Pathways to Suicidal Behavior in Posttraumatic Stress Disorder

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This study investigated paths to suicidal behavior in 94 civilian participants with chronic posttraumatic stress disorder (PTSD). Two statistical modeling programs, TETRAD II version 2.1 and Mplus 5.21 were used to construct a working model of suicide in PTSD. Two paths to suicidal behavior were identified. In the first path, suicidal behavior was directly associated with greater life impairment, which in turn was associated with poorer occupational and social functioning. In the second path, suicidal behavior was directly associated with depressive symptoms, which in turn were associated with more severe PTSD symptoms. Psychotropic medication, employment status, and threat to life further contributed to the model. The findings suggest that negative perceptions of functional impairment and depression are strongly associated with suicidal behavior in PTSD.

Although there is general consensus in the literature that there is a strong association between posttraumatic stress disorder (PTSD) and suicidal behavior (Panagioti, Gooding, Tarrier, 2009; Sarreen, Houlanan, Cox, & Asmundson, 2005; Tarrier & Gregg, 2004), few studies have examined factors that may render those diagnosed with PTSD more susceptible to suicidal thoughts and behaviors. A number of studies have demonstrated that suicidal risk was significantly and positively associated with the reexperiencing symptom cluster (Amir, Kaplan, Efroni, & Kotler, 1999; Jurisic & Marusic, 2009; Kotler, Iancu, Efroni, & Amir, 2001; Nye & Bell, 2007) and hyperarousal symptom cluster (Ben Yacov & Amir, 2004) and negatively or insignificantly associated with the avoidance and numbing symptom cluster (Kotler et al., 2001; Nye & Bell, 2008).

A basic methodological limitation with the existing literature examining associations between PTSD and suicidal behavior is that there is no evidence elucidating the mechanisms by which suicidal behavior develops from PTSD. One possibility is that particular PTSD symptom clusters lead to depression, which then leads to suicidal behavior (Panagioti et al., 2009). In accord with this, comorbid depressive symptoms appear to mediate the relationship between PTSD symptoms and suicidal ideation among African American women with a history of intimate partner violence (Leiner, Courmont, Houry, & Kaslow, 2008). A second possibility is that comorbid depression may lead to suicidal behavior because it exacerbates the effects of PTSD symptoms. A third possibility is that an overriding factor mediates the impact of PTSD symptoms and depression on suicidal behavior. For example, Tarrier and Gregg (2004) reported that increased severity of life impairment, a subjective measure that mainly reflects levels of disability and negative perceptions of functional impairment, was the strongest predictor of suicidal behavior. Similarly, two models of suicide emphasize the role of negative appraisals (i.e., interpretative negative perceptions of external events and internal states) as a central component of suicidal behavior (Bolton, Gooding, Kapur, Barrowclough, & Tarrier 2007; Johnson, Gooding, & Tarrier, 2008; Williams, 1997; Williams, Crane, Barnhofer, & Duggan, 2005). Additionally, Joiner and Van Orden’s (2008) interpersonal-psychological theory of suicidal behavior postulates that negative subjective perceptions of burdensomeness have a crucial role in developing suicidal behavior. Currently, the use of these theoretical postulations in explaining suicidal behavior in PTSD has not yet been tested.

The main aim of this study was to formulate paths to suicidal behavior in those with PTSD. This was achieved by reanalyzing a data set from individuals with a diagnosis of PTSD (Tarrier & Gregg, 2004). Based on both theory and empirical data, it was predicted that the variables would follow a particular path to suicidal behavior. Variables that reflect negative perceptions of functional impairment (i.e., life impairment, occupational functioning impairment, social functioning impairment) and clinical symptoms (i.e., severity of depressive symptoms and each of the three
PTSD symptom clusters) were hypothesized to be directly associated with suicidal behavior. The characteristics of the traumatic experience (e.g., type of trauma, duration of trauma), receiving psychotropic medication, and demographic factors (e.g., younger age, being female, married or divorced/widowed, increased number of dependent children) were hypothesized to contribute to the path to suicidal behavior via their association with the severity of clinical symptoms and/or the negative perceptions of functional impairment. These predictions were based on previous literature which has indicated that particular types of traumas (i.e., combat trauma, physical or sexual abuse) and prolonged exposure to traumatic events are strongly associated with symptoms of depression, PTSD symptoms/diagnosis, and suicidal behavior (e.g., Suliman, Mkabile, Fincham, Ahmed, Stein, & Sedaat, 2008; Ullman, 2004). Psychotropic medication was included in the hypothesized model because previous research has shown that receiving medication is associated with suffering comorbid depressive disorders and more frequent use of mental health services (Harpaz-Rotem, Rosenheck, Mohamed, & Desai, 2009; Mohamed & Rosenheck, 2008). Finally, it has been found that a number of demographic factors (e.g., being female, younger, unmarried or divorced/widowed, having dependent children) are predictive of increased suicidal thoughts and behaviors in the general population (e.g., Bernal et al., 2006; Driver & Abed, 2004; Kessler, Borges, & Walters, 1999).

**METHOD**

**Participants**

Data from 94 individuals attending a screening process to enter a clinical trial of cognitive–behavioral treatments of PTSD (Tarrier, Pilgrim, et al., 1999; Tarrier, Sommerfield, Pilgrim, & Humphreys, 1999) and data which had previously been presented in Tarrier and Gregg’s (2004) article were reanalyzed for the purpose of this study. Potential participants were referred from primary and secondary health services in the northwest of England. Those participants who were initially screened and assessed as meeting the inclusion criteria proceeded to the full assessment procedure. The inclusion criteria were a diagnosis of PTSD according to the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R)*; American Psychiatric Association, 1987), confirmed by the Clinician Administered PTSD Scale (CAPS; Blake et al., 1990), retrospective analysis showed all patients also met DSM-IV criteria; a minimum of 6 months duration of PTSD but not more than 10 years (a maximum duration of 10 years was used to prevent the inclusion of a small number of outliers with a very long duration); childhood sexual abuse was not the index trauma;¹ not suffering from a psychotic or organic brain illness; not having received a primary diagnosis of alcohol or substance abuse; if receiving psychotropic medication, then medication must have been constant for 3 months prior to the study; not receiving any concurrent psychological or psychosocial intervention; and not having received any type of cognitive–behavioral intervention in the 6 months prior to referral (Tarrier & Gregg, 2004; Tarrier et al., 1999).

**Measures**

Questions were asked as part of the initial assessment interview regarding suicidal thoughts (“Have you seriously thought about suicide?”), suicidal plans (“Have you ever made plans to commit suicide?”), and suicide attempts (“Have you ever attempted suicide or attempted to end your life?”) since exposure to the index trauma. Suicidal behavior was an ordinal 4-point variable: 0 = *no suicidal behavior*, 1 = *suicidal ideation*, 2 = *suicidal plans*, and 3 = *suicide attempts*. In the analyses, suicidal behavior was treated as a continuous variable.

The CAPS (Blake et al., 1995) was administered and a total severity score was computed by adding the intensity and frequency score for each symptom. Intensity and frequency scores were also computed for each symptom category (reexperiencing symptom cluster, avoidance numbing symptom cluster, and hyperarousal symptom cluster). The CAPS has been found to have excellent reliability (e.g., across items, raters, and testing occasions) and validity (e.g., convergent and discriminant validity, diagnostic utility, and sensitivity to clinical change) (Weathers, Keane, & Davidson, 2001). The Cronbach’s alpha coefficient has been estimated to range from .85 to .87 for the three symptom clusters and .94 for the total score (Blake et al., 1995).

The trauma characteristics (e.g., type, duration, threat to life) of the participants, the social functioning impairment (1 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme impairment in social functioning) the occupational functioning impairment (0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme impairment in occupational functioning) and the subjective life impairment (Subjective Distress subscale; 0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme distress) were assessed as part of the CAPS. The Subjective Distress item of the CAPS assesses subjective impairment and disability/problems due to PTSD symptoms. Types of trauma were classified into three categories: crime (violent criminal assault), accident, and other (e.g., war, combat). The measures of life impairment, occupational functioning, and social functioning impairment are based upon subjective judgments of current levels of functioning and thus they may not reflect objective impairment but limiting, negative subjective perceptions of functional impairment (Tarrier & Gregg, 2004).

The Beck Depression Inventory (BDI; Beck, 1988), a 21-item measure of the severity of depression (range 0–63) was used to assess the severity of symptoms of depression. The BDI has good reliability and validity. The Cronbach’s alpha coefficient of the BDI

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¹ Childhood sexual abuse was excluded as the index trauma as it may involve impairment to development in contrast to traumas in adult life and would thus not be comparable to adult trauma.
is around .86 for psychiatric patients and .81 for nonpsychiatric individuals (Beck, Steer, & Carbin, 1988).

Data Analysis

The statistical analyses were based on organizing the variables in two groups. The main goal of the analysis was to examine the links between the dependent or outcome variables, psychotropic medication (1 if yes, 0 otherwise), current employment (1 if yes, otherwise 0), reexperiencing symptom cluster, avoidance and numbing symptom cluster, hyperarousal symptom cluster, severity of depressive symptoms (BDI), social functioning impairment, occupational functioning impairment, life impairment, and suicidal behavior. The baseline covariates or independent variables, age, gender, cohabiting (1 if yes, otherwise 0), number of dependent children, type of trauma (1 if the trauma was a violent criminal assault, 0 otherwise), duration of trauma (1 > 1 hour, 0 otherwise), threat to life (1 if yes, 0 otherwise), were considered only useful to help establish the direction of any links between the outcome variables and to allow them to act as potential confounders of those links. In some of the analyses, employment status and psychotropic medication were treated as members of the independent group.

In an initial descriptive analysis, Pearson correlations were calculated for all pairs of variables (regardless of whether the variables were binary, ordinal, or continuous). Similarly, partial correlations were calculated for each pair of variables, controlling for all the other variables in the data set (both independent and dependent). The statistical significance of these correlations was used to produce an initial nondirected graph. This is a graph in which there is no indication of causal direction between the variables. The links in the graph indicate which of the pairs of variables are correlated after controlling for all the other variables in the data set. These significance values are only approximate due to lack of bivariate normality.

TETRAD II Version 1.2 (Spirtes, Scheines, Meek, & Glymour, 1994) is capable of searching for patterns of causal relationships within datasets using various search algorithms. The use of TETRAD and similar algorithms for the discovery of causal patterns is described in Shipley (2000), Spirtes, Glymour, and Scheines (2000), and Pearl (2009). This process was used to generate statistical causal models that fit with the pattern of significant and nonsignificant partial correlations in the dataset. Statistical significance level for the individual links was set to be .05. The rationale for using TETRAD in the current study was to explore the data and produce an initial model of suicidal behavior, which would be confirmed afterwards using Mplus Version 5.21 (Muthén & Muthén, 1998–2009). The TETRAD algorithms work with partial correlations, details of the algorithm can be found in Spirtes et al. (2000), and the final undirected links produced are the same as those produced by the partial correlations described above. Directed links are produced with the following procedure. Assuming that there are four variables (i.e., A, B, C, D) with the following relationships: (a) A is directly associated with B, (b) B is directly associated with C, (c) there is no direct link between A and C. If A precedes C then the only direct link between the variables is: A → B → C. Further, if D is associated with C (with no direct links between the D and the other two variables) then the direct of the links has to be A → B → C → D.

As described in the article by Tarrier and Gregg (2004), of the total number of participants (N = 94), 41 (43%) reported no suicidal ideation, 36 (38.3%) reported suicidal thoughts, 8 (8.5%) reported definite plans, and 9 (9.6%) had attempted suicide since the trauma. Overall, 53 (54.4%) participants reported suicidal behavior after the trauma exposure. A considerably higher percentage of those who reported suicidal behavior were victims of violent criminal assaults (n = 28, 52.8% vs. n = 18, 43%), \( \chi^2 (2, N = 94) = 6.230, p = .044 \), and scored significantly higher on the CAPS total scale (\( M = 74.83, SD = 15.48 \) vs. \( M = 62.56, SD = 36.3(12.1) \) years and more than half of the participants (n = 54, 55.6%) were men. The majority of individuals in the sample were married (n = 55, 56.7%), cohabiting (n = 71, 73%), currently unemployed (n = 78, 80.2%), and their mean age for completing full-time education was 16 years. No significant differences were found between participants who reported some level of suicidal behavior and participants who reported no suicidal behavior with respect to demographic factors (Tarrier & Gregg, 2004).

RESULTS

Sample Characteristics and Suicidal Behavior

The mean age of the sample was 36.3 (SD = 12.1) years and more than half of the participants (n = 54, 55.6%) were men. The majority of individuals in the sample were married (n = 55, 56.7%), cohabiting (n = 71, 73%), currently unemployed (n = 78, 80.2%), and their mean age for completing full-time education was 16 years. No significant differences were found between participants who reported some level of suicidal behavior and participants who reported no suicidal behavior with respect to demographic factors (Tarrier & Gregg, 2004).

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There were five participants with missing BDI scores. All the analyses presented below were based on data from the remaining 89 participants. Significant positive correlations were found between suicidal behavior and the severity of reexperiencing symptom cluster, the severity of hyperarousal symptom cluster, symptoms of depression and life impairment (see below the diagonal in Table 1).

Possible causal pathways cannot be inferred with any confidence from these correlations and partial correlations (Aldrich, 1995; Ellet & Ericson, 1986). The use of partial correlations, however, yielded some interesting patterns (see above the diagonal in Table 1). Of particular note is that suicidal behavior was conditionally independent of all other variables in the data set except life impairment and psychotropic medication. That is, all of the partial correlations between suicidal behavior and other variables were nonsignificant (the correlation is “explained” by the other variables) except for those between suicidal behavior and life impairment and psychotropic medication. Similarly, the only direct link between the PTSD symptom clusters with the other outcome variables appeared to be between the avoidance and numbing symptom cluster and social functioning impairment.

### Tentatively Inferring the Direction of Causal Influences

In the TETRAD analyses, it was hypothesized that the demographic variables (age, gender, cohabiting, current employment, number of dependent children) and trauma characteristics (type of trauma, duration of trauma, threat to life) preceded all the other variables. In the first analysis, psychotropic medication and current unemployment were included within the group of dependent variables; in the second, they were classified as being members of the independent group (the distinction was specified in TETRAD through the use of the “knowledge and temporal” option).

Table 2 presents the model that resulted from the exploratory TETRAD analyses. As expected, the three PTSD symptom clusters were closely related. Even though the relationships between the PTSD symptom clusters were not entirely clear, the severity of avoidance and numbing symptom cluster was directly associated with social functioning impairment and symptoms of depression. A direct positive association between symptoms of depression and suicidal behavior was identified, but it was not possible to determine its direction. Receiving psychotropic medication was directly associated with both social functioning impairment and suicidal behavior. Social functioning impairment was directly associated with occupational functioning impairment, which in turn, was associated directly with life impairment. Finally, a direct link between life impairment and suicidal behavior was found, but neither

### Table 1. Pearson Correlations and Partial Correlations with Both Independent and Dependent Measures Partialled Out

<table>
<thead>
<tr>
<th>Measures</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td>0.18</td>
<td>0.38</td>
<td>0.56</td>
<td>1.28</td>
<td>2.78</td>
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<td>8.93</td>
<td>27.01</td>
<td>26.96</td>
<td>25.99</td>
</tr>
<tr>
<td>Psychotropic medication</td>
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<td>0.56</td>
<td>1.28</td>
<td>6.05</td>
<td>6.05</td>
<td>4.08*</td>
<td>4.08*</td>
<td>30.83*</td>
<td>25.96</td>
<td>25.99</td>
<td></td>
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<tr>
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<td>6.05</td>
<td>6.05</td>
<td>6.05</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
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<td>4.08*</td>
</tr>
<tr>
<td>CAPS Avoidance/Numbering</td>
<td>2.78</td>
<td>6.05</td>
<td>6.05</td>
<td>6.05</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
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<tr>
<td>CAPS Hyperarousal</td>
<td>27.01</td>
<td>6.05</td>
<td>6.05</td>
<td>6.05</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
<td>4.08*</td>
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<tr>
<td>BDI</td>
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<td>7.15</td>
<td>7.15</td>
<td>7.15</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
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<tr>
<td>Social impairment</td>
<td>25.99</td>
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<td>11.68</td>
<td>11.68</td>
<td>4.08*</td>
<td>4.08*</td>
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<tr>
<td>Occupational impairment</td>
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<td>6.05</td>
<td>6.05</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<tr>
<td>Life impairment</td>
<td>25.99</td>
<td>11.68</td>
<td>11.68</td>
<td>11.68</td>
<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
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<td>4.08*</td>
<td>4.08*</td>
<td>4.08*</td>
</tr>
<tr>
<td>Suicidal behavior</td>
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<td>11.68</td>
<td>11.68</td>
<td>11.68</td>
<td>4.08*</td>
<td>4.08*</td>
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</table>

Note: N = 89. Employment = Current employment; Psychotropic medication = Receiving psychotropic medication; CAPS Reexperiencing symptom cluster; CAPS Avoidance/Numbering symptom cluster; CAPS Hyperarousal symptom cluster; BDI = Clinician Administered Posttraumatic Stress Disorder Scale; Social impairment = Social functioning impairment; Occupational impairment = Occupational functioning impairment; Life impairment = Life impairment; Suicidal behavior = Suicidal behavior.

Partial correlations are presented above diagonal. All correlation coefficients are Pearson correlations. Statistically significant correlations are indicated by an asterisk (* for p < .05, ** for p < .01, *** for p < .001).
Table 2. Statistically Significant Links between the Dependent Variables as Indicated by TETRAD Analyses Assuming No Omitted Variables

<table>
<thead>
<tr>
<th>Current employment, psychotropic medication as independent variables</th>
<th>Current employment, psychotropic medication as dependent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment –&gt; Occupational impairment</td>
<td>Employment –&gt; Occupational impairment</td>
</tr>
<tr>
<td>Medication –&gt; Social impairment</td>
<td>Medication –&gt; Social impairment</td>
</tr>
<tr>
<td>Medication –&gt; Suicidal behavior</td>
<td>Medication –&gt; Suicidal behavior</td>
</tr>
<tr>
<td>Hyperarousal –&gt; Reexperiencing</td>
<td>Hyperarousal –&gt; Reexperiencing</td>
</tr>
<tr>
<td>Avoidance/numbing – Hyperarousal</td>
<td>Avoidance/numbing – Hyperarousal</td>
</tr>
<tr>
<td>Avoidance/numbing –&gt; Depression</td>
<td>Avoidance/numbing –&gt; Depression</td>
</tr>
<tr>
<td>Depression –&gt; Hyperarousal</td>
<td>Depression –&gt; Hyperarousal</td>
</tr>
<tr>
<td>Depression &lt;-&gt; Suicidal behavior</td>
<td>Depression &lt;-&gt; Suicidal behavior</td>
</tr>
<tr>
<td>Social impairment –&gt; Occupation impair</td>
<td>Social impairment –&gt; Occupation impair</td>
</tr>
<tr>
<td>Occupation impair &lt;-&gt; Life impairment</td>
<td>Occupation impair &lt;-&gt; Life impairment</td>
</tr>
<tr>
<td>Life impairment &lt;-&gt; Suicidal behavior</td>
<td>Life impairment &lt;-&gt; Suicidal behavior</td>
</tr>
</tbody>
</table>

Note. Employ = Current employment, Occupational impairment/Occupation impair = Occupational functioning impairment, Medication = Psychotropic medication, Social impairment = Social functioning impairment, Hyperarousal = Hyperarousal symptom cluster, Reexperiencing = Reexperiencing symptom cluster, Avoidance/numbing = Avoidance and numbing symptom cluster, Depression = Symptoms of depression. For two variables, A and B: A –> B = A has a direct effect on B; B –> A = B has a direct effect on A; A – B = Either A has a direct effect on B, or B has a direct effect on A; A <-> B = Suggests that A and B have a common cause.

The direction of the link could be determined nor a common cause excluded. The model suggested by the TETRAD analyses is presented in Figure 1.

A Confirmatory Working Model

A confirmatory working model was constructed following a number of hypotheses and procedures. First, it was hypothesized that the patterns of correlations between the three PTSD symptoms could be explained by the fact that they are indicators of a common latent variable (i.e., CAPS total score). Second, all demographic, trauma-related variables, and psychotropic medication were allowed to be arbitrarily correlated and to influence each of the remaining outcome variables (i.e., they were treated as exogenous variables that may have an influence on the outcomes and as potential confounders of causal effects between the outcome variables themselves), but their effects were removed one by one as described in the Method section (the links from the baseline covariates to the dependent variables were actually found to have little impact on the links between the dependent variables, i.e., there was little evidence of confounding). Initially, it was assumed that the CAPS total score was associated with both symptoms of depression and social functioning impairment. However, a much better fit was obtained after allowing the CAPS total score to be associated with symptoms of depression, and the avoidance and numbing symptom cluster to have a direct link with social functioning impairment. Following the outcomes from the TETRAD analyses, it was hypothesized that social functioning impairment would be associated with occupational functioning impairment, which in turn, would be associated with life impairment. Finally, symptoms of depression and life impairment were predicted to have a direct association with suicidal behavior, but the direction of the link was not specified. The final model (informed by the TETRAD results, but not completely determined by them) was fitted using Mplus. The model appeared to fit the data very well.

Figure 1. Pattern of causal influences suggested by the exploratory TETRAD analyses.
well-fitting model is indicated by a Comparative Fit Index (CFI) > .90, and a root mean square error of approximation (RMSEA) < .05. The goodness-of-fit of the final model was indicated by the following: $\chi^2 (37) = 42.18$, CFI = .98, RMSEA = .04. The alternative (with a link from the CAPS total factor, to social functioning, rather than from the CAPS numbing variable, produced the following: 50.48 with 37 df, CFI = .95, RMSEA = .06. The Mplus estimates for the final model are presented in Table 3. The key links are shown in Figure 2.

**DISCUSSION**

The principle aim of the current study was to formulate a model of suicidal behavior in PTSD. In the final model, two paths to suicidal behavior were identified. The first path was acting on suicidal behavior by exacerbating the severity of life impairment. Life impairment was directly associated with low levels of occupational impairment, which in turn was associated with greater social functioning impairment. The avoidance and numbing symptom cluster and receiving psychotropic medication contributed to the path to suicidal behavior through their association with impaired social functioning. Finally, being currently unemployed added to the path through its association with occupational functioning impairment. The second path was acting on suicidal behavior through the severity of depressive symptoms. Depressive symptoms were associated with increased severity of PTSD symptoms. The PTSD symptoms, in turn, were associated with experiencing threat to life during the traumatic event that led to the PTSD diagnosis and being currently unemployed. The current findings are consistent with our hypothesis that clinical symptoms and variables that reflect functional impairment are closely associated with suicidal behavior.

Based on previous findings (Leiner et al., 2008; Panagioti et al., 2009; Tarrier & Gregg, 2004), it was hypothesized that symptoms of depression would be a strong predictor of suicidal behavior. Consistent with these predictions, the findings demonstrated that symptoms of depression were significantly correlated with suicidal behavior. Nonetheless, the direction of the association between suicidal behavior and symptoms of depression was not identified in the final model. This is the first study that provides evidence that measures of life impairment, occupational functioning, and social functioning impairment, which may reflect limiting, negative subjective perceptions of functional impairment (Tarrier & Gregg, 2004), are associated with suicidal behavior in PTSD. Life impairment was directly associated with suicidal behavior. Likewise with symptoms of depression, however, the direction of the association between life impairment and suicidal behavior could not be clarified in the model. Thus, it appears possible that a common factor that was not measured in the current study may mediate the impact of both symptoms of depression and life impairment on suicidal behavior. Recent models of suicide propose that negative dysfunctional appraisals such as feelings of hopelessness, defeat, and entrapment are the overriding factors that drive suicidal behavior in other psychiatric disorders (i.e., psychosis; Bolton et al., 2007; Johnson et al., 2008; O’Connor, O’Connor, O’Connor, Smallwood, & Miles, 2004; Williams et al., 2005). Surprisingly, to date no research has examined the role of such negative dysfunctional appraisals in the development of suicidal behavior in PTSD. A primary focus of the research on PTSD and suicidal behavior in the future should be to rectify this limitation.

Consistent with previous findings, the PTSD symptoms contributed to the second path to suicidal behavior through increasing the severity of symptoms of depression (Leiner et al., 2008). Additionally the avoidance and numbing symptom cluster contributed also to the first pathway to suicidal behavior because it resulted in impaired social functioning. One explanation for this finding is that avoidance and numbing symptoms result in decreased levels of social functioning because of their association with more severe reexperiencing symptoms. In other words, the higher the severity of the reexperiencing symptom cluster (i.e., memories, flashbacks, nightmares) the more likely it is for individuals to adopt cognitive and behavioral avoidance strategies together with other dysfunctional strategies (e.g., alcohol consumption) to cope with the distressing intrusions that clearly have an adverse effect on their functioning.

Receiving psychotropic medication had a direct impact on suicidal behavior. An explanation supported by the model is that receiving psychotropic medication is associated with increased negative perceptions of social functioning impairment. Although this is not adequately shown in the model, negative perceptions of social functioning may mask the presence of more severe PTSD symptoms and comorbid depression.
Perceived threat to life during the traumatic event that led to the PTSD diagnosis had a direct impact on the severity of PTSD symptoms and thus contributed indirectly to the model of suicidal behavior. This finding is consistent with the findings of a previous study, which showed that perceived threat to life predicts the development of PTSD after the trauma (Holbrook, Hoyt, Stein, & Seiber, 2001). Other trauma characteristics such as type of trauma and duration of trauma and threat to life were not associated directly or indirectly with suicidal behavior. It should be noted, however, that those PTSD patients who experienced childhood sexual abuse as an index trauma were excluded from the current study because childhood sexual abuse was considered potentially different from traumas occurring in adult life. Previous studies have reported a strong relationship between childhood sexual abuse and suicidal behavior (Adams & Lehnert, 1997; Dube et al., 2001). Thus, the exclusion of those having childhood sexual abuse as the index trauma in the current study may underestimate the impact of previously experienced traumas on suicidal behavior.

This study has a number of limitations that warrant discussion. Data were provided by a convenience sample recruited as part of a screening process to participate in a clinical trial. Individuals obviously and acutely suicidal may have been screened out of the original study for ethical and clinical reasons because the majority of the participants were referred from primary and secondary health services. The current results are based on a reanalysis of a previous data set (Tarrier & Gregg, 2004) and thus only those variables available from the previous study were included in the current analyses. A clinical measure was used to assess suicidal behavior based on the principle that the subcategories of suicidal behavior (i.e., suicidal ideation, plans, attempts) lie on a continuum (Tarrier, Barrowclough, Andrews, & Gregg, 2004). Life impairment was hypothesized to reflect subjective evaluative judgments about aspects of an individual's perceptions of themselves and their ability to cope in their own environments. However, we appreciate that the role of such perceptions in suicidal behavior need further clarification and that the current findings are the first step for future investigations. The sample size is modest and one issue is whether the results generalize. Given the characteristics of the sample and the recruitment method, we are confident that the sample is representative of PTSD patients seeking treatment in a UK public health system. The study design is cross-sectional. Future larger longitudinal studies are needed to validate the current model.
REFERENCES


