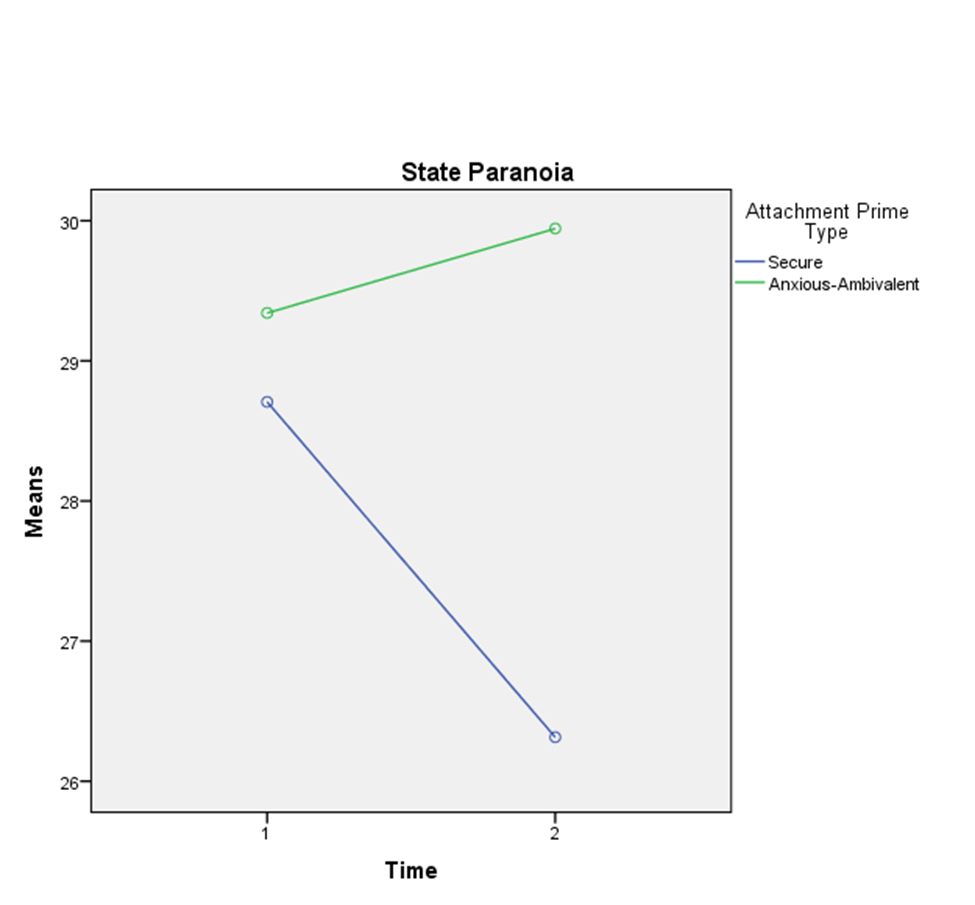
Table 2

*Descriptive statistics for state measures pre and post imagery task*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Secure attachment imagery | | Anxious-ambivalent attachment imagery | |
| Pre imagery  M (SD) | Post imagery  M (SD) | Pre imagery  M (SD) | Post imagery  M (SD) |
| Paranoia | 28.71 (12.65) | 26.31 (12.35) | 29.34 (12.57) | 29.94 (13.32) |
| Anxiety | 41.50 (11.13) | 38.01 (10.34) | 41.37 (11.73) | 44.90 (11.97) |
| Self-esteem | 61.19 (13.27) | 65.69 (13.83) | 60.45 (13.58) | 59.90 (15.44) |
| Positive affect | 26.46 (8.26) | 29.22 (9.00) | 25.25 (8.66) | 22.48 (8.24) |
| Negative affect | 18.06 (7.37) | 15.70 (6.99) | 17.35 (7.68) | 18.77 (7.16) |

Figure 1

*Paranoia, mood and self-esteem – pre and post attachment-based imagery tasks*

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