Ansiedad y Estrés

Original

Dysfunctional Attitudes and Long-Term Posttraumatic Growth in Victims of Terrorist Attacks

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ABSTRACT

Background: The theoretical models of posttraumatic growth (PTG) assume that a change in core beliefs or attitudes about the world and oneself is at the root of PTG. However, there are few studies on the relationship between these attitudes and PTG and their results are contradictory. The contradictions could be clarified using an instrument that assesses attitudes more specifically related to the traumatic event (traumatic dysfunctional attitudes) and analyzing whether said relationship is linear or an inverted U.
Methods: A sample of 210 adults directly exposed to terrorist attacks in Spain completed diagnostic measures of emotional disorders and measures of PTSD and depression symptomatology, optimism, traumatic and depressive dysfunctional attitudes, and PTG a mean of 29.6 years after the attacks (range: 2-47 years).
Results: Multiple regression analyses revealed that some long-term PTG dimensions were significantly associated in a linear or inverted-U fashion with traumatic dysfunctional attitudes, such that the most extreme levels of spiritual change were associated with the highest total levels of traumatic dysfunctional attitudes while the highest levels of appreciation of life were associated with moderate levels of total traumatic dysfunctional attitudes and, especially, attitudes of perpetual suffering. However, long-term PTG was not associated with depressive dysfunctional attitudes.
Conclusion: The findings underscore the importance of core attitudes for PTG and offer support for the hypothesis that, over time, the positive basic attitudes of many people who have experienced a traumatic event are reconstructed, but incorporating negative or dysfunctional attitudes, which means that a certain amount of traumatic dysfunctional attitudes may be a necessary condition for long-term PTG.

Actitudes Disfuncionales y Crecimiento Postraumático a Largo Plazo en Víctimas de Atentados Terroristas

RESUMEN

Antecedentes: Los modelos teóricos del crecimiento postraumático (CPT) suponen que un cambio en las creencias o actitudes básicas sobre el mundo y uno mismo es la raíz del CPT. Sin embargo, existen pocos estudios sobre la relación entre esas actitudes y el CPT y sus resultados son contradictorios. Las contradicciones podrían aclararse utilizando un instrumento que evalúe las actitudes más específicamente relacionadas con el acontecimiento traumático (actitudes disfuncionales traumáticas) y analizando si dicha relación es lineal o en forma de U invertida.
Método: Una muestra de 210 adultos expuestos directamente a atentados terroristas en España completaron medidas de trastorno emocional y medidas de sintomatología de TEPT y depresión, optimismo, actitudes disfuncionales traumáticas y depresivas y CPT una media de 29.6 años después de los atentados (rango: 2-47 años).

Resultados: Análisis de regresión múltiple revelaron que algunas dimensiones del CPT a largo plazo se asociaron significativamente de forma lineal o de U invertida con las actitudes disfuncionales traumáticas, de manera que un mayor nivel de crecimiento espiritual se asociaba con un mayor nivel total de actitudes disfuncionales traumáticas y un mayor nivel de nueva valoración de la vida se asociaba con un nivel moderado total de actitudes disfuncionales traumáticas y, especialmente, de actitudes de cronificación del malestar. Sin embargo, el CPT a largo plazo no se asoció con las actitudes disfuncionales depresivas.
Conclusión: Los resultados subrayan la importancia de las actitudes básicas en el CPT y ofrecen apoyo a la hipótesis de que, con el paso del tiempo, las actitudes básicas positivas de muchas de las personas que han experimentado un acontecimiento traumático se reconstruyen, pero incorporando actitudes negativas o disfuncionales, lo que supone que un cierto nivel de actitudes disfuncionales traumáticas podría ser una condición necesaria para el CPT a largo plazo.

Dysfunctional Attitudes and Long-Term Posttraumatic Growth in Victims of Terrorist Attacks

Posttraumatic growth (PTG) is defined as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p. 1). This positive psychological change includes several dimensions, mainly the perception of better relationships with others, new opportunities in life, greater personal strength, spiritual growth, and a renewed or greater appreciation of life (Tedeschi & Calhoun, 1996; Tedeschi et al., 2018).

The concept of PTG has been used to explain the fact that people can experience positive reactions after a terrorist attack, such as an increase in altruistic behaviors, the presence of positive emotions, the development of strengths and new abilities, and the appearance of positive changes in cognitive schemas on human nature, the world or oneself (Vázquez et al., 2008). In fact, a search conducted on June 11, 2022 in the PsycInfo database for the words "posttraumatic growth" or "post-traumatic growth" and "terrorism" or "terrorist" in the Abstract or Document Title fields resulted in 53 publications that show the presence of PTG after a terrorist attack, including 27 empirical studies

These positive psychological reactions and consequences that people may have after suffering a terrorist attack are particularly puzzling, since their tendency to suffer from frequent, severe psychopathological reactions and consequences is well documented. It is estimated that, after suffering a terrorist attack, 33-39% of directly exposed adult victims will develop posttraumatic stress disorder (PTSD), 20-30%, major depressive disorder, 17%, agoraphobia, 9%, generalized anxiety disorder, and 6%, panic disorder (García-Vera et al., 2016; García-Vera & Sanz, 2010; Salguero et al., 2011). These percentages are smaller among people less directly exposed to a terrorist attack, such as, for example, the relatives of those killed or injured in the attacks, emergency personnel and first responders, or the general population of the area affected by the attacks, but even so they are much larger than those found in the general population before the attacks (García-Vera et al., 2021; Sanz & García-Vera, 2021).

The counterintuitive nature of PTG creates a need for studies to clarify the factors that predict its presence and theoretical models that can explain it. Among these models, the most influential is, without a doubt, that of Tedeschi and Calhoun (1995; Tedeschi et al., 2018), the researchers who coined the term PTG and who created the Posttraumatic Growth Inventory or PTGI (Tedeschi & Calhoun, 1996). Recent meta-analyses published on PTG reveal that the PTGI is the most common instrument used to measure PTG (Liu et al., 2017; Vishnevsky et al., 2010; Wu et al., 2019).

Both in its first formulations (Tedeschi & Calhoun, 1995) and in its most recent ones (Tedeschi et al., 2018), this theoretical model is essentially cognitive and assumes that a change in cognitive schemas is the basis of PTG. Specifically, the model assumes that, for PTG to occur, a traumatic event must challenge a person's positive cognitive schemas related to "notions of the world being a fair place —where good things happen to good people […] ideas about the extent to which a person has control over what happens to them, their personal motivations, relationships, capabilities, and expectations of the future […] a person's sense of their own worth […] the meaning of life or previously held spiritual or religious beliefs" (Tedeschi et al., 2018, p. 47).

Given the centrality of this assumption to the conception of PTG, it is curious that comparatively few published studies have examined the relationship between PTG and the basic positive beliefs or attitudes about the world and oneself that form those positive cognitive schemas. For example, of the more than 3,000 publications on PTG found after performing a search on PsycInfo with the words "posttraumatic growth" or "post-traumatic growth" in the Abstract field, only nine included the World Assumptions Scale or WAS (Janoff-Bulman, 1989) in the Tests and Measures field, even though the WAS is the most widely used instrument to measure the positive cognitive schemas about the world and oneself that are often called into question after traumatic events.

Research on PTG and basic beliefs or attitudes, apart from being scarce, has also produced inconsistent results. Although several studies have found a significant positive correlation between a higher level of PTG or any of its dimensions and a higher level of positive basic beliefs or attitudes measured by the WAS (Bayer et al., 2007; Currier et al., 2012; Dekel et al., 2011; Engelkemeyer & Marwit, 2008; Gökler Danışman et al., 2018; Valdez & Lilly, 2015), other studies have found a significant negative correlation (Lahav et al., 2016), others have found a mix of significant positive and negative correlations (Carboon et al., 2005) and still others have failed to find any significant correlation (Su & Chen, 2015).

The lack of consistency in the results on the relationship between PTG and positive basic beliefs or attitudes could be due to two reasons, among others. In the first place, this relationship may not be linear, but curvilinear. This possibility has not been empirically examined in any previous study on PTG in reference to basic beliefs or attitudes, but it has been examined in reference to posttraumatic stress symptomatology. Specifically, some studies have found data suggesting that the relationship between posttraumatic stress symptoms and PTG would not be linear, but would be an inverted U, so that the highest levels of PTG would be associated with moderate levels of posttraumatic stress symptoms, as opposed to low or high levels (see meta-analysis by Shakespeare-Finch & Lurie-Beck, 2014). Similarly, one might expect an inverted U-shaped relationship between positive core beliefs or attitudes and PTG, such that the highest levels of PTG would not appear to be associated with strongly positive or negative core beliefs but with the presence of moderate levels of positive or negative basic beliefs. As Janoff-Bulman (2004, p. 30) suggested: "Successfully coping or recovering from trauma

does not mean returning to one's earlier fundamental assumptions, but rather establishing a comfortable, integrated assumptive world [basic schemas about the world and oneself] that incorporates the traumatic experience. The trauma is permanently encoded in the survivor's psyche via changes in these basic schemas that reflect some degree of both disillusionment and personal vulnerability: that is, at the level of their basic assumptions, survivors are left with somewhat more negative views of the world and of their own security".

Moreover, in this process of reconstruction of the cognitive schemas about the world and oneself that serves as the basis for PTG, it is assumed that time is a key element (Janoff-Bulman, 2004; Tedeschi et al., 2018). In the moments immediately after the traumatic event, it is very likely that cognitive schemas incorporate a negative view of oneself and of the world resulting from the threatening, distressing and painful characteristics of the traumatic event experienced. However, with the passage of time and the consequent effort to make sense of the traumatic experience, people are likely to re-establish their positive cognitive schemas, even though these are now neither as generally positive nor as absolutely positive as they were before the traumatic event, but rather that, after a certain time has elapsed since the traumatic event, these cognitive schemas will also incorporate some negative aspects of the world or of oneself. As Janoff-Bulman (2004, p. 32) stated: "Coping [with a traumatic event] involves rebuilding an assumptive world that can account for the victimization, yet is simultaneously comfortable enough to allow survivors to go on with their lives. In rebuilding their fundamental assumptions, survivors essentially incorporate the data of their experience; the new, more negative assumptions acknowledge the survivors' greater danger and increased vulnerability. Yet in contrast to the immediate aftermath of victimization, negative views do not pervade the inner world of survivors. Over time, rather than overgeneralize from the trauma, survivors reestablish generally positive, yet less absolutely positive, core assumptions. They can no longer say, 'It can't happen to me'. They know all too well that it can, and their new assumptive world is rebuilt acknowledging this very real possibility in the future". Thus, the inverted U-shaped relationship between the PTG and positive —or negative— core beliefs or attitudes is much more likely to be found when the PTG is examined over the long term (e.g., five or more years after the traumatic event; Fausor et al., 2022) rather than when examined in the short or medium term.

The second reason that could explain the lack of consistency in the results on the relationship between the PTG and basic beliefs or attitudes is that, in previous studies on the subject, a nonspecific measure of core beliefs or attitudes has been used. The WAS was not designed to measure the core assumptions, beliefs or attitudes that a certain traumatic event may challenge, but rather it aims to measure three categories of core assumptions, beliefs or attitudes that can be affected by any type of traumatic event that provokes a "feeling of vulnerability" (e.g., crime, disease, accident, natural disaster) (Janoff-Bulman, 1989). But, as the author of the WAS herself states, "clearly, the proposed categories and the assumptions comprising these categories are unlikely to be exhaustive of vulnerability related assumptions" (Janoff-Bulman, 1989, p. 117). Therefore, it could be possible that different types of traumatic events, in addition to undermining certain basic beliefs or attitudes common to all types of traumatic events and that the WAS seems to measure, could also affect some specific core beliefs or attitudes for each particular type of traumatic event, and that the measurement of these more specific beliefs or attitudes would allow a better examination of the relationship between PTG and core beliefs or attitudes.

Precisely, the main objective of the present study was to examine the relationship between PTG and basic beliefs or attitudes using an instrument that allows the evaluation of the beliefs or attitudes more specifically related to a particular traumatic event and, in addition, to analyze if said relationship is linear or inverted-U shaped. Specifically, the study focused on long-term PTG and core beliefs or attitudes particularly related to the experience of having suffered a terrorist attack. To do this, the Traumatic Dysfunctional Attitude Scale (EADT, Spanish initialism) was used, which is an instrument recently developed by Navarro et al. (2022; Navarro Montes, 2021) based on the analysis of 480 hours of recordings of trauma-focused cognitive behavioral therapy applied to 59 victims of terrorism with PTSD. Although the focus of the EADT is negative or dysfunctional beliefs or attitudes, these are the inverse of the positive beliefs or attitudes that the WAS focuses on. In fact, of the 32 items on the WAS, nine are reverse items that reflect negative or dysfunctional beliefs or attitudes, such as, for example, "People don't really care what happens to the next person" (item 12) or "People are naturally unfriendly and unkind" (item 2), which, in addition, are very similar to some of the beliefs or attitudes that reflect the direct items of the EADT (e.g., item 33: "Human beings are selfish, they only think of themselves"; item 28: "People always judge others negatively"). Similarly, of the 34 items on the EADT, six are inverse items that reflect positive beliefs or attitudes, such as, "The negative consequences of an attack are reversible; they are not burned into your brain" (item 11) or "After suffering an attack it is possible to be happy again" (item 12).

Secondarily, the present study also aimed to analyze whether there is a relationship between long-term PTG and core beliefs or attitudes associated with depression. It would be expected that these beliefs or attitudes could also be related to the presence of PTG for several reasons. First, depressive symptoms and disorders are, together with posttraumatic stress symptoms and disorders, the most frequent problems suffered by people exposed to a traumatic event, such as a terrorist attack (García-Vera et al., 2021; Sanz & García-Vera, 2021). Second, it is assumed that the experience of a traumatic event can give rise to PTG to the extent that it challenges and modifies the basic beliefs or attitudes that the person has about himself and the world around him. In this sense, various theoretical models, such as Beck's cognitive theory of depression (Beck, 1987; Beck et al., 1979), propose that core negative or dysfunctional beliefs and attitudes about oneself are a vulnerability factor for depressive symptoms and disorders, a proposal that has been supported by abundant empirical scientific literature (Batmaz & Ozdel, 2016; de Graaf et al., 2009; Ruiz et al., 2015; Sanz & Vázquez, 1993). Specifically, Beck's cognitive theory of depression proposes that attitudes and beliefs that either imply a very high regard for interpersonal relationships and high social dependency when judging one's own worth, or prioritize independence, self-determination, goal achievement and fear of failure are cognitive diatheses that, in the presence of stressors, can lead to depression. These two types of attitudes are measured by the dependency/need for approval factor and the achievement/perfectionism factor, respectively, of the Dysfunctional Attitude Scale or DAS by Weissman and Beck (1978), the most used and validated tool to assess dysfunctional attitudes from Beck's cognitive theory of depression (de Graaf et al., 2009; Dunkley et al., 2004; Sanz & Vázquez, 1993, 1994, 2008). In conclusion, a relationship between long-term PTG and dysfunctional beliefs or attitudes of dependency/need for approval and achievement/perfectionism could also be expected, since the experience of a traumatic event such as, for example, a terrorist attack, could modify the degree of importance, consideration, or primacy that the person gives to social dependency, interpersonal relationships, independence, or the achievement of objectives when judging their own worth.

To sum up, the general objective of the present study was to analyze the relationships between traumatic or depressive dysfunctional attitudes with long-term PTG and, in this sense, it is the first study that specifically addresses these relationships, since the only study focused on dysfunctional attitudes and PTG that was found in the published scientific literature addressed the relationship between PTG and initial maladaptive schemas that account for dysfunctional beliefs in people with personality disorders or maladaptive personality traits (Karimzadeh et al., 2021), but not with dysfunctional attitudes specifically associated with posttraumatic stress or depression. In their study, Karimzadeh et al. (2021) found a significant and negative relationship, although small (r = -.194), between PTG and initial maladaptive schemas in a sample of women with breast cancer evaluated at least six months after having undergone their last surgery or chemotherapy treatment.

Methods

Participants

The sample of participants in this study is the same that participated in the study by Fausor et al. (2022). A sample of 210 adults who had been injured in a terrorist attack or who were relatives of people who had died or had been injured in an attack was recruited from members of the Association of Victims of Terrorism (AVT) of Spain. They were part of a larger investigation into the long-term psychological consequences of terrorist attacks. The selection of participants was carried out in two phases. In the first phase, 791 adults belonging to the AVT were contacted by telephone, of which 390 completed a psychological interview by phone, while 38 participants requested to be interviewed in person. In a second phase, the 428 victims interviewed in the first phase were invited to carry out a more exhaustive face-to-face psychological evaluation that included, in addition to the PTGI, various psychopathological questionnaires and a structured diagnostic interview for emotional disorders. Of the total number of people invited, 210 carried out this second face-to-face psychological evaluation.

The mean age of this final sample of participants was 53.48 years (range = 18-84; SD = 12.78) and 49.5% of them were women. Of the participants, 38.6% had been injured in a terrorist attack, 41.4% were direct relatives of a person killed in a terrorist attack and the remaining 20% were direct relatives of a person injured in a terrorist attack. The terrorist attacks that the participants had suffered had occurred an average of 29.61 years before their participation in this study (range = 2-47; SD = 9.04) and had been committed mostly by ETA (89.5%). Regarding their educational level, 44.2% of the participants had Spanish secondary education, 31.3% had university education, 23.5% had Spanish primary education and 1% had no education. Most of the participants were married or living with a stable partner (66.2%) and working (55.7%) at the time of the evaluation. The results of the diagnostic clinical interview indicated that 46.55% of the participants suffered from emotional disorders, the most frequent being major depressive disorder (MDD) (17.6%), PTSD (16.3%), specific phobia (8.2%), panic disorder (8.1%), and generalized anxiety disorder (7.1%).

Instruments

Structured Clinical Interview for the DSM-IV Axis I Disorders, Clinician Version (SCID-I VC; First et al., 1997; the Spanish version of First et al., 1999). The SCID-I CV evaluates the presence of diagnosable mental disorders according to the DSM-IV. The present investigation only applied modules A (mood disorders) and F (anxiety and other disorders) for the diagnosis of PTSD, MDD and other emotional disorders (e.g., anxiety disorders). The diagnostic measures of the SCID-I CV have good psychometric properties, including good inter-rater and test-retest reliability indices for the diagnosis of both PTSD and MDD (Lobbestael et al., 2011; Zanarini et al., 2000).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Spanish adaptation, Beck et al., 2011). The BDI-II is a self-report inventory designed to assess the presence of depressive symptoms and their severity, consisting of 21 items scored from 0 to 3 and offering a range of scores from 0 to 63. The BDI-II presents, both in its original version and in its Spanish adaptation, good reliability and validity indices (Beck et al., 2011; Sanz, 2013; Sanz et al., 2005). In the sample of victims of terrorism in this study, the BDI-II obtained an internal consistency index (Cronbach's alpha) of .95.

PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). This study used the Spanish adaptation by Sanz et al. (2021). The PCL-5 is a 20-item measure that assesses the presence and severity of posttraumatic stress symptoms according to the DSM-5 diagnostic criteria for PTSD. The items are answered using 5-point Likert-type scales and are scored between 0 and 4, providing a total score that ranges between 0 and 80. Both the original version of the PCL-5 and its Spanish adaptation have good indices of reliability, convergent validity, and diagnostic validity (Blevins et al., 2015; Sanz et al., 2021). Participants in this study were instructed to complete the PCL-5 in relation to the attack they had suffered, and their scores on the PCL-5 obtained an internal consistency index (alpha) of .95.

Life Orientation Test-Revised (LOT-R; Scheier et al., 1994). This study used the Spanish adaptation by Otero et al. (1998). The LOT-R is a scale designed to evaluate optimism and it consists of 10 items that are answered on a 5-point Likert-type scale and scored from 0 to 4. Six of these 10 items allow a total optimism score to be obtained that can range between 0 and 24. This score presents good reliability and validity indices both in the original version of the LOT-R and in its Spanish adaptation (Ferrando et al., 2002; Scheier et al., 1994). In the sample of victims of terrorism in this study, the total LOT-R score obtained an internal consistency index (alpha) of .80.

Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The study used the Spanish adaptation by Vázquez et al. (2006), whose instructions specifically indicate to assess "the reaction after the terrorist attack". The PTGI is an instrument designed to assess the positive psychological changes experienced after a traumatic event. The PTGI is made up of 21 items that are answered using 6-point Likert-type scales, from *no change,* which is scored 0, to *a very important change,* which is scored 5, so that the instrument provides an overall PTG score that can range between 0 and 105. Based on the results of various factorial analyses (Taku et al., 2008; Tedeschi & Calhoun, 1996), the PTGI also allows five dimensions of PTG to be measured through the following five subscales: relating to others, new opportunities, personal strength, appreciation of life, and spiritual change. Both the total score and the scores of the subscales of the original version of the PTGI present good indices of reliability, factorial validity, and criterion validity (Taku et al., 2008; Tedeschi & Calhoun, 1996). In the sample of victims of terrorism in this study, the total PTGI scores obtained an internal consistency index (alpha) of .95, while the subscale scores obtained the following indices: .82 (relating to others), .89 (new opportunities), .84 (personal strength), .74 (appreciation of life), and .81 (spiritual change).

Dysfunctional Attitude Scale-Revised (DAS-R; de Graaf et al., 2009). The DAS-R is a revised version of the Dysfunctional Attitude Scale, form A (DAS-A; Weissman & Beck, 1978). The DAS-R contains 17 of the 40 items of the DAS-A, with the same instructions and the same 7-point Likert-type scale (1 = *totally disagree,* 7 = *totally agree*),

and, as with the DAS-A, it is designed to measure dysfunctional attitudes typical of depression. The DAS-R gives a total score for depressive dysfunctional attitudes, but it also has subscales that measure perfectionism and dependency. The DAS-A was adapted to Spanish by Sanz y Vázquez (1993) and Ruiz et al. (2015) adapted the DAS-R from this version. DeGraaf et al. (2009) have reported good reliability and validity indices for the scores of the total scale and the two subscales of the DAS-R (e.g., α = .81 – .91), which have been replicated in the Spanish population by Ruiz et al. (2015) (e.g., α = .76 – .91). In the present sample of victims of terrorism, the internal consistency reliability indices of the DAS-R total scale scores and its perfectionism and adaptation subscales were .91, .89, and .79, respectively.

Traumatic Dysfunctional Attitude Scale (EADT; Navarro Montes, 2021; Navarro et al., 2022). This instrument was developed to evaluate dysfunctional beliefs specifically in victims of terrorism. The EADT is made up of 34 items with five-point Likert-type scales, from *totally disagree,* which is scored 1, to *totally agree*, which is scored 5. The EADT gives a total score for traumatic dysfunctional attitudes, but also three subscale scores: dangerous world attitudes, negative views of society and of human beings, and attitudes of perpetual suffering. Navarro Montes (2021) and Navarro et al. (2022) have reported good reliability and validity indices for the total scale scores and the three subscales of the EADT in samples of victims of terrorist attacks (e.g., α = .85–.93). In the present sample, the reliability indices of internal consistency of the scores of the total EADT scale and its subscales of dangerous world, negative views of society and human beings, and perpetual suffering were .94, .88, .86, and .87, respectively.

Procedure

Verbal informed consent was obtained from the participants prior to the telephone interview, and during the face-to-face interview, the participants signed an informed consent form to collaborate in a larger investigation of the long-term psychological consequences of terrorism. Subsequently, a psychologist assessed the psychopathological consequences derived from the terrorist attack or attacks using the following instruments applied in the following order: SCID-I VC, BDI-II, PCL-5, EADT, PTGI, DAS-R, and LOT-R. All the psychologists who acted as evaluators had been specifically trained in carrying out the evaluations through a university degree focused on psychological care for victims of terrorist attacks, observing evaluations, carrying out supervised evaluations and conducting weekly clinical sessions.

Analysis of data

The statistical analyses in this study were carried out with the statistical program SPSS, version 22. To examine the presence of linear relationships between the PTG and dysfunctional attitudes, the Pearson correlations were calculated between the PTGI measures and the EADT and DAS-R measures of traumatic and depressive dysfunctional attitudes and, to examine the presence of curvilinear relationships between the PTG and the measures of dysfunctional attitudes, the scores in these measures were first centered about the mean (by subtracting the mean from each score) and then squared to create the quadratic term for these measures. Hierarchical multiple regression analyses were performed for each PTG measure and, in each analysis, the effect or linear term of each dysfunctional attitude measure of the EADT or the DAS-R (the centered variable) was included in a first step and the effect or quadratic term (the variable centered squared) in a second step, in

order to check whether the inclusion of the quadratic term implied a statistically significant increase in the explained variance of the PTG measurement.

Next, multiple regression analyses were performed on each of the PTG measures using as predictors the dysfunctional attitude measures of the EADT or the DAS-R that had shown, either in their linear effect or in their quadratic effect, statistically significant relationships ($p < .05$) with the corresponding PTG measurement of the PTGI. In these multiple regression analyses, the variables that had also shown significant relationships with the PTG in the previous study carried out with the same sample (Fausor et al., 2022) were included as control predictor variables.

Specifically, in the previous study, the Pearson correlations of the PTGI measures were calculated with the measures of the following sociodemographic, clinical and attack-related characteristics: gender (1 = female; 0 = male), age, educational level (no education, primary, secondary and university), marital status (married or living with a stable partner vs. single, divorced, separated or widowed), symptoms of posttraumatic stress, depressive symptoms, diagnosis of PTSD, diagnosis of MDD, diagnosis of an anxiety disorder, absence of diagnosed emotional disorders, years elapsed since the attack, age at the attack, number of attacks suffered, number of traumatic events after the attack, having been injured in the attack (vs. relative of someone killed or injured in the attack) and being a relative of someone killed in the attack (vs. injured or relative of someone injured in the attack). Of these variables, nine did not show statistically significant correlations ($p > .05$) with any of the six PTG measures of the PTGI —level of education, depressive symptomatology, PTSD diagnosis, MDD diagnosis, anxiety disorder diagnosis, years elapsed since the attack, age at the attack, having been injured in an attack and being a relative of someone who died in an attack— (Fausor et al., 2022). The remaining variables evaluated in the present study showed statistically significant correlations ($p < .05$) with one or several of the six PTG measures of the PTGI and were retained as control variables in the regression analyses performed to examine the relationship between dysfunctional attitudes and PTG.

As a previous step to the multiple regression analyses, the possible existence of collinearity problems between the predictors was verified calculating the tolerance indices and the variance inflation factors (VIF), and considering that tolerance indices lower than .20 are indicative of potential collinearity problems and indices less than .10 of serious problems, while VIF greater than 12 also suggest a collinearity problem (Martínez Arias et al., 2015).

Results

Correlation Between Posttraumatic Growth and Dysfunctional Attitudes: Linear Relationship

Table 1 shows the linear correlations of each of the measures of PTG (total and subscale scores of the PTGI) with each of the measures of traumatic dysfunctional attitudes (total and subscale scores of the EADT) and with each of the measures of depressive dysfunctional attitudes (total and subscale scores of the DAS-R). The results in Table 1 indicate that the only PTG measure that showed statistically significant correlations with dysfunctional attitudes was that of spiritual change, which, specifically, correlated with all measures of traumatic dysfunctional attitudes, with small coefficients ranging from .147 (with dangerous world attitudes) to .178 (with total traumatic dysfunctional attitudes score), indicating that a higher level of traumatic dysfunctional attitu-

Table 1

Correlations of the dysfunctional attitude measures with the posttraumatic growth measures of the PTGI

Dysfunctional attitude measures	Posttraumatic growth measures					
	Total PTGI score	Relating to others	New opportu-nities	Personal strength	Appreciation of life	Spiritual change
Traumatic (EADT)						
Dangerous world	.085	.102	.031	.040	.056	.147*
Negative view of humans/society	.097	.051	.082	.099	.123	.148*
Perpetual suffering	.031	.008	.027	-.050	.104	.157*
Total score	.079	.063	.052	.027	.106	.178*
Depressive (DAS-R)						
Perfectionism	-.053	-.002	-.093	-.119	-.094	.011
Dependency	-.030	-.002	-.085	-.123	-.034	.113
Total score	-.044	-.002	-.097	-.126	-.068	.057

Note. *Statistically significant correlations with $p < .05$ (bilateral test). DAS-R: Dysfunctional Attitude Scale-Revised. EADT: Traumatic Dysfunctional Attitude Scale. PTGI: Posttraumatic Growth Inventory.

des was associated with a higher level of spiritual change, but not with a higher level of total PTG or of the remaining dimensions of PTG. However, none of the depressive dysfunctional attitude measures showed any statistically significant correlation with any of the six PTG measures from the PTGI.

Correlation Between Posttraumatic Growth and Dysfunctional Attitudes: Curvilinear Relationship

Table 2 presents the results of the hierarchical multiple regression analyses performed to examine the possible curvilinear relationship of the PTG measures with the measures of traumatic or depressive dysfunctional attitudes. In most cases, the inclusion, in

a second step, of the quadratic term of the dysfunctional attitudes variable in question (e.g., dangerous world attitudes) did not lead to any statistically significant increase in the percentage of explained variance of each of the PTG measurements with respect to the regression model that, in a first step, included only the linear term of said variable. Therefore, most of the quadratic components of the predictors were not statistically significant, indicating that there were no significant curvilinear relationships between the PTG measures and the measures of traumatic or depressive dysfunctional attitudes that appear in Table 2. However, four exceptions to this general pattern of non-significant results were found. Both the score in the attitudes of perpetual suffering and the total score in traumatic dysfunctional attitudes showed statistically significant quadratic terms with respect to the overall PTG score

Table 2

Linear and curvilinear relationships between the dysfunctional attitude measures and the posttraumatic growth measures of the PTGI: multiple regression analysis results

Predictor	Variable criteria: posttraumatic growth measures of the PTGI											
	Total PTGI		Relating to others		New opportunities		Personal strength		Appreciation of life		Spiritual change	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Dangerous world (EADT)												
Step 1: linear term	0.085	.007	0.102	.010	0.031	.001	0.040	.002	0.056	.003	0.147*	.022*
Step 2: quadratic term	-0.134	.015	-0.141	.016	-0.108	.009	-0.098	.008	-0.148	.017	-0.110	.010
Negative view of humans/society (EADT)												
Step 1: linear term	0.097	.009	0.051	.003	0.082	.007	0.099	.010	0.123	.015	0.148*	.022*
Step 2: quadratic term	0.003	.000	0.012	.000	0.043	.002	-0.029	.001	-0.044	.002	0.030	.001
Perpetual suffering (EADT)												
Step 1: linear term	0.031	.001	0.008	.000	0.027	.001	-0.050	.002	0.104	.011	0.157*	.025*
Step 2: quadratic term	-0.161*	.026*	-0.114	.013	-0.104	.011	-0.063	.004	-0.219*	.047*	-0.076	.006
Total score (EADT)												
Step 1: linear term	0.079	.006	0.063	.004	0.052	.003	0.027	.001	0.106	.011	0.178*	.032*
Step 2: quadratic term	-0.160*	.023*	-0.136	.017	-0.116	.012	-0.113	.012	-0.213*	.041*	-0.096	.008
Perfectionism (DAS-R)												
Step 1: linear term	-0.053	.003	-0.002	.000	-0.093	.009	-0.119	.014	-0.094	.009	0.011	.000
Step 2: quadratic term	0.005	.000	0.008	.000	0.003	.000	-0.007	.000	-0.049	.001	0.040	.001
Dependency (DAS-R)												
Step 1: linear term	-0.030	.001	-0.002	.000	-0.085	.007	-0.123	.015	-0.034	.001	0.113	.013
Step 2: quadratic term	0.016	.000	0.019	.000	0.015	.000	0.016	.000	0.009	.000	0.067	.003
Total score (DAS-R)												
Step 1: linear term	-0.044	.002	-0.002	.000	-0.097	.009	-0.126	.016	-0.068	.005	0.057	.003
Step 2: quadratic term	-0.010	.000	0.000	.000	0.007	.000	-0.016	.000	-0.067	.003	0.062	.002

Note. *Statistically significant predictor with $p < .05$. DAS-R: Dysfunctional Attitude Scale-Revised. EADT: Traumatic Dysfunctional Attitude Scale. PTGI: Posttraumatic Growth Inventory.

and to the appreciation of life dimension, and, in all four cases, the standardized coefficients of these terms had negative signs, indicating that there was an inverted U-shaped relationship between these two measures of traumatic dysfunctional attitudes and these two measures of PTG, that is, the highest levels of overall PTG and the greater appreciation of life dimension were associated with moderate levels of overall traumatic dysfunctional attitudes and traumatic dysfunctional attitudes of perpetual suffering (see Table 2).

Multiple Regression Analysis of Posttraumatic Growth

Tables 3, 4 and 5 show that when scores of traumatic dysfunctional attitudes that had shown statistically significant linear or quadratic relationships with one or more of the scores of the PTGI were included as predictors in multiple regression analyses, their results indicated that the total traumatic dysfunctional attitudes score was positively and significantly associated with the PTG dimension of spiritual change, and the attitudes of perpetual suffering score and the total traumatic dysfunctional attitudes score showed a significant inverted U shaped correlation with the appreciation of life dimension, after controlling for the effect of the rest of the predictors.

Table 3
Linear regression on the spiritual change measure of the PTGI

Predictor	Beta	t	p	partial r
With the subscales of the EADT				
Sex	.141	1.85	.065	.134
Age	.093	1.30	.194	.095
Marital status	-.051	-0.68	.496	-.050
Optimism (LOT-R)	.144	1.47	.143	.107
Posttraumatic Stress (PCL-5)	.130	1.20	.230	.087
No diagnosis	.045	0.48	.630	.035
N.º of terrorist attacks	.039	0.54	.588	.040
N.º of traumatic events after the attack	.025	0.35	.729	.025
Dangerous world (EADT)	.068	0.62	.533	.045
Negative view of humans/society (EADT)	.081	0.87	.383	.064
Perpetual suffering (EADT)	.086	0.71	.478	.052
With the total EADT scale				
Sex	.141	1.88	.062	.135
Age	.093	1.32	.188	.096
Marital status	-.049	-0.66	.509	-.048
Optimism (LOT-R)	.146	1.52	.130	.110
Posttraumatic Stress (PCL-5)	.126	1.23	.217	.089
No diagnosis	.046	0.49	.623	.036
No. of terrorist attacks	.039	0.54	.591	.039
No. of traumatic events after the attack	.026	0.36	.718	.026
Total score of the EADT	**.207**	**2.01**	**.046**	**.144**

Note. EADT: Traumatic Dysfunctional Attitude Scale. LOT-R: Life Orientation Test-Revised. PCL-5: PTSD Checklist for DSM-5. PTGI: Posttraumatic Growth Inventory.

Specifically, regarding the spiritual change scores of the PTGI, the regression model with eleven predictors, including the three measures of traumatic dysfunctional attitudes of dangerous world, negative vision of society and human beings and of perpetual suffering, explained 9.4% of the variance of these scores, but this model did not become statistically significant ($R^2 = .094$, $F = 1.78$, $p = .060$), nor were any of the predictors, including the three measures of traumatic dysfunctional attitudes (see Table 3). However,

when these three measures were replaced by the total measure of traumatic dysfunctional attitudes, the regression model was statistically significant ($R^2 = .094$, $F = 2.19$, $p = .024$), explaining the same percentage of variance of scores on spiritual change (9.4%). In this second regression model, the total measure of traumatic dysfunctional attitudes was significantly and positively associated with PTGI spiritual change scores, such that a higher total level of traumatic dysfunctional attitudes was associated with a higher level of spiritual change, although this association was small in magnitude (partial $r = .144$; see Table 3).

Regarding the PTGI appreciation of life scores, the regression model with nine predictors, including the quadratic term of the traumatic dysfunctional attitude score of perpetual suffering, significantly explained 15.4% of the variance of said scores ($R^2 = .154$, $F = 3.89$, $p < .001$), and gender, the number of traumatic events after the attack and the quadratic term of the dysfunctional attitudes of perpetual suffering were significantly associated with these scores (see Table 4). This last predictor was the most important variable for explaining the variance in appreciation of life (partial $r = -.196$) and, given the negative sign of its beta coefficient and its partial correlation, the highest levels of appreciation of life were associated with moderate levels of dysfunctional attitudes of perpetual suffering. The second most important predictor was the number of traumatic events suffered (partial $r = .186$), followed by gender (partial $r = .168$), so that having suffered more traumatic events after the attack and being a woman were associated, in that order of importance, with a higher level of the PTG dimension of appreciation of life (see Table 4).

Table 4
Linear regression of the appreciation of life measure of the PTGI

Predictor	Beta	t	p	partial r
With the subscale of the EADT				
Sex	**.171**	**2.37**	**.019**	**.168**
Age	.032	0.48	.630	.035
Marital status	.023	0.33	.741	.024
Optimism (LOT-R)	.048	0.60	.546	.043
Posttraumatic Stress (PCL-5)	.175	1.91	.058	.136
No diagnosis	-.036	-0.47	.684	-.029
No. of terrorist attacks	.106	1.54	.124	.111
No. of traumatic events after the attack	**.179**	**2.63**	**.009**	**.186**
Perpetual suffering (EADT) – quadratic term	**-.188**	**2.77**	**.006**	**-.196**
With the total EADT scale				
Sex	**.175**	**2.40**	**.017**	**.171**
Age	.026	0.38	.704	.028
Marital status	.027	0.38	.701	.028
Optimism (LOT-R)	.028	0.35	.729	.025
Posttraumatic Stress (PCL-5)	.173	1.85	.066	.132
No diagnosis	-.023	-0.26	.797	-.019
No. of terrorist attacks	.105	1.50	.136	.108
No. of traumatic events after the attack	**.192**	**2.78**	**.006**	**.197**
Total score of the EADT – quadratic term	**-.151**	**-2.14**	**.033**	**-.154**

Note. EADT: Traumatic Dysfunctional Attitude Scale. LOT-R: Life Orientation Test-Revised. PCL-5: PTSD Checklist for DSM-5. PTGI: Posttraumatic Growth Inventory

When the quadratic term of the perpetual suffering score was replaced by the quadratic term of the total traumatic dysfunctional attitudes score, the results obtained were similar. The regression model was also statistically significant ($R^2 = .139$, $F = 3.43$, $p < .001$), explaining a slightly lower percentage of the variance

in appreciation of life scores (13.9%). In this second regression model, the quadratic term of the overall traumatic dysfunctional attitudes score was also significantly and negatively associated with appreciation of life scores (partial r = -.154), indicating an inverted U-shaped relationship, but this predictor was not the most important, rather the most important predictor was the number of traumatic events suffered (partial r = .197), followed by gender (partial r = .171), so that having suffered more traumatic events after the attack, being a woman and the presence of moderate levels of traumatic dysfunctional attitudes, in that order of importance, were associated with the highest scores for the appreciation of life dimension (see Table 4).

Finally, in relation to the total level of PTG measured by the total score of the PTGI, the results of the multiple regression analyses revealed that neither the quadratic term of the dysfunctional attitudes of perpetual suffering nor the quadratic term of the total level of traumatic dysfunctional attitudes were significantly associated with the total level of PTG. The two regression models that included these predictors explained, in a statistically significant way, 16.1% and 15.5%, respectively, of the variance of the total PTG level (R^2 = .161 and .155, F = 3.99 and 3.79, both p < .001), but, in both models, the only variables that were significantly associated with this total level of PTG were gender, the number of traumatic events after the attack, and the number of terrorist attacks. Specifically, being a woman (partial r = .217 and .215), having suffered more traumatic events after the attack (partial r = .181 and .192) and having experienced more attacks (partial r =.160 and .151) were associated, in that order of importance, with a higher overall level of PTG (see Table 5).

Table 5
Linear regression on the total PTG measure of the PTGI

Predictor	Beta	t	p	*partial r*
With the subscale of the EADT				
Sex	**0.223**	**3.04**	**.003**	**.217**
Age	0.107	1.58	.115	.115
Marital status	-0.050	-0.70	.482	-.051
Optimism (LOT-R)	0.045	0.56	.573	.041
Posttraumatic Stress (PCL-5)	0.146	1.59	.114	.115
No diagnosis	0.051	0.57	.568	.042
No. of terrorist attacks	**0.153**	**2.22**	**.028**	**.160**
No. of traumatic events after the attack	**0.173**	**2.52**	**.013**	**.181**
Perpetual suffering (EADT) – quadratic term	-.132	-1.91	.058	-.138
With the total EADT scale				
Sex	**.221**	**3.00**	**.003**	**.215**
Age	0.116	1.71	.089	.125
Marital status	-.056	-0.78	.437	-.057
Optimism (LOT-R)	0.056	.68	.497	.050
Posttraumatic Stress (PCL-5)	0.156	1.68	.095	.122
No diagnosis	0.050	0.56	.576	.041
No. of terrorist attacks experienced	**0.146**	**2.09**	**.038**	**.151**
No. of traumatic events after the attack	**0.174**	**2.52**	**.013**	**.192**
Total of the EADT – quadratic term	-0.103	-1.46	.145	-.107

Note. EADT: Traumatic Dysfunctional Attitude Scale. LOT-R: Life Orientation Test-Revised. PCL-5: PTSD Checklist for DSM-5. PTGI: Posttraumatic Growth Inventory.

The mentioned results of the multiple regression analyses that appear in Tables 3, 4 and 5 were not affected by collinearity problems, since, in each of the analyses, all the tolerance indices were greater than .32 and all VIF were less than 2.50.

On the other hand, although not all the measures of traumatic or depressive dysfunctional attitudes were related to the PTG, as reflected in the results of the regression analyses, all of them were significantly related to the symptomatology of posttraumatic stress and depression. Specifically, the measures of traumatic dysfunctional attitudes presented statistically significant correlations which were generally large (> .50), which ranged between .32 (negative view of human beings and of society) and .66 (perpetual suffering) with the measure of posttraumatic stress and between .37 (negative view of human beings and of society) and .63 (perpetual suffering) with the measure of depression (see Table 6). Similarly, measures of depressive dysfunctional attitudes presented statistically significant and moderate (< .30) to large correlations, ranging from .40 (dependency) to .47 (total DAS-R score) with posttraumatic stress symptomatology and between .41 (dependency) and .50 (total DAS-R score) with depressive symptomatology (see Table 6).

Table 6
Correlations of the dysfunctional attitude measures with the measures of posttraumatic stress (PCL-5) and depression (BDI-II)

Dysfunctional attitude measures	Posttraumatic stress	Depression
Traumatic (EADT)		
Dangerous world	.51	.53
Negative view of humans/society	.32	.37
Perpetual suffering	.66	.63
Total score	.60	.61
Depressive (DAS-R)		
Perfectionism	.45	.48
Dependency	.40	.41
Total score	.47	.50

Note. All correlations are statistically significant with p < .001 (bilateral test). BDI-II: Beck Depression Inventory-II. DAS-R: Dysfunctional Attitude Scale-Revised. EADT: Traumatic Dysfunctional Attitude Scale. PCL-5: PTSD Checklist for DSM-5.

Discussion

The primary objective of the present study was to examine the relationship between long-term PTG and depressive and traumatic dysfunctional core beliefs or attitudes. The results from a sample of people directly exposed to terrorist attacks in Spain and who were evaluated an average of 29.6 years after the attack indicate that, after controlling the effect of other variables that in a previous study with the same sample were related to long term PTG, such as, for example, gender, the level of symptoms of posttraumatic stress, the number of attacks experienced and the number of traumatic events suffered after the attack (Fausor et al., 2022), some dimensions of long-term PTG were linearly or curvilinearly related to traumatic dysfunctional attitudes. Specifically, a higher level of the spiritual change dimension was significantly associated with a higher overall level of traumatic dysfunctional attitudes and a higher level of the appreciation of life dimension was significantly associated with a moderate overall level of traumatic dysfunctional attitudes and, especially, with a moderate level of traumatic dysfunctional attitudes of perpetual suffering.

These results would support the general assumption of many PTG models and, in particular, of the Tedeschi and Calhoun 's+ model (1995; Tedeschi et al., 2018), which assumes that core beliefs or attitudes about the world and oneself play an important role in PTG. However, the results would also contradict or qualify the model's more specific assumptions regarding those basic beliefs or attitudes, since the model's more specific assumptions or principles "emphasize how reconstrual with positive evaluations of trauma

and its outcome are the foundation for growth" (Tedeschi et al., 2018, p. 41). From this more specific assumption or principle, a negative linear relationship between long-term PTG and traumatic dysfunctional attitudes would be derived, that is, a higher level of long-term PTG would be associated with a lower level of traumatic dysfunctional attitudes —or, correspondingly, with a higher level of positive traumatic attitudes—. However, this is not the case in the present study. Since a higher level of the spiritual change dimension was found to be associated with a higher overall level of dysfunctional traumatic attitudes, this result would contradict Tedeschi and Calhoun's model and would also contradict the results of studies that have found a positive correlation between a higher level of PTG or any of its dimensions and a higher level of positive core attitudes measured by the WAS (Bayer et al., 2007; Currier et al., 2012; Dekel et al., 2011; Engelkemeyer & Marwit, 2008; Gökler Danışman et al., 2018; Valdez & Lilly, 2015). However, it must be remembered that other studies, consistent with what was found in the present, have found a correlation between a higher level of PTG or one of its dimensions and a lower level of positive basic attitudes measured by the WAS —or, in addition, a higher level of negative or dysfunctional core attitudes— (Carboon et al., 2005; Lahav et al., 2016).

To try to explain these contradictory results, it could be hypothesized that the real relationship between PTG and dysfunctional, or positive, core attitudes depends on the moment in which the attitudes are evaluated. Immediately after the traumatic event, core attitudes, which before the event were positive in most people, are very likely to become negative as a result of the threatening, distressing and damaging nature of the event; but, over time, Tedeschi and Calhoun's (1995; Tedeschi et al., 2018) model assumes that people will rebuild their positive basic attitudes. However, in the present study, the participants were evaluated between two and 47 years after having suffered the terrorist attack, with an average of 29.6 years, which seems sufficient for this positive reconstruction of core beliefs or attitudes to have occurred. Despite this, the participants with the highest total levels of traumatic dysfunctional attitudes were the ones who showed the greatest spiritual change. Even among participants who were evaluated more than 10 years after experiencing a terrorist attack, the relationship between the total level of traumatic dysfunctional attitudes and spiritual change was statistically significant and positive (r = .173, p = .017, n = 191). Therefore, the results of this study together with those of other previous studies (Carboon et al., 2005; Lahav et al., 2016) suggest that, for PTG to occur, at least in some dimensions such as spiritual change, it is not necessary for the person to reach a positive reconstruction of their core beliefs or attitudes, or, at least not all of their core beliefs or attitudes, but it is possible to find PTG among people who have been exposed to a traumatic event such as a terrorist attack and show negative or dysfunctional beliefs and attitudes specifically related to said traumatic event. The use in future research of instruments such as the EADT that measure basic beliefs or attitudes specifically related to the traumatic event could help to clarify the role that positive and negative dysfunctional beliefs or attitudes may play in PTG.

Another complementary possibility to clarify the contradictory results regarding the relationship between core beliefs or attitudes and PTG is to assume that the relationship is not linear, positive or negative, but curvilinear, specifically, an inverted U. This type of relationship is what emerges from the proposals of Janoff-Bulman (2004), especially after a long time has passed since the traumatic event. To our knowledge, no study has been published that has examined the existence of this quadratic relationship, except for the present study, and its results indicate that this possibility would not explain the contradictory results regarding the PTG dimensions

of relating to others, new opportunities, personal strength, and spiritual change. However, regarding the PTG dimension of appreciation of life, the results of this study indicate that it has an inverted U-shaped relationship with traumatic dysfunctional attitudes, especially those of perpetual suffering. Therefore, the results of the present study provide novel evidence to support the proposals of Janoff-Bulman (2004) that, over time, the positive core attitudes or beliefs of many of the people who have experienced a traumatic event are reconstructed, but incorporating negative or dysfunctional attitudes or beliefs. This would explain why we observed that, many years after a terrorist attack, the victims who believe that they have changed their hierarchy of values or priorities in life or who appreciate their life more present moderate levels of dysfunctional traumatic attitudes or beliefs or, complementarily, moderate levels of positive traumatic attitudes or beliefs.

It is important to highlight that, in the present study, the relationship between traumatic dysfunctional attitudes and long-term PTG is independent of the relationship that both constructs have with posttraumatic stress symptoms. Scientific literature shows that there is a significant and positive relationship between PTG and posttraumatic stress symptoms (see the meta-analysis by Liu et al., 2017), which would support the idea that the experience of a certain level of emotional distress derived from trauma may be a necessary condition for PTG (Tedeschi et al., 2018). Furthermore, both theoretical cognitive models and empirical studies indicate the presence of a significant and positive relationship between dysfunctional attitudes and posttraumatic stress symptoms (Navarro et al., 2022), a relationship that was also evidenced in the present study, since large correlations ranging between .51 (dangerous world) and .66 (perpetual suffering) were found for three of the four measures of traumatic dysfunctional attitudes and a moderate correlation (.32) for the scores of the remaining attitudes (negative view of human beings and society). Therefore, it could be speculated whether the relationship between traumatic dysfunctional attitudes and long-term PTG could be explained by a third variable, in this case, posttraumatic stress symptoms. However, after controlling the effect of this symptomatology, the results of the multiple regression analyses of the present study revealed that the significant relationship between traumatic dysfunctional attitudes and long-term PTG was maintained.

It could also be speculated that the relationship between traumatic dysfunctional attitudes and long-term PTG found in this study is specific to the type of traumatic event examined in it, since terrorist attacks have been considered more devastating than other disasters and types of violence for the following reasons: (a) they involve a deliberate intent to harm; (b) they target society or a broad social group as a whole, and (c) they often lack a clear end point, since the threat is usually permanent and therefore no one can be sure if the worst is yet to come (Vázquez et al., 2008). In addition, as García-Vera and Sanz (2016) and Fausor et al. (2022) have argued, the terrorist attacks that occurred in Spain may have had even more devastating negative psychological effects than other terrorist attacks examined in the scientific literature, since they were committed by organized terrorist groups within the community itself that perpetrated attacks continuously over many years, and whose actions were associated with the appearance of other repetitive and prolonged acts of physical and psychological violence against large sectors of the population, creating a collective climate of suspicion, distrust and destruction of the community's moral system and its beliefs and core attitudes. In this social context of violence and threat, it seems consistent that the victims of terrorism who participated in the present study could present higher levels of traumatic dysfunctional attitudes and that these had a particular relationship with long-term PTG or with some of

its dimensions. Future research should try to replicate the results presented here with samples of people affected by other types of terrorist attacks and by other types of traumatic events.

One might wonder why victims of terrorist attacks who show moderate or high levels of traumatic dysfunctional attitudes show, many years after the attack, a new appreciation of life or greater spiritual growth, respectively. Perhaps the reason is that the presence of traumatic dysfunctional attitudes is precisely a dialectical part of the processes of reflexive and deliberate reappraisal and rumination, which are the vehicle for the victims' attempts to understand what happened to them and its subsequent consequences, processes and attempts, which are the fundamental basis of PTG, since it is understood as the "result of the struggle" with the traumatic events, as a result of attempts to adapt to the changing circumstances of life and develop cognitive schemas of revised basic attitudes that allow the victims to understand them (Tedeschi et al., 2018).

On the other hand, the results of the present study also reveal that not all dysfunctional attitudes are relevant to understanding PTG. Specifically, in the present study, depressive dysfunctional attitudes were not found to show any significant relationship with long-term PTG or any of its dimensions, although these attitudes were significantly and positively associated with the presence of depressive and posttraumatic stress symptoms. This finding reaffirms the need both to use measures of core beliefs and attitudes specifically related to traumatic events in future research and to refine the theoretical models to specify what kind of core beliefs and attitudes are affected by traumatic events and are the basis of PTG.

The limitations of this study should be taken into account when considering the results and conclusions. Among such limitations, it should be noted that the study is cross-sectional, and that it would be necessary to carry out longitudinal studies to achieve a better evaluation of the temporal evolution of PTG over the years and the influence of various factors on said evolution, including the influence of traumatic dysfunctional attitudes. Another limitation has to do with the response rate of the research and, therefore, with the representativeness of the sample of participants and the generalization of the results. The response rate of the study was between 26.5% (in relation to those contacted in the first phase) and 49.1% (in relation to those contacted only in the second phase), figures that are comparable to those obtained in other studies with people directly affected by terrorist attacks in Spain (e.g., Miguel-Tobal et al., 2006). However, it is important to point out that no statistically significant differences were found between the people who carried out the face-to-face psychological interviews and those who did not in terms of sex, marital status, educational level, or the years elapsed since the attack, although there were statistically significant differences in terms of the age of the person at the time of the evaluation, the age of the person when they suffered the attack, the type of direct exposure to the attack or the presence of emotional symptoms, so it is also not possible to completely rule out a certain selection bias linked to the response rate.

Another limitation of the study has to do with the possibility of accurately evaluating PTG so many years after the terrorist attack. This limitation has to do with the more general question of the validity of PTG reports, an issue that has been the subject of intense debate in the scientific literature and that faces several problems (Tedeschi et al., 2018). Of course, these problems are even greater when long-term PTG is evaluated. Some of the problems have to do with the idea that what instruments like the PTGI measure is self-reported or perceived PTG and that this does not always reflect a "true" or real PTG. In this sense, the self-reported or perceived PTG would be subject to different biases that the evaluated person might have, including self-serving biases. In the case of an evaluation carried out many years after the traumatic event, the memory biases derived from such a long period, which would affect the reliability of the self-report data, should also be considered. In this sense, future research should address the degree of agreement between self-reported PTG and the changes that relatives, friends or co-workers have been able to observe. In addition, long-term PTG evaluation presents the additional problem of discriminating whether changes in, for example, perception of oneself, the world or life are due to the traumatic event or due to the passage of time, for example, passing from youth to middle age or from middle age to old age. Therefore, future studies on long-term PTG should include a control group to ensure that the growth evaluated has really arisen from the traumatic event and not only from the passage of time.

Despite these limitations, this study presents novel results on the relationship between traumatic dysfunctional attitudes and long-term PTG in people directly affected by a terrorist attack, a factor, a class of PTG and a type of population on which there is almost no prior research. These results highlight the association between traumatic dysfunctional attitudes and long-term PTG and offer support for the hypothesis that, over time, the positive basic attitudes or beliefs of many people who have experienced a traumatic event are reconstructed, but incorporating negative or dysfunctional attitudes or beliefs, so that this association can take the form of an inverted U for some dimensions of the PTG and, for other dimensions, reflect a positive linear relationship, which, in any case, means that the presence of a certain level of traumatic dysfunctional attitudes could be a necessary condition for PTG.

The results also have practical implications, for example, for preventive and therapeutic interventions with victims of terrorist attacks. Specifically, the results imply that the objective of cognitive and narrative techniques should not be the reconstruction of the uniformly and rigidly positive cognitive schemas that the person had about the world, others and oneself before the terrorist attack, but the reconstruction of more complex and flexible cognitive schemas that recognize and allow a dialectic between the positive and the negative in life. These cognitive schemas include attitudes and beliefs that, for example, recognize that the world is benevolent, but not always, and that the world is comprehensible, but not always. This set of more complex and multifaceted and less rigid attitudes or beliefs would facilitate both PTG and the person's preparation for subsequent traumatic or stressful events and thereby minimize the likelihood of future psychopathological consequences (Janoff-Bulman, 2006).

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