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In the shadow of terror: Posttraumatic stress and psychiatric co-morbidity following bombing in Iraq: The role of shattered world assumptions and altered self-capacities

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ABSTRACT

Whilst research has looked at posttraumatic stress disorder (PTSD) and psychiatric co-morbidity among civilians exposed to bombing, there is a lack of longitudinal data on the development of these outcomes and the psychological factors associated with them, particularly among Iraqi civilians. This study aimed to: investigate 1) the trajectory of PTSD and psychiatric co-morbidity following bombing among civilians in Iraq and 2) the link between shattered world assumptions, altered self-capacities and identified health outcomes. One hundred and eighty (F = 90, M = 90) Iraqi civilians exposed to first time bombing were recruited approximately one month (time 1) after the bombing and five months (time 2) after the baseline assessment. A control group data (178, F = 91, M = 87) from people who were not exposed to bombing was also collected. They completed the Posttraumatic Stress Diagnostic Scale, the General Health Questionnaire-28, the World Assumptions Questionnaire and the Inventory of Altered Self-Capacities. The results showed that there was a significant decline in the proportion of people meeting the screening criteria for PTSD and psychiatric co-morbidity symptoms over time. For the cross-sectional analysis, controlling for demographic variables, regression analysis showed that severity of the bombing ($\beta = .16$), controllability of events ($\beta = -.21$), safety and vulnerability ($\beta = .31$) and affect dysregulation ($\beta = .37$) significantly predicted PTSD time 1. Controllability of events ($\beta = -.20$) and affect dysregulation ($\beta = .37$) also predicted psychiatric co-morbidity at time 1. For the prospective analysis, controlling for PTSD and psychiatric co-morbidity at time 1, none of these dimensions predicted PTSD and psychiatric co-morbidity at time 2. Findings are discussed in terms of individual resilience. It can be concluded that following bombing, civilians developed PTSD and psychiatric co-morbidity which declined over time. Civilians' perceptions of their ability to control events in the world and regulate their affect had a short term impact on the severity of these symptoms.

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1. Introduction

Since 2003, there has been a dramatic increase in severe conflict, including war and terrorist attacks in Iraq. The capital, Baghdad, and several other cities have been repeatedly subjected to terrorist bombings (see Fig. 1). Thousands of Iraqi people have been killed and wounded, mostly by suicide bombers in crowded public places. Existing studies indicate that people who live in war and conflict zones are at a high risk of psychological and emotional instability

that is considered of sufficient severity to be diagnosed as psychological disorders (Mollica et al., 2001; Smith et al., 2001).

These bombing attacks have been found to lead to many facets and complexities of posttraumatic and psychiatric co-morbidity among survivors (North et al., 2011). Studies conducted following the Oklahoma City bombing in 1995 and other bombing attacks around the world broadly support findings of severe consequences. North et al. (2011) found the prevalence of PostTraumatic Stress Disorder (PTSD) symptoms among survivors of the Oklahoma City bombing ranging from 34% to 41% and 45% had post-disaster psychiatric symptoms. Verger et al. (2004) propose that 31% developed PTSD symptoms after the France bombing in 1994–1996. Moreover, 35.6% of the bombing attack survivors in Istanbul in 2003 have since developed PTSD symptoms (Page et al., 2009).

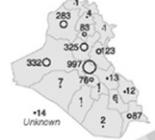
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30 Days, 2,368 Attacks

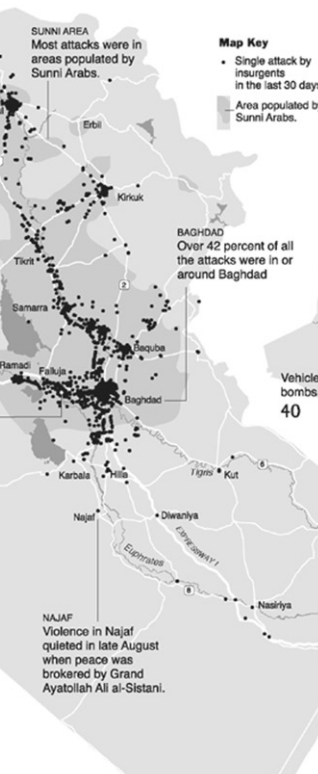
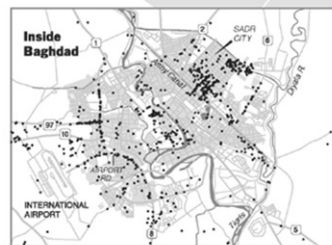
Data from a private security company on attacks over the last 30 days show that every province has been hit at least once. This period was neither the most violent nor the most quiet over the past year.

Attacks by Province



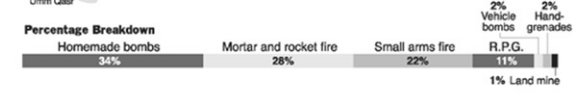
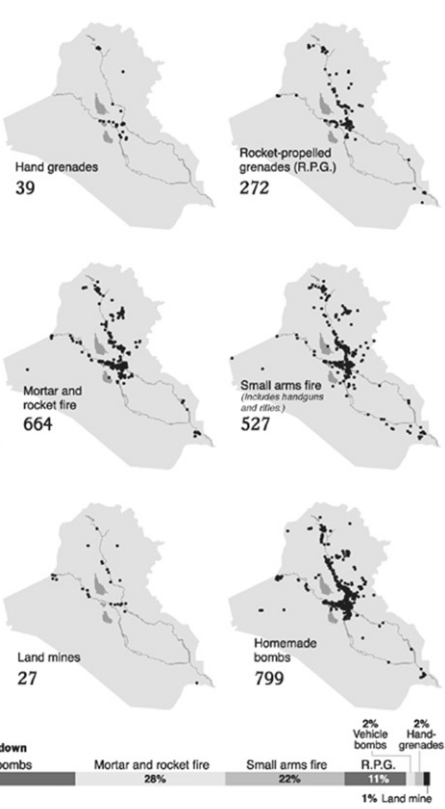
High numbers of attacks occur along highways because supply convoys and military vehicles are vulnerable to homemade bombs planted on the roadside.

Attacks were recorded around Falluja but not in it. It is controlled by insurgents and is considered a "no go" zone for American military and Iraqi security forces.



Map Key
 • Single attack by insurgents in the last 30 days
 ■ Area populated by Sunni Arabs

Types of Attacks
 Homemade bombs, along with mortar, rocket and small arms fire, accounted for most of the attacks. Vehicle bombs were usually used in urban areas.



Source: Special Operations Consulting, Security Management Group Inc.

Fig. 1. Bombing attacks in Iraqis' provinces and Baghdad.

Besides the development of PTSD symptoms, exposure to a bomb attack has been found to promote numerous long-term psychological disorders among its survivors (North et al., 2011). It has been found that 22% of the people who were exposed to the 1995 Oklahoma City bombing suffered depression, 9% agoraphobia, 7% panic disorder, 4% had generalized anxiety disorder, 9% experienced alcohol abuse, and 2% had drug use disorders (North et al., 1999). It has also been discovered that bombing attack survivors experience a negative impact on their general mood (Somer et al., 2005), phobic fear of public transport and travel phobia (Handley et al., 2009), intrusive and avoidant symptoms in the months following the incident (Essar et al., 2007), grief and lost sense of personhood (Allen, 2006), and personal guilt (Ankri et al., 2010).

However, there are scarcely any studies examining PTSD and psychiatric co-morbidity following bombing attacks generally, and specifically in relation to civilians in Iraq. Only one published study has addressed psychological effects among Iraqi children who were exposed to the bombing of Al-Ameriyah shelter on February 13th, 1991. This was one of the most extreme attacks targeted on Iraqi civilians. Following the bombing, Dyregrov et al. (2002) interviewed a group of 94 Iraqi children who had lost family member(s) and/or friend(s) after 6 months, 1 year, and 2 years. The Impact of Event Scale (IES) (Horowitz et al., 1979) was chosen to assess the reaction of the sample. Around 80% of the 94 children were found to have developed PTSD symptoms. The majority of them also experienced sadness and were afraid of losing family members. The study also showed that there was no significant decline in PTSD symptoms over time; neither after 6 months or one year. After two years, however, there was a significant decline in intrusive and avoidance symptoms (Dyregrov et al., 2002).

Recently a qualitative study was also carried out to explore how people who have experienced a bomb attack in Iraq make sense of

their experience. Nine survivors were recruited (M = 4, F = 5), with an average age of between 19 and 33. Interviews based on a semi-structured schedule showed that being in a bombing experience had considerable impacts of loss of personal interest, deterioration in relationships with others and other significant negative aspects of personality changes, such as withdrawal. This loss of self was conspicuous and adopted several patterns such as; changing mood and psychological imbalance "altered self-capacities". The experience was also found to have a negative impact on their sense of safety and personal and familial vulnerability. Furthermore, there was found to be a "shattering of the world assumptions" whereby the world and its populations being seen as risky, untrustworthy coupled with feeling negative about the future and potential for positive change (Freh et al., 2012).

A number of theories have been developed regarding the course of outcomes following a traumatic life event. Janoff-Bulman (1992) argues that PTSD or psychiatric co-morbidity arises in two different ways. First, PTSD is thought to occur when survivors fail to readily assimilate or accommodate the lessons from the traumatic event into their global meaning systems or assumptive worlds. That is, people experience symptomatic oscillations between avoiding the trauma material through avoidance (e.g. dissociation and emotional numbing) and confronting the memory of the trauma through intrusive thoughts and nightmares. These symptoms will persist until they engage in sufficient cognitive processing which challenges the assumptions they hold about the world, and then lessons learned from the trauma can be reconciled. Secondly, trauma-induced reactive depressive symptoms are thought to occur when the assumptive world is revised to reflect uniform negative beliefs (e.g., events that occur at random, the self is unlucky, and the world is a malevolent place) about the world and self (Foa et al., 1999).

Research exploring differences in world assumptions have found that people who tend to reflect the most positive assumptions have not experienced trauma, whereas people with past trauma, but not PTSD, tend to adopt more negative assumptions. On the other hand, people with PTSD or other trauma-related psychopathology tend to reflect the most negative assumptions (Foa et al., 1999; Ehlers and Clark, 2000; Janoff-Bulman, 1992). For example, the assumptions of the people with PTSD reflected that they were both unlucky and that the world was generally now non trustworthy. Additionally, holding negative world assumptions correlated significantly with depression and anxiety (Dekel et al., 2004).

Although preceding literature showed that exposure to potentially traumatic events could cause disorders in the individual's perception of world, others and the future, it could also cause disorders in perceptions of self and relationships with others. It has been argued that the inability of the individual to reflect on their experience of dangerous events could result in a state of imbalance fueling a traumatic response. According to the altered self-capacity theory, the traumatic event, as a new experience, presents strange information to the personal experience because it is located outside the range of normal human experience and therefore it is unexpected. When it occurs, however, it is posing threat and danger to the survival and safety of the individual. As a result, the person's behavior can be affected by withdrawing from social life, changing self-ability and a disturbance of the normal self-capacity to deal with the trauma effectively (Yehuda and McFarlane, 1995).

Failure of the survivors to deal with the traumatic experience effectively, identify, perceive, and give meaning to the traumatic event as a new and urgent experience might lead to PTSD at different stages (Magwaza, 1999), particularly with people who show delay of comprehension and understanding of the reality of the danger of the incident (Thrasher et al., 1994). In other words, developing PTSD symptoms could occur in two different ways: 1) emotional reactions followed by denial or attempts at inhibiting personal feelings, 2) distortion of the way that the person looks to themselves, others, relationships with others and changes in the person's vision to his/her own capabilities.

Based on a prior qualitative study (Freh et al., 2012), this study aims to address the aforementioned gaps in literature by examining: 1) the trajectory of post-bombing PTSD symptoms, and 2) the relationship between altered self-capacities, shattering of world assumptions and the severity of post-bombing PTSD and psychiatric co-morbidity.

In the light of the preceding literature, we developed the following more specific hypotheses: 1) A proportion ranging from 34% to 44% of the sample would meet the screening criteria of PTSD. 2) Post-bombing PTSD symptoms and psychiatric co-morbidity would decline significantly over time. 3) The bombing group will experience more severe PTSD symptoms, psychiatric co-morbidity in all levels compared with the control group. 4) Severity of the bombing (in terms of people's subjective indications of their distress following the bombing) would be related to a shattering of assumptions (including views of their own safety and a sense of lost control of their lives). The experience of the severity of the bombing is seen as related to subjective appraisal of the effect it had on them and this is connected to a sense of their world as being unsafe and of vulnerability. Specifically, it was hypothesized that a shattering of world assumptions would relate to the severity of post-bombing PTSD symptoms and psychiatric co-morbidity at Time 1 and follow up. 5) The bombing group would relate to the severity of post-bombing PTSD symptoms and psychiatric co-morbidity at assessment Time 1 and the follow up. Finally, after controlling for the severity of the bombing attack, one or more of the dimensions of the shattering of world assumptions and altered self-capacities are expected to be associated with PTSD and psychiatric co-morbidity.

2. Method and design

This research employs a longitudinal design aiming to assess changes in distress over time. Ethical approval for this study was obtained in advance from the Faculty of Health Ethics committee at the University of Plymouth. Permission was obtained from Ministry of Health (MoH) in Iraq to collect the data.

3. Procedure

Iraqi civilians who were exposed to bombing attack were recruited for this study approximately one month (Time 1) after the bombing and five months (Time 2) after the baseline assessment. The contact with the MoH was made by the first author to obtain permission to conduct this research. After the researcher obtained permission, the staff were acquainted to the purpose of the study, given the selection criteria, and asked to identify potential participants. Two hundred and twenty-seven individuals were identified. Forty three did not wish to participate. Of those 184 consented to participate, 4 participants were excluded because they were unable to read and write, yielding a final $n = 180$.

Following their consent, participants' cognitive impairment was assessed using the Mini-Mental State Examination (MMES). By using >24 as a cut-off, results excluded no one. For Time 2, the principal researcher and the administration staff contacted the participants by telephone and/or e-mail. We asked them if they still wished to carry on with the follow up of this study. No one dropped out.

The researchers were aware that recruiting the control group from people who did not hear and/or witness bombing in Iraq is almost impossible. However, every effort was made to recruit participants from rural regions that were considered, to some extent, safe: such as North Mosul, West Baghdad, some places in Kurdistan.

Control people were also recruited via the MoH. Clinic staff were acquainted of the purpose of the study, given the selection criteria and asked to identify potential participants, that: 1) did not witness a bombing attack in his/her life, 2) civilians, 3) 18 years old or above, 4) be able to read and write, and 5) no previous long-term psychiatric history. Control people were defined as individuals who had never been exposed or a witness to any bombing attack in their life. Two hundred and seventeen people were recruited. Due to the unwillingness of 39 people to participate in this study, names and some details of the 178 were passed to the principal researcher. Thereafter, participants provided written informed consent before participating and were offered 10,000 Iraqi Dinars (£4) in appreciation of their time and effort. A full description about the control group will be discussed in more details in the results section of this study.

4. Measures

4.1. Bombing experience questionnaire

The researchers developed a self-report questionnaire to collect information about peritraumatic and posttraumatic risk factors associated with the bombing. A list of possible involvement experiences during the bombing was created according to literature in this field, and participants ticked those that applied to them (Page et al., 2009). These bombing experience variables assessed a variety of problems that survivors may have experienced in response to their exposure to the bombing attack. Risk factors were identified in three partially overlapping domains: 1 – level of perceived threat to life before the bombing (3 questions coded into yes and no categories e.g. did you anticipate that you would be involved in

a bombing attack one day?); 2 – level of perceived threat to life during the bombing (10 questions coded into yes and no categories, 4 questions – 4 point scales, and 1 open ended question e.g. did you feel you lost control of yourself?); and, 3 – level of perceived threat to life after the bombing (2 questions coded into yes and no categories, and 6 questions – 4 point scales e.g. do you deliberately stay at home and avoid going out in case you experience another bombing?).

4.2. PTSD symptoms

To assess the PTSD symptoms, the self-report Posttraumatic Stress Disorder Symptom Scale (PDS) was used (Foa et al., 1993). Participants were asked to focus on their experience of bombing and report posttraumatic stress symptoms. The PDS has a 17 item symptom severity scale corresponding to DSM-IV criteria for PTSD symptoms and generates three subscales: intrusion, avoidance, and hyperarousal. Higher scores highlight the more severe symptoms, with a possible score range from 0 to 51. The PDS has sound psychometric properties. The scale has shown good concurrent validity (.81) and significant correlations with the Impact of Event Scale's intrusions and avoidance subscales (Foa et al., 1993).

The DSM-IV has specified the diagnoses of PTSD into Full PTSD and No PTSD. In this study however, Full PTSD, Partial PTSD, and No PTSD will be used. Although, Partial PTSD is not specified in DSM-IV, the rationale for using such a screening is based on existing literature suggesting that it is not always helpful to view PTSD in terms of simply having it or not (Joseph et al., 1997). The literature also suggests that PTSD could be better conceptualized as a spectrum disorder, which may occur along a continuous dimension from normal to extreme or abnormal stress responses (Shalev, 2002). Furthermore, it has also been proposed that some people who are exposed to trauma or dangerous event may not fulfill screening criteria for PTSD but still experience impairment in functioning, thus require more or less of a level of intervention and care to those who developed full PTSD symptoms (Carlier and Gersons, 1995). For these forgoing reasons, PTSD reactions were classified into full, partial, and no PTSD by some researchers (see Amir and Ramati, 2002; Ginzburg et al., 2002; O'Reilly et al., 2004). In this study, partial PTSD is defined as people who developed probable PTSD and met, at least, one out of the three required symptom groups (Criteria B, C, and D) (i.e. they met screening criteria for intrusion symptoms, but not avoidance and/or hyperarousal symptoms) and duration of ≥ 1 month (Criterion E).

4.3. General psychiatric co-morbidity

The General Health Questionnaire (GHQ-28) was used to assess the General Psychiatric Symptomatology (Goldberg and Hillier, 1979). It includes somatic problems, anxiety, social dysfunction, and depression. GHQ-28 scores range from 0 to 84 and each item is scored from (0 to 3). GHQ-28 has validated in other studies and scored $\alpha = .91$ (Dowell, 2006). The GHQ-28 had been validated in Arabic culture, but not in Iraq, and has shown reliability and validity (Thabet et al., 2004). The internal consistency of the scale calculated using Cronbach's alpha, was $=.91$ and split half was $.88$.

4.4. Altered self-capacity

The Inventory of Altered Self-Capacities (IASC) was chosen to test symptoms relevant to altered self-capacity. The IASC was developed by Briere and Runtz (2002). IASC is a relatively brief 63 items designed to assess the disturbance functioning in relation to the self and others. It also evaluates seven types of self-capacity disturbance: Affect Dysregulation, Identity Impairment,

Idealization Disillusionment, Abandonment Concerns, Susceptibility to Influence, Interpersonal Conflict, and Tension Reduction Activities. The IASC has sound psychometric properties. Reliability (Cronbach's alphas) coefficients for IASC subscales ranged from .78 to .93 with an average of .89 (Briere and Runtz, 2002).

4.5. Shattering of world assumption

To examine the effects of the bombing attack experience on survivors' fundamental assumptions, the World Assumptions Scale (WAS) was used. The WAS was developed by Kaler (2009). The scale consists of 22 items yielding 4 subscales Controllability of Events (CE), Comprehensibility and Predictability of People (CPP), Trustworthiness and Goodness of People (TGP), and Safety and Vulnerability (SV). The TGP and SV comprised of 6 items, whereas CE and CPP 5 items. The items are measured on a 6-point Likert scale (anchored by "strongly agree" and "strongly disagree"). The psychometric properties of the WAS has been proven by studies. Cronbach's α s for the WAQ ranged from .74 to .82 (Kaler, 2009).

5. Translation and reliability

Translation of the inventories was employed. Questionnaires were translated into Arabic by the first author and an expert interpreter. Back translation was conducted by other interpreters who speak Arabic as their first language and are also professionals in English. Both of the translators had lived in English speaking countries for several years and worked as professional interpreters. All items were then discussed, with more emphasis on items where discrepancies were noted, where a uniform interpretation or an example of a difficult word or question was agreed upon (or both). The reliability of the questionnaires was also covered in this study. Cronbach's α s showed that all the questionnaires have sound psychometric properties (see Table 1).

6. Results

6.1. Demographic variables

A total of 180 Iraqi civilians with an equal number of males and females participated in this study. The average age was about thirty

Table 1
Cronbach's α for the subscales and total score.

Subscale	Cronbach's α ; <i>n</i> = 180
PDS-intrusion	.78
PDS-avoidance	.64
PDS-hyperarousal	.69
PDS total score	.84
GHQ-28 somatic	.79
GHQ-28 anxiety	.67
GHQ-28 social dysfunction	.72
GHQ-28 depression	.82
GHQ-28 total score	.90
Affect dysregulation	.83
Identity impairment	.80
Idealization disillusionment	.66
Abandonment concerns	.76
Susceptibility to influence	.69
Interpersonal conflict	.90
Tension reduction activities	.73
Inventory of altered self-capacities total score	.94
Controllability of events	.70
Comprehensibility and predictability of people	.80
Trustworthiness and goodness of people	.79
Safety and vulnerability	.86
Shattering of the world assumptions total score	.92

years ranging from 18 to 53. Just over half were married and around 41% single. The majority of the participants were Arab. The participants were chosen from different regions (Baghdad 97, 53.9%; Anbar 62, 34.4%; Mosul 13, 7.2%; and Babil 8, 4.4%). All the participants identified themselves as Muslims.

In terms of the educational level; more than a third had received education up to secondary school level. The income of over two thirds was low. Occupations included building laborers (6%), factory workers (7%), cleaners (4%), social servant (8%), self-employed (16%), students (6%), educators (7%), shop assistants (5%), mechanics (6%), nurses (2%), salesmen (3%), engineers (3%) and company directors (2%). Otherwise, 7% were housewives and 12% unemployed.

Almost two thirds of the participants did not have any major life illnesses before the bombing. Of the rest, 31, 7 and 2% had 1, 2 and 3 other major life illnesses respectively. These details were confirmed in medical records.

The control group comprised 178 people from the general public. The sample was distributed almost equally between males and females. The majority of the participants (53%) were married and less than half (43%) single. Almost one third attended universities and obtained undergraduate and postgraduate qualifications. The income level of over third was in the low income category, in which 6% were unemployed, 8% self-employed, 3% taxi drivers and 5% housewives. Less than half were in the medium, in which, (12%) were educators, salesmen (14%), factory workers (7%), students (9%) and nurses (10%). Otherwise, the rest were in the high income category, engineers (5%) and university lecturers (5%).

In terms of medical status, the majority of the participants (82%) did not have any major life illnesses prior to the assessment. Of the rest, 12 and 5% had 1 and 2 major life illnesses respectively. Allergy (5%) was the most pervasive illness. Other illnesses included arthritis (3%), back problems (2%) and digestive disorders (4%).

Compared with the bombing group, the control group showed no significant differences in terms of age, gender, marital status, educational level, and ethnicity. However, there were significant income differences and major life illness between the two groups. The control group showed no significant cognitive functioning difference than the bombing group. People with bombing experience reported no significant traumatic events during their life time than the control group (see Table 2).

6.2. Incidence of outcomes over time

Table 3 shows that at time 1, over half of the participants developed full PTSD. At time 2, however, just over 40% developed full PTSD. There was a significant decline from T1 to T2 in terms of the number of participants meeting the full PTSD screening criteria and the total severity of PTSD. On the symptoms levels, there was a significant decline in the three post-bombing PTSD symptoms over time consistently: avoidance [$t(179) = 10.67, P < .001, r = .62$], intrusion [$t(179) = 10.19, P < .001, r = .60$] and hyperarousal [$t(179) = 9.94, P < .001, r = .60$].

With regard to psychiatric co-morbidity, the majority (167, 92.7%) of the participants scored well at or above the psychiatric co-morbidity cut-off point of 4 at T1, thus fulfilling the criteria for psychiatric caseness. In other words, the likelihood for them to receive a diagnosis for a general psychiatric disorder has increased substantially. This figure dropped to (155, 86.1%) three quarters out of the 180 participants who completed the GHQ-28 at T2. Whereas, only (14, 7.8%) out of 178 healthy people scored at or above the cut-off point of 4.

On the symptoms level, the decline was significant in terms of meeting the GHQ-28 cut-off over time; somatic [$t(179) = 12.03, P < .001, r = .67$], anxiety [$t(179) = 11.21, P < .001, r = .64$], social

Table 2
Demographic details of the bombing group and healthy people.

	Bombing group		Control		χ^2	<i>t</i>
	Mean	SD	Mean	SD		
Age	29.94	8.86	30.70	8.97	–	–.80
Cognitive function	26.23	1.41	26.45	1.37	–	–1.50
Number of traumatic life events	1.43	.61	1.16	.38	–	1.73
Onset of bombing (month)	5	1.46	–	–	–	–
Gender	N	%	N	%		
M	90	50	87	48.9	.04	–
F	90	50	91	51.1		
Marital status						
Single	75	41.7	78	43.8	.01	–
Married	97	53.9	95	53.4		
Divorced	1	.6	3	1.7		
Widowed	7	3.9	2	1.1		
Income						
Low income	113	62.8	69	38.8	20.65**	–
Medium income	56	31.1	83	46.6		
High income	11	6.1	26	14.6		
Education level						
Primary	36	20.0	44	24.7	6.11	–
Secondary	70	38.9	83	46.6		
University	74	41.1	51	28.7		
Arab	159	88.3	151	84.8	.94	–
Kurdish	21	11.7	27	15.2		
Major life illness	Yes	No	Yes	No		
	N %	N %	N %	N %		
	74 41.1	106 58.9	32 17.8	146 82.2	22.98**	–

Note: for the present and further analysis, variables were coded as follows. Gender: 1 = male, 2 = female; marital status: 1 = single/divorced/widowed, 2 = married; income: 1 = low income, 2 = mid income/high income; educational level: 1 = university, 2 = primary/secondary; ethnicity: 1 = Arab, 2 = Kurdish; major life illness: 1 = yes, 0 = no.
* $P < .05$, ** $P < .001$.

dysfunction [$t(179) = 12.94, P < .001, r = .69$], and depression symptoms [$t(179) = 9.09, P < .001, r = .56$] (see Table 4).

Because the participants were chosen from different regions, we were questioning whether the region makes a difference to the psychological well-being. In other words, are the people of Baghdad having more severe PTSD and psychiatric co-morbidity than the other people from other regions? A *t*-test showed that there are no significant differences between the population of Baghdad and people from other Iraqi cities outside Baghdad in terms of PTSD [$t(178) = .25, ns$] and psychiatric co-morbidity [$t(178) = .71, ns$].

6.3. How do participants compare with the control group?

Table 4 shows the means and standard deviations of the GHQ-28, SWA, and IASC of both bombing and control group. The

Table 3
Diagnoses of probable post-bombing PTSD and mean scores over time.

	Intrusion		Avoidance		Hyperarousal		No PTSD		Partial PTSD		Full PTSD	
	Mean	SD	Mean	SD	Mean	SD	N	%	N	%	N	%
T1 (180)	8.87	3.43	11.72	3.50	8.62	3.12	42	23.4	35	19.4	103	57.2
T2 (180)	6.50	3.45	8.92	3.60	6.18	2.92	59	32.8	44	24.4	77	42.8

Table 4
The means and standard deviations of GHQ-28, IASC, and SWA.

	Bombing group T1		Bombing group T2		Control group	
	Mean	SD	Mean	SD	Mean	SD
GHQ-28						
Somatic problems	12.31	4.52	8.81	3.73	4.70	1.92
Anxiety	13.07	3.54	10.11	3.18	2.43	1.88
Social dysfunction	12.56	3.86	8.76	3.33	2.88	2.00
Depression	11.29	4.92	8.33	3.85	1.41	1.78
IASC						
Abandonment concerns	25.03	6.26	–	–	11.49	3.67
Susceptibility to influence	19.16	4.77	–	–	13.43	3.28
Idealization disillusionment	21.91	5.36	–	–	12.66	3.60
Tension reduction activities	22.08	5.57	–	–	10.07	1.98
Interpersonal conflict	25.77	7.30	–	–	11.12	3.91
Affect dysregulation	30.16	6.30	–	–	12.88	3.47
Identity impairment	26.36	6.63	–	–	12.01	2.85
SWA						
Controllability of events	12.11	3.86	–	–	22.98	4.00
Comprehensibility and predictability of people	13.26	4.57	–	–	22.61	4.00
Trustworthiness and goodness of people	11.97	3.88	–	–	22.62	4.04
Safety and vulnerability	15.23	6.16	–	–	27.18	4.84

bombing group reported significantly more somatic problems [$t(356) = 20.67, P < .001, r = .74$], anxiety [$t(356) = 35.40, P < .001, r = .88$], social dysfunction [$t(356) = 29.71, P < .001, r = .84$], and depression [$t(356) = 25.19, P < .001, r = .80$] than the control group. Looking at participants' levels of reduced self-capacity, people with bombing attack experience had a significantly higher level of altered self-capacity than the control participants. In particular, the bombing group showed significantly higher in abandonment concerns [$t(356) = 24.89, P < .001, r = .79$], susceptibility to influence [$t(356) = 17.28, P < .001, r = .67$], idealization disillusionment [$t(356) = 23.47, P < .001, r = .78$], tension reduction activities [$t(356) = 27.13, P < .001, r = .82$], interpersonal conflict [$t(356) = 23.59, P < .001, r = .78$], affect dysregulation [$t(356) = 32.07, P < .001, r = .86$], and identity impairment [$t(356) = 26.50, P < .001, r = .80$] than the control group.

With regard to the world assumptions of post-bombing among survivors, interest was taken in the profound effects of bombing attacks to assess assumptions of survivors and compare it with the control group. Findings demonstrated significant differences between the bombing and non-bombing groups, indicating that survivors viewed the world as less safe, people less trustworthy and as less benevolent than did the control. More specifically, control group were significantly more able to control events in their lives [$t(356) = -26.13, P < .001, r = .81$], comprehensibility and predictability of people [$t(356) = -20.57, P < .001, r = .74$], overall believing people to be trustworthy and good [$t(356) = -16.47, P < .001,$

$r = .66$], and feeling the world is safer [$t(356) = -20.37, P < .001, r = .73$] than the bombing group displayed.

6.4. Correlation between the severity of bombing experience, IASC, and SWA, with outcomes

To establish the relationship between the severity of bombing attack, altered self-capacity, shattering of world assumption and the outcomes, series of hierarchal multiple regression analysis were carried out. Before presenting the data, Table 6 showed the correlation between the predictor variables and severity of PTSD and psychiatric co-morbidity at T1 and T2. Severity of the bombing experience, shattering the world assumptions, and altered self-capacity total score were significantly correlated with higher severity of PTSD and psychiatric co-morbidity at T1 and T2. Time since the bombing was not correlated with PTSD and psychiatric co-morbidity at time 1 and time 2 (see Table 5).

6.5. Cross-sectional associations

To assess the unique and cumulative contributions of the independent variables to PDS and GHQ and investigate the relative importance of the predictors and the percentage of variance in the PDS and GHQ total scores, two hierarchal multiple regressions in this analysis were carried out. In which the PTSD and psychiatric co-morbidity at T1 were dependent variables, whereas shattering

Table 5
Correlations (r) between PTSD, psychiatric co-morbidity, and other bombing-related factors.

Variable/measure	1	2	3	4	5	6	7
1 PTSD T1	–						
2 GHQ-28 T1	.73**	–					
3 PTSD T2	.67**	.52**	–				
4 GHQ-28 T2	.59**	.66**	.71**	–			
5 Severity of the bombing	.27**	.21**	.19**	.17*	–		
6 Time since the bombing	-.06	-.05	-.09	-.12	-.14	–	
7 Inventory of altered self-capacities	.48**	.50**	.39**	.37**	.23**	.00	–
8 Shattering of world assumptions	-.47**	-.48**	-.40**	-.39**	-.20**	.06	-.63**

Note: for the present analysis, variables were coded as follows. Severity of bombing: 1 = not at all, 2 = mild/severe; IASC = altered self-capacity; SWA = shattering of world assumption; ** $P < .001$ (two-tailed); * $P < .05$ (two-tailed).

of the world assumption and altered self-capacity independent variables. For each regression, we controlled for the severity of bombing attack experience. No outliers (Mahalanobis ≥ 3 SD) were detected during the exploration of diagnostics.

In terms of PTSD severity T1, the results show that model 1 explained a significant proportion of the variance [$F(1,178) = 14.66, P < .001, R^2$ change = .076] and that it explained just >7% of the variance (adjusted $R^2 = .071$). After controlling for the variable in model 1, model 2 improved significantly the prediction of the severity of PTSD at T1 [$F(4,174) = 14.28, P < .01, R^2$ change = .305]. After controlling for models 1 and 2, the overall model 3 improved prediction significantly [$F(7,167) = 4.58, P < .001, R^2$ change = .417] and that explained just over 37% of the variance (adjusted $R^2 = .375$). Tests associated with regression coefficient showed that the severity of bombing attack ($P < .01$), controllability of events ($P < .05$), safety and vulnerability, and affect dysregulation ($P < .01$) made a significant contribution to the model (see Table 6).

Turning to the severity of psychiatric co-morbidity T1, a similar regression analysis was computed. The results were the same in that model 1 explained a significant proportion of the variance just over 4% (adjusted $R^2 = .041$) [$F(1,178) = 8.64, P < .05, R^2$ change = .046]. After adjusting for model 1, model 2 improved significantly the prediction of the psychiatric co-morbidity T1, [$F(4,174) = 12.05, P < .001, R^2$ change = .253] and that explained just over 25% of the variance (adjusted $R^2 = .253$). With models 1 and 2 controlled for, the overall model 3 explained <35% (adjusted $R^2 = .359$) of the variance of psychiatric co-morbidity at T1. The overall model improved significantly the prediction of psychiatric co-morbidity severity at T1 [$F(7,167) = 3.94, P < .05$]. Regression coefficient showed that controllability of events ($P < .05$) and affect dysregulation ($P < .001$) made a significant contribution to the model (see Table 7).

6.6. Prospective associations between severity of bombing attack, PTSD and psychiatric co-morbidity

To examine the relationship between the severity of bombing experience and change in the severity of PTSD and psychiatric co-morbidity over time, hierarchical multiple regressions were used

Table 6
Hierarchical multiple regressions for predicting post-bombing PTSD at time 1.

Variables	B	SEB	β
Outcomes: PTSD total score			
Step 1			
Severity of the bombing	6.82	1.78	.27**
Step 2			
Severity of the bombing	4.76	1.59	.19*
Controllability of events	-.42	.20	-.19*
Comprehensibility and predictability of people	-.39	.20	-.20
Trustworthiness and goodness of people	-.81	.21	-.36**
Safety and vulnerability	.31	.18	.22
Step 3			
Severity of the bombing	4.12	1.51	.16*
Controllability of events	-.48	.19	-.21*
Comprehensibility and predictability of people	-.35	.19	-.18
Trustworthiness and goodness of people	-.45	.22	-.20
Safety and vulnerability	.44	.17	.31*
Abandonment concerns	-.09	.14	-.06
Susceptibility to influence	-.29	.14	-.16
Idealization disillusionment	.04	.15	.02
Tension reduction activities	.04	.16	.02
Interpersonal conflict	-.01	.14	-.01
Affect dysregulation	.51	.12	.37**
Identity impairment	.20	.13	.15

* $P < .05, **P < .001$.

Table 7
Hierarchical multiple regressions for predicting post-bombing psychiatric co-morbidity at time 1.

Variables	B	SEB	β
Outcomes: Psychiatric co-morbidity total score			
Step 1			
Severity of the bombing	8.61	2.93	.21*
Step 2			
Severity of the bombing	5.09	2.67	.12
Controllability of events	-.72	.34	-.19*
Comprehensibility and predictability of people	-.42	.34	-.13
Trustworthiness and goodness of people	-.72	.36	-.19*
Safety and vulnerability	.00	.30	.00
Step 3			
Severity of the bombing	3.71	2.56	.09
Controllability of events	-.74	.32	-.20*
Comprehensibility and predictability of people	-.37	.32	-.12
Trustworthiness and goodness of people	-.02	.38	-.00
Safety and vulnerability	.12	.29	.05
Abandonment concerns	-.03	.23	-.01
Susceptibility to influence	.01	.24	.00
Idealization disillusionment	.20	.26	.07
Tension reduction activities	-.20	.27	-.08
Interpersonal conflict	.02	.25	.01
Affect dysregulation	.82	.21	.37**
Identity impairment	.14	.23	.07

* $P < .05, **P < .001$.

to establish whether severity of bombing attack would predict the severity of PTSD and psychiatric co-morbidity at time 2 over and above the effect of the severity of PTSD and psychiatric co-morbidity at time 1, shattering of the world assumptions and altered self-capacity scores, all of which were found to correlate with time 2 PDS severity and psychiatric co-morbidity.

Focusing on predicting PTSD severity at time 2, in the first regression, PTSD and psychiatric co-morbidity at time 1 and the bombing experience were entered in the first block, and then the 4 dimensions of shattering of world assumptions in the block 2. The 7 dimensions of the altered self-capacity were entered in the fourth block. The results showed that model 1 explained a significant proportion of the variance [$F(3,176) = 49.49, P < .001, R^2$ change = .458], and that accounting for just above 45% of the variance (adjusted $R^2 = .448$). With model 1 controlled for, neither model 2 [$F(4,172) = .112, ns, R^2$ change = .023], nor model 3 [$F(7,165) = .634, ns, R^2$ change = .014] improved their prediction of PTSD severity at time 2. The major contribution was made by severity of PTSD at T1 ($P < .001$) (see Table 8).

With regard to severity of psychiatric co-morbidity at time 2, a similar regression analysis was computed. The results were similar in that model 1 explained a significant proportion of the variance [$F(3,176) = 51.29, P < .001, R^2$ change = .466] with just over 45% variance explained (adjusted $R^2 = .466$). With the variables in model 1 controlled for, neither model 2 [$F(4, 172) = .75, P > .05, R^2$ change = .034], nor model 3 [$F(7, 165) = .60, P > .05, R^2$ change = .013] improved prediction of psychiatric co-morbidity severity. The significant predictors were severity of PTSD T1 ($P < .05$) and psychiatric co-morbidity at time 1 ($P < .001$) (see Table 9).

7. Discussion

This longitudinal study aimed to investigate: first, the prevalence of PTSD and psychiatric co-morbidity, second the trajectory of post-bombing PTSD symptoms and psychiatric co-morbidity approximately 2 months (time 1) and 5 months (time 2) after

Table 8
Hierarchical multiple regression for predicting change in post-bombing PTSD at time 2.

Variables added		B	SEB	β
Step 1	Severity of the bombing	.15	1.41	.00
	PTSD T1	.62	.08	.63**
	GHQ T1	.03	.05	.04
Step 2	Severity of the bombing	-.19	1.40	-.00
	PTSD T1	.64	.08	.65**
	GHQ T1	.00	.05	.00
	Controllability of events	-.11	.17	-.05
	Comprehensibility and predictability of people	.16	.17	.08
	Trustworthiness and goodness of people	.23	.19	.10
	Safety and vulnerability	-.32	.15	-.23*
Step 3	Severity of the bombing	-.43	1.43	-.01
	PTSD T1	.63	.09	.64**
	GHQ T1	-.00	.05	-.00
	Controllability of events	-.12	.18	-.05
	Comprehensibility and predictability of people	.17	.18	.09
	Trustworthiness and goodness of people	.27	.21	.12
	Safety and vulnerability	-.30	.16	-.21
	Abandonment concerns	-.14	.12	-.10
	Susceptibility to influence	-.00	.13	-.00
	Idealization disillusionment	.07	.14	.04
	Tension reduction activities	.04	.15	.02
	Interpersonal conflict	.17	.13	.14
	Affect dysregulation	-.05	.12	-.04
	Identity impairment	-.003	.12	-.00

*P < .05, **P < .001.

Table 9
Hierarchical multiple regression analysis for predicting change in psychiatric co-morbidity at time 2.

Variables added		B	SEB	β
Step 1	Severity of the bombing	.22	1.89	.00
	PTSD T1	.31	.11	.23*
	GHQ T1	.40	.06	.49**
Step 2	Severity of the bombing	-.08	1.91	-.00
	PTSD T1	.32	.11	.24*
	GHQ T1	.38	.07	.45**
	Controllability of events	-.02	.24	-.00
	Comprehensibility and predictability of people	-.07	.24	-.02
	Trustworthiness and goodness of people	.26	.26	.08
Step 3	Severity of the bombing	-.15	1.95	-.00
	PTSD T1	.32	.12	.24*
	GHQ T1	.40	.07	.48**
	Controllability of events	.00	.24	.00
	Comprehensibility and predictability of people	-.04	.24	-.01
	Trustworthiness and goodness of people	.26	.29	.08
	Safety and vulnerability	-.24	.22	-.12
	Abandonment concerns	.07	.17	.03
	Susceptibility to influence	-.10	.18	-.04
	Idealization disillusionment	-.26	.19	-.12
	Tension reduction activities	.05	.20	.02
	Interpersonal conflict	.14	.18	.08
	Affect dysregulation	-.24	.16	-.13
	Identity impairment	.16	.17	.09

*P < .05, **P < .001.

exposure to the bombing. We also examined the role of shattered world assumptions and altered self-capacities in predicting PTSD and psychiatric co-morbidity.

It was hypothesized that a proportion of people ranging from 34% to 44% will meet the screening criteria of PTSD. The findings of the present study did not confirm this hypothesis in that over 76% of the sample met the screening criteria for PTSD. The incidence was substantially higher and not within the range reported in similar research on other terrorist attack survivors e.g. (Somasundaram, 1996; Page et al., 2009; Ankri et al., 2010; North et al., 2011), despite the similarities in study design (Verger et al., 2004), the way in which PTSD was measured (e.g. Luce et al., 2002; Ankri et al., 2010), and the time of assessment after the bombing e.g. 4–9 weeks (Somasundaram, 1996).

The occurrence of higher prevalence of PTSD documented here compared with other extant post-bombing studies is predicted by the severity of the experience. The present study has shown that many survivors did realize that their lives were in danger during the event. It has been well-documented that the perceived life threat is a robust factor for the development of post-disaster PTSD (Galea et al., 2002; Page et al., 2009). So, it is possible that awareness of life threat is a driver of high risk for PTSD (DiGrande et al., 2011).

Another potential explanation is that most of the participants have experienced horror and frightening scenes including fear of being killed, having seen bodily remains, having a friend or relative sustained severe injury, and/or having lost a loved one during the bombing. So, the explanation of being more susceptible to PTSD might lie in a biological understanding of PTSD etiology, as images of grotesque and unimaginable scenes are encoded into memory and may be re-lived upon stimuli. Taken all together, the threat perceived by the individual and the secondary exposure (death of loved and other factors of perceived life threat) seemed to be the specific factors that related to the development of disaster related PTSD in survivors of terrorist bombing in Iraq.

It was also hypothesized that there would be a high level of impact of the bombing experienced by the participants and that the participants would experience psychological distress, characterized by somatic problems, anxiety, social dysfunction and depression. The present study found that 92.7% of the participants fulfilled the criteria for psychiatric caseness. The support of this hypothesis basically adds support to the existing literature in that exposure to a bomb attack tends to promote long-term psychological disorders among its survivors (North et al., 1999, 2011).

However, the prevalence of psychiatric co-morbidity rated by GHQ was higher than the mental health problems rated by the same instrument. Wagner et al. (1998) in a study of prevalence of co-morbid symptoms among professional fire-fighters in Germany estimated that 27% of the participants had psychiatric impairments. The prevalence was also not comparable to the reported aftermath of the Oklahoma City bombing in 1995 (North et al., 1999), the Madrid train bombings in March 11, 2004 (Miguel-Tobal et al., 2006) and the aerial bombing in Sri Lanka (Somasundaram, 1996).

The explanation of this finding could be due to the combination of exposure to direct dangerous potential trauma (bombing attack) and other indirect dangerous life events. So, it is not only that bombing attack experience led to mental health problems, but, there may be other contributing factors such as exposure to life dangerous events which increased the risk for mental health problems. Another potential explanation could be due to the life circumstances in Iraq. Iraqis are living in an area of severe conflict and danger. These unsettled circumstances could affect the psychological well-being of the general people to the same degree that the bombing attacks do. For example, in the control group of this study nearly 8% developed PTSD symptoms, which is significantly higher than is reported in other studies e.g. (Kessler et al.,

2005). The current difficult and dangerous circumstances that Iraqi people have been living in might have provided a convenient and appropriate environment for the emergence of such disorders and posed a considerable risk for psychological disturbances.

Despite the high prevalence of PTSD and psychiatric co-morbidity, there was found to be a decrease in rates and severity of PTSD reactions, in which, over one third (59, 32.8%) of the directly exposed survivors were screened with no PTSD at T2 comparison with (42, 23.4%) at baseline assessment T1. More importantly, all three symptoms showed evidence of decline over approximately 5 months, with avoidance achieving the largest effect size ($r = .62, P < .001$), followed by intrusion and hyperarousal achieving same effect size ($r = .60, P < .001$).

Our findings support existing literature suggesting a significant decline regarding the total severity of PTSD symptoms over time after exposure to a bombing with or without treatment between 6 and 9 months (Sprang, 2001). Most longitudinal disaster studies have found the total scores of the three PTSD symptoms diminish with time and tend to decline significantly and meaningfully (Thabet and Vostanis, 2005; Jakupcak et al., 2008; North et al., 2011).

How resilience is achieved was found to occur through a number of processes. These are framed within the world assumption theory model which addresses the role of fundamental scheme change in outcomes reflecting resilience. Janoff-Bulman (1992) suggests that alleviation might be achieved by two avenues. First, people may develop more complex and flexible ways of understanding the world and of dangerous events. This is seen in statements by people that they feel themselves to be 'wiser' or 'stronger' as a result of having had the dangerous experience. In effect, they regard themselves as less naive and have, arguably, a more realistic view of the world as a potentially dangerous place. This view may be less likely to be 'fractured' by encountering further dangerous or challenging events.

Second, some assumptions are relevant to the purpose in life. These assumptions (e.g. mortality) are thought to be made more salient by an experience that highlights existential concerns. For instance, when the individual is faced with their mortality, they can become more concerned with these aspects of life that are most central, meaningful, and important. The new salience of these core beliefs and values may influence the way in which new assumption about the world and belief systems are constructed. Therefore, survivors reconstruct new assumptions about the world, self and others that are more profoundly informed by what matters to them. For instance, a bombing survivor's statement that they have changed their priorities in positive ways after experiencing a tough experience might be reflective of such a route toward alleviation.

The hypothesis also was that psychiatric co-morbidity would decline significantly over time. This hypothesis was fully supported in that there was a significant reduction over time. Although changes in the psychiatric co-morbidity seem to be debatable in the literature, the decline over time could be possible due to the following reasons: first the habituation or immunology principle. The immune hypothesis could be a factor that might have contributed in the alleviation of mental health problems. Immune hypothesis is generally recognized as a mediator of distress and a predictor of psychological well-being among survivors of traumatic experiences (Laudanski and Lis-Turlejska, 2004). And the second reason for the decline in psychiatric co-morbidity could be due to the overlap between psychiatric co-morbidity and PTSD symptoms. It was proposed that people with PTSD tend to experience psychiatric difficulties, including depression (North et al., 2011), anxiety, somatisation and social dysfunction (Wagner et al., 1998). A serious amount of literature is in line with this finding. In studies e.g. (North et al., 1999) found that forty-five percent had

a post-disaster psychiatric disorder and 34.3% had PTSD. It was also found that avoidance and intrusion symptoms were significantly associated with psychiatric co-morbidity and social dysfunction (North et al., 2011).

The hypothesis that the bombing group will experience more severe probable PTSD and psychiatric co-morbidity symptoms in all levels compared with the control group was fully supported, indicating that the control group is more successful in the interpersonal functioning than the bombing group. This relates to the extent to which the person is able to: (1) maintain a sense of self-awareness and self-identity that is reasonably stable across ordinary difficult situations and interactions with other people; (2) cope effectively and positively with the emotions without resorting to avoidance coping strategies; and (3) maintain meaningful social relationships with others that are not disturbed by inappropriate confrontations, inordinate feeling of being abandoned, or activities that purposely destroy normal social connections with the self and/or others.

The study also examined the extent to which the shattered of world assumptions is related to the severity of post-bombing PTSD and psychiatric co-morbidity. It was hypothesized that one or more of the dimensions of the shattering world assumptions would relate to the severity of post-bombing PTSD symptoms and psychiatric co-morbidity at assessment T1 and follow up T2. This was partially supported in that at T1, after controlling for the severity of the bombing attack, safety and vulnerability was associated with post-bombing PTSD but not with the psychiatric co-morbidity shortly after the bombing, whereas controllability of events was associated with post-bombing PTSD and psychiatric co-morbidity.

This supported previous literature, for example, Harris and Valentiner (2002); Walker et al. (2005) confirmed that dangerous life events could shatter fundamental assumptions held by the survivor and people with no previous trauma had more positive assumptions toward others and the future. This finding is also consistent with some research looking at other traumatic events e.g. intimate partner violence IPV (Lilly, 2008) and victims of bullying (Rodríguez-Muñoz et al., 2010) where the shattering of world assumptions showed heightened reports of PTSD symptoms and showed more negative beliefs about safety, the world and other people. Harrigan (2008) also revealed that the negative world assumptions appear to contribute and lead to increase the severity of PTSD symptoms.

Focusing on the dimensions of the shattered world assumptions, the findings revealed that of the four dimensions, safety and vulnerability had the strongest correlation with the PTSD outcome. This finding corresponds to a body of literature (e.g., Janoff-Bulman, 1992).

To discuss the foregoing finding, one can draw insights from the assumptive world theory (Janoff-Bulman, 1992). This theory argues that we all recognize and acknowledge incidents and traumatic events. However, we are at the same time still in the mind-set that "it will not happen to me". Janoff-Bulman (2004) has accurately described this as the Invulnerability Assumption (IA). We are behaving on the basis of deceptive or illusory invulnerability and people generally tend to exaggerate the probability of experiencing positive occurrences in life and reduce the probability of experiencing painful and unexpected events. But, experiencing tough traumatic events may deeply shatter our held and probably unexamined invulnerability assumption and beliefs about the safety of our world and ourselves (Jianping et al., 2007). Subsequently, the person will not be able to say *it will not happen to me*. Therefore, this assumption would change to sense of a vulnerability, not invulnerability, and threat which prevails in the perception of the victims about safety. Thus, they may seem powerless in front of an overwhelming force and at the same time feel incapable of

protecting themselves. Therefore, they realize that anything bad, dangerous, or unexpected could now happen to them. As a result, the victim's perspective toward others and the world changes. So, they recognize and believe they are living in a dangerous environment; and the world is unsafe, filled with hatred and viciousness, furthermore noticing danger more and holding a pre-occupation with danger. In other words, the trauma shatters the fundamental assumptions about the safety of our world. Wherefore, they will lose trust in others particularly if the traumatic event had been caused by another human being.

The results also supported the final hypothesis in that after controlling for the severity of the bombing experience, one or more of the dimensions of the altered self-capacity is expected to be associated with PTSD and psychiatric co-morbidity. The results did show that affect dysregulation had short term effects on post-bombing PTSD and psychiatric co-morbidity. However, they did not influence psychological distress outcomes in the long term. This finding is consistent with the widely held view that PTSD is a disorder of disturbances in the ability to regulate self-capacities (Zlotnick, 1999). This finding is also consistent with some research looking at other potential traumatic events. Studies, e.g. Zlotnick (1997), found that a greater degree of affect dysregulation was significantly related to PTSD as well as psychiatric co-morbidity among sample of 85 incarcerated women.

One could argue that it seems normal for people to develop disturbances in the ability to regulate self-capacities so soon after the bombing. The findings of this study, however, showed that participants experienced significant variation in terms of this sort of reaction to the bombing e.g. people experienced different degrees of abandonment concerns, idealization, and susceptibility (see Table 4). In other words, approximately one month after the incident, participants had different degrees of altered self-capacities. So, it is not always the case that people develop severe degrees of altered self-capacities after a bombing.

To close this article, it is worth pointing out the limitations of this study. Firstly, every effort was made to ensure that the questionnaires in both Arabic and English language were similar in meaning. Validity of the translation, however, could be one of the limitations that might have affected the results of this research. Secondly, although the researchers have tried to recruit participants for the control group from some regions that are considered safe such as – North Mosul, West Baghdad, some places in Kurdistan – the selection criteria of the group could be a further potential criticism of this study. One could argue that the control group is almost not pure control since they witness and hear about bombings almost daily. Witnessing and hearing about bombings could be another source of exposure (Bux and Coyne, 2009). So, the extent of media exposure also may have influenced responses and may be crucial avenues for future research. Thirdly, drawing on the findings of recent studies that have examined the relationship of war exposure and daily stressors to mental health status, the group differences in income could be also one of the limitations that need to be considered as they may have influenced findings and possibly included as a covariate. Therefore, low income (daily stressor) may influence the relationship between trauma and PTSD symptoms (Miller and Rasmussen, 2010).

Another possible criticism, which might influence the outcomes, is that we have not taken account of coping strategies as a possible factor affecting participants' ability to tolerate the bombing. If we take account of coping strategies, the shattering of world assumptions and altered self-capacity may be less important which, in turn may change outcomes. Fifth, we have not taken account of the past life traumatic events and to what extent they might have affected both their psychological and physical well-being. Much of the literature suggests a link between past

traumatic life events and posttraumatic stress and physical health problems (Kolassa et al., 2010). Moreover, nor do we know to what extent past traumatic stress could have exacerbated their invulnerability assumptions and beliefs about the self and safety of the world. Finally, we did not use the Structured Clinical Interview to confirm the diagnosis. So, the prevalence rate of PTSD is based on a screening instrument.

8. Conclusion

Exposure to bombing attacks leads to the development of PTSD symptoms and psychiatric co-morbidity. However, the symptoms tend to decline over time regardless of being treated or not. Exposure to bombing attacks shatters the fundamental assumptions about the safety of our world, and also affects people's core sense of self. Moreover, experiencing bombing attacks deeply shatters our held and probably unexamined invulnerability assumptions. The results also indicate that people are able to generate resilience in part by developing more complex and 'realistic' world assumptions which recognize the world as a potentially dangerous and unpredictable place. This appears to help people to be prepared for, and to gather resources for dealing with unpredictable dangers, which in the case of Iraq, are perhaps predictable in that it continues to be a highly dangerous country.

Contributors

Main author designed the study and wrote the protocol and managed the literature. Author (Man Chung) undertook the statistical analysis, and author (Rudi Dallos) wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

All authors have no conflicts of interest.

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