Defeat and entrapment in schizophrenia: The relationship with suicidal ideation and positive psychotic symptoms

Peter James Taylor *, Patricia A. Gooding, Alex M. Wood, Judith Johnson, Daniel Pratt, Nicholas Tarrier

School of Psychological Sciences, 2nd floor, Zochonis building, University of Manchester, Oxford Road, Manchester, M13 9PL, England

A R T I C L E   I N F O

A B S T R A C T

The current study tests whether perceptions of defeat and entrapment are the psychological mechanisms underlying the link between positive psychotic symptoms and suicidal ideation in schizophrenia. A sample of 78 patients with schizophrenia spectrum disorders completed self-report measures and a clinical interview. Of this sample, 21.8% reported a single past suicide attempt and 50% reported multiple past attempts. It was found that perceptions of defeat and entrapment, conceptualised as a single variable, accounted for a large proportion (31%) of the variance in suicidal ideation and behaviour. Defeat and entrapment also mediated the relationship between positive symptom severity and suicidal ideation. This result held whilst controlling for levels of hopelessness and depression. Secondary analyses suggested that suspiciousness in particular was linked to suicidal ideation. The results support a socio-cognitive model (The Schematic Appraisals Model of Suicide: SAMS) of suicide in psychosis.

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1. Introduction

Suicide is a substantial clinical problem in individuals diagnosed with schizophrenia spectrum disorders. Estimated lifetime rates range between 4.9% and 10%, depending on the methodology used (Caldwell and Gottesman, 1990; Palmer et al., 2005). Rates of non-lethal suicidal behaviour are greater still, with rates of ideation reported at 20.4% over a 15 day period (Kontaxakis et al., 2004) and estimated rates for attempts ranging between 13% and 50% (Fenton et al., 1997; Tarrier et al., 2004; Bolton et al., 2007). Suicide ideation and attempts remain an important focus for research, as both represent substantial risk factors for subsequent suicide attempts and completions (Sidley et al., 1999; Nimeus et al., 2002; Corcoran et al., 2004). The current study is an investigation of the psychological architecture underlying suicidal ideation in individuals with schizophrenia, focussing on the role of perceptions of defeat and entrapment.

A recently developed psychological model of suicidal behaviour in schizophrenia, the Schematic Appraisals Model of Suicide (SAMS), argues that perceptions of defeat and entrapment are a core component of the psychological mechanisms underlying suicidal ideation in this group (Johnson et al., 2008). This model expands on earlier theoretical accounts regarding the central role of these variables in suicidal behaviour (Williams, 1997). Defeat and entrapment encompass perceptions of failure, or loss without a way forward or means of escape (Gilbert and Allan, 1998; Rooke and Birchwood, 1998). The SAMS builds

on past research linking defeat and entrapment-related appraisals about living with schizophrenia to negative outcomes like depression and hopelessness in those with the disorder (Birchwood et al., 1993; Rooke and Birchwood, 1998; Iqbal et al., 2000; Karatzias et al., 2007 White et al., 2007).

Positive symptoms are the main experiential symptoms of psychosis, and when experienced as enduring and disruptive, they may potentially contribute to perceptions of defeat and entrapment. Positive psychotic symptoms, and in particular experiences of suspiciousness and paranoia, are a well-supported risk factor for suicidal ideation and behaviour in individuals diagnosed with schizophrenia (Fenton et al., 1997; Heilä et al., 1999; Saarinen et al., 1999; Tarrier et al., 2006), although conflicting findings exist (Hawton et al., 2005; Pompili et al., 2009). Paranoid symptoms, for example, were present in 35% of a sample of suicides diagnosed with schizophrenia prior to the act, and present in 57% of a sample of recently discharged patients who went on to commit suicide (Heilä et al., 1999; Saarinen et al., 1999). Delusions and command hallucinations may also be risk factors for suicide, although the evidence is more equivocal (Fenton et al., 1997; Harkavy-Friedman et al., 2003; Hawton et al., 2005). It is possible that this relationship between positive symptoms and suicidal ideation is mediated by heightened perceptions of defeat and entrapment. Experiences of paranoia and suspiciousness might be expected to be especially linked to feelings of defeat and entrapment due to the signals of interpersonal struggle and threat conveyed by such experiences (Freeman et al., 2005). The case for negative symptoms is less clear. There is varied evidence to suggest that negative symptoms may actually protect against the risk of suicide (Fenton et al., 1997; Schwartz-Stav et al., 2006; Tarrier et al., 2007), whilst other research indicates no relationship (Hawton et al., 2005). As

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* Corresponding author. Tel.: +44 161 306 0428; fax: +44 161 306 0406.
E-mail address: p.j.taylor@postgrad.manchester.ac.uk (P.J. Taylor).

the focus of the current article was on risk, negative symptoms were not investigated.

The aim of the present study was to test the role of defeat and entrapment as mediators of the impact of positive symptom severity upon suicidal ideation in a sample of individuals diagnosed with schizophrenia spectrum disorders. Defeat and entrapment were considered as a single latent variable for the purposes of the analysis for two reasons. First, it has been argued that they are conceptually the same (for a detailed discussion, see Johnson et al., 2008). Second, a factor-analytic study has found that the defeat and entrapment scales were best explained by a one-factor solution (Taylor et al., 2009). It was hypothesized that positive symptom severity would have a positive relationship with suicidal ideation, and that this relationship would be fully mediated by perceptions of defeat and entrapment. Furthermore, it was hypothesized that these effects would stand whilst controlling for hopelessness and depression. In addition, a secondary exploratory analysis was undertaken to investigate which positive symptoms in particular would have the most influence on suicidal ideation and how well these would fit the mediational model.

2. Method

2.1. Participants and procedure

Participants were outpatients living in the Greater Manchester area. The inclusion criteria were as follows: 1) a chart diagnosis (ICD-10 criteria) of schizophrenia spectrum disorders (e.g., schizophrenia, schizoaffective disorder, psychosis not otherwise specified); 2) drug misuse or organic disorder acceptable only if they were not judged to be the major cause of the psychosis; 3) aged 18 years or over; 4) currently not at very high risk of suicide as judged by their keyworker or other appropriate healthcare professional; 5) English-speaking; and 6) capable of providing informed consent as judged by their keyworker or other appropriate healthcare professional. The study recruited a convenience sample of consecutively referred patients living within the catchment area of the study and meeting the inclusion criteria. Patients were referred by their keyworkers or other appropriate healthcare professional. Participants completed all measures in a single session, except in three cases where the study was completed over two sessions approximately a week apart. Ethical approval was obtained from a national research ethics committee prior to commencing the study.

2.2. Measures

2.2.1. Entrapment

The entrapment scale (Gilbert and Allan, 1998) comprises 16 items assessing feelings of being trapped by internal and external events (e.g., 'I feel trapped inside myself'). Items are rated on a five-point scale ranging from 'Not at all like me' to 'Extremely like me'. No previous reports of internal consistency for this measure in a psychosis group could be found. The alpha coefficient for the current study was 0.95.

2.2.2. Defeat

The defeat scale (Gilbert and Allan, 1998) comprises 16 items assessing perceptions of defeat including those of failed struggle and low social rank (e.g., "I feel that I am one of life's losers"). Items are rated for their prevalence in the past week, on a five-point scale ranging from 'Never' to 'Always/all the time'. No previous reports of internal consistency for this measure in a psychosis group could be found. The alpha coefficient for the current study was 0.86.

2.2.3. Hopelessness

The Beck Hopelessness Questionnaire (BHS; Beck et al., 1974) comprises 20 true or false items assessing the prevalence of hopelessness in the past week (e.g., "My future seems dark to me"). This measure has a reported alpha coefficient of 0.93 and a test–retest reliability of $r = 0.85$ over 3 weeks (Holden and Fekken, 1988). This measure has been used extensively in individuals diagnosed with schizophrenia (e.g., Tarrier et al., 2004; White et al., 2007).

2.2.4. Suicidal ideation

The Beck Suicidal Ideation Scale (BSS; Beck and Steer, 1991) is a 21-item scale assessing the prevalence of suicidal ideation, planning and intent in the past week and previous attempt history. For each item, participants choose between three responses of increasing suicidal ideation (e.g., 'I have no desire to kill myself'; 'I have a moderate to strong desire to kill myself'). In previous research in a sample with psychotic disorders the BSS has demonstrated an alpha coefficient of 0.96 and test–retest reliability over 1 week of $r = 0.88$ (Pinninti et al., 2002).

2.2.5. Psychotic symptoms

The Brief Psychiatric Rating Scale Expanded version (BPRS-E; Ventura et al., 1994) is a 24-item interviewer-rated assessment of psychopathological symptoms. Each item refers to a particular symptom and is rated for frequency and severity on a seven-point scale ranging from 1 ('not present') to 7 ('extremely severe'). For the purposes of the current study, separate positive and depressive symptom total scores were calculated by summing scores on the relevant item (i.e., positive symptoms = unusual thought content, suspiciousness, bizarre behaviour, grandiosity, hallucinations, hostility; depression = depression; anxiety, guilt, self-neglect, somatic concern), based on empirically identified components (Dinglemans et al., 1995). The suicide subscale was excluded from the depressive symptoms total score to avoid confounding depression with suicidal ideation. The positive and depressive symptom components were found to have alpha coefficients of 0.74, and 0.75, respectively. Ratings were made by one of two doctoral-level students or a trainee clinical psychologist. Intra-class correlation coefficients between the three raters for a subset of interviews ($n = 19$) ranged between 0.87 and 0.92, suggesting good inter-rater reliability.

2.3. Statistical analysis

The hypothesized mediational model was tested via Structural Equation Modelling (SEM). Covariances were analysed via AMOS version 7.0 using Maximum-Likelihood estimation (Arbuckle, 2006). In this model defeat and entrapment were represented as a single latent variable (referred to as defeat/entrapment hereafter). The chi-squared goodness-of-fit statistic was scaled to compensate for the small sample using a formula by Bartlett (1950)[1]. Monte Carlo simulations have found this scaled chi-square to function acceptably in models with sample sizes to parameter ratios of 5:1 (Nevitt and Hancock, 2004). A significant value ($P < 0.05$) of this statistic suggests poor fit.

Model fit was also assessed via combinational rules found to minimise type I and type II errors suggesting cut-off scores of <0.09 for the Standardized Root Mean squared Residual (SRMR) and >0.95 for the Comparative Fit Index (CFI) as indicants of good fit (Hu and Bentler, 1999).

Mediation was formally tested via bootstrapping with 1000 random samples. This method involves generating confidence intervals through a process of random re-sampling. Bootstrapping provides an alternative test of mediation to the commonly used Sobel's test that is suitable for smaller samples (Preacher and Hayes, 2004).

3. Results

3.1. Sample characteristics

A sample of 90 participants was initially recruited for the study. Of these, six failed to meet diagnostic criteria and six had substantial missing data, and were therefore excluded. This resulted in a final sample of 78 participants (23 female; mean age = 42.5 years, S.D. = 11.8) with diagnoses of schizophrenia ($n = 71$, 91.0%), schizoaffective disorder ($n = 4$, 5.1%), psychosis not otherwise specified ($n = 2$, 2.6%), and atypical psychosis ($n = 1$, 1.3%), in accordance with ICD-10 criteria. The majority of participants were white ($n = 63$, 80.8%), then mixed British ($n = 6$, 7.7%), Asian ($n = 3$, 3.8%), Afro-Caribbean ($n = 1$, 1.3%) and other ($n = 4$, 5.1%). Ethnicity data was missing for one participant. Participants had an average duration of illness of 17.5 years (S.D. = 11.0). Age, gender and duration of illness were not significantly associated with suicidal ideation ($P > 0.05$). Only 22 (28.2%) participants reported no history of suicide attempts, with 17 (21.8%) reporting a single attempt and 39 (50.0%) reporting multiple past attempts, ranging in number from 2 to 11. No record was taken of the nature or severity of these attempts. Descriptive statistics and correlations for the measures used are reported in Table 1. Multicolinearity was not a problem in the data (tolerance > 0.2; Menard, 1995), although defeat and entrapment were highly correlated ($r = 0.85$), supporting the decision to analyse these as a single latent variable.

3.2. Testing the model

The hypothesized mediation model with associated fit indices, standardized regression weights and multiple squared correlations is displayed in Fig. 1. This model fit the data well and all direct paths were significant ($P < 0.05$). The results of the bootstrap analysis suggested that the indirect effect of positive symptoms on suicidal ideation was also significant, $P = 0.002$ (95% $CI = 0.14$–0.39). The above model assumed full mediation, where no direct effect of positive symptoms upon suicidal

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[1] This adjustment involves a multiplicative scaling of the original chi-squared test statistic of the form $c = 1 - [(2p + 4k + 5)/6(n-1)]$, where p = the number of measured variables and k = the number of latent variables. This resulted in $c = 0.963$ for the model displayed in Fig. 1, and $c = 0.959$ for the model displayed in Fig. 2.

Table 1
Means, standard deviation and correlations for variables in model.

	Un-transformed		Transformed[a]		2	3	4	5	6
	Mean	S.D.	Mean	S.D.					
1. Suicidal ideation	5.64	6.67	1.91	1.43	0.52*	0.56*	0.29*	0.53*	0.51*
2. Defeat	28.56	16.02				0.85*	0.35*	0.71*	0.61*
3. Entrapment	24.67	18.55					0.49*	0.70*	0.64*
4. Positive symptoms	13.10	5.95	3.53	0.79				0.32*	0.46*
5. Hopelessness	7.41	5.51	2.45	1.20					0.64*
6. Depression	12.18	4.91	2.41	0.43					

*$P < 0.05$.

[a] The variables suicidal ideation, positive symptoms and hopelessness were square-root transformed and depression logarithmically transformed to correct for positive skew. This resulted in skew that was acceptably low ($Z < 1.96$). Correlations are only provided for transformed versions of variables.
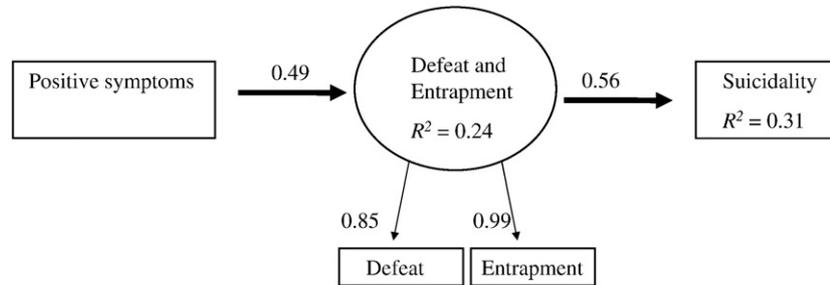
χ^2_{-K} (2, $n = 78$) = 2.55, $P = 0.28$, SRMR = 0.03, CFI = 1.00

Fig. 1. Model depicting full mediation of positive symptoms on suicidal ideation via defeat/entrapment. Rectangles represent observed variables in the model. Defeat and entrapment have been used as indicators of a single latent variable, represented by an oval. Associated fit indices, standardized regression weights and squared multiple correlations reported. All paths were significant ($P < 0.05$).

ideation remained after accounting for perceptions of defeat/entrapment. In order to test this assumption, a second partial mediation model was calculated and compared with the full mediation model. The models were compared in terms of improvement in the scaled chi-squared statistic and Akaike's Information Criterion (AIC). It has been suggested that differences of ≤2 on the AIC provide substantial support for the more parsimonious model (Burnham and Anderson, 2004). The partial mediation model failed to demonstrate a significant improvement in fit, $\Delta\chi^2_{-K}$ (1) = 0.02, *n.s.*, ΔAIC = 1.98, providing support for the more parsimonious full mediation model.

In order to test the robustness of the mediation model, the analysis was repeated controlling for the effect of hopelessness (BHS) and depressive symptoms (BPRS-E). The model continued to demonstrate good fit, χ^2_{-K} (4, $n = 78$) = 5.54, $P = 0.24$, SRMR = 0.02, CFI = 0.99. All direct and indirect paths remained significant and standardized coefficients differed by $\beta \le 0.30$.

3.3. Secondary analysis

A secondary exploratory analysis was undertaken to examine the individual positive symptoms that contributed most to suicidal ideation. Correlations between individual positive symptoms and suicidal ideation are reported in Table 2.

Table 2
Correlations between individual positive symptoms as rated on the BPRS-E and suicidal ideation.

| Symptoms	Correlation (r_s)
Hostility	0.15
Grandiosity	−0.14
Suspiciousness	0.42*
Hallucinations	0.23*
Delusions	0.15
Bizarre behaviour	0.11

*$P < 0.05$.

Only suspiciousness and hallucinations were significantly associated with suicidal ideation. In order to investigate whether the link between these individual symptoms and suicidal ideation was mediated by perceptions of defeat and entrapment, an SEM was calculated with suspiciousness and hallucinations as predictors, defeat/entrapment as a mediator and suicidal ideation as an outcome variable. Suspiciousness and hallucinations had means of 2.72 (S.D. = 1.76) and 3.00 (S.D. = 2.14), respectively. Prior to the analysis the variable suspiciousness was square-root transformed to correct for mild positive skew, resulting in a mean of 1.56 (S.D. = 0.53). This model with associated fit indices, standardized regression weights and multiple squared correlations is displayed in Fig. 2. The model fit the data well, and all direct paths were significant, with the exception of the direct effect of hallucinations on defeat/entrapment. The indirect effect of suspiciousness on suicidal ideation was also significant, $P = 0.002$, (95% $CI = 0.18$–0.46), but not the indirect effect of hallucinations on suicidal ideation, $P = 0.28$, (95% $CI = -0.05$–0.20).

4. Discussion

It was found that perceptions of defeat and entrapment, conceptualised as a single variable, accounted for a large proportion (31%) of the variance in suicidal ideation. As hypothesized, defeat and entrapment fully mediated the association between positive symptom severity and suicidal ideation. This result held whilst controlling for levels of hopelessness and depression suggesting it was robust, and not simply an artefact of the conceptual overlap between variables. An additional exploratory analysis revealed that suspiciousness in particular was related to suicidal ideation and that this effect was also fully mediated by defeat and entrapment.

These results support the SAMS model which argues that negative appraisals result in perceptions of defeat and entrapment in psychotic disorders. These in turn lead to suicidal ideation (Johnson et al., 2008). Defeat and entrapment, defined as perceptions of loss or rejection without escape or likelihood of improvement (Gilbert and Allan, 1998),
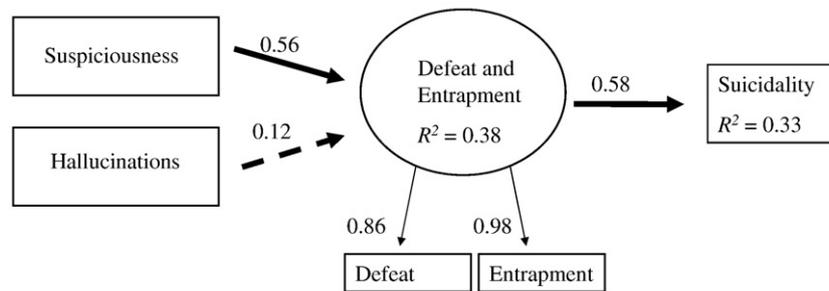
$$\chi^2_{-K} (4, n = 78) = 2.19, P = 0.79, SRMR = 0.03, CFI = 1.00$$

Fig. 2. Model depicting full mediation of suspiciousness and hallucinations on suicidal ideation via defeat/entrapment. Rectangles represent observed variables in the model. Defeat and entrapment have been used as indicators of a single latent variable, represented by an oval. Associated fit indices, standardized regression weights and squared multiple correlations reported. All paths were significant ($P<0.05$) except for effect of hallucinations on defeat/entrapment, indicated by dashed arrow.

may represent one particularly maladaptive psychological response to the difficulties posed by living with psychosis, which may provoke suicidal ideation and behaviour as a means of escape or protest (Williams, 1997).

The current study supports the link between the severity of positive psychotic symptoms, in particular experiences of suspiciousness or paranoia, and suicidal ideation (Fenton et al., 1997; Heilä et al., 1999; Saarinen et al., 1999). Moreover, it was found that this relationship was explained by perceptions of defeat and entrapment, which were amplified as symptoms became increasingly distressing and enduring. Suspiciousness may be particularly entrapping and defeating as such experiences can carry a sense of ongoing personal threat and negative implications concerning social rank (Freeman et al., 2005). It is possible that paranoia represents a psychosis-specific risk factor for suicide that functions along side other trans-diagnostic factors such as depression (Bolton et al., 2007). This possibility requires further investigation.

It could be that the current results concerning defeat and entrapment are simply an artefact of the demoralisation syndrome identified in some individuals diagnosed with schizophrenia. This syndrome, which follows an individual's negative awareness of the impact of the illness on their goals and future aspirations has also been associated with suicide (Drake and Cotton, 1986; Restifo et al., 2009), and shares some conceptual similarities with defeat and entrapment. However, this explanation is unlikely, since hopelessness and depression are proposed as key symptomatic features of the demoralisation syndrome in schizophrenia (Drake and Cotton, 1986; Restifo et al., 2009) and both of these variables were controlled for in the current analyses.

The results of this study raise the possibility that perceptions of defeat and entrapment could be used alongside better established indicators of suicide such as depression and hopelessness (Siris, 2001; Tarrier et al., 2004; Montross et al., 2005; Schwartz-Stav et al., 2006; Bolton et al., 2007; Pompili et al., 2009) to identify patients diagnosed with schizophrenia who are at heightened risk of suicide. Further investigation of the utility of defeat and entrapment in predicting suicidal behaviour is therefore warranted. The results also suggest that psychological therapies aimed at reducing suicidal ideation in individuals diagnosed with schizophrenia could focus specifically on reducing perceptions of defeat and entrapment, alongside interventions aimed more directly at alleviating clients' symptoms. Psychosocial interventions, including psychotherapy, have been suggested as one important approach in the prevention of suicide in individuals diagnosed with schizophrenia (Pompili et al., 2004). A recent meta-analysis has also supported the overall efficacy of Cognitive–Behavioural Therapy (CBT) in suicide prevention (Tarrier et al., 2008). CBT may therefore provide one useful framework within which perceptions of defeat and entrapment could be targeted (Swallow, 2000). A more detailed discussion of therapeutic approaches to dealing with defeat and entrapment in psychosis is described elsewhere (Johnson et al., 2008).

A caveat of this study is the relatively small sample size. However, the models depicted in Figs. 1 and 2 met recommendations of over five participants per parameter being estimated (Bentler and Chou, 1987; Kline, 1998). Furthermore, an adjusted version of the chi-squared goodness-of-fit statistic was employed which has been found to function adequately, delivering acceptable type I error rates, at sample size to parameter ratios below 5:1 (Nevitt and Hancock, 2004). Finally, the significance of mediation was tested using bootstrapping, which is a suitable method to use with smaller sample sizes (Preacher and Hayes, 2004). Replication of the present results in a larger sample would still be beneficial for strengthening the generalizability of these results. A second caveat is the cross-sectional design, which limits the ability to draw causal inferences. As such, the reported results may simply reflect overlapping variance in the constructs of interest. Even if this were the case, the results would continue to be of theoretical interest. The redundancy of the association between positive symptoms and suicidal ideation when defeat and entrapment are considered remains an important result irrespective of whether causality is clearly demonstrated.

Future research would benefit from the further refinement and exploration of the defeat and entrapment construct in relation to psychosis. This should involve additional investigation of the phenomenology of this construct and its operationalisation within the context of psychosis. The use of a case–control methodology to further investigate defeat and entrapment in relation to suicide would also be of interest. Such research would be beneficial in confirming the present findings and determining whether they extend to completed suicide.

To conclude, the current study highlights the importance of perceptions of defeat and entrapment in understanding suicidal ideation and behaviour in those with schizophrenia spectrum disorders. The results imply that the severity of positive psychotic symptoms is only associated with suicidal ideation to the extent that it contributes to maladaptive perceptions of defeat and entrapment.

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