A Social Model of Posttraumatic Stress Disorder (PTSD): Interpersonal Trauma, Attachment,

Group Identification, Disclosure, Social Acknowledgement and Negative Cognitions

Sarah Woodhouse, Rupert Brown & Susan Ayers

Author note

Sarah Woodhouse and Rupert Brown, School of Psychology, University of Sussex.

Susan Ayers, School of Health Sciences, City, University of London.

Correspondence concerning this article should be addressed to Sarah Woodhouse, School of Psychology,

Pevensey 1, University of Sussex, Brighton, BN1 9QH.

Phone: +44(0)7971571603. Email: s.n.woodhouse@sussex.ac.uk

Abstract

In response to calls for social models of PTSD (Charuvastra & Cloitre, 2008), we hypothesise relationships between interpersonal/non-interpersonal traumatic events, fearful attachment style, emotional disclosure, group identification, social acknowledgment, posttraumatic cognitions and core trauma symptoms. The utility of social support vs social acknowledgement is also briefly considered. To test this exploratory model, a cross-sectional survey of participants ($N =$ 298) with varying levels of traumatic symptoms following mixed traumas was conducted. Structural Equation Modelling (SEM) was used to analyse the model. Results support a mediational model, with group identification appearing to mediate the relationship between fearful attachment and social acknowledgement, emotional disclosure appearing to mediate the relationship between interpersonal trauma and social acknowledgment, and posttraumatic cognitions appearing to mediate the relationship between social acknowledgement and core trauma symptoms. Results suggest that, within this exploratory model, social acknowledgment and social support explain a similar amount of variance in traumatic symptoms, but acknowledgment explains considerably more variance in cognitions than social support. The paper successfully applies current theoretical insights on group identification processes to the posttraumatic environment. This theoretical application is relatively novel within the PTSD literature and helps stimulate new theory in this domain. It also provides further evidence of the 'social cure' theory. More broadly, the findings highlight the utility of social psychological constructs in helping explain trauma symptoms. We discuss the implications of our findings, the study limitations and suggest avenues for further research.

Keywords: Posttraumatic Stress Disorder, interpersonal trauma, attachment, social acknowledgment, group identification, disclosure, posttraumatic cognitions

Posttraumatic stress disorder (PTSD) is a specific set of prolonged symptoms experienced in response to a very stressful event. Symptoms are grouped into four categories: re-experiencing and intrusions, avoidance/numbing of emotions, increased arousal and negative cognition/mood. Diagnosis of PTSD requires a traumatic event which involves real or threatened death, serious injury or sexual violence to self or others. For a diagnosis to be made, symptoms must persist beyond four weeks. PTSD is by no means the only response to trauma, but is one of the few trauma-specific psychiatric disorders (American Psychological Association [APA], 2013). Given the necessity of the event in the diagnosis of PTSD, research into how different types of trauma may lead to different symptom patterns and/or levels has been useful (Sharp, Fonagy & Allen, 2012). Theorists have highlighted the need for a more in depth examination of the social framework within which a traumatic event occurs, and have emphasised the dynamic, relational, nature of trauma responses (Bonnan-White, Hetzel-Riggin, Diamond-Welch, & Tollini, 2015; Maercker & Horn, 2013). In this paper, we aimed to contribute to the existing PTSD literature by proposing and testing a new social model which delineates the links between type of trauma experienced (*interpersonal* or *non-interpersonal*), various social psychological variables and posttraumatic cognitions/symptoms.

Meta-analyses of risk factors for PTSD have found lack of social support to be one of the strongest predictors of symptom severity (Brewin, Andrews, & Valentine, 2000; Ozer et al., 2003), whilst high levels of social support have been causally implicated in both mental and physical health (Thoits, 2011; Uchino, 2004). It is clear, then, that what those around us say and do affects our well-being and resilience to stress. However, leading models of PTSD have tended to focus on information processing, cognitions and/or memories (Ehlers & Clark, 2000; Foa, Riggs, Dancu & Rothbaum, 1993; Horowitz, 1976). Until relatively recently, social factors tended to be included in posttraumatic models as secondary factors or sequelae (Ehlers & Clark, 2000). New models, which explore social variables, have emerged (e.g., Sharp et al., 2012; Maercker & Horn, 2013) but are relatively unknown and untested compared to the leading models.

The construct *social support* requires further analysis since, despite often being presented as

unidimensional, it is comprised of several different social processes. Here we have focused on three processes that may be involved in the social support effect: *emotional disclosure*, *group identification* and *social acknowledgement*. In our hypothesized social model (Figure 1), we begin with the traumatic event (interpersonal vs non-interpersonal) and the individual's typical (dispositional) *attachment style*. Then, the three relational processes are presented as operating between these two antecedent variables and posttraumatic cognitions, to lead to perseverant trauma symptoms.

Interpersonal Trauma

The proposed model (Figure 1) draws together a number of related ideas from existing literature. There is evidence that traumatic responses will be more severe and prolonged following an interpersonal event than a non-interpersonal event (Charuvastra & Cloitre, 2008; Frans, Rimmö, Åberg, & Fredrikson, 2005; Kessler et al., 1994, 2005). By *interpersonal trauma*, we mean a traumatic event perceived to be caused by another human being (e.g., rape/assault). An example of a *non-interpersonal* event would be experiencing a natural disaster like an earthquake. In their meta-analytic study of predictors of PTSD, Ozer, Best, Lipsey and Weiss (2003) found that fearing for one's life appears to be especially associated with interpersonal violence. Charuvastra and Cloitre (2008) suggested that the "experience of fear associated with a trauma will reflect, in some way, the meaning ascribed to the event" (p. 303). Recent research suggested that, even more than fear, anger and shame responses may be particularly high following an interpersonal event (Badour, Resnick, & Kilpatrick, 2017). The heightened affect and subsequent trauma symptoms experienced in relation to an interpersonal traumatic event may reflect our understanding of human agency, or they may reflect a deeper shattering of social bonds, trust (Janoff-Bullman, 1992) and "post-traumatic change in general beliefs about the world's orderliness, meaningfulness and benevolence." (Maercker & Horn, 2013, p. 466). Charuvastra and Cloitre (2008) have called for social models of PTSD in order to examine the interpersonal/non-interpersonal distinction, interpersonal mechanisms and social cognition.

Emotional Disclosure

Emotional disclosure has been well researched, particularly the beneficial psychosocial outcomes from appropriately disclosing stressful/traumatic events (Pennebaker, 1993; Pennebaker, Zech, & Rimé, 2001; Rimé, Kanyangara' Yzerbyt & Paez , 2011). For example, Bedard-Gilligan, Jaeger, Echiverri-Cohen, and Zoellner (2012) investigated individual differences in disclosure, and found sexual and childhood trauma were linked with increased disclosure difficulty, implying that individuals who experience interpersonal traumatic events may be less able or willing to disclose information about the events and their feelings. If an individual has undergone an interpersonal trauma that may have affected their ability to trust another human being, then their willingness to disclose their feelings should be impacted.

Research into the possible theoretical and causal reasons why this may be the case have focused on the fact that disclosing emotions is a relational interpersonal process. Not only is another human being required, they are required to be open, receptive and, most likely, supportive. In addition to testing the influence of event type (interpersonal or non-interpersonal) on disclosure, Bonnan-White, Hetzel-Riggin, Diamond-Welch and Tollini (2015) considered the influence of the *reaction* of the individual in whom the trauma-survivor chose to confide. They examined 63 college students who reported a history of disclosing at least one traumatic event. Participants provided information about the first person in whom they confided, the social reactions of that person, general social reactions to trauma disclosure, and their own trauma-related cognitions and psychological distress. Women and survivors of non-interpersonal trauma reported more supportive responses than men and survivors of interpersonal trauma. In addition, victim blame (if the first person the survivor told about the event reacted by blaming the survivor) was associated with more negative trauma-related cognitions and trauma-related distress. Interpersonal trauma was also associated with high negative trauma-related cognitions and trauma-related distress.

In a similar student sample study, Littleton (2010) examined female students who had experienced sexual assault. Negative reactions from disclosure partners predicted higher levels of

self-blame and negative views of the self after sexual assault, and negative social reactions were associated with increased levels of and posttraumatic stress symptoms (PTSS), whereas positive social support seemed to decrease these symptoms. Both studies support the theory that disclosure is a relational interpersonal process. They also highlight the complex relationships between the type of trauma experienced, ability/willingness to disclose and the reactions of those confided in.

Adult Attachment Style

There is evidence that an adults' attachment style may affect the severity and perseverance of PTSD. In a meta-analytic review, Woodhouse, Ayers and Field (2015) found that attachment categories comprised of high levels of anxiety most strongly related to PTSS, with fearful attachment displaying the largest association. In their socio-cognitive model of PTSD, Sharp et al. (2012) used attachment theory to explain the relationship between interpersonal traumatic events, attachment style and PTSS. Attachment theory proposes that our earliest caregiving experiences provide us with internal working models of self and other – schema-like representations of what to expect from relationships that guide relationship behaviours and beliefs. These schemas are broadly categorised as secure or insecure, based on individual levels of relationship anxiety and avoidance. They proposed that attachment schemas impact attachment-relevant social information, and that this relationship is heightened if the individual is confronted with a traumatic loss in the interpersonal realm. The attachment schema is activated and, in the case of insecure attachment schemas, will lead to maladaptive social-cognitive processing (e.g., negative cognitions and social appraisal, attention to negative social stimulus, distorted memory of social events), which in turn will prevent the individual from effectively making use of current attachment relationships or social support.

In support of the mechanisms outlined in Sharp et al.'s (2012) model, evidence exists that an adult's attachment style impacts social cognition and PTSD (e.g., Ortigo, Westen, Defife, & Bradley, 2013). Social psychology offers further evidence of the impact of dispositional attachment schemas onto group processes. Adult attachment styles are conceived as schematic cognitive models of *relationships*. A small number of studies have considered how these working models of

relationships may influence how an individual interacts socially with groups. Specifically, the possible relationship between different attachment styles and the process of group identification has been explored experimentally (Crisp et al, 2009; Milanov, Rubin & Paolini, 2013). Using experimental attachment manipulations, Crisp et al. (2009) found that participants high in attachment anxiety identified less with a salient in-group after imagining a distressing conversation with their romantic partner. In a second experiment, they observed a moderating role for attachment avoidance in the control condition. Milanov, Rubin and Paolini (2013) also explored the relationship between adult attachment and how people interact with social groups. They found that people with a secure attachment style had higher social identification than those with a dismissive-avoidant style and higher communal identification than those with a dismissive-avoidant style or a fearful-avoidant style. Taken together, these experimental studies demonstrate that attachment style does not operate in isolation. Not only do these studies support the idea that attachment style affects how people interact socially, they specifically highlight their impact on the process of social identification.

Group Identification

Group identification comprises people's self-definition in terms of a particular group, together with their evaluation of and emotional attachment to that group (Tajfel, 1978). Jetten, Haslam and Haslam (2012) argued that identifying with a well-functioning group "is an important means by which we can inoculate ourselves against, and repel, threats to our mental and physical health" (p. 4). The process of identifying with a group involves individuals moving from considering themselves as 'I' to considering themselves as 'we'. Jetten et al. (2012) argued that providing that the 'we' individuals that adopt is functional, the shift in the self-concept will benefit the individual. Because groups provide individuals with clear self-definition, a sense of belonging and a raft of norms which guide behaviour, they proposed that well-functioning groups can provide a *social cure* in many health domains.

The health benefits of group identification processes have been observed in, amongst others, recovering stroke patients (Haslam et al., 2008), the elderly (Gleibs, Haslam, Haslam & Jones, 2011) and prison guards (Sani, Magrin, Scrignaro, & McCollum, 2010). Although the benefits of group identification within the context of PTSD have not been extensively considered, there has been some recent research. Mughal, Carrasco, Brown and Ayers (2015) assessed an intervention for war trauma in Sierra Leone and found that the reduction in PTSS in the intervention was greater for participants with a stronger identification with Sierra Leone as a nation. Swartzman, Sani and Munro (2017) compared the utility of social support, family identification (sense of belonging to and commonality with family members) and family constraints (the extent to which family members are closed, judgmental or unreceptive) in predicting posttraumatic stress after cancer. Both family identification and family constraints were more strongly associated with posttraumatic stress than social support, with identification relating to lower symptoms, and constraints relating to higher symptoms. Finally, Kearns, Muldoon, Msetfi, and Surgenor (2017) measured participants before and after a charity fundraiser for suicide prevention. Those who had lost someone they knew and/or a family member to suicide were found to have a significant increase in well-being after the event, and this was mediated by identification with the crowd. Although Kearns et al. (2017) did not specifically measure trauma symptoms, their findings support the idea that social identification may be protective in a posttraumatic context.

The above three studies consider three different types of social identification: national (also see Muldoon & Downes, 2007), family and trauma-survivor identification. They all point to the benefits of identification with salient groups in the aftermath of a trauma, and they strengthen the rationale for continued research in this area.

The social identity model of stress suggests that social identity can play a role in protecting group members from adverse reactions to stress because it provides a basis for group members to receive and benefit from social support. Haslam, O'Brien, Jetten, Vormedal and Penna (2005) studied three groups exposed to high levels of stress: patients recovering from heart surgery, bomb

disposal officers and bar staff. There was a positive correlation between social identification and social support, and a negative correlation between social identification and stress. Path analysis indicated that social support was a significant mediator of the relationship between social identification and stress. Branscombe and colleagues (e.g., Branscombe, Schmitt, & Harvey, 1999) have demonstrated that when low-status groups are exposed to stress (prejudice and discrimination), the sense that – as victims of injustice – they share identity with other members of those in-groups buffers their well-being. As Haslam et al. (2005) explained, "such research suggests that…the experience of beneficial social support – is more likely to occur to the extent that individuals are socially identified with those in a position to provide support" (p. 357). In the current study, we aimed to explore the relationship between group identification and perceived social support, but do so using a relational trauma-specific measure of social support: social acknowledgment.

Social Acknowledgement

Social acknowledgement is a trauma-specific construct that builds on and extends traditional measures of social support (Maercker & Horn, 2013; Maercker & Müller, 2004). Whereas social support measures aim to determine how supported an individual feels generally, social acknowledgement measures aim to determine how understood the individual feels specifically as the victim of a traumatic event. Do victims feel that people understand what they have been through? Do they feel there is enough sympathy for them as the victim of a specific trauma? Do they feel that their experience is underestimated? In short, is their traumatic experience acknowledged? Maercker and colleagues proposed that people react to the individual as a victim of a certain *type* of trauma – that the event itself is relevant to social reactions. Social acknowledgement of a rape, for example, will probably be different from acknowledgement of a car accident.

Social acknowledgement theorists are interested in how the individual perceives *disapproval* and *recognition*. Compared to conventional measures of social support, the acknowledgement measure is found to explain a higher proportion of PTSS variance (Maercker & Müller, 2004). Low

levels of social acknowledgement (high disapproval/low recognition) is implicated in higher levels of PTSD in violence exposure (Sommer et al., 2017), aid workers (Jones, Müller, & Maercker, 2006) and crime victims (Müeller, Moergeli, & Maercker, 2008).

Posttraumatic Cognitions

Although we focus on social factors, we also recognize the importance of cognitive factors, particularly their role in the perseverance of symptoms after the event (Ehlers & Clark, 2000). Theorists have suggested that high levels of social support may impact PTSD by influencing posttraumatic cognitions (Ehlers & Clark, 2000; Guay, Billette, & Marchand, 2006) and empirical evidence supports this prediction (Woodward et al., 2015; Robinaugh et al., 2011). The widely used posttraumatic cognitions inventory (PTCI, Foa, Tolin, Ehlers, Clark, & Orsillo, 1999) consists of three subscales: negative cognitions about self (e.g., "*I have no future*; *I am a weak person*"), negative cognitions about the world (e.g., "*people can't be trusted*"; "*the world is a dangerous place*"), and self-blame (e.g., "*the event happened because of the way I acted*"). By considering these items, and therefore the nature of posttraumatic cognitions, the social referencing implicit in this type of cognition is apparent. The measure places the individual in the wider social context and measures a type of social cognition (blame).

The fourth PTSD symptom cluster - negative cognitions and mood - was added to the Diagnostic and Statistical Manual relatively recently (DSM V, APA, 2013). Clinical PTSD measures have been updated to reflect the new symptom cluster, and items show the same social referencing we see in the PTCI. For example: "In the past month how much were you bothered by having strong negative beliefs about yourself, other people, or the world *(for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)*?"; "In the past month how much were you bothered by blaming yourself or someone else for the stressful experience or what happened after it?" (Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). Given this diagnostic acknowledgement of the social nature of appraisals, we could anticipate that social factors and interpersonal mechanisms may well

be increasingly important in predicting PTSD.

This paper draws on the above theories to develop and test a social model of trauma symptoms, shown in Figure 1, that builds upon and extends existing models (e.g., Maercker & Horn, 2013; Sharp et al., 2012). The full model is exploratory: this combination of variables has not been tested in its entirety before. The mechanisms and pathways in the model are explained below.

Insert Figure 1 here

The Proposed Social Model

Overview. The model presented in Figure 1 is not an attempt to radically overhaul the way that we conceive of PTSD. Instead, it aims to draw together different, well verified, aspects of other models and research, whilst also aiming to broaden the field's perception of relational interpersonal processes by including group processes (i.e., identification). We aimed to describe the social and interpersonal processes that lead to elevated trauma symptoms, and in doing so also describe the process of perseverant PTSS through the inclusion of feedback loops. The model's structure and variable order reflects past theory and research, as outlined above (e.g., the causal relationship between interpersonal traumas and reduced emotional disclosure). The model we present includes social acknowledgment, but we also test a variant of the model that uses a more traditional trauma-specific measure of social support to allow us to compare the construct's utility.

Interpersonal trauma and attachment style. Although an individual's attachment style is conceived as a relatively fixed dispositional construct that develops in infancy, theoretically we would still have expected the traumatic event to relate to attachment behaviours and feelings, as attachment patterns are triggered at times of stress (Bowlby, 1982; Weinfield, Sroufe & Egeland, 2000). Due to the dispositional nature of attachment, rather than inferring directional causation, we proposed that the constructs inter-relate.

Interpersonal trauma and social acknowledgement. We proposed that the *direct* effect of interpersonal trauma on social acknowledgement is mainly explained through the judgements that society makes of the type of trauma experienced. The social acknowledgement literature has

suggested that the individual's social network, and society at large, will have their own response to the type of trauma experienced, which will be perceived by the traumatised individual in terms of higher or lower social acknowledgement. We anticipated that a large part of the *indirect* effect of interpersonal trauma on social acknowledgement would be mediated via the process of emotional disclosure (Maercker & Horn, 2013). An individual who has experienced an interpersonal trauma may be less willing, or able, to discuss the event that occurred. We hypothesised that lower levels of emotional disclosure may lead to lower levels of perceived social acknowledgement. This is illustrated in the extreme example of an individual who has experienced a traumatic event but talks to no one about the event or their feelings. In this extreme case, the individual's perception of social acknowledgement will necessarily be extremely low as all avenues for sympathy and acknowledgement are closed.

Attachment style and social acknowledgement. We anticipated that an individual's attachment style, triggered by the event, will *directly* affect their perception of social acknowledgement. As explained above, due to its negative impact on interpersonal relationships, we anticipated that higher levels of insecure attachment, in particular fearful attachment, would directly relate to lower levels of perceived social acknowledgement. In a novel contribution, we also proposed that high levels of attachment anxiety/avoidance (fearful attachment) would *indirectly* relate to social acknowledgement, via group identification. A relatively homogenous sample, in terms of either demographics, trauma type or other social indicators, could be asked about their strength of identification to a specific, common, group (for example, a student sample may be asked about their identification to the group of students in their halls of residence). However, as the sample was relatively heterogeneous, participants were asked to nominate a group that was important to them. We anticipated that identification to this nominated group would provide the basis for accepting/perceiving social acknowledgment. As the social acknowledgement construct builds on the theoretical social support framework (Maercker & Horn, 2013), we expected

to observe a similar relationship between identification and acknowledgement, as has been observed

between group identification and perceived social support (Haslam et al., 2005).

Social acknowledgement and posttraumatic cognitions. As proposed in the literature and

evidenced in social acknowledgment research, we expected low levels of social acknowledgement

to relate to higher levels of posttraumatic cognitions, and that this would relate to higher levels of

core trauma symptoms. At a cognitive level, social acknowledgement is likely to operate similarly

to social support which, studies have suggested, impacts PTSD via post traumatic cognitions

(Woodward et al., 2015; Robinaugh et al., 2011). High levels of social acknowledgment may

facilitate the recovery process by working to help affirm cognitions that have been shaken during

the trauma, showing the individual that they are cared for and protected by their close relationships

and groups. The reverse is true of low/negative levels of social acknowledgement since we would

anticipate that these would heighten feelings of fear and mistrust, and that this would lead to a cycle

of negative cognitions about self and others. Further, given that perceived social acknowledgement

is a construct made up of negative cognitions about family and wider society, we expected that the

primary means in which it would impact other trauma symptoms was via posttraumatic cognitions.

Posttraumatic cognitions and symptoms. Available research has suggested a strong

relationship between posttraumatic cognitions and posttraumatic stress disorder (PTSD; Ehlers,

Ehring, & Kleim, 2012; Dunmore, Clark, & Elhers, 1997; Ehring, Ehlers, & Glucksman, 2006; Foa

et al.1999). It is this evidence that helped support the inclusion of negative cognition in the DSM V

diagnosis. At the time of data collection, no new and reliably tested measures of PTSD had been

published to reflect the updated DSM V. Given the evidence, we have positioned cognitions as a

trauma-relevant process leading from acknowledgement to other core trauma symptoms.

Reciprocal loops. The model includes reverse mechanisms indicating how the relationships

can feasibly be conceived as operating in the opposite direction. Ehlers and Clark (2000) have

described how the appraisal of trauma symptoms themselves exacerbate and prolong symptoms. As

symptoms worsen, so too will negative cognitions, so at the base of the model we have added a

feedback arrow from symptoms to cognitions. Further into the model, we anticipated that an increase in negative cognitions would negatively impact both perception of social acknowledgement and acknowledgement itself as individuals withdraw and avoid others. As perception of social acknowledgement decreases, we expected that willingness to disclose feelings and the strength of positive group identification with those around them would also decrease. The model we present is not static: it is the dynamic *process* of perseverant and recurring symptoms.

In summary, this study aimed to test the ability of a new social model, which consists of the above social and cognitive variables, to explain variance in core PTSD symptoms. We hypothesized that inter-personal trauma would directly predict social acknowledgement, and that the effects of trauma would be partially mediated through emotional disclosure. Similarly, we hypothesised that fearful attachment would directly predict levels of social acknowledgement, and that its effects would be partially mediated through group identification. We expected levels social acknowledgement to directly predict posttraumatic cognitions, which in turn would predict core trauma symptoms.

Method

Design

We conducted a cross-sectional online survey of participants with varying levels of traumatic symptoms following mixed traumas. Interpersonal trauma (binary), fearful attachment, emotional disclosure, group identification, perceived social acknowledgement, posttraumatic cognitions and core trauma symptoms were measured using self-report measures at one time point.

Participants

A convenience sample of participants ($N = 298$) was recruited via the Internet. The sample was predominantly Caucasian ($N = 258$) and female ($N = 231$), with a mean age of 37. To be eligible for the study, participants had to be over 18 years old, be fluent in English and have experienced at least one traumatic event. The largest category of traumatic event nominated as the one which bothered them the most is 'other' ($N = 50$) which predominantly consisted of incidents of

types of psychological abuse/bulling ($N = 15$) or the death of someone known ($N = 17$). The remaining reported events varied greatly in nature (i.e., seeing sister self-harm, finding out about a partner's infidelity, being falsely arrested). The death of significant other category was the largest single event category ($N = 44$), followed by sexual assault by someone known ($N = 37$) and serious accident ($N = 31$). When asked to nominate the social group they most identified with, the majority of participants nominated a group of close family ($N = 86$), followed by a group of friends ($N = 76$), and work colleagues ($N = 25$). Seventy eight percent of participants ($N = 231$) disclosed that they have been diagnosed with a psychological disorder, of which the majority had been diagnosed with PTSD or Complex-PTSD ($N = 107$).

Measures[1]

Group identification. Participants read a short paragraph explain that: by 'groups' we mean collections of people that are important to you and with whom you interact regularly. You do not necessarily have to meet them face-to-face, the communication may be online or over the phone. This may be a group you feel generally positive towards, or it may be a group you find challenging. We then provided numerous examples of groups (e.g., a sports team, a household, a family, a friendship circle), and asked participants to tell us the name of the group they most identify with. The extent to which participants identified with their nominated group was then measured using three solidarity items, three centrality items and one satisfaction item from Cameron (2004), along with two satisfaction items from Leach et al. (2008). Example items: 'I have a lot in common with other members of this group' (Cameron, 2004), 'I am glad to belong to this group' (Leach et al., 2008) and 'the fact that I am a member of this group rarely enters my mind' (Cameron, 2004). Response scale ranged from 1 (strongly disagree) to 7 (strongly agree), and high scores represent high levels of identification with the named group. ($\alpha = .83$).

Social acknowledgement. Six items were taken from Maerker and Muller's (2004) social

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[1] Ten items from Ullman's (2000) Social Reactions Questionnaire (SRQ) were administered but not used in the final analysis due to the similarity of questions to the social acknowledgment questionnaire and the relatively low alpha compared to other measures ($\alpha = .65$).

acknowledgement Scale. The original measure had 16 items. However, to prevent item overload, six were chosen based on their performance in Maerker & Muller's (2004) original factor analysis and their factor loadings. Two were taken from the social recognition subscale, two from the family disapproval subscale and two from the general disapproval subscale. Example items: "Most people cannot imagine how difficult it is simply to continue with 'normal' daily life," "My family showed a lot of understanding for my state after the incident," "The reactions of my acquaintances were helpful." Response scale ranged from 0 (*totally disagree*) to 5 (*totally agree*), and high scores represent high levels of perceived social acknowledgement ($\alpha = .75$).

Adult attachment. Bartholomew and Horowitz (1991) 5-item measure was chosen to measure attachment. It presents short descriptions of the four different attachment styles (secure, fearful, preoccupied and avoidant) and asked participants to rate how much the description describes their general relationship style on a 7-point Likert scale. Likewise, participants were asked to choose one description which best describes them. Example description of fearful attachment style: "I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others." Response scales ranged from 0 (*strongly disagree*) to 7 (*strongly agree*), and high score represent high levels of the measured attachment style. Scale reliability could not be calculated for this measure as items are used individually and measuring incompatible constructs.

Emotional disclosure. Four items were taken from Bedard-Gilligan et al.'s (2012) measure of emotional disclosure. Example items: "How many times have you told the full story (including your surroundings, feelings, thoughts, and the involvement of yourself/others) of what happened during the event?," "When you talk about this event, how much detail do you include?" Response scale ranged from 0 (*never*) to 5 (*very often*), and high scores reflect high levels of emotional disclosure ($\alpha = .72$).

Social support. The 14 items from Joseph et al.'s (1992) Crisis Support Scale were used to assess overall social support. Example items: "Were people sympathetic and supportive just after the event?" "are people sympathetic and supportive at the present time?" "were people helpful in a practical sort of way just after the event?" "are people helpful in a practical sort of way at the present time?" "whenever you wanted to talk, how often was there someone willing to listen just after the event?" "whenever you want to talk how often is there someone willing to listen at the present time?" (1, *never,* to 7, *always*, high scores representing high levels of overall support; α = .80).

Posttraumatic cognitions. The 12 top loading items from the original 33 item Posttraumatic Cognitions Inventory (PTCI, Foa et al., 1999) were used. Seven items were from the Negative Cognitions about Self factor, three from Negative Cognitions about Others, and two from Self-blame. Example items: "People can't be trusted," "my life has been destroyed by the trauma," "the event happened because of the way I acted." Response scale ranged from 1 (*totally disagree*) to 7 (*totally agree*), and high scores represent high levels of posttraumatic cognitions (α = .89).

Posttraumatic Stress Symptoms (intrusions, avoidance and hyperarousal). Horowitz et al.'s (1979) 15-item Impact of Events Scale (IES) was used to measure core trauma symptoms. Example items: "my feelings about it [the event] were kind of numb," "I tried not to talk about it [the event]," "I thought about it [the event] when I didn't mean to," "I had strong waves of feelings about it [the event]." Response scale ranged from 0 (*not at all*) to 5 (*often*), and high scores represent high levels of core trauma symptoms. (α = .91).

Traumatic events and interpersonal trauma. The traumatic events list was taken from the validated and widely used PTSD Diagnostic Scale (PDS; Foa, Cashman, Jaycox & Perry, 1997). The list includes many events included in the Diagnostic and Statistical Manual (APA, 2013). Events include: Serious accident, fire or explosion, natural disaster, traumatic childbirth, military combat or experience of war, sexual assault by someone you know. Also included is 'other', which includes a free-text box. Participants were asked to mark all the events they have experienced and

then state the one event which bothers them the most. For the analysis, events were grouped into

interpersonal and non-interpersonal, and participants each received a binary (yes/no) score.[2]

Procedure

Participants were recruited via social media platforms such as Twitter, online forums and

trauma support websites. A brief advertisement was posted on these platforms asking if people had

experienced a traumatic event and, if so, if they would consider taking the "social worlds and

trauma survey." Upon clicking on the link in the advert, potential participants were directed to a

webpage hosted by Qualtrics that gave a detailed explanation of the study. Participants then had to

provide their consent to participate by answering "yes" or "no" to two questions. Firstly, they were

presented with explicit details of the inclusion criteria, and asked if they met them. Secondly, they

consented to take part based on the information that they had read on the study information page.

After providing consent, participants were able to complete the survey. The research project

satisfied British Psychological Society (BPS) ethical guidelines and was approved by the University

of Sussex Sciences & Technology Cross-School Research Ethics Committee.

Analysis

Bivariate correlations were conducted using SPSS 23. The full model was tested using

structural equation modelling, using the AMOS software.[3] Model fit was evaluated using the

following indices: chi-square, which assumes the perfect fit of the model, so a significant difference

indicates a poor model; root mean square error of approximation (RMSEA), for which values under

0.10 are acceptable, <0.08 is better, and <0.05 is good; comparative fit index (CFI), for which

values >0.9 are acceptable; and Tucker-Lewis coefficient (TFI), for which values close to 1 indicate

a good fit (Shcumacker & Lomax, 2004).

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[2] Not all DSM V traumatic events are included on the list, and the 'other' category allows participants to self-determine whether an event is traumatic. Diagnosis of PTSD requires a traumatic event specifically included in the DSM. The events list we have used was not polcuded to enable diagnosis. We included it to allow us to understand the sample and provide information on the interpersonal/non-interpersonal event classification.

[3] The data contained no extreme outliers, as defined using the third inter-quartile range (3 x IQR) rule. However, three moderate outliers were identified via boxplots (1.5 x IQR). Sensitivity analysis was performed by removing the outliers and repeating the SEM analysis: no notable differences were observed.

There were two types of missing data. The first type comprised of participants who randomly missed one/two items from one of the measures. For these participants their mean score for the measure was calculated from the valid data points they provided. The second type of missing data was more severe and reflects participants who have missed 40% or more of the items from a single measure. These cases were excluded from any analyses using the measure. In the most severe case, 20 participants missed more than 40% of group identification items, meaning that the N for the final SEM analyses is 278.

Additionally, missing value analysis was performed on all variable total and mean scores. All variables were used as grouping variables (completers vs non-completers) and there were no significant differences in the mean PTSS scores. We repeated the analysis using various outcome measures and the only significant completers vs non-completers difference related to social support and group identification. Participants who did not wish to name a group and complete the group identity measure had previously scored lower on social support, implying that the group identification missing data was not random.

Results

Overview

Our three mediation hypotheses – that disclosure mediates the relationship between interpersonal trauma and social acknowledgement, group identification mediates the relationship between adult attachment and social acknowledgement, and posttraumatic cognitions mediates the relationship between social acknowledgement – were first explored through bivariate correlations. All correlations can be viewed in Table 1. Our primary aim was to test the ability of the entire model to explain variance in PTSS. Structural Equation Modeling (SEM) was used to test this overarching hypothesis. As the full model is exploratory, other theoretically sound mediation models (i.e., the relationship between disclosure and core trauma symptoms may be mediated by group identification) were tested using SPSS and SEM. The utility of the social support model (Figure 3) was also tested using SEM. Reciprocal feedback-loops were tested as mediation models using SPSS.

Sample Characteristics

A large number of participants (62%) had experienced interpersonal trauma ($N = 185$). The mean time elapsed since the trauma occurred was 7.5 years ($SD = 4$ yrs). Trauma symptoms within the sample were elevated ($M = 2.73, SD = 1.21$) compared to normal levels experienced after stress ($M = 0.65, SD = 0.52$; Horowitz, Wilner & Alvarez, 1979). Posttraumatic cognitions were also high ($M = 3.98, SD = 1.32$) compared to normal levels experienced after trauma/stress ($M = 1.06, SD = 0.51$; Foa, Tolin, Ehlers, Clark, & Orsillo, 1999). Attachment scores ranged from 1 – 7 on all four attachment style items (Sec. $M = 2.82, SD = 1.86$; Fear. $M = 4.93, SD = 1.93$; Preocc. $M = 3.26, SD = 1.94$; Dismiss. $M = 4.09, SD = 1.97$). Fearful attachment was particularly elevated, as has been found in multiple studies of traumatized samples (Woodhouse, Ayers, & Field, 2015). Emotional disclosure scores were midway ($M = 2.44, SD = .73$) within the scale's range (0 - 5). For those who completed the questionnaire ($N = 278$), strength of identification to their nominated group was relatively high ($M = 5.10, SD = 1.10$) within the scale's range (0 – 7.00).

Bivariate Correlations

As can be seen from Table 1, consistent with our hypotheses, there was a correlation between interpersonal trauma and disclosure, and between disclosure and social acknowledgement. Interpersonal trauma and social acknowledgement were also negatively related. Further, as we hypothesised, there were correlations between secure attachment and group identification and between fearful attachment and group identification. Group identification related to social acknowledgement. Additionally, both secure attachment and fearful attachment were associated with social acknowledgement. In support of our hypotheses, there was a robust negative correlation between social acknowledgement and posttraumatic cognitions, and posttraumatic cognitions also correlated with core trauma symptoms.

Insert Table 1 here.

Testing the Whole Social Model

The model was tested by starting with the hypothesised model (Figure 1). Additional covariance paths were then added based on both theory and the modification indices to enable a better

model fit. The final model (Figure 2) included the hypothesised indirect covariance between interpersonal trauma and fearful attachment (.16), and five additional indirect covariance paths from and between residual errors. Of note, the covariance between fearful attachment and negative cognitions residual error (e4) was particularly strong (.29). The full model accounted for 31% of core PTSS variance and all fit indices for the final model were excellent (shown in Figure 2). Our principle aim of predicting variance in PTSS by using a social mediation model was therefore achieved. Please see Table 2 for the indirect, mediated, effects of variables within the final model (Figure 2).

As hypothesised, the standardized effect of interpersonal trauma onto disclosure was -.21 ($p < .001$), with interpersonal trauma explaining 4% of variance in emotional disclosure scores. The standardized effect of disclosure onto social acknowledgement was .23 ($p < .001$), and interpersonal trauma onto social acknowledgment was -.26 ($p < .001$). As such, these results support our mediation hypothesis that interpersonal trauma would directly (and negatively) relate to acknowledgement, and indirectly via disclosure.

As hypothesized, the effect of fearful attachment style on group identification was -.14 ($p < .05$), with fearful attachment explaining 2% of variance in group identification scores. The effect of group identification onto social acknowledgement was .20 ($p < .001$), and of fearful attachment onto social acknowledgment was -.27 ($p < .001$). These results support our mediation hypothesis that fearful attachment would directly relate to acknowledgement, and indirectly relate via group identification. The direct paths and indirect paths from interpersonal trauma (via disclosure) and fearful attachment (via group identification) accounted for 33% of variance in social acknowledgement.

As hypothesised, the effect of social acknowledgement onto negative cognitions was strong, -.55 ($p < .001$), as was that of negative cognitions onto core trauma symptoms is .56 ($p < .001$). The direct paths and indirect paths from interpersonal trauma (via disclosure) and fearful attachment (via group identification), and the direct path from social acknowledgement, accounted for 41% of variance in negative cognitions.

As we expected, other theoretically sound mediation models existed between the variables within this cross-sectional sample. As examples: the relationship between interpersonal trauma and disclosure was mediated by social acknowledgment; the relationship between attachment and group identification was mediated by social acknowledgement. Other models we might expect to find did not exist (i.e., the relationship between disclosure and core trauma symptoms was not mediated by group identification). Although many mediation models existed, critically, the only theoretically cogent variable structure – using all variables – that retured excellent model fit indices was the proposed model.

<div align="center">Insert figure 2 and Table 2 here</div>

Social Support vs Social Acknowledgement

An alternative model was tested using social support in place of social acknowledgment (Figure 3). The pathway coefficients and *p*-values were similar. However, the standardized coefficient from disclosure to social support (.44) was notably higher than from disclosure to acknowledgment (.23). Interpersonal trauma, attachment, disclosure and group identification explained similar amounts of variance in social support (31%) and social acknowledgment (33%). Both models explained identical amounts of variance in core trauma symptoms. The most prominent difference between the two models was the explained variance in posttraumatic cognitions. Where the acknowledgement model explained 41% of variance, the social support model explained 20%. To enable model fit data to be calculated, the direct path from fearful attachment to social support had to be removed.

The indirect mediated effects, and their associated significance values, within the social support model were similar to those reported in Table 2 for the social acknowledgement model. However, of note, the indirect effect of fearful attachment onto cognitions was nonsignificant within the social support model.

<div align="center">Insert figure 3 here</div>

Reciprocal Feedback Loops

The feedback loops presented in Figure 1 were tested as mediations. Core trauma symptoms significantly predicted acknowledgement via negative cognitions. Negative cognitions significantly predicted disclosure via acknowledgment. Negative cognitions did not significantly predict group identification via acknowledgment, however acknowledgement did significantly predict group identification in a regression analysis.

Discussion

The proposed social model of PTSD explained almost a third of the variance in core trauma symptoms, as measured by the IES scale. This result is all the more notable given the very heterogeneous sample of trauma victims that were surveyed. In general, all our hypotheses were supported by our results. Experience of an interpersonal traumatic event, a fearful attachment style, low emotional disclosure, low levels of group identification, low perceived social acknowledgement and high posttraumatic cognitions, were all associated with higher levels of intrusion, avoidance and hyperarousal trauma symptoms. The effect of interpersonal trauma on social acknowledgement seems to be partially mediated by emotional disclosure; the effect of attachment style on social acknowledgment may be partially mediated by group identification; and the effect of social acknowledgement onto core trauma symptoms appears to be mediated via posttraumatic cognitions. Although an alternative model replacing social acknowledgement with social support yielded similar standardized coefficients and fit indicies, the social support model fit could only be achieved by removing a nonsignificant direct path from fearful attachment to social support. More importantly, the social support model explained 20% of cognitions compared to the 41% explained by acknowledgement. Given the theoretical and clinical significance of posttraumatic cognitions in the development of PTSD, we concluded that social acknowledgment may have greater explanatory power within a posttraumatic context than social support.

These findings underline the importance of developing and testing social models of PTSD (Charuvastra & Cloitre, 2008) and support elements of previously proposed models (Sharp et al., 2012; Maercker & Horn, 2013). Consistent with Sharp et al. (2012), our results support the use of

attachment theory as a means of understanding the processes operating between an adult's

attachment style, social cognition and posttraumatic cognitions/symptoms. Our results also support

elements of Maercker and Horn's (2013) model, especially their assertion that interpersonal

traumatic events relate to high levels of PTSD via the individual process of emotional disclosure

and the social process of social acknowledgement.

Certain aspects of the model require further consideration, such as the relationship between

social acknowledgement, posttraumatic cognitions and PTSS. The substantial negative association

between social acknowledgement and posttraumatic cognitions implies that negative cognitions

may mediate a considerable amount of the effect of social acknowledgement on trauma symptoms.

This finding, and the results more generally, support the notion that posttraumatic cognitions may

play an important role in the perseverance of trauma symptoms. Despite the fact that negative

cognitions and mood has been added to PTSD diagnostic criteria, our results suggest that

considering their role separately from other core trauma symptoms may be beneficial if we want to

better understand how social factors impact symptoms. Relatedly, social support appears less

proficient at explaining variance in posttraumatic cognitions than the social acknowledgment

construct.

As advocated within the PTSD literature (Charuvastra & Cloitre, 2008), our findings

support a more nuanced consideration of which processes may be at work when social factors are

implicated in recovery from a traumatic event (Brewin et al., 2000; Ozer et al., 2003). Our results

also support Maercker and Horn's (2013) dynamic multi-levelled approach to understanding trauma

response. The event is represented by the interpersonal/non-interpersonal distinction, but remains

present throughout the model through its impact on both emotional disclosure and social

acknowledgement. At the individual level, disposition/personality is represented through attachment

style, affective processing through emotional disclosure, and cognitive processing through

posttraumatic cognitions. At the group level, we included the process of group identification and the

family disapproval subscale of the social acknowledgement measure. The broader social context is

represented via the general disapproval and social recognition subscales of the social acknowledgement measure.

Strengths and Limitations

The study's core strength is that it is draws together social factors that may be important in the aetiology of PTSD. The mechanisms linking these social factors to each other, and PTSS, are theoretically sound. The model is firmly based on previous research and theory, but also incorporates novel elements. The inclusion of group identification, largely absent from the PTSD literature, is particularly noteworthy. However, a number of limitations also stand out.

The study has a cross-sectional design and we find evidence of reciprocal feedback-loops, so any inferences about causality are problematic. The obvious remedy to this defect would be to use a longitudinal design, yet such a design is not without its difficulties. Our participants mainly had a time since trauma of over five years, by which time symptoms are likely to have become relatively stable and therefore challenging to study via a longitudinal design (which requires some measurable change). Given the probable high individual stabilities in trauma symptoms, any such longitudinal design will require a very large sample to have a statistical chance of detecting such change and its determinants. Furthermore, the interval between testing points will probably need to be quite long, which increases the risk of participant attrition. Perhaps one solution would be to combine a longitudinal design with the evaluation of some intervention which, it is to be hoped, would induce some positive change in participants.

Relatedly, because the data is cross-sectional we cannot include the proposed feedback loops in the SEM model. Although we test them individually using mediation and regression, more complex multivariate models which include the feedback-loops need testing. This could be achieved in the future through a longitudinal cross-lagged design.

Full measures were not used in some cases (emotional disclosure, social acknowledgement and negative cognitions). Due to the nature of recruitment – online via social media – we removed items to reduce the likelihood of drop-outs, and therefore maximize the possible sample size. This

was achieved, but perhaps to the detriment of the scope of some measures. In particular, given the pivotal role of social acknowledgement within the model, using the full scale would have enabled us to investigate the role of the three subscales. Related to this, the variables we use in the model are closely related concepts (e.g., social acknowledgement and group identification), which therefore raises the issues of shared variance. Although this issue is unavoidable, testing the measure in other samples and/or using different measures would help address the issue.

The predominantly female sample raises issue of generalizability despite the fact gender was not found to be a significant covariate. A more gender-balanced sample is required to test the model again, and allow us to ascertain if it is truly generalizable to the whole adult population.

Lastly, the traumatic events list included within the study measures is widely used (PDS, Foa, Cashman, Jaycox and Perry, 1997), however, it does not correspond with the DSM V event list update (APA, 2013). Although the clinical definition of what constitutes a traumatic event is often viewed as subjective, unnecessary and in need of constant review (e.g., Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Kilpatrick, Resnick, & Acierno, 2009; Pai, Suris & North, 2017), to ascertain the model's clinical relevance DSM event lists should be used along with clinical PTSD diagnostic interviews.

Future Research and Clinical Implementation

The study's findings support a greater application of social psychological theories and constructs to the field of trauma research, and health outcomes more widely. Jetten et al. (2012) argued that groups matter, not just in terms of social support and social networks, but that group *processes* matter. This study finds that higher group identification relates to increased perceived social acknowledgment, which in turn relates to lower posttraumatic cognitions and symptoms. The possible clinical benefits of such a finding are clear: If we can increase identification to well-functioning groups, we may be able to help lessen the traumatic response. Joining a well-functioning group has known health benefits, strongly identifying with it appears to bring many more.

Following longitudinal studies of the role of identification to specific groups implicated in health and mental health outcomes (e.g., family, survivor groups, support groups, rehabilitation groups), lab-based group identification manipulations are required to establish how we increase identification to these specific well-functioning groups for specific high-risk groups (i.e., trauma survivors). Groups4Health (G4H, Haslam et al., 2016) is a psychological intervention aimed at improving health by empowering people to develop social group memberships. The program is derived from the social identity framework that seeks to improve health through increased group identification. Tested in young adults experiencing social isolation, higher levels of mental health, loneliness, self-esteem and life-satisfaction were measured six months after the intervention (Haslam et al., 2016, p. 20). The adaptation of this intervention for those who have experienced specific traumas is likely to be clinically beneficial.

Conclusion

In conclusion, this research provides support for the relevance and usefulness of a social model of trauma. We aimed to explain a significant amount of variance in PTSS, and have explained nearly a third through the social mediation model. The study illustrates the importance of reviewing traditional social support constructs, and applying a more dynamic, relational, approach to our consideration of trauma response. By incorporating social identity processes (especially group identification) into the model, the paper also illustrates the potential benefits of the possibility of using group process research to increase our understanding of the impact of social factors in a posttraumatic context. Outside of the lab, trauma-specific applied interventions are critical

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Tables

Table 1

Cross-sectional correlations between trauma symptoms, cognitions, acknowledgement, group identification, disclosure, attachment, interpersonal trauma, gender, time since trauma and age

Variables	1	2	3	4	5	6	7	8	9	10	11.	12.	13.
1. IES	-	.54**	-.35**	.03	-.33**	-.22**	.24**	.07	.11	.09	.14*	.02	-.02
2. PTCI		-	-.64**	-.24**	-.34**	-.46**	.46**	.23**	.00	.24**	.14*	.07	.16**
3. Acknowledge.			-	.23**	.37**	.46**	-.41**	-.10	.03	-.35**	-.22**	-.14*	-.41**

	1	2	3	4	5	6	7	8	9	10	11	12	13
4. Group Id.				-	.01	.13*	-.12*	-.04	-.04	.00	.05	-.11	-.10
5. Disclosure					-	.31**	-.26**	-.04	-.11	-.23**	-.16**	.10	-.14*
6. Secure						-	-.56**	-.06	-.07	-.17**	-.07	-.07	-.26**
7. Fearful							-	.19**	.13**	-.23**	.19*	.03	.15*
8. Preoccupied								-	-.17**	.05	.09	-.08	-.04
9. Dismissing									-	-.05	-.08	.14*	-.03
10. Interp. t										-	-.19**	-.01	.20**
11. Gender											-	-.02	-.07
12. Age (yrs)												-	.33**
13. Time since t. (yrs)													-
Mean	2.73	3.98	2.08	5.10	2.44	2.82	4.93	3.26	4.09	.62	1.78	42	7.5
Std. deviation	1.21	1.32	1.13	1.10	.73	1.86	1.93	1.94	1.97	.49	.42	12.5	4
Range (min)	.00	1.08	.00	1.67	.00	1	1	1	1	0	1	23	0.5
Range (max)	5.00	6.67	4.83	7.00	4.83	7	7	7	7	1	2	73	10+

| N | 298 | 298 | 296 | 278 | 292 | 298 | 296 | 297 | 294 | 298 | 298 | 298 | 295 |

Gender (Male = 1, Female = 2); Interpersonal trauma (No = 0, 1 = yes); *p < .05, **p < .01; Mean scores are presented and used in analysis

Table 2

The indirect, mediated, effect of each column variable on each row variable, for the final model

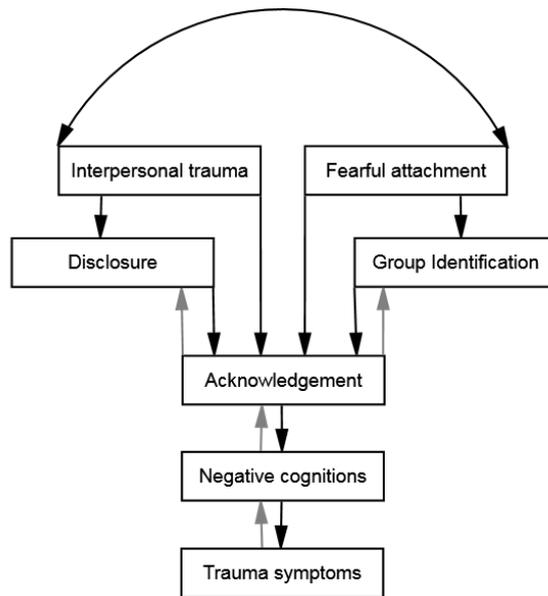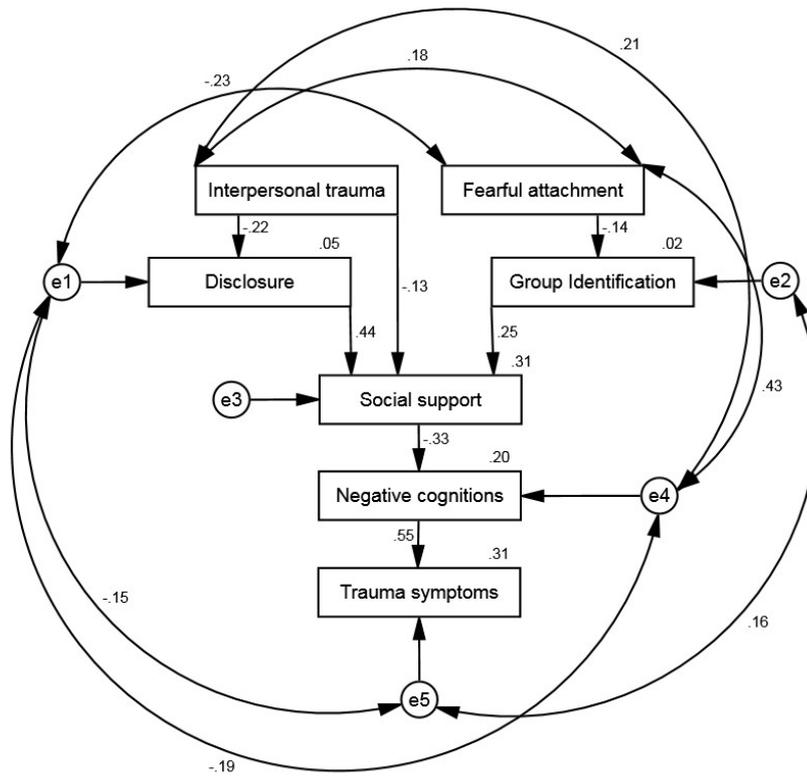|	Interp.	Fearful	Disclosure	Group Id.	Acknow.
Acknow.	-.11**	-.02*			
Cognitions	.44*	.11*	-.23*	-.13**	
PTSS	.23**	.06**	-.12**	-.07**	-.34**

*p < .05 **p < .01

Figures

Figure 1 The proposed social model of Posttraumatic Stress Disorder (PTSD)

$\chi^2 = 8.24$, $df = 7$, $p = .31$; RMSEA $= .025$, 90% CI: .00 - .08; CFI $= .997$; TLI $= .991$

Figure 2 Structural Equation Modelling (SEM) of the proposed social model of Posttraumatic

Stress Disorder (PTSD). Standardized coefficients are reported ($N = 278$).

$\chi^2 = 8.15$, $df = 7$, $p = .32$; RMSEA = .024, 90% CI: .00 - .80; CFI = .997; TLI = .991

Figure 3 Structural Equation Modelling (SEM) of a model variant using social support.

Standardized coefficients are reported ($N = 278$).