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## Perceived benefits after terrorist attacks: the role of positive and negative emotions

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5 Terrorist attacks have been related to the onset of several mental disorders. These events may also trigger positive  
psychological consequences in some individuals. In this research, we collected data several weeks after the  
11 March 2004 Madrid terrorist attacks. We evaluated perceived benefits as well as a broad range of positive and  
10 negative emotions. All positive emotion factors (Strength, Excitement, Pride, and Joy) were positively associated  
with perceived benefits. Of negative emotion factors (Distress, Hate, and Shame), only Hate was related,  
negatively, to perceived benefits. These results highlight the important role of positive emotions in the research of  
perceived benefits as well as the wide array of positive and negative emotions that can be elicited after a terrorist  
attack.

**Keywords:** positive emotions; benefit finding; posttraumatic growth; terrorism; trauma

### Introduction

15 In the last two decades, an abundance of literature has  
shown that life-threatening traumatic events may have  
a serious impact on direct victims and witnesses of  
those events (Norris et al., 2002). However, prior  
20 research has shown that mere exposure to a potentially  
traumatic event is not a sufficient condition to develop  
posttraumatic symptoms. Only a small percentage of  
those who have been directly exposed to a traumatic  
event develop a diagnosable mental disorder.  
Epidemiological studies in the general population  
25 indicate that, whereas approximately 60% of people  
in the United States (Kessler, Sonnega, Bromet,  
Hughes, & Nelson, 1995) and Europe (Darves-  
Borno et al., 2008) are exposed to at least one  
traumatic event in their lifetimes (such as, for example,  
30 sudden death of a close relative or friend, or a serious  
car accident), prevalence rates of posttraumatic stress  
disorder (PTSD) are 3.6% in the USA (Kessler et al.,  
1995) and just 1.1% in Europe (Alonso et al., 2004).

Although a wide variety of traumatic events exist,  
35 terrorist violence may be psychologically the most  
devastating. With regard to the type of violence  
inflicted, the United Nations defines terrorism as:  
'Any act intended to cause death or serious bodily  
injury to a civilian, or to any other person not taking  
40 an active part in the hostilities in a situation of armed  
conflict, when the purpose of such acts, by their very  
nature or context, is to intimidate a population, or to  
compel a government or an international organization  
to do or to abstain from doing any act'

(United Nations, 1999). From a psychological point  
45 of view, terrorist violence may be particularly dama-  
ging because it not only involves a deliberate intent to  
harm, but also targets populous areas and often lacks a  
clear end point, allowing the threat of terrorism to  
loom well past a specific attack (Vázquez, Pérez-Sales,  
50 & Hervás, 2008). Yet, similar to other traumatic  
events, not everyone directly or indirectly exposed to  
a terrorist attack develops posttraumatic clinical  
disorders. Recent studies in community samples have  
shown that only a low percentage of people exposed to  
55 terrorist attacks develop clinically significant disorders  
(Galea et al., 2003; Miguel-Tobal et al., 2006; Schuster  
et al., 2001; Vázquez, Pérez-Sales, & Matt, 2006). An  
emerging field within the trauma literature focuses on  
factors that promote resiliency after this type of event  
60 (Bleich, Gelkopf, Melamed, & Solomon, 2006;  
Bonanno, Galea, Bucciarelli, & Vlahov, 2006).

Furthermore, recent research has shown that  
65 people directly or indirectly exposed to traumatic  
events may experience various positive emotions and  
outcomes (Helgeson, Reynolds, & Tomich, 2006). The  
phenomenon of experiencing positive effects after  
traumatic events has received considerable theoretical  
and empirical attention in the past decade, and has  
70 been described as posttraumatic growth, thriving,  
stress-related growth, benefit finding, or adversarial  
growth, among other names (Butler et al., 2005).  
Recent studies have found this kind of positive result  
in persons who have survived traumatic events such  
75 as natural disasters, cancer, community violence,

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and sexual assault (Linley & Joseph, 2004; Vázquez, Cervellón, Pérez-Sales, Vidales, & Gaborit, 2005).

Unexpectedly, experiences of positive growth have been also found after terrorist attacks (Vázquez & Páez, in press). For example, a study including more than 4000 people compared data concerning perceived strengths before and after the New York September 11, 2001, terrorist attacks. The results showed that, following the attack, several character strengths increased significantly and, moreover, this increase remained significant for several months (Peterson & Seligman, 2003). Specifically, positive changes were found in various strengths associated with interpersonal factors (i.e., kindness, leadership, love, and teamwork), and in aspects related to the philosophy of life or spirituality (Ai, Cascio, Santangelo, & Campbell, 2005). Another investigation also studied positive emotions as precursors to posttraumatic growth. A group of students from New York University were evaluated before and after the September 11 terrorist attacks (Fredrickson, Tugade, Waugh, & Larkin, 2003). Results from this study showed that resilient individuals were most likely to suggest posttraumatic growth following September 11. Most interesting, mediational analyses showed that positive emotions experienced on the same the day or immediately following the day of the attacks (gratitude, interest, love) fully accounted for the relation between pre-attack resilience and post-attack growth, which suggests that positive emotions experienced in the aftermath of the terrorist attacks increased perceptions of psychological growth. Unfortunately, this study did not report the association between specific emotions emerging after the terrorist attack and posttraumatic growth.

Other studies found that the general public may display positive effects from a terrorist attack in terms of philanthropic and altruistic behaviours, social sharing of emotions, and a significant increase in feelings of closeness or feeling proud to belong to the nation (see review in Vázquez et al., 2008). However, it is important to note that the existence of positive reactions after traumatic events does not mean that negative effects are eliminated as a consequence. In a study carried out with a Spanish sample after the 11 March 2004 attacks in Madrid, a direct and significant relation was found between the perception of positive and negative psychological consequences (Barbero & Linley, 2006). A similar result was found with a British sample after the September 11 attacks (Linley, Joseph, Cooper, Harris, & Meyer, 2003). Therefore, the nature of the relations between positive and negative reactions following a terrorist attack remains unclear.

The present study investigated the emergence of positive and negative emotions as well as perceived benefits following a terrorist attack in Madrid, Spain. On 11 March 2004, Al Qaeda attacked metropolitan Madrid by detonating a series of bombs in three

different train stations, killing 191 people and wounding more than 1500 others. Following the strategy initiated after the September 2001 terrorist attacks on New York, we designed a study to assess the reactions of the general population 2 weeks after the attacks. The first goal of our study was to construct a more detailed picture of the positive and negative emotions elicited following a terrorist attack. For that purpose, we included a wide array of emotions that can help us to better understand psychological reactions after that type of event. The second goal of our study was to explore the relation between the pattern of emotions experienced by people after a traumatic event and the perception of benefits derived from that experience. Fredrickson et al. (2003) suggested that the cognitive broadening that accompanies states of positive emotion can improve the ways people cope during crises. Likewise, most theorists and studies have suggested that positive emotions are part of the pathway to perceived benefits, as we mentioned above (e.g., Tedeschi & Calhoun, 1995). However, several studies with breast cancer survivors (Sears, Stanton, & Danoff-Burg, 2003) found that some specific positive emotions (i.e., optimism) are not significantly related to benefit finding measures. Thus, we aimed to explore more systematically the pattern of connections between positive and negative emotions with people's perception of psychological benefits derived from such events.

## Method

### *Participants and procedure*

One week after the 11 March 2004 attack, a class of university psychology students in Madrid was asked to participate in a study on the effects of terrorist attacks in the general population. The students completed a questionnaire and were asked to recruit two adults aged 18 or older who were in Madrid on the day of the terrorist attack. Following Galea et al.'s (2002) procedure, people exposed to the attacks were oversampled by asking the students to preferably select people who had been somehow exposed to the attacks (see [exposure criteria in Section 2.2.3](#)). The final sample comprised 194 university students and 309 individuals from the general population. All participants returned the questionnaires 18–25 days after the terrorist event. The return rate was 66.8%. The final sample consisted of 503 respondents (67% female) whose average age was 31.4 years ( $SD = 14.8$ ).

### *Measures*

#### *Posttraumatic stress symptoms*

The measure of these symptoms was assessed with the Posttraumatic Stress Disorder Checklist-Civilian

185 (PCL-C; Weathers, Litz, Herman, Huska, & Keane,  
1993), a 17-item self-report that covers the set of  
symptoms associated with PTSD as defined in the  
DSM-IV (American Psychiatric Association, 1994).  
The PCL-C was *explicitly* framed with respect to the  
190 11 March 2004 terrorist attacks. Items were scored on  
a scale ranging from 1 (*not at all*) to 5 (*extremely*). The  
possible range of scores was 17–65. The overall  
diagnostic efficiency has been found to be acceptably  
high at 0.90 (Blanchard, Jones-Alexander, Buckley, &  
195 Forneris, 1996). In our study, the scale showed high  
internal consistency (Cronbach's  $\alpha = 0.89$ ).

#### *Psychopathological reactions*

We included the Spanish 12-item version of the  
General Health Questionnaire (Goldberg & Williams,  
200 1988; Lobo, Perez-Echeverria, & Artal, 1988), a widely  
used instrument in epidemiological studies with a  
general population. Each item assesses the severity of  
a psychological symptom over the past few weeks using  
a 4-point scale (from 1 to 4). Following the procedure  
used by Gao, Luo, Thumboo and colleagues (2004), we  
205 used the total score as a single global index of  
psychopathology. The total score ranges from 12 to  
48, with higher scores indicating worse conditions.  
The total score of the GHQ showed a high level of  
internal consistency ( $\alpha = 0.86$ ).  
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#### *Exposure to the events*

A 6-item questionnaire was used to explore the role of  
exposure in the reactions to the terrorist attacks. This  
Exposure Questionnaire was made up of questions  
from Galea et al. (2002), Schuster et al. (2001), and  
215 also items that were recommended by the NIH Office  
of Behavioral and Social Sciences Research (2002) to  
assess the degree of exposure to the September 11  
attack. Respondents were asked to report whether they  
were injured or physically affected by the attacks (this  
220 item was scored on a 3-point rating scale where  
 $0 = \text{not at all}$ ,  $2 = \text{a lot}$ ); and whether they directly  
witnessed the attacks, or knew (a) people, (b) friends,  
or (c) relatives who were wounded or killed during the  
225 attacks (these five items were responded on a 2-point  
rating scale where  $0 = \text{no}$ ,  $1 = \text{yes}$ ). We computed a  
total score for level of exposure by adding the scores of  
all of these items.

#### *Positive and negative emotions*

230 Emotions were assessed by a self-report which included  
the 20-item Positive and Negative Affect Scale  
(PANAS; Watson, Clark, & Tellegen, 1988), and  
other relevant emotions (e.g., Fredrickson et al.,  
2003). For a more detailed assessment of the emotions  
235 that can arise in the context of a terrorist attack

(e.g., Rasinski, Berkbold, Smith, & Albertson, 2002),  
we added four additional positive emotions (peaceful,  
grateful, hope, cheerful) and ~~five~~ additional negative  
emotions (hate, shame, sad, humiliated, aggressive,  
helpless). In addition, we also included a list of other  
240 positive feelings that, although they cannot be con-  
sidered pure emotional states, we thought that they  
could be relevant to assess people's reactions to a  
terrorist attack (solidarity, the feeling of belonging to a  
nation, trust in others, safe, and sense of control).  
245 Intensity ratings of all the items were made on the  
PANAS 5-point scale that included 'very slightly or  
not at all', 'a little', 'moderately', 'quite a bit', and  
'extremely'. For the current study, the respondents  
250 were asked to report the intensity of their mood during  
the '48 hours following the attacks'.

#### *Perceived benefits*

Positive perceptions of the experience were assessed  
with the *Positive Meaning Scale* used by Fredrickson  
et al. (2003) in their prospective study of resilience and  
255 positive emotions following the terrorist attacks on  
September 11. This 5-item scale examined the extent to  
which participants found some positive meaning within  
the terrorist attack or were able to expect future  
benefits from it: 'Did anything good come out of  
260 dealing with this problem?'; 'Do you feel that you  
might find benefit in this situation in the long-term?';  
'Do you think it is likely that there is something to  
learn from this experience?'; 'Did you try to see the  
good side of the situation?'; 'Did you think about how  
265 this event could change your life in a positive way?'.  
All items were rated on a 5-point scale ( $0 = \text{nothing}$ ,  
 $4 = \text{much}$ ). The alpha coefficient of the scale  
was 0.76.

## **Results**

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### *Description of the sample*

Data from 503 participants were initially included in  
the study. Twenty participants (4.0%) were directly  
exposed to the terrorist attack, and seven (1.4%)  
275 suffered injuries as a consequence of the attack.  
Seventy-three participants (14.5%) were daily users  
of the subway lines that were affected by the attack,  
and 218 participants (43%) knew someone affected by  
the attack; 116 (23%) were friends of direct victims,  
whereas 32 participants (6.4%) were relatives of  
280 someone directly affected by the attack.

### *Posttraumatic symptoms*

In our sample, the mean PCL-C total score was 31.9  
( $SD = 12.9$ ). Using the standard cut-off scores  
285 suggested for the PCL-C to assess the probable

Table 1. Mean and standard deviation of intensity of positive emotions after Madrid 11 March 2004 terrorist attacks for total sample, no direct exposure subsample, and direct exposure subsample.

	Total sample		No direct exposure ( $n = 247$ )		Direct exposure ( $n = 250$ )		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>PANAS Positive Affect</i>							
Interested	2.51	1.11	2.63	1.05	2.42	1.18	2.14*
Alert	2.19	1.20	2.00	1.19	2.39	1.19	-3.64**
Attentive	2.02	1.15	2.02	1.16	2.04	1.15	-0.23
Active	1.69	1.14	1.66	1.15	1.73	1.14	-0.70
Strong	1.64	1.11	1.64	1.13	1.65	1.11	-0.09
Determined	1.49	1.13	1.51	1.10	1.49	1.18	0.12
Excited	1.51	1.21	1.49	1.15	1.54	1.27	-0.50
Proud	1.09	1.34	1.13	1.33	1.07	1.38	0.45
Inspired	0.42	0.78	0.51	0.83	0.34	0.73	2.48*
Enthusiastic	0.30	0.65	0.37	0.73	0.25	0.58	2.10*
<i>Other positive emotions</i>							
Peaceful	1.56	1.12	1.66	1.13	1.48	1.12	1.82
Grateful	1.12	1.37	1.09	1.34	1.18	1.42	-0.77
Hope	0.74	0.92	0.79	0.97	0.70	0.90	1.07
Cheerful	0.48	0.77	0.56	0.85	0.39	0.67	2.55*
<i>Other positive reactions</i>							
Solidarity	3.12	0.99	3.04	1.00	3.21	0.98	-1.93*
Belonging to a nation	3.07	1.04	3.08	1.04	3.09	1.04	-0.76
Trust in others	1.77	1.04	1.8	1.03	1.75	1.08	0.53
Safe	0.68	0.96	0.78	1.00	0.60	0.94	2.12
Sense of control	0.59	0.94	0.66	0.92	0.53	0.97	1.49

Note: A 4-point Likert scale was used (ranging from 0 = none or very slightly to 4 = a lot).

\*\* $p < 0.01$ ; \* $p < 0.05$ .

PTSD cases (Ruggiero, Del Ben, Scotti, & Rabalais, 2003), 13.3% of the participants scored 44 or above on the PCL-C total scores, whereas 7.2% of the sample scored 50 or above. These results were similar to those found in other studies that analyzed the impact on the general population of terrorist attacks. For instance, Schlenger et al. (2002), also using the PCL-C (cut-off score  $>50$ ) in a US nationally representative sample several weeks after the September 11 attacks, detected possible cases of PTSD ranging from 2.7% in Washington, DC, to 11.2% in New York City.

### Positive and negative emotions

A mean score for each of the emotions assessed in our study (i.e., positive items of PANAS and the rest of positive and negative emotions added in our study) was calculated. We found that 'Interested', 'Alert', and 'Attentive' were the most frequent positive emotions after the attack (see Table 1). Regarding other positive reactions, it is noteworthy that feelings of 'Solidarity' and 'Being part of a nation' had the highest means, even when including the rest of the positive emotions. Nevertheless, it is possible that the magnitude of positive emotions in a stressful circumstance depends entirely upon the level of exposure to the event. To rule out this possibility, we divided the sample into two subgroups according to their level of exposure to the

terrorist attacks. Those participants who responded that they had not been exposed in all items of the *Exposure to the Events Questionnaire* were labelled as the 'No Direct Exposure' group ( $n = 247$ ). The 'Direct Exposure' group ( $n = 250$ ) was made up of the rest of the participants (i.e., those who responded positively to at least to one of the direct exposure items). As Table 1 shows, for most of the positive emotions, there were no significant differences between the Direct versus No Direct Exposure. Interestingly, the Direct Exposure group showed higher scores in interest than the group of people who had no direct involvement in the tragedy.

### Positive and negative emotions and perceived benefits

Zero-order correlations were calculated in order to analyze the associations between specific positive emotions and perceived psychological benefits related to the stressful event. We used partial correlations to control for participants' level of exposure. As shown in Table 2, 'Determined', 'Attentive', and 'Strong' were the positive emotions more closely associated with perceiving positive results from the event, regardless of the level of exposure.

### Positive and negative emotion factors

In order to obtain a more succinct index of the emotions experienced, two exploratory factor analyses

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Table 2. Zero-order correlations between positive emotions and the index of perceived benefits. Partial correlations controlling for participants' level of exposure are shown in parentheses.

	Perceived benefits
<i>PANAS Positive Affect</i>	
Determined	0.24*** (0.24***)
Attentive	0.21*** (0.19***)
Strong	0.19*** (0.20***)
Active	0.17*** (0.16***)
Proud	0.16*** (0.19***)
Inspired	0.15*** (0.18**)
Interested	0.15*** (0.15***)
Excited	0.07
Enthusiastic	0.06
Alert	-0.01
<i>Other positive emotions</i>	
Peaceful	0.16*** (0.17***)
Grateful	0.16*** (0.17**)
Hope	0.13** (0.14**)
Cheerful	0.04
<i>Other positive reactions</i>	
Trust in others	0.17*** (0.18***)
Belonging to a nation	0.12** (0.17**)
Solidarity	0.06
Safe	0.06
Sense of control	0.06

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ .

were conducted including positive and negative emotions, respectively. In the first one, we included the 14 positive emotions assessed (excluding positive reactions). Using maximum likelihood estimation and an oblimin rotation procedure, we obtained a four-factor solution that explained 56.9% of the variance. The four factors extracted were Strength, Excitation, Pride, and Joy (see Table 3).

We conducted a similar factor analysis (i.e., maximum likelihood estimation and oblimin rotation procedure) with the 15 negative emotions assessed. We obtained a three-factor solution that explained 57.9% of the variance. In this case, the three factors were labelled as follows: Distress, Hate/Revenge, and Shame (see Table 4).

Finally, for further analyses, we calculated the variables corresponding to each factor, making a composite index of the items loading 0.40 or more. When an item loaded in two factors, it was not included in any composite.

**Perceived benefits and positive and negative emotion factors**

We calculated the zero-order correlations for positive and negative emotion indexes obtained through factor analyses. Perceived benefit significantly and positively correlated with the four positive emotion factors.

Table 3. Factor analysis of positive emotion items (factor loadings >0.40).

	Factors			
	Strength	Excitement	Pride	Joy
Strong	0.86			
Peaceful	0.73			
Active	0.72			
Determined	0.70			
Excited		0.78		
Alert		0.72		
Attentive		0.54		
Interested	0.47	0.40		
Grateful			0.81	
Proud			0.75	
Enthusiastic			0.48	0.45
Cheerful				0.73
Hope				0.67
Inspired				0.66
% of variance explained	25.12%	13.86%	9.67%	8.31%

Table 4. Factor analysis of negative emotion items (factor loadings >0.40).

	Factors		
	Distress	Hate/revenge	Shame
Distressed	0.86		
Frightened	0.80		
Fearful	0.79		
Worried	0.74		
Sad	0.69		
Anxious	0.69		
Helpless	0.69		
Revenge		0.88	
Hate		0.85	
Aggressive		0.59	
Irritated		0.51	
Shame			0.76
Guilty			0.67
Humiliated			0.59
% of variance explained	37.36%	12.67%	7.92%

Yet, there was also one negative emotion factor (i.e., hate) that showed a significant negative relation to participants' ability to perceive positive results from the event (see Table 5).

We also calculated zero-order correlations between the positive and negative emotions composites (PANAS plus emotions added) and the perceived benefits index. We found a significant positive correlation between the perceived benefits index and positive emotions ( $r = 0.30, p < 0.001$ ), but the correlation with negative emotions was nonsignificant ( $r = -0.06, ns$ ). Using only the items from the PANAS, the results were

Table 5. Zero-order correlations between factors of positive and negative emotions and the perceived benefits index.

	Perceived benefits	Positive emotion factors				Negative emotion factors		
		Strength	Excitement	Pride	Joy	Distress	Hate	Shame
Strength	0.25***	–						
Excitement	0.12**	0.12**	–					
Pride	0.20***	0.23***	0.23***	–				
Joy	0.15***	0.35***	–0.03	0.12**	–			
Distress	–0.01	–0.18***	0.63***	0.10*	–0.21***	–		
Hate	–0.14**	0.05	0.39***	0.11*	0.07	0.42***	–	
Shame	0.01	0.09*	0.29***	0.08	0.07	0.32***	0.38***	–

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

Table 6. Zero-order correlations between perceived benefits, positive and negative emotions factors, and stress-related symptoms.

	Perceived benefits	Positive emotions factors				Negative emotions factors		
		Strength	Excitement	Pride	Joy	Distress	Hate	Shame
GHQ-12	0.01	–0.17**	0.35***	0.04	–0.07	0.47***	0.21***	0.24***
PCL-C	–0.06	–0.15**	0.44***	0.12*	–0.12**	0.63***	0.42***	0.31***
Intrusive	–0.05	–0.10*	0.37***	0.14**	–0.09*	0.57***	0.37***	0.28***
Avoidance	–0.05	–0.17***	0.31***	0.07	–0.09*	0.48***	0.32***	0.26***
Hyperarousal	–0.06	–0.13**	0.47***	0.10*	–0.14**	0.62***	0.41***	0.27***

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

375 nearly identical. There was a significant positive  
correlation between the perceived benefits index and  
the positive affect subscale ( $r = 0.27$ ,  $p < 0.001$ ), but not  
with the negative affect subscale ( $r = -0.04$ ,  $ns$ ).

#### *Perceived benefits, emotions, and symptoms*

380 We also calculated zero-order correlations among  
positive and negative emotional factors, psychological  
symptoms, and perceived benefits. As can be seen in  
Table 6, perceived benefit was neither significantly  
related to specific trauma-related symptoms, as  
385 assessed by the PCL total score and its three factors,  
nor to general distress, as assessed by the GHQ-12. The  
three negative emotion factors positively correlated  
with all of the symptom measures. Yet, the general  
pattern of correlations with positive emotions and  
390 psychopathology was mixed. Whereas the Strength  
factor correlated negatively with the severity of stress-  
related symptoms, the Excitement and Pride factors,  
when significant, were positively correlated with  
psychological symptoms (see Table 6). It could be  
395 hypothesized that the unexpected association between  
the factor Excitement and stress-related symptoms is  
partially due to the fact that, at least in Spanish, the  
translation of excited (*excitado*) and alert (*alerta*)

is ambiguous, as they can be interpreted by readers  
both in a positive sense (associated with enthusiasm) 400  
and in a negative sense (associated with hyperarousal).

In order to further explore this possibility, we  
conducted another factor analysis this time including  
the positive and the negative emotions simultaneously.  
A six-factor solution was found, explaining 56.7% 405  
of the variance. Interestingly, ‘Excited’ and ‘Alert’ loaded  
in the factor that gathered emotions associated with  
distress, suggesting that most participants seemed to  
interpret these items as negative emotions. We again  
410 calculated the correlation between the positive emo-  
tions index (omitting these two ambiguous emotions)  
and perceived benefits, but the correlation was almost  
identical ( $r = 0.31$ ,  $p < 0.001$ ).

#### **Discussion**

The results from our study confirm that, even in highly 415  
stressful conditions, positive emotions can coexist with  
negative emotions (see Linley et al., 2003). These  
findings support previous research concerning the  
general population following a terrorist attack. For  
420 example, in a national survey on the effects of the  
September 11 attacks, Smith, Rasinski, and Toce  
(2001) observed that, at the moment of the interview

(i.e., 2 weeks after the attack), 69.0% of the participants felt positive emotions and 33.7% felt negative emotions.

In our sample, the two most frequent positive emotions experienced by participants were solidarity and the feeling of being part of a nation. This finding is consistent with previous literature. For example, Smith et al. (2001) found that 59% of American citizens engaged in positive civic actions (e.g., charities, blood donation, or volunteering for organizations) in response to the attacks. Regarding the feelings of being part of a nation, a survey conducted after the September 11 attacks showed that national pride increased in the general population in the USA after the attacks (Smith et al., 2001), in a score that was already among the two or three highest in the world (Smith & Kim, 2006). Furthermore, according to several national surveys, between 74% and 82% of Americans engaged in flag-display behaviours (Skikta, 2006).

One of the chief aims of our study was to explore the relation of positive emotions experienced by people after a traumatic event and the perception of benefits. Our findings show that positive emotions were consistently related to the perception of benefits after the traumatic event. In fact, all four positive emotion factors (i.e., Strength, Excitement, Pride, and Joy) were positively related to the perception of benefits. These benefits may, in turn, play a positive role in the process of adapting to stressful events. For instance, longitudinal studies of bereaved caregivers have found that those who experienced positive emotions in the midst of their bereavement were also more likely to find positive meaning in their experiences and to develop long-term postbereavement plans and goals (Stein, Folkman, Trabasso, & Richards, 1997).

After exploring in detail the role of specific positive emotions, our results indicated that feeling determined, attentive, and strong were positively related to the perception of benefits. These results suggest that confronting trauma with determination may be an important element associated with adaptive coping to trauma. Research in personality has also shown that one of the characteristics of resilient people is their ability to perceive stressors as challenges rather than as threats, which helps them to adaptively cope with difficulties (Kobasa, 1979). More generally, positive coping styles seem also to be important for adaptation to adversity. In a recent study on the effects of September 11, the findings supported the idea that positive coping strategies (i.e., positive reinterpretation, accessing social support, prayer, and acceptance) were positively associated with an index of perceived stress-related growth (Park, Aldwin, Fenster, & Snyder, 2008).

In regard to negative emotions, previous studies that examined the relation between negative affect and

post-traumatic growth produced mixed results. Whereas some found that negative affect was unrelated to growth (e.g., Barbero & Linley, 2006; Cobb, Tedeschi, Calhoun, & Cann, 2006), others showed that some negative emotions (e.g., sadness) but not all (e.g., anxiety) are positively related to perceived benefits (see a meta-analytic review in Helgeson et al., 2006). Compared to positive emotions, the pattern of results with negative emotions was fairly complex. Whereas, in general, negative emotion factors (Distress and Shame) showed no significant relation to the perception of benefits, the Hate factor was negatively associated with it. One possible explanation for this result is that the nature of the traumatic event (i.e., a terrorist attack provoked by an exogenous group, e.g. Al Qaeda) may promote feelings of rage and hate towards an external enemy. This kind of negative emotion might narrow behavioural and cognitive responses, thus inhibiting psychological growth. Yet, the role of hate and related emotions is still controversial. In a recent study, feelings of anger were found to be associated with perceptions of psychological growth in an American sample assessed a few weeks after September 11 (Park et al., 2008). Similarly, Hobfoll, Canetti-Nisim, and Johnson (2006) found a significant association between reported psychosocial gains and increases in authoritarianism, ethnocentrism, and support for political violence in a sample of Israeli citizens. Thus, it appears that future research is needed to clarify the role of negative emotions such as hate and anger in the perception of benefits, as the role of these emotions may depend on the circumstances of the attack.

One of the limitations of the present study was the cross-sectional design. In a longitudinal study on the effects of the September 11 attacks, Butler et al. (2005) showed that initial posttraumatic growth levels might decline, with the exception of spiritual changes. Therefore, it is unknown whether the present findings concerning benefit finding will be present long after a terrorist incident.

Our study, as the vast majority of studies related to the benefit-finding field, is based on self-report measures (see Helgeson et al., 2006). There is a need to diversify the spectrum of measures of benefit finding including, for instance, behavioural data or health outcomes (Park & Lechner, 2006). This is particularly important in this field, as research can be highly vulnerable to social desirability effects and illusory self-deceit (Tedeschi, Calhoun, & Cann, 2007; Zoellner, & Maercker, 2006). Future research should include behavioural and performance measures as well as information from significant others such as spouses, parents, or colleagues to obtain more convergent validity of the concept of psychological benefits.

Another limitation of the study is related to its generalizability. Whereas Al Qaeda's attacks on the

United States or Spain resulted in an upsurge of patriotism and a greater feeling of social cohesion, in countries afflicted by endogroup terrorist violence the effects have been quite different. For instance, in Sri Lanka (Somasundaram, 2004) or Northern Ireland (Campbell, Cairns, & Mallett, 2004), terrorism carried out by members of the same community or country has had more negative effects on the population by creating a climate of collective suspicion and mistrust. Thus, the social and political context of terrorist attacks may have a profound implication on the positive or negative consequences of such acts in the population.

In conclusion, human responses in the face of adversity are more complex than sometimes believed. In the 1970s and 1980s, models of trauma shared the common assumption that most people exposed to traumatic events are likely to develop stress-related symptoms and disorders (Bonnano, 2004). In the last two decades, new evidence has accumulated showing that resilience is, in fact, the most common response after experiencing highly adverse events (Ahern, Kiehl, Sole, & Byers, 2006). Furthermore, new developments in this field are showing that not only resilience (i.e., absence of symptoms) but positive results are also common (Vázquez et al., 2008). Our study suggests that emotions such as strength, interest, pride, and solidarity are all present in the general population after a terrorist attack. It is likely that these positive emotions will promote the perception of positive results, whereas some negative emotions (i.e., hate) might inhibit this process.

We believe that the findings of this study, combined with other research from the field, are important with a view to developing effective prevention and intervention programs for traumatic events. Some studies have shown that, after a terrorist attack aimed at the general population, positive coping strategies are related to less stress-related symptoms (Vázquez, Hervás, & Pérez-Sales, 2008) and psychological growth (Park et al., 2008). These studies suggest that promoting positive emotions and adaptive coping skills contribute to minimize the negative psychological impact of these events. Feelings of solidarity and belonging to a nation were felt intensely in our sample. It would be helpful to promote interventions aimed at enhancing this symbolic cohesion to others. These interventions can be carried out at different levels. For instance, from a public policy perspective, it is interesting to note that recent longitudinal research shows that participation in public demonstrations after the Madrid terrorist attack in 2004 had a positive effect on the participants. More specifically, increases in posttraumatic growth, assessed 3 weeks after the attacks, were predicted by the frequency of participation in demonstrations measured 1 week after the attacks (Páez, Basabe, Ubillos, & Gonzalez, 2007). This research suggests that

interventions aimed at allowing people to feel they are part of a community or a nation may be effective to increase their perception of benefits.

Finally, psychosocial research after the September 11 attacks also showed that feelings of solidarity and pride as well as philanthropic behaviours are a common response after terrorist attacks (Steinberg & Rooney, 2005). For example, making visible, acknowledging, and paying tribute to the people who helped out during those difficult times can lead to constructing a feeling of communitarian solidarity. Likewise, citizen participation in tributes to the survivors and victims may lead to a higher presence of feelings like solidarity (Vázquez & Páez, *in press*), which may generate upward spirals. It is a social responsibility of scientists and other social actors to contribute to provide balanced information on the complex pattern of positive and negative psychological and societal responses after these events and to promote interventions. In so doing, we hope that we can significantly contribute to enhance the ways in which open societies cope with terrorism.

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