

A Measure of State Persecutory Ideation for Experimental Studies

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Abstract: Experimental research is increasingly important in developing the understanding of paranoid thinking. An assessment measure of persecutory ideation is necessary for such work. We report the reliability and validity of the first state measure of paranoia: The State Social Paranoia Scale. The items in the measure conform to a recent definition in which persecutory thinking has the 2 elements of feared harm and perpetrator intent. The measure was tested with 164 nonclinical participants and 21 individuals at high risk of psychosis with attenuated positive symptoms. The participants experienced a social situation presented in virtual reality and completed the new measure. The State Social Paranoia Scale was found to have excellent internal reliability, adequate test-retest reliability, clear convergent validity as assessed by both independent interviewer ratings and self-report measures, and showed divergent validity with measures of positive and neutral thinking. The measure of paranoia in a recent social situation has good psychometric properties.

Key Words: Persecutory, delusions, psychosis, schizophrenia, assessment.

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There is an emerging area of research in psychosis that focuses upon understanding the actual experiences of patients. Of the symptoms of psychosis, the most researched has been persecutory ideation (see review by Freeman, 2007). In these studies, the presence of persecutory ideation has been assessed by diagnostic interviews such as the Present State Examination (WHO, 1992), positive symptom measures such as the Scale for the Assessment of Positive Symptoms (Andreasen, 1984) or self-report measures such as the Paranoia Scale (Fenigstein and Venable, 1992) or the Persecutory Ideation Questionnaire (McKay et al., 2006). Such measures are designed to assess persecutory ideation over weeks or

months and are therefore unsuitable for experimental studies where state level of paranoia is the variable of interest. Progress in understanding paranoia is likely to depend upon experimental studies that, for example, manipulate hypothesized causal factors and assess the impact on delusional thinking.

We have developed virtual reality (VR) as a means of studying paranoid thinking in the laboratory. In the studies, participants are presented with a social scene populated by neutral characters (e.g., a library, a train ride). The characteristics of those participants who have formed paranoid interpretations of the scene are then investigated (Freeman et al., 2003, 2005; Valmaggia et al., in press). The main advantage of using a controlled VR environment is that any persecutory thoughts that occur are known to be “pure” (unfounded), since the characters have been programmed to be neutral. In the course of this experimental development work, it has been necessary to develop the first measure to assess persecutory thinking in a recent social scene, i.e., a state measure. In this article, we present the measure and report on its reliability and validity.

METHOD

Participants

Data from 185 individuals from 3 separate studies were used to examine the psychometric properties of the measure. The first study tested 100 individuals from the general population, recruited by a leaflet distributed to the local area advertising a study of “people’s reactions in virtual reality” (53 male, 47 female). The second study tested 64 university students (31 male, 33 female) (Green, 2006). The third study tested 21 patients attending a specialist intervention service for those at high risk of developing psychosis (13 male, 8 female) (Valmaggia et al., in press). These participants were aged between 16 and 35 years, and had never experienced a psychotic episode, and were being managed clinically in the community. The clinical participants met one or more of the following criteria assessed with the Comprehensive Assessment of the At Risk Mental State (Phillips et al., 2000): (a) attenuated positive psychotic symptoms; (b) brief limited intermittent psychosis; or (c) a recent decline in functioning, together with either schizotypal personality disorder or a first-degree relative with a psychotic disorder. All these clinical participants were experiencing attenuated positive symptoms, whereas a quarter of the participants ($n = 5$) also had a history

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FIGURE 1. An image from the virtual reality experiment.

of a brief limited intermittent psychosis, and a minority ($n = 2$) had a family history of mental health problems.

Measures

State Social Paranoia Scale (See Appendix)

The 10 items for this measure of recent paranoid thinking in a social situation were derived from a clear definition by Freeman and Garety (2000): The individual believes that harm is occurring, or is going to occur, to him or her and that the persecutor has the intention to cause harm. All measure items contained both elements of threat and intention (i.e., clear persecutory thinking was assessed). Each item is scored on a 5-point scale (Do not agree – Totally agree). Higher scores indicate greater levels of persecutory thinking. In the scale, 5 items concerning neutral views of the people in the social situation and 5 items concerning positive views of the people in the social situation are dispersed. These positive and neutral items are used to form 2 subscales to establish the divergent validity of the State Social Paranoia Scale (SSPS), but are not considered of psychometric interest in their own right. It is helpful in understanding the estimates of divergent validity to remember that it is possible for participants to view some computer characters positively but other characters in the same environment negatively.

Post-VR Interview

An interview with the participants asking about their experience in VR was recorded. Questions asked were: What did you think about your VR experience? What thoughts ran through your mind? What did you think of the people? What did you think they thought about you? Do you think they had any intentions towards you? These interviews were then rated by another researcher, blind to the self-report measure scores,

on a 6-point scale (0 = none, 1 = slight, 2 = a little, 3 = some, 4 = moderate, 5 = marked persecutory thinking).

Green et al. Paranoid Thoughts Scales

In all participants trait paranoia was assessed with the Green et al. Paranoid Thoughts Scales (G-PTS; Green et al., unpublished data), which is a newly developed instrument. It has two 16-item subscales measuring ideas of social reference and ideas of persecution. The scales have displayed good internal and test-retest reliability and convergent validity in a large nonclinical sample ($N = 353$) and in a clinical sample of 50 individuals with persecutory delusions. The scale total correlates highly ($r = 0.71$) with the Paranoia Scale (Fenigstein and Vanable, 1992). Higher scores indicate greater levels of paranoid thought.

Paranoia Scale

In the second and third studies, trait paranoia was also assessed by the Paranoia Scale (Fenigstein and Vanable, 1992). The 20-item self-report Paranoia Scale was developed to measure paranoia in college students and includes items assessing both ideas of persecution and reference. Each item is rated on a 5-point scale (1-5). Scores can range from 20 to 100, with higher scores indicating greater paranoid ideation.

Visual Analogue Scales

Visual analogue scales (10-cm lines) were also used to assess convergent and divergent validity. In the first study, the 100 participants were asked to indicate on a visual analogue scale how much they had felt paranoid in the environment. On separate lines, they were also asked to rate how much the characters had been hostile, neutral, and friendly.

Procedure

The procedure in all 3 studies followed that outlined in Freeman et al. (2003). Participants were assessed for level of trait paranoia, spent approximately 5 minutes in the virtual environment, and then completed measures of their experiences. The virtual environment in all cases was a London Underground tube train (Fig. 1). The first study used a head-mounted display (VR 1280; Virtual Research Systems, Aptos, California) and the other 2 studies used an immersive projection system commonly referred to as “CAVE” (Fakespace Systems, Marshalltown, Iowa). To assess test-retest reliability, 42 participants in the general population study repeated the VR experience and the SSPS.

TABLE 1. Age, Intellectual Functioning, and Paranoia Scores

	General Population ($n = 100$)			University Students ($n = 64$)			Clinical Group ($n = 21$)		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Age	37.0	13.1	18–77	23.4	5.0	18–41	25.0	4.7	20–34
IQ	105.0	11.9	77–127	106.6	6.7	85–119	98.4	8.8	83–116
SSPS	12.7	5.0	10–35	13.6	4.7	10–29	16.6	9.3	10–41
G-PTS Persecution score	23.0	11.7	16–74	23.6	8.8	16–49	34.9	17.7	16–68
Paranoia score	—	—	—	42.8	15.0	20–77	50.7	19.7	20–89

TABLE 2. Correlations of SSPS Scores in Each of the Studies

	Pearson Correlations With SSPS Score		
	General Population (n = 100)	Student Population (n = 64)	Clinical Population (n = 21)
Interview scores	0.69	0.66	0.85
<i>p</i>	<0.001	<0.001	<0.001
G-PTS persecution	0.24	0.24	0.60
<i>p</i>	0.018	0.055	0.004
G-PTS reference	0.34	0.23	0.55
<i>p</i>	<0.001	0.073	0.010
G-PTS total	0.31	0.24	0.59
<i>p</i>	0.001	0.053	0.005
Positive score	-0.19	-0.20	-0.46
<i>p</i>	0.066	0.111	0.035
Neutral score	-0.40	-0.53	-0.53
<i>p</i>	<0.001	<0.001	0.015

Analysis

All analyses were conducted using SPSS for Windows (version 12.02) (SPSS, 2004). All significance test results are quoted as 2-tailed probabilities. Internal consistency was assessed using Cronbach’s [*alpha*]. Test-retest reliability was assessed by Pearson correlation and 1-way random model single measure intraclass correlation coefficient (ICC). Convergent and divergent validity was assessed using Pearson’s correlations. Results are reported for the whole sample and by each study.

RESULTS

The mean state and trait paranoia scores are displayed in Table 1.

Reliability

In the overall sample, the internal reliability of the SSPS was excellent (Cronbach’s [*alpha*] = 0.91). This was the case in all 3 study populations (general population α = 0.91, university student group α = 0.84, clinical group α = 0.96). Forty-two nonclinical participants repeated the VR experience and the SSPS. Test-retest reliability was adequate (Pearson correlation = 0.78, p < 0.001; intraclass correlation coefficient = 0.74; 95% confidence interval = 0.57–0.85).

Validity

The SSPS was significantly correlated with blind ratings from the structured interview, r = 0.73, p < 0.001. The measure was associated with interview ratings in all 3 study populations (Table 2). In the first study, the SSPS was also

correlated with visual analogue ratings of paranoia, r = 0.59, p < 0.001, and character hostility, r = 0.63, p < 0.001.

Convergent validity was also shown with the trait paranoia measures. In the total sample, higher levels of SSPS paranoia were associated with higher scores for G-PTS persecution, r = 0.38, p < 0.001, G-PTS reference, r = 0.40, p < 0.001, and G-PTS total, r = 0.41, p < 0.001. Positive associations with trait paranoia were found in each of the individual studies (Table 2). In the second and third studies, there were significant correlations of the SSPS with the Paranoia Scale (university student group r = 0.31, p = 0.014, clinical group r = 0.44, p = 0.044). Individuals who reported paranoid thinking in day-to-day life reported more persecutory ideation in the recent social scene as measured by the SSPS.

As expected, higher SSPS scores were negatively associated with the scores for both the positive, r = -0.27, p < 0.001, and neutral items included in the scale, r = -0.44, p < 0.001. The more paranoid the interpretation of the people in the tube then the less the characters were seen as positive or neutral. This confirms the divergent validity of the scale. Similar associations were found in each of the studies (Table 2). In the first study, SSPS scores were negatively associated with visual analogue ratings of how friendly, r = -0.19, p = 0.062, and how neutral the people in the environment appeared, r = -0.30, p = 0.002.

DISCUSSION

Theoretical development in understanding paranoid thinking is proceeding at a faster pace than testing of suitable assessment instruments. However, progress in understanding will depend on accurate assessment. In this brief report, we have presented the first state measure of persecutory ideation suitable for experimental research. The items in the measure are clear persecutory thoughts with obvious face validity: they concern fears about harm and others’ deliberate intent. The SSPS captures recent paranoid thinking in a social situation. The measure has been evaluated in both clinical and nonclinical groups (although the sample size of the former was much smaller than the latter). Internal reliability and test-retest reliability were evaluated. Convergent validity was assessed in relation to blind interview ratings, 2 self-report trait paranoia measures, and self-report visual analogue scales. Divergent validity was assessed in relation to positive and negative self-report of the experience. In all these tests, the SSPS performed well, indicating good psychometric properties. Moreover, the modest associations with the existing trait paranoia measures confirm the need for a state measure such as the SSPS. In the future, the psychometric properties of this measure in a clinical persecutory delusions group will require evaluation.

APPENDIX: STATE SOCIAL PARANOIA SCALE (SSPS)

Please circle how much you agree or disagree with following statements:

	Do not agree	Agree a little	Agree moderately	Agree very much	Totally agree
1. Someone was hostile towards me	1	2	3	4	5
2. No-one had any particular feelings about me	1	2	3	4	5

(Continued)

APPENDIX: (Continued)

	Do not agree	Agree a little	Agree moderately	Agree very much	Totally agree
3. Someone had bad intentions towards me	1	2	3	4	5
4. Someone was friendly towards me	1	2	3	4	5
5. Someone was trying to make me distressed	1	2	3	4	5
6. I felt very safe in their company	1	2	3	4	5
7. Someone stared at me in order to upset me	1	2	3	4	5
8. Everyone was trustworthy	1	2	3	4	5
9. Someone wanted me to feel threatened	1	2	3	4	5
10. I wasn't really noticed by anybody	1	2	3	4	5
11. Someone had kind intentions toward me	1	2	3	4	5
12. Someone would have harmed me in some way if they could	1	2	3	4	5
13. Someone had it in for me	1	2	3	4	5
14. Everyone was neutral towards me	1	2	3	4	5
15. Someone was trying to intimidate me	1	2	3	4	5
16. Everyone was pleasant	1	2	3	4	5
17. Someone was trying to isolate me	1	2	3	4	5
18. No-one had any intentions towards me	1	2	3	4	5
19. Everyone seemed unconcerned by my presence	1	2	3	4	5
20. Someone was trying to irritate me	1	2	3	4	5

Persecution items in bold.

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AUTHOR QUERIES

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