

Prevalence of Posttraumatic Stress Symptomatology and Distribution of Attachment Patterns 1 and 5 Months after a Terrorist Attack

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Abstract

As a consequence of a terrorist attack, people may experience posttraumatic stress disorder (PTSD) and lack of feeling secure in relationships. This longitudinal study aimed to examine the prevalence of PTSD symptoms over time, the relationship between adult attachment styles and PTSD, as well as their association with degree of exposure, and finally to consider the distribution and the trajectory of attachment styles. The sample consisted of 235 students (M=125, F=110) who were exposed to different levels of trauma intensity in response to a bombing attack. Participants were recruited and assessed approximately 1 month and 5 months after the attack using a battery of questionnaires. Findings revealed, as expected, that 79.5% of the participants met the criteria for current probable PTSD and 78.2% endorsed one of the three insecure attachment dimensions at baseline, which declined over time. Correlational analyses revealed a significant positive relationship between intensity of exposure and both PTSD symptoms and insecure attachment. The results confirm and extend previous findings on the association between direct exposure to life-threatening situation and the risk of behavioural and emotional problems among civilians, which may present as non-specific psychopathology.

Keywords:

PTSD, Attachment, Terror, Longitudinal, Iraq

Introduction

Posttraumatic stress disorder symptoms and insecure attachment may contribute to a psychological impairment, whereas the secure attachment can have an ameliorative effect on PTSD symptoms severity (Freh, Dallos, & Chung, 2013). Studies have documented associations between attachment patterns and posttraumatic stress disorder among people to a variety of stressful experiences such as unresolved loss of a loved one (O'Connor & Elklit, 2008), childhood physical abuse and serious neglect (Mickelson, Kessler, & Shaver, 1997; Dieperink, Leskela, Thuras, & Engdahl, 2001) and combat exposure (Nye et al., 2008). Studies have also shown associations between attachment and PTSD among individuals exposed to multiple (Besser, Neria, & Haynes, 2009) or single (Fraley, Fazzari, Bonnano, & Dekel, 2006) terrorist attacks, with less secure attachment being associated with higher symptoms of PTSD. However, no study has been conducted to investigate this subject among civilians in Iraq after exposure to a bombing attack.

Attachment styles have been distinguished by theorists as secure and insecure, in which the insecure attachment contains preoccupied, fearful and dismissive types (Dieperink et al., 2001). These styles are held internal representations of the availability of others to provide support along with a set of strategies for accessing the support.

This model of attachment suggested by Bartholomew 1991 contains two key components (Bartholomew & Horowitz, 1991). The first is an internal model of the self and the second is an internal model of others. Each internal model can be divided into positive or negative to produce these four attachment patterns (Renaud, 2008).

So, according to this model, a person's image toward the self can be divided into positive or negative. The positive side represents the self as worthy of love and support. On the other hand,

the negative part represents the self which does not deserve love and support. The person's image of the other also can be divided into two parts as positive and negative. The positive side represents others as trustworthy and available, whereas the negative side represents others as unreliable and rejecting. The four attachment styles that are elicited from the aggregation of two opposite dimensions in this model can be seen in Fig 1. Each cell represents a theoretical ideal, or prototype, that different people might approximate to different degrees.

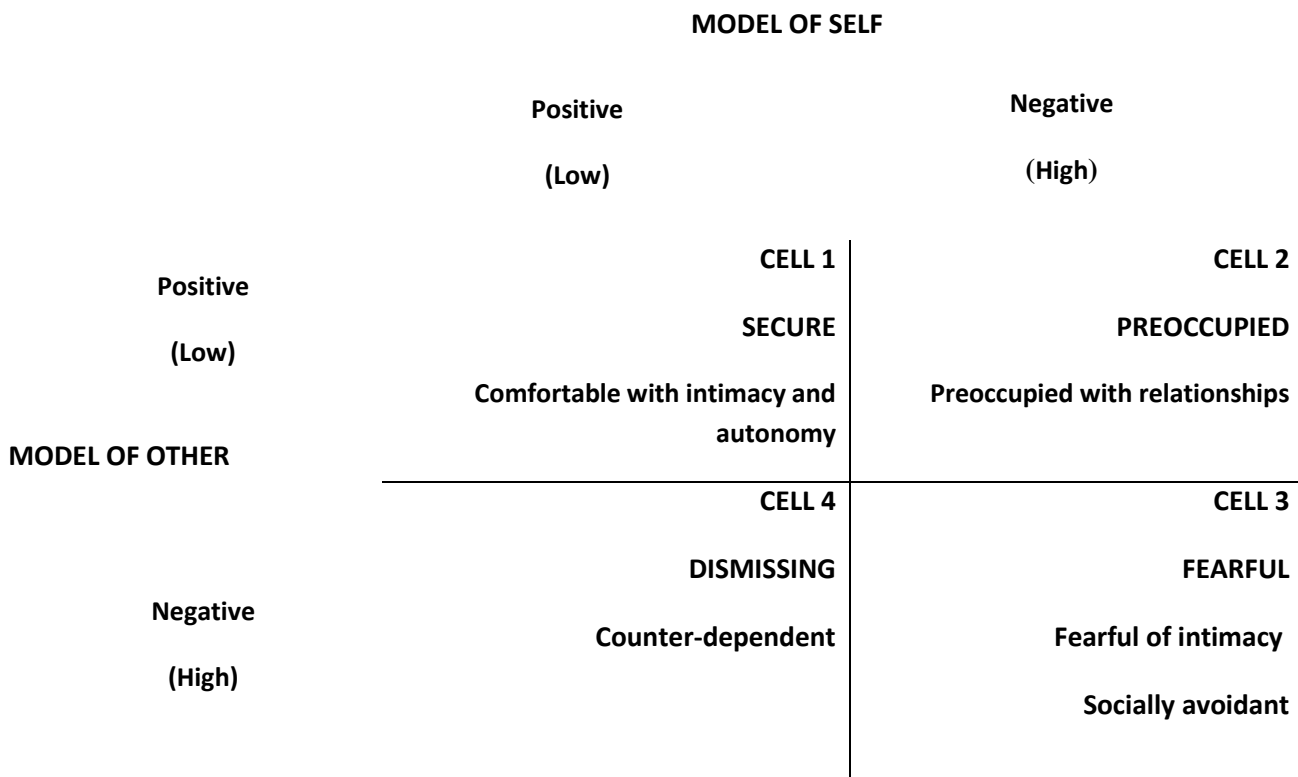


Figure 1. The two-dimension model (based on Bartholomew & Horowitz, 1991).

Since the individual's expectations that other people are generally accepting and responsive, cell 1 indicates a sense of worthiness (lovability) plus an expectation that other people are generally accepting and responsive. Theoretically, this cell represents what has been called by researchers securely attached. Cell 2, however, refers to a sense of unworthiness and an inability to love others and be loved, but it is combined with a positive evaluation of others. Individuals in this

category seek the acceptance of valued others. This pattern corresponds conceptually to Hazan and Shaver's ambivalent group (Hazan & Shaver, 1987) and to Main's enmeshed or preoccupied with attachment pattern and is referred to as preoccupied. Cell 3 is named fearful avoidant. It incorporates a sense of self-unworthiness with an expectation that others will be negatively disposed (untrustworthy and rejecting). Individuals who are under this category tend to avoid close relationships with others to protect themselves against anticipated rejection. Finally, Cell 4 indicates a sense of love-worthiness combined with a negative disposition toward other people. Such people protect themselves against disappointment by avoiding close relationships and maintaining a sense of independence and invulnerability. This style corresponds conceptually to the detached or dismissing of attachment attitude described by Main, Kaplan, & Cassidy (1985), so this category was named as dismissive avoidant.

It has been suggested that dangerous events are processed and interpreted within our attachment styles and these can influence the development of symptoms, including those of PTSD (Brewin, Andrews, & Valentine, 2000). Studies (e.g. Muller, Sicoli, & Lemieux 2000) have also been conducted to understand the short and long term effects of dangerous events on attachment styles, especially with regard to experiences such as combat and rape. Recently, researchers examining attachment styles have begun to focus on the impact of attachment patterns on the development of posttraumatic stress and psychopathology (Fraley & Shaver, 2000).

Studies have found a significant link between attachment styles and posttraumatic stress (Alexander et al., 1998). Bowlby (1982) proposed that insecure attachment results from interactions that cause individuals to doubt the trustworthiness, responsiveness, and accessibility of other people and to question the integrity of the self. Likewise, PTSD comprises feelings of distrust toward others, and reflects a state of anxious apprehension that impedes the person's ability to have satisfying interpersonal relationships.

Studies also proposed that each of the attachment styles can play a vital role in developing symptomatology (Dieperink et al., 2001). Thus, progress has been made towards understanding the influence of each pattern on the development or otherwise of PTSD and other emotional symptoms. Mikulincer & Florian (1998) suggested that individuals who possess insecure attachment styles are more likely to develop PTSD symptoms than individuals with secure attachments. In the same vein, Muller et al. (2000) demonstrated that there is a significant relationship between insecure attachment and PTSD and this association derives from the notion that both conditions embody a lack of felt security in interpersonal relations. Empirical studies such as O'Connor and Elklit (2008) also claimed that stressful attachment-related events such as the unresolved loss of a loved one can lead to a number of PTSD symptoms. Dieperink et al. (2001) also found a significant association between insecure attachment and developing PTSD symptoms and a number of psychiatric disorders such as depression and chronic pain among adults who were abused as children. The results of Muller's studies (2000), that used Griffin and Bartholomew's (1994) two-dimensional model of attachment classification, showed that fearful and dismissive attachment styles were associated with increasing level of posttraumatic symptoms (O'Connor & Elklit 2008). This may be because both these strategies involve people being reluctant and anxious to seek support from others which can help to alleviate the sense of isolation and of helplessness.

On the other hand, secure attachment may have an ameliorative effect on PTSD symptoms severity (McFarlane, 1988). Studies (e.g. Dieperink et al., 2001; Kanninen, Punamaki, & Qouta, 2003) reported that there is a significant association between secure attachment and a decrease in PTSD symptoms among males who had experienced stress and females who terminated a pregnancy. The results of Muller's studies (2000) also reported that secure attachment was associated with lower reported PTSD symptom severity and less dysphoria (Dieperink et al.,

2001). Secure attachment consists of a positive sense of self and also accompanying positive views that others are willing to provide support and comfort. They are therefore more likely to seek and to be able benefit from emotional support and comfort offered by relatives, friends and others.

Attachment Patterns in Childhood

Theory conceptualizes the propensity of human beings to make strong affectional bonds to particular others. Bowlby hypothesizes that an attachment system evolved to maintain proximity between infants and their caretakers under conditions of danger or threat. More recent formulations view the attachment system as functioning continuously to provide children with a sense of "felt security" which facilitates exploration by the child. The quality of early attachment relationships is thus rooted in the degree to which the infant has come to rely on the attachment figure as a source of security (Bowlby, 1982).

On the basis of infants' responses to separation from and reunion with caretakers in a structured laboratory procedure, it has been identified three distinct patterns of infant attachment: secure, anxious-resistant, and avoidant. Children classified as securely attached welcome their caretaker's return after a separation and, if distressed, seek proximity and are readily comforted. Infants classified as anxious-resistant show ambivalent behavior toward caregivers and an inability to be comforted on reunion. Infants classified as avoidant avoid proximity or interaction with the caretaker on reunion. Continuity in infant attachment patterns seems to be mediated largely by continuity in the quality of primary attachment relationships. According to Bowlby's theory, children, over time, internalize experiences with caretakers in such a way that early attachment relations come to form a prototype for later relationships outside the family. Bowlby (1982) identifies two key features of these internal representations or working models of attachment:

- 1- Whether or not the attachment figure is judged to be the sort of person who in general responds to calls for support and protection.
- 2- Whether or not the self is judged to be the sort of person towards whom anyone, and the attachment figure in particular, is likely to respond in a helpful way.

The first concerns the child's image of other people; the second concerns the child's image of the self. Recent research has examined the nature of internal working models in relation to children's earlier attachment styles. The data show, for example, that children classified as ambivalent hold negative views of themselves, but the data are not as consistent with respect to children classified as avoidant (Cassidy, 1988). A considerable body of research also links the child's attachment style at 12 or 18 months to the child's social and emotional adjustment through early childhood.

Attachment Patterns in Adulthood

A basic principle of attachment theory is that attachment relationships continue to be important throughout the life span (Bowlby, 1982). Although evidence exists documenting the continuity of attachment-related behaviors, investigators have only recently examined the relationship between working models of attachment and social and emotional adaptation in adults. Main (1985) has developed an Adult Attachment Interview that explores adults' representations of childhood attachment relations. On the basis of these interviews, mothers have been classified into attachment groups that parallel the three childhood attachment patterns and are predictive of the quality of the mother's interaction with her own child and the security of the child's attachment. This procedure was used by Kobak and Sceery (1988) to examine young adults' self- and other-representations, providing some evidence that secure subjects view themselves as relatively undistressed and others as supportive, that dismissive (avoidant) subjects view the self as undistressed and others as unsupportive, and that preoccupied subjects (corresponding to anxious-resistant children) view the self as distressed and others as supportive. Hazan and Shaver (1987) conceptualized romantic love as an attachment process and developed a self-report procedure to classify adults into three categories that correspond to the three attachment styles of

childhood. Their results showed that compared with the secure group, the two insecure groups reported more negative experiences and beliefs about love, had a history of shorter romantic relationships, and provided less favorable descriptions of their childhood relationships with parents. Subjects in the two insecure groups also reported more self-doubt and less acceptability to others than did those endorsing a secure self-description. These two approaches differed both in the particular attachment relationships focused on (parent-child versus love relationships) and in the methodology used for classifying subjects (interview versus self-report). Whereas the interview method identified avoidant adults as people who denied experiencing subjective distress and downplayed the importance of attachment needs, the self-report method identified people who reported feeling subjective distress and discomfort when they become close to others. Thus, a single avoidant-detached category may obscure conceptually separable patterns of avoidance in adulthood. Moreover, although Bowlby (1982) suggested that working models differ in terms of images of self and others, no study has considered all four categories that are logically derived by combining the two levels of self-image (positive vs. negative) with the two levels of image of others (positive vs. negative). The present research examined all four of these categories and assessed subjects through subjects' own self-reports.

Aims and hypothesis

This study was mainly designed to, 1) Examine the prevalence of PTSD symptoms and attachment styles among Iraqi civilians who were directly exposed to a bombing attack, 2) Investigate trajectory of PTSD symptoms and attachment styles, 3) Investigate the relationship between attachment styles, perceived life threat experience during bombing, and PTSD symptoms.

On the basis of previous literature, it was hypothesized that in the current high-risk sample of adults: (1) A significant proportion of people would meet the screening criteria of PTSD; (2)

Participants would demonstrate a predominantly insecure attachment; (3) The post-bombing PTSD and insecure attachments would decline significantly over time; (4) individuals with insecure attachment would report the greatest number of probable PTSD symptoms, whereas those securely attached would report the least; (5) Participants who have experienced bombing will show significantly greater insecure patterns than people who have not; (6) intensity of exposure would be significantly associated with the levels of probable PTSD symptoms and attachment dimensions; And (7) insecure attachment pattern would be associated with posttraumatic stress symptomatology.

Measures

Demographics characteristics

A six item demographics questionnaire was included in the study to gather information about participants' gender, age, marital status, ethnicity, income, and major life illnesses.

Bombing Experience Questionnaire

A self-report questionnaire was developed by the researcher 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 (Page et al., 2009; Verger et al., 2004) and participants checked those that applied to them. These questions assessed a variety of problems they might have experienced in function 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 (2 questions coded into yes and no categories e.g. did you anticipate that you would be involved in a bombing attack one day?). Questions were rated on a 2-point intensity scale (0=yes; 1=no); 2- level of perceived threat to life during the bombing (this section comprised 10 questions coded into yes and no categories e.g. did you feel you lost control of yourself?, 5 questions coded into 4 point scales e.g. Did you

feel isolated and alone during the attack? Questions in this section were rated on a 4-point intensity scale (0=not at all; 3= completely), and 1 open ended question e.g. which parts of your body were injured?); and 3- level of perceived threat to life after the bombing (3 questions coded into yes and no categories e.g. were you taken to a hospital?, and 5 questions coded into 4 point scales e.g. do you deliberately stay at home and avoid going out in case you experience another bombing?

Posttraumatic Stress Disorder (PTSD)

To assess the PTSD symptoms, the self-report Posttraumatic Stress Disorder Symptom Scale (PDS) was used (Foa, 1995). The PDS has a 17 item symptom severity scale corresponding to DSM-IV-TR symptoms and generates three subscales: intrusion, avoidance and hyperarousal. PTSD scoring criteria require at least one intrusion-re-experience symptom, three avoidance symptoms and two hyperarousal symptoms. Higher scores highlight more severe symptoms, with a possible score ranging from 0 to 51 (Foa, Cashman, Jaycox, & Perry, 1997). 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 sub-scales (Foa et al., 1997). Scores on the PDS and its subscales were also positively correlated with the Profile of Mood States (POMS) depression and anxiety subscales and negatively correlated with the POMS vigor subscale ($r=-.29$ to $-.39$) (Norris & Aroian, 2008). This questionnaire was used and validated among a sample of Iraqis and showed reliability and validity. Reliability was supported by Cronbach's alpha for the Arabic version (.93) and its subscales (.77-.91) (Norris & Aroian, 2008).

Relationship Scales Questionnaire (RSQ-30)

To assess a variety of attachment patterns in this study, Relationship Scales Questionnaire (RSQ-30) was used (Bartholomew & Horowitz, 1991). The RSQ is a 30-item questionnaire requiring

participants to rate, on a 5-point Likert-type scale, the extent to which these statements describe their feelings about close relationships (1 = not at all like me, 5 = very much like me). Items are summed to create four subscales- secure, fearful, preoccupied and dismissing styles. The RSQ-30 has sound psychometric properties, and concurrent validity with significant correlations with Hazan and Shaver's scale, and Collins and Read's scale. A study used data from heterosexual couples showed Cronbach alphas (averaged over partners) of 0.50, 0.73, and 0.73 for Hazan and Shaver's secure, anxious, and avoidant scales, respectively, and alphas ranging from 0.73 to 0.78 for Collins and Read's dependency, anxiety, and closeness scales (Griffin & Bartholomew, 1994).

Procedure

Participants

Equal numbers of male and female were randomly selected from the undergraduate students in Anbar University according to the selection criteria: 1) expose or witness bombing attack once in his/her life, 2) civilians, 3) 18 years old or above, and 4) no cognitive impairment. First-year students were excluded to ensure that subjects had been at college long enough to make close friends. Potential subjects were invited by the researcher to briefly explain the objectives of the study and to obtain the permission to participate. Two hundred and seventy five individual were identified. Forty person did not wish to take place, yielding a final n= 235.

The control group was recruited from the general population according to the selection criteria :- 1) no exposure to bombing attack, 2) civilians, 3) 18 years old or above, 4) be able to read and write, and 5) no previous long term psychiatric history. Two hundred and seventeen people were recruited randomly. Participants were contacted by the investigator. Due to unwillingness of 87 person to participate, names and some details of 178 (n= 87 male, (48.9%) and (n= 91 female, (51.1%) were passed to the researcher.

Translation and reliability of the questionnaires

Translation of the inventories was employed. The questionnaires which have been already translated into Arabic language and used in Arabic culture (e.g. PDS) were used in this study (Thabet et al., 2005). Whereas, questionnaires which have not been translated before into Arabic language (e.g. RSQ-30), were translated into Arabic language by the researcher and one of the interpreters. Back translation was conducted by interpreters fluent in both Arabic and English. 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). Both of the translators had lived in English speaking countries for several years and earned part of their income as professional interpreters.

Due to the fact that most of the questionnaires in this study have not been used in the Iraqi culture, the psychometric properties (e.g. reliability) for the questionnaires were essential to be found. Cronbach's alpha reliability for all the questionnaires was calculated (see table 1).

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

	<i>Scales</i>	<i>Cronbach's Alpha α</i> <i>n= 185</i>
1.	Intrusion	.76
2.	Avoidance	.66
3.	Hyperarousal	.71
4.	PDS total score	.85
5.	RSQ insecure	.77
6.	RSQ secure	.74
7.	RSQ total score	.73

Assessment

Following their consent, an interview with eligible participants was conducted. All the 235 participants were asked to complete the questionnaires comprising this study including information on their perception of threat from the bombing attack, PDS and RSQ-30 and the

demographic questionnaire. The participants were assessed at least 1 month post-bombing (T1), in accordance with the diagnostic criteria of PTSD based on DSM-IV.

Approximately five months after the first assessment, calls by cell phone were made by the researcher, of which 190 were answered by participants themselves. The others were either not answered, disconnected, had bad connections, or were answered by another person. Participants not reached by cell phone were contacted via email. Participants were asked if they still wish to carry on with the follow up of this study. All but 20 of them agreed to take place in the second assessment.

The second assessment involved almost same procedure to the first apart from the participants being asked if they had experienced a further bombing attack since the first assessment. Then, participants were asked to answer the questionnaires package (PDS and RSQ-30) for the second assessment. Twenty two participants had been exposed to further bombing attacks.

The control group participants were invited by the researcher to take part in this study. Participants were given information about what the study entails. Thereafter, participants provided written informed consent before participating. Participants were invited again in groups, at a mutually convenient time for the researcher and the participants, to complete the questionnaires of the study (PDS and RSQ-30). Each group contained approximately 20-34 person (m=27).

Results

Demographics

The sample consisted of 235 (M=125, F=110) who had been exposed to bombing attack. They ranged in age from 18 to 22 (m= 19.5). The vast majority of them were single. In terms of income level, more than one third reported low (87, 37%) and mid income (114, 48.5%).

Whereas, the income of 34 (14.4%) was high. All the participants categorized themselves as Muslims.

The subjective experience of the bombing

Considerable research has shown that there is a significant association between the perceived threat of a dangerous event and the exhibiting of stress symptoms (Becker-Blease & Freyd, 2005; Chung et al., 2004; Miguel-Tobal et al., 2006; North et al., 1999). It is therefore important to analyse and make sense of the initial responses of the participants and identify the severity of the experience. The initial responses were divided into 3 stages, before, during and after the bombing (see table 2).

Table 2 the intensity of the exposure

	YES		NO	
	N	%	N	%
Before the bombing				
Did you anticipate that you would be involved in a bombing attack one day?	174	73.6	62	26.3
Did you know anyone who died or sustained an injury in a bombing attack?	187	79.5	48	20.4
During the bombing				
Were you with anyone you know when the bomb exploded?	154	65.5	81	34.4
Did anyone you know die in the bombing?	74	31.4	161	68.5
Did anyone you know sustain an injury during the bombing?	98	41.7	137	58.2
Were you injured during the attack?	46	19.5	189	80.4
Were you covered with dark and dusty smoke from the bombing?	56	23.8	179	76.1
Were you unconscious during the attack?	23	9.7	212	90.2
Did you feel that you were going to die during the attack?	133	56.5	102	43.4
Did you see people exploded into pieces?	17	7.23	218	92.7
Did you see body remains?	12	5.1	223	94.8
Did you see people severely injured?	43	18.2	192	81.7
	Mean		SD	
Was the injury painful?	1.04		.56	
Did you feel confused?	1.82		.57	
Did you feel you lost control of yourself?	1.84		.83	
Did you feel isolated and alone during the attack?	1.94		.72	
Were you horrified by what you saw during the attack?	1.01		.62	
	YES		NO	
After the bombing	N	%	N	%

Did you try to rescue other victims after the bombing?	15	6.3	220	93.6
Were you taken to a hospital?	35	14.8	200	85.1
Did you leave the site of bombing without seeking medical care?	194	82.5	41	17.4
	Mean		SD	
Are you angry about what happened to you?	2.13		.91	
Are you worried that you might experience another bombing?	1.92		.86	
Do you think your life is in danger?	1.77		.88	
Do you deliberately stay at home and avoid going out in case you experience another bombing?	1.43		1.34	
Do you feel that the bombing attack have changed you as a person?	1.82		.86	

Prevalence of Current Probable PTSD

To permit comparisons across studies, the researcher assessed probable PTSD using DSM-IV diagnostic criteria (the frequency rating had to be one or higher re experiencing symptom, three avoidance symptoms, and two hyperarousal symptoms. In the present study, 79.3 % of the participants met the criteria for current probable PTSD. Avoidance symptoms were the most prevalent, followed by hyperarousal. The less frequently endorsed symptom among participants was intrusion (see table 3).

Table 3 screening criteria of post-bombing PTSD and mean scores

	NO PTSD		Probable PTSD		Intrusion		Avoidance		Hyperarousal	
	N	%	N	%	Mean	SD	Mean	SD	Mean	SD
PDS- T1 (235)	48	20.4	187	79.5	6.68	2.86	9.94	3.09	6.98	2.77
PDS- T2 (215)	63	29.3	152	70.6	5.45	2.33	7.88	2.32	5.66	2.13
<i>t</i>					6.15**		8.97**		9.13**	
<i>R</i>					.52		.55		.58	

** $p < .001$, * $p < .05$; r = effect size

At the follow up approximately five months after the first assessment, PDS showed that over two thirds of the participants met the PTSD screening criteria, whereas nearly one third were

screened with no PTSD. The symptoms level did change slightly but significantly between the two time assessments (see table 3).

Distribution of attachment dimensions over time

The predominant attachment dimensions were calculated by selecting the RSQ category with the highest mean rating (Muller et al., 2000). At T1, 78.2% (n=184) of the participants endorsed one of the three insecure attachment dimensions (fearful, preoccupied or dismissing). Whereas, secure style was predominant for only 21.7% (n= 51), indicating that the attachment styles within this sample were predominantly insecure (See table 4).

Table 4 Trajectory of attachment styles over time

Attachment Patterns T1 n=235	Attachment Patterns T2 n=215							
	Secure		Fearful		Preoccupied		Dismissing	
	N	%	N	%	N	%	N	%
Secure (n=51)	42	19.53	9	4.18	5	2.32	3	1.39
Fearful (n=84)	9	4.18	58	26.97	2	0.93	4	1.86
Preoccupied (n=37)	4	1.86	2	0.93	22	10.23	3	1.39
Dismissing n=(63)	4	1.86	12	5.58	8	3.72	28	13.02

Missing data=20

Regarding the time course of the attachment styles, results showed that there was an increase in the number of participants who exhibited secure attachment, whereas there was decrease in insecure styles over time. In particular, *t* test showed that there was a significant decline over time in fearful [$t(214) = 7.32, p < .001, r = .43$], preoccupied [$t(214) = 6.74, p < .001, r = .58$] and dismissing patterns [$t(214) = 7.66, p < .001, r = .49$], whereas secure attachment [$t(214) = 6.01, p < .001, r = .59$] increased significantly over time.

In comparison with the control group, people who had experienced bombing showed scores significantly higher than the control on fearful [$t(411) = 17.44, p < .001, r = .64$], preoccupied [t

(411) =12.35, $p<.001$, $r=.56$] and dismissing styles [$t(411) =13.22$, $p<.001$, $r=.63$], whereas the control group had significantly higher scores [$t(411) =-18.23$, $p<.001$, $r=.77$] than the bombing group on the secure pattern.

PTSD symptoms, attachment dimensions and intensity exposure

The researcher also examined the association between the intensity of exposure to bombing attack, symptoms of PTSD and attachment patterns. The results indicate that intensity of exposure was significantly associated with avoidance, intrusion and hyperarousal. Furthermore, analysis of the association between intensity exposure and the remaining study variables indicated that both attachment dimensions were significantly associated with intensity exposure. The results of this study also showed that attachment patterns among individuals exposed to bombing attack are significantly associated with level of PTSD symptoms (see table 5).

Table 5 correlations (r) for measures of attachment patterns, PTSD symptoms, and intensity of exposure

Variable	1	2	3	4	5	6	7	8
<i>PTSD symptoms</i>								
1. Intrusion	-							
2. Avoidance	.40**	-						
3. Hyperarousal	.35**	.37**	-					
4. PDS	.76**	.79**	.74**	-				
<i>Attachment dimensions</i>								
5. Insecure	.40**	.36**	.27**	.45*	-			
6. Secure	-.01	-.06	-.01	-.02	-.25**	-		
7. RSQ	.41**	.36**	.28**	.46**	.98*	-.05*	-	
8. Intensity exposure	.38**	.30**	.40**	.47**	.40**	-.19**	.37*	-

* $p<.05$, ** $p<.001$

Discussion

This study was conducted in a sample of Iraqi undergraduate students from University of Anbar who were exposed to bombing attack, which occurred as part of the ongoing armed conflict by terrorists in Iraqi since April 2003.

A great deal of studies conducted following terrorist attacks have suggested that the prevalence of PTSD is high among survivors (Luce et al., 2002; Verger et al., 2004; Miguel-Tobal, 2006; Bux & Coyne, 2009; Page et al., 2009; Ankri et al., 2010). However, the reported levels of probable PTSD symptoms in the present study is substantially higher and not within the range reported in previous studies documenting PTSD among individuals exposed to large-scale violent events (e.g. Page et al., 2009; North & Pfefferbaum, 2002; North et al., 2011). The study findings indicate that 79.5% of the sample met the criteria for current probable PTSD. This study refers to this outcome as current probable PTSD to acknowledge that symptoms determined through the use of a screening instrument do not necessarily indicate whether an individual meets diagnostic criteria (as suggested by North & Pfefferbaum, 2002).

The magnitude of the current study is not in line with a previous study of university students exposed to a bus bombing. That study found that 18% of the students met the screening criteria for PTSD 6 months after the event (Gil, 2005). Furthermore, in a study by North et al. (2004) examining the impact of the 1995 bombing of Oklahoma City reported that 34% of their surveyed population met the diagnostic criteria for PTSD. Several methodological and sample characteristics might explain the differences in the prevalence of PTSD in the two studies. Whereas North and colleagues used a nationally representative sample, this study was conducted using a selected sample of young adults who were all exposed to some level of direct threat to life. In addition, the two studies used different PTSD measures, which prohibit direct comparison of the findings.

It is also important to remember that the bombing experience was the first bombing experience that the cohort of this study had been exposed to and they were left without psychological intervention. Therefore, the participants might be overwhelmed by their personal experience to the point of being unable to benefit from any later support (Ankri et al., 2010). Individuals under

such difficult circumstances might continue to express high levels of post-bombing symptoms, become severely incapacitated and experience increased loneliness and isolation, contributing to the maintenance of PTSD symptoms. A related explanation for this finding could be that bombing attacks are featured in many television programs, broadcasts and print media. These programs and frequent uses of images about bombings which represent strong reminders of their experience with potential re-traumatisation probably contributed to the high levels of PTSD discovered.

On the basis of previous literature, it was hypothesized that in the current high-risk sample of adults, participants would demonstrate a predominantly insecure attachment. This hypothesis was fully supported in that more than 35% of the participants exhibited a fearful insecure pattern, 15.7% an insecure preoccupied, and 26.8% displayed an insecure dismissing pattern. In contrast, 21.7% revealed a secure attachment pattern. This finding seems to favour the idea that people react to dangerous events in different ways but that generally, insecurity is triggered by a bombing attack experience where there is, specifically, a lack of security in interpersonal relations and difficulties in becoming close to and relying on others. This finding stands in agreement with literature looking at other stressful experiences such as adults who reported the experience of childhood abuse. A study by Muller et al. (2000) indicated that 76% of a sample of adults who reported the experience of childhood abuse endorsed one of the three insecure attachment styles (dismissing, fearful or preoccupied). However, the prevalence of insecure attachment prototype in this study was higher than had been reported in literature e.g. a study by Bartholomew and Horowitz (1991) found that only 8.8% of the 77 participants exhibited the fearful style, whereas the secure group exhibited a high rating (46.7%).

Two possible explanations are worthy of exploration. Previous research suggests that the experience of bombing attack could lead to feelings of mistrust of others, and therefore would

reflect a state of anxious apprehension that holds back an individual's ability to have satisfying interpersonal relationships. Likewise, prior insecure attachments resulting from negative interactions with others could aggravate a victim's tendency to question the integrity of the self and doubt the trustworthiness, responsiveness and accessibility of others. Secondly, methodological and sample characteristics might explain the differences in the prevalence of attachment patterns. Whereas Bartholomew and Horowitz (1991) used a sample of adults, this study was conducted on a selected sample of young students who were all exposed to a high level of direct threat. In addition, the two studies used different attachment measures, which prohibit direct comparison of the findings.

Regarding PTSD and attachment styles over time, the results of this study show a decrease in rates and severity of PTSD reactions, in which, just less than one third (63, 29.3%) of survivors were screened with no PTSD at T2 compared with 20.4% (48) at baseline assessment. More importantly, all three symptoms showed evidence of decline over approximately 5 months, with hyperarousal achieving the largest effect size ($r = .58$, $p < .001$), followed by avoidance ($r = .55$, $p < .001$) and intrusion ($r = .52$, $p < .001$). This finding is in agreement with broader trauma research literature that found a significant reduction regarding the total severity of PTSD symptoms over time with or without treatment (Sprang, 2001; Thabet, Abed, & Vostanis, 2004; Jakupcak et al., 2008; North et al., 2011). This reduction in PTSD symptoms over time can be explained by a traumatic research literature. Researchers e.g. North and colleagues (2011) emphasize the ability of people to adapt to the new traumatic and dangerous situations and maintain their level of psychological functioning, in spite of adverse events and environments. The overall evidence is that symptoms peak during the first year and then decline gradually. Literature also supports the claim that people have a natural tendency to engage in positive accommodation, given a psychologically nourishing environment to alleviate the effects of their

traumatic experiences (Shaw, Joseph, & Linley, 2005), particularly if there is a secure, stable, and supportive environment.

It was also hypothesized that bombing-related insecure attachment will decline over time with or without treatment. The findings of this study supported this hypothesis in that there was a significant reduction in the insecure attachment pattern. Although no previous longitudinal study has been conducted looking at the trajectory of attachment styles after the experience of a bombing attack, this finding is consistent with literature looking at the time course of attachment among psychiatric patients. In a study by Fonagy et al. (1996), psychiatric patients were administered the Adult Attachment Interview (AAI) twice over a period of one year. Of the 82 patients, the results reported changes from insecure to secure attachment status for more than 40%. In other studies e.g. Diamond and colleagues (2003), attachment patterns for over one third of the patients changed from insecure to secure. Also, among a group of 29 people, Travis et al. (2001) reported a significant increase in secure attachment and a significant decrease in the number of participants with fearful attachment (Daniel, 2006).

It is not easy to make comparisons with the present study since most changes in attachment patterns reported in these studies were after the provision of psychotherapy. However, it is worth drawing attention to the following two points: First, changes could be due to the reliability of the measures used to assess attachment patterns over time. A portion of observed change is sometimes attributable to measurement error (Waters, Hamilton, & Weinfield, 2000). To validate the genuineness of changes in attachment patterns, future research should include other instruments such as Adult Attachment Interview (AAI) which do not simply rely on self-report measures which are prone to defensive biases. Bartholomew and Horowitz (1991) argued that people identified as dismissing and avoidant on the AAI and on the Hazan and Shaver questionnaire respectively were different in important respects. Second, feeling secure after

experiencing a highly dangerous event is relatively rare. However, resilience and decline of PTSD and other symptoms could make rates of secure attachment noteworthy. This decline and the reduction of some symptoms thus seem to be able to shift measured attachment in the direction of greater security. This is not surprising since PTSD and symptoms of unresolved states are conceptualised as features of insecure attachment.

The results of this study also supported the hypothesis that people with insecure patterns will show a greater number of PTSD symptoms. The results indicate that the majority of the participants who developed probable PTSD symptoms exhibited insecure attachment. This is consistent with existing studies that demonstrated associations between attachment patterns and PTSD after exposure to a stressful experience such as unresolved loss of a loved one (O'Connor & Elklit, 2008), childhood physical abuse and serious neglect (Dieperink et al., 2001; Mickelson et al., 1997). This finding can be explained by two potential processes. First, individuals with insecure attachment pattern are less resilient to life threat and are, therefore, more likely to show high levels of PTSD symptoms (Mikulincer & Florian, 1998). The second potential process is that individuals who perceive their social networks as being unsupportive under situations of continuous stress may exhibit elevated anxiety levels in the form of PTSD symptoms (Florian, Mikulincer, & Bucholtz, 1995).

Data of the present study also suggest that intensity of exposure to a bombing attack is significantly associated with reported levels of PTSD symptoms and both attachment dimensions. The magnitude of this finding is consistent with existing literature that severity of experience, as represented by number of injuries and secondary exposure through injury and death of loved ones, is a risk factor for development of posttraumatic stress symptomatology (North et al., 1999) and can yield a negative view of oneself in relation to others "insecure attachment" (Roberts, Gotlib, & Kassel, 1996; Bowlby, 1982). Results in the literature also have

suggested that people with a severe bombing experience “directly affected” have higher levels of PTSD symptoms and demonstrated insecure attachment than individuals with low severity “indirectly affected” (Somer et al., 2005; North et al., 1999). This finding might potentially be due to the fact that people with a severe experience tend to magnify the impact of stressful events, bombing in this case, and manifest a variety of intrusion, avoidance symptoms, and lack of feeling secure in interpersonal relations.

The final finding revealed that posttraumatic stress symptomatology is significantly associated with insecure attachment, hence confirming the existing literature reporting that bombing-exposure survivors who adopt insecure attachment were exhibiting more post-bombing PTSD symptoms (Mikulincer & Shaver, 2007; Besser & Neria, 2010). The present result also supported previous literature. For example, Alexander et al. (1998) have demonstrated that insecure attachment styles predicted the development of PTSD symptoms. This finding could be discussed according to the attachment and psychopathology theory. Bowlby (1982) postulated that the association between PTSD and insecure attachment derives from the idea that both conditions embody a lack of felt security in interpersonal relations. Studies in this field e.g. (Bartholomew & Horowitz, 1991; Bowlby, 1982) proposed that PTSD involves mistrust feelings of others, and therefore would reflect a state of anxious apprehension that hold back an individual's ability to have satisfying interpersonal relationships with others. Likewise, insecure attachment results from negative interactions with others that could cause individuals to question the integrity of the self and doubt the trustworthiness, responsiveness, and accessibility of others.

There are some limitations in this study that need to be considered. Firstly, the prevalence rate of the probable PTSD was based on a self-report instrument. The limitation of self-report is not an exclusive problem for the present study and appears in many studies on PTSD following perceived life threat (Gillespie et al., 2002; Luce et al., 2002; Page et al., 2009). It has been

argued that self-report measures often over estimate symptoms and it is advocated that using Structured Clinical Interview (SCI) may help to address their limitation. However, it was not possible to conduct SCI for such a large group of participants due to the time constraints. Secondly, a longer follow-up study would have given a more complete picture, but again, reactions to new stresses due to the difficult life circumstances and on-going bombing attacks could have been difficult to exclude. Finally, the selection criteria of the control group could be a potential weakness of the study. One might argue that the group is not purely control since they would have witnessed and heard about bombings almost daily. Witnessing and hearing about bombings could be another source of exposure may have influenced responses (Bux & Coyne, 2009).

The strengths of this study are, however, important to consider. To the best of the researcher's knowledge, the present study represents the first attempt toward efforts to understand the relationships between attachment dimensions and their associations with PTSD and intensity of exposure over time among Iraqi young students experiencing life-threatening attack. In addition, this study employed a prospective design. This design allowed the researcher to assess the stability and continuity of variables and provided more definitive results since data drawn longitudinally are much stronger than correlational data. Furthermore, this study was conducted using mostly equal samples of male and female, all Muslims, and with different outcomes. So, the findings might generalize to the broader population.

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