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Posttraumatic Growth, Metacognitive Beliefs, Self-Absorption and Dysfunctional Trauma-Related Attitudes in a Sample of the Spanish General Population

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A B S T R A C T

Background: The prevailing theoretical models of posttraumatic growth (PTG) are fundamentally cognitive. However, few studies have examined the relationship of PTG with metacognitive beliefs, self-focused attention and trauma-related attitudes toward the world and oneself. These cognitive constructs might influence in the development of PTG. The aim of the study was to examine the relationship of PTG with dysfunctional metacognitive beliefs, dysfunctional self-focused attention (self-absorption), and dysfunctional trauma-related attitudes.
Method: A sample of 250 adults (58.8% women; average age = 41.9 years) who had suffered a traumatic event in the past (on average, 14.5 years prior to the study) completed tests measuring those three cognitive constructs, symptoms of posttraumatic stress and depression, optimism, and PTG.
Results: Multiple regression analyses revealed significant linear and inverted U-shaped relationships between some dimensions of PTG and negative beliefs about the uncontrollability and danger of worry, cognitive self-consciousness, private self-absorption, and dysfunctional traumatic attitudes related to chronification of distress. However, the variables that showed the greatest and most consistent relationships with PTG were the number of traumatic events suffered and posttraumatic stress symptomatology and, to a lesser extent, optimism and depressive symptomatology.
Conclusion: The results highlight the important role that cognitive factors play in PTG. More specifically, the results underline the important role of people's basic attitudes toward themselves and the world, as well as the role of self-focused attention and metacognitive beliefs. The results also support the hypothesis that a certain degree of emotional distress may be a necessary precondition for PTG.

Crecimiento Postraumático, Creencias Metacognitivas, Autoabsorción y Actitudes Disfuncionales Traumáticas en una Muestra de la Población General Española

Palabras clave:
Crecimiento postraumático
Metacognición
Atención autofocalizada
Actitudes disfuncionales
Autoabsorción
Creencias básicas
Estrés postraumático
Depresión
Optimismo

R E S U M E N

Antecedentes: Los modelos teóricos actuales sobre el crecimiento postraumático (CPT) son fundamentalmente cognitivos. Sin embargo, existen pocos estudios sobre la relación del CPT con las creencias metacognitivas, la atención autofocalizada y las actitudes sobre el mundo y uno mismo relacionadas con el suceso traumático, factores cognitivos que podrían influir en el desarrollo del CPT. El objetivo del estudio fue examinar la relación del CPT con las creencias metacognitivas disfuncionales, la atención autofocalizada disfuncional (autoabsorción) y las actitudes disfuncionales traumáticas.
Método: Una muestra de 250 adultos (58.8% mujeres; edad media = 41.9 años) que habían sufrido un acontecimiento traumático hacía una media de 14.5 años completaron medidas de esos tres constructos cognitivos, de sintomatología de estrés postraumático y depresión, optimismo y CPT.

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Resultados: Análisis de regresión múltiple revelaron que algunas dimensiones del CPT se asociaron linealmente o en U invertida con las creencias metacognitivas negativas sobre la preocupación, la autoconciencia cognitiva, la autoabsorción privada y las actitudes disfuncionales traumáticas de cronificación del malestar. Sin embargo, los factores con una asociación mayor y más consistente con el CPT eran el número de sucesos traumáticos vividos y la sintomatología de estrés postraumático, y, en menor medida, el optimismo y la sintomatología depresiva.
Conclusión: Los resultados subrayan la importancia de los factores cognitivos en el CPT, en especial, de las actitudes básicas sobre uno mismo y el mundo y de la atención autofocalizada, pero también de las creencias metacognitivas. Los resultados también apoyan la hipótesis de que algún malestar emocional puede ser una condición necesaria para el CPT.

Scientific research has made clear that a large percentage of people have suffered at least one traumatic event over the course of their lives. The literature also tells us that a significant percentage of these people may display a range of different short-, medium- or long-term psychological symptoms and mental disorders, chief among them posttraumatic stress disorder (PTSD) and major depressive disorder (MDD). For example, according to one epidemiological study by Olaya et al. (2014), about 54% of the members of the adult population of Spain have been through at least one traumatic event in their lifetimes. The same study found prevalence rates of PTSD of 87.3% among people who were forced to flee the country because of the Civil War, 20.5% among rape survivors, and 17.5% among those who had experienced sexual harassment. Elsewhere, a prospective-longitudinal study by Asselmann et al. (2018) found that, among a sample of young adults in Germany, 20% of those who had experienced a traumatic event, whatever the sort, suffered from MDD eight years after the event.

While such psychopathological consequences are common, it is clear from the figures above that most people who survive traumatic events do not display psychological symptoms or disorders. Moreover, a growing body of literature has shown that after traumatic events some people can have positive reactions. They may develop new strengths and abilities, begin to act more altruistically, experience positive changes in their cognitive schemas with regard to human nature, themselves or the world, or report more positive emotions (Joseph & Finley, 2008; Linley & Joseph, 2004). Many of these positive reactions can be grouped under the construct of posttraumatic growth (PTG), which has been defined as "positive psychological change experienced as a result of the struggle with highly challenging circumstances" (Tedeschi & Calhoun, 2004, p. 1). This construct has most often been measured using the Posttraumatic Growth Inventory, or PTGI (Tedeschi & Calhoun, 1996), an instrument that yields an overall score for posttraumatic growth (PTG), as well as separate scores for five components, dimensions or factors of this broader construct: relating to others, new possibilities, personal strength, appreciation of life, and spiritual change.

Among the theoretical models that have been used to explain PTG, perhaps the most prominent is the one posed by Tedeschi and Calhoun (1995; Tedeschi et al., 2018), the researchers who coined the term PTG and who created the PTGI. From the time of the initial formulation of the theory (Tedeschi & Calhoun, 1995) to the more recent publications by the authors (Tedeschi et al., 2018), the model has always been eminently cognitive. It is based on the premise that certain cognitive constructs play a fundamental role in PTG. Firstly, the model specifies that in order for PTG to come about, the originating traumatic event must call into question existing positive cognitive schemas, upending the person's assumptions that the world is a fair place, that people can predict and control what happens to them, that most people are basically good, that the individual him- or herself is of value, and that the world makes sense. The questioning of these beliefs or attitudes leads the person into a cognitive struggle to understand what has happened, to grasp the nature of the world and of him- or herself. In other words, these traumatized people enter into a cognitive struggle to rebuild their cognitive schemas about the world and about themselves. Rethinking these core beliefs and attitudes is a stressful experience and can lead to emotional distress. According to Tedeschi et al. (2018), the interaction between these two processes results in the two processes of cognitive ruminations that are fundamental conditions for the development of PTG. The initial process of rumination is intrusive and automatic, but it can later give way to a second process that is more thoughtful and deliberative than the first. This latter rumination process can be a means of gaining an understanding of the traumatic event and its consequences (Tedeschi et al., 2018).

In this theoretical context, cognitive constructs such as metacognitive beliefs, self-focused attention, and trauma-related attitudes can also play central roles in PTG. A person's metacognitive beliefs are defined as beliefs about his or her own mental processes. Such beliefs are a reflection of a metacognitive way of processing information, wherein thoughts are not taken as mere descriptions of reality but are instead viewed as mental events that merit examination (Wells, 2000; Wells & Matthews, 1994). A metacognitive way of thinking allows people to take a more critical stance toward their cognition and can help facilitate PTG. For example, Taku et al. (2012) have suggested that metacognition can allow traumatized people to compare the different versions of themselves from "before" and "after" the traumatic event, a thought process that can allow them to recognize their own PTG. Additionally, adopting a metacognitive position can "facilitate a move toward a position where a sense of gradual resolution can be incorporated into the altered life-narrative," thus allowing the individual to lend meaning to the traumatic experience, which is a key process within PTG (Tedeschi & Blevins, 2015, p. 374).

Self-focused attention is the tendency to concentrate one's attention on oneself, whether on internal issues such as one's own thoughts, feelings and emotions (private self-focused attention) or on external (or physical) issues such as one's outward appearance or the impression one makes on others (public self-focused attention). While it is true that both private and public self-focused attention have been linked to emotional distress and maladjustment (see the review articles by Ingram, 1990, and Mor & Winquist, 2002), ever since the classic study by Fenigstein et al. (1975), research has shown that self-focused attention, particularly of the private variety, can foster the development of renewed perception and improve a person's understanding of his or her situation, thus contributing to personal growth. That is why it is reasonable to expect to find a relationship between self-focused attention and PTG, especially given that the processes of rumination that the Tedeschi et al. (2018) model says are central to this growth process are, by their very nature, characterized by self-focused attention. Indeed, rumination itself can be understood as a kind of self-focused attention (Mor & Winquist, 2002).

Finally, Tedeschi and Calhoun's PTG model (1995; Tedeschi et al., 2018) maintains that changes in the positive cognitive schemas of

people who have been through traumatic events are at the root of PTG. Therefore, it would stand to reason that these positive beliefs and attitudes toward the world and oneself, which are the foundation of these cognitive schemas, would also be related to PTG. This is especially likely to be the case for beliefs or attitudes related to the traumatic event itself (trauma-related attitudes or traumatic attitudes) (Liébana et al., 2022).

There has been little empirical research into the relationship between PTG and the three cognitive constructs described above (metacognitive beliefs, self-focused attention, and trauma-related attitudes). The lack of research is especially striking when it comes to the latter two constructs, metacognitive beliefs and self-focused attention. Furthermore, the results of the scanty research that does exist on these questions are not wholly consistent. For example, one study (Nalipay & Mordeno, 2018) found a mix of both positive and negative significant correlations between higher scores for the various dimensions of PTG and three measurements of positive metacognitive beliefs, but another study (Clauss et al., 2021) did not find any significant correlations between overall levels of PTG and scores on two different measurements of negative or dysfunctional beliefs.

On the other hand, several studies have found significant positive correlations between positive trauma-related attitudes and higher scores of PTG, or higher scores for certain dimensions of the construct (Gökler Danışman et al., 2018; Valdez y Lilly, 2015). Other studies, however, have found significant negative correlations in this regard (Lahav et al., 2016) or even significant positive correlations between PTG and a greater presence of negative or dysfunctional trauma-related attitudes (Liébana et al., 2022). There are also studies that have found a mix of positive and negative significant correlations between these variables (Carboon et al., 2005), and still others that have found no significant correlations at all (Su & Chen, 2015), or have found inverted U-shaped relationships (a significant association between PTG and a moderate level of negative or dysfunctional trauma-related attitudes) (Liébana et al., 2022).

Given the scarcity of empirical studies and the inconsistent results of the small body of existing research, the objective of this study was to examine the relationship between PTG and metacognitive beliefs, self-focused attention, and trauma-related attitudes. In particular, the study sought to explore links between PTG and the negative or dysfunctional aspects of these cognitive constructs, specifically, dysfunctional metacognitive beliefs, dysfunctional self-focused attention (or self-absorption; Ingram, 1990), and dysfunctional trauma-related attitudes.

These three dysfunctional constructs are on the opposite end of the spectrum from adaptive metacognitive beliefs, functional auto-focused attention and positive basic attitudes, respectively. These more positive constructs are all either directly or indirectly involved in Tedeschi and Calhoun's (1995; Tedeschi et al., 2018) model of PTG. In fact, instruments assessing these positive constructs tend to include inverse items that reflect their negative or dysfunctional variants, and vice-versa (Liébana et al., 2022). This argument supports this study's focus on the negative or dysfunctional variants of metacognitive beliefs, self-focused attention and trauma-related attitudes, but the choice of this focus also arose from the desire to investigate whether the association between these variables and PTG might be curvilinear rather than linear. This possibility has yet to be examined through empirical study in any of the previous research on the relationships between PTG and metacognitive beliefs, self-focused attention and basic beliefs or attitudes (with the exception of the study by Liébana et al., 2022). However, studies of posttraumatic stress symptoms have sometimes looked at possible curvilinear relationships with PTG. The findings of some of these studies suggest that the relationship between posttraumatic stress symptoms and PTG may not be linear but instead that there may be a quadratic relationship that takes on an inverted U-shaped form. This would indicate an association between higher levels of PTG and moderate levels of posttraumatic stress symptoms, but it would mean a lesser likelihood of PTG when posttraumatic stress levels are higher or lower (see the meta-analysis by Shakespeare-Finch & Lurie-Beck, 2014). It might be reasonable to expect a similar inverted U-shaped quadratic relationship between PTG and dysfunctional metacognitive beliefs, self-absorption and dysfunctional trauma-related attitudes. In this case, higher levels of PTG would not be expected to appear in association with either low or high levels of these three constructs (or, consequently, with lower or higher levels of the corresponding positive or functional variants of the constructs). However, in the presence of moderate levels of dysfunctional metacognitive beliefs, self-absorption or dysfunctional trauma-related attitudes (or of the inverse, positive and functional sides of these variables), a greater tendency toward PTG would be expected. As Janoff-Bulman (2004) suggested with regard to basic attitudes or beliefs, successfully recovering from a traumatic experience does not mean returning to the former cognitive schemas about the world and oneself that may have been characterized by generally positive basic attitudes and beliefs. Instead, recovery involves adopting cognitive schemes that embrace both positive and negative or dysfunctional attitudes.

In sum, the aim of the present study was to examine the relationship of PTG with dysfunctional metacognitive beliefs, self-absorption, and dysfunctional trauma-related attitudes. These potential associations have been studied in a sample of the general population of people who have been through traumatic events. The study also examined the associations between PTG and other variables that have been established in the scientific literature on the topic, including sex (Vishnevsky et al., 2010), posttraumatic stress symptoms (Liu et al., 2017; Shakespeare-Finch & Lurie-Beck, 2014), depressive symptoms (Long et al., 2021), and optimism (Prati & Pietrantoni, 2009).

Method

Participants

An initial sample of 552 adults from the general Spanish population were recruited to participate in this study by Psychology undergraduates at the Universidad Complutense in Madrid who were taking part in an elective seminar on personality and PTSD. Each of the students invited six family members or acquaintances to take part in a study on personality and posttraumatic stress according to criteria designed to ensure a certain degree of diversity in the sample in terms of age and sex. Of this initial sample, 250 people indicated, through the Event Experience Inventory (EEI), that they had had at least one traumatic experience. They made up the final sample for this study.

The participants of this final sample ranged from 18 to 90 years of age (mean = 41.9, *SD* = 16.1), and 58.8% were women. The number of traumatic experiences they had had ranged from 1 to 11 (mean = 1.6, *SD* = 1.3), and the experiences they identified as most traumatic had taken place an average of 14.5 years before the study (range of time elapsed = 0-83, *SD* = 14.9). In 85.2% of the cases, this most traumatic event had been life-threatening, while for 11.3% of the participants, the event carried a risk of severe injury, and for 3.5% it involved sexual violence. In 37.5% of the cases, the most traumatic event was something that had happened to the participant him- or herself, while in the remaining 62.4% of the cases it had happened to a family member or a close acquaintance. In terms of education, 45.4% had stopped studying after finishing high school, 41.8% had been to university, 10.8% had completed only primary school, and 2% had no formal education. Most of the participants (58.7%) were married or

lived with a partner, and most were employed (59.7%) at the time of assessment.

Instruments

Event Experience Inventory (EEI). This is an ad hoc instrument created for the purposes of this study, but it is based on the Life Events Checklist for the DSM-5 (LEC-5; Weathers et al., 2013a). The instrument seeks to identify the traumatic life events that a person has experienced. The inventory is made up of 27 items, of which the first 24 describe different kinds of traumatic events as established in the DSM-5 definition (American Psychiatric Association, 2013). These are events that involve the threat of death, serious injury or sexual violence. Items 25 and 26 ask about any other kind of traumatic event that the respondent (item 25) or a loved one (item 26) may have experienced. When no traumatic experiences are recorded in these 26 items, the participant answers a final item about the most distressing situation in his or her life (item 27). For each event (item), participants indicate if they themselves had the experience or if it happened to a loved one, and they briefly describe the event and the approximate date on which it occurred. The answers given to items 1 to 26 were used to measure the number of traumatic events each participant had experienced and to determine whether their descriptions of these events met the DSM-5 definition of traumatic experiences. Participants were also asked to identify the most traumatic experiences of their lives, and they based their answers on the instruments measuring PTG and posttraumatic stress symptomatology on this experience. This traumatic event and the descriptions and responses to the IEE made it possible to gather data on the following two variables: type of traumatic event (life-threatening or otherwise) and type of victim (the participant him- or herself or a loved one).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996; Spanish adaptation in Beck et al., 2011). The BDI-II is a self-report instrument designed to assess the presence and severity of symptoms of depression. It is made up of 21 items, each of which is scored from 0 to 3, with total possible scores ranging from 0 to 63. Both the original English version of the BDI-II and its Spanish adaptation have been found to have good indices of reliability and validity (Beck et al., 2011; Sanz, 2013; Sanz et al., 2005). In the sample used in this study, an internal consistency index of .88 (Cronbach's alpha) was calculated for the BDI-II.

PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013b). This study used the Spanish adaptation of the PCL-5 by Sanz et al. (2021). The PCL-5 is a 20-item instrument that measures the presence and severity of symptoms of posttraumatic stress according to the DSM-5 diagnostic criteria for PTSD. The items are answered using a five-point Likert scale and are scored from 0 to 4, with a final score that can range from 0 to 80. Both the original PCL-5 and the adapted Spanish version have been found to have good indices of reliability and of convergent and diagnostic validity (Blevins et al., 2015; Sanz et al., 2021). The participants in the study were asked to complete the PCL-5 with regard to the most traumatic event they had experienced. Their scores on the PCL-5 displayed an internal consistency index (alpha) of .94

Life Orientation Test-Revised (LOT-R; Scheier et al., 1994). This study used the Spanish adaptation of this instrument by Otero et al. (1998). The LOT-R is designed to assess the degree of optimism people feel, and it is made up of 10 items that are answered on a 5-point Likert scale and are scored from 0 to 4. The answers to 6 of the 10 items yield an overall score for optimism than can range from 0 to 24. Good indices of reliability and validity have been found for both the original version of the LOT-R and the Spanish adaptation (Ferrando et al., 2002; Scheier et al., 1994). In the sample assessed in this study the total score for the LOT-R displayed an internal consistency (alpha) of .75.

Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The Spanish adaptation by Vázquez et al. (2006) was used, but the instructions were altered in that participants were asked to choose "the statement that best represents your experience after the event", and in that they specified that items should be answered in reference to "the most traumatic event that you have described". The PTGI is designed to assess the positive psychological changes experienced after a traumatic event. The PTGI is made up of 21 items that are answered on a 6-point Likert scale, ranging from "No change," which corresponds to a score of 0, to "A great degree of change," which corresponds to a score of 5, meaning that the overall score for the PTGI can range from 0 to 105. Supported by the results of a number of factorial analyses (Taku et al., 2008; Tedeschi & Calhoun, 1996), the PTGI also yields measurements of five different dimensions of PTG, thanks to the following five subscales: Relating to Others, New Possibilities, Personal Strength, Appreciation of Life, and Spiritual Change. Both the overall score of the PTGI and the scores for the individual subscales have been found to have good indices of reliability and factorial and criterion validity (Taku et al., 2008; Tedeschi & Calhoun, 1996). For the sample of participants in this study, the total PGTI scores displayed an internal consistency index (alpha) of .96, while the internal consistency indices for the individual subscales were as follows: .90 (Relating to Others), .88 (New Possibilities), .84 (Personal Strength), .88 (Appreciation of Life), and .84 (Spiritual Change).

Dysfunctional Traumatic Attitude Scale, version for the general population (EADT-PG). This instrument was initially created as a tool to assess the dysfunctional beliefs of people who had been victims of terrorist acts (Navarro Montes, 2021; Navarro et al., 2022), but this study used a version adapted for the general population. The main difference from the original version is that the references to a "terrorist attack" in the instructions and items were replaced by more general references to a "traumatic event". Both versions of the EADT are made up of the same 34 items that are answered on a five-point Likert-type scale ranging from "totally disagree", which receives a score of 1, to "totally agree", which receives a score of 5. Both versions of the EADT yield an overall score for dysfunctional trauma-related attitudes, as well as separate scores for three different subscales that assess attitudes assuming the world is dangerous (e.g., "When something bad has happened to you, it's sure to happen again"), attitudes characterized by a negative view of society and humans (e.g., "Humans are selfish, and they only think of themselves"), and attitudes assuming chronic distress (e.g., "The anxiety caused by a traumatic event is never going to disappear"). Among samples of victims of terrorist attacks, studies by Navarro Montes (2021) and Navarro et al. (2022) have found good indices of reliability for the overall scale and for the three subscales of the EADT (e.g., α = .85–.93). In this study, whose participants are from the general population, the internal consistency index (alpha) for the overall EADT-PG was .88, and for the Dangerous World, Negative View of Society and Humans, and Chronification of Distress subscales were .81, .76 and .74, respectively.

*Metacognitions Questionnaire 30 (*MCQ-30; Wells & Cartwright-Hatton, 2004). The Spanish adaptation by Ramos-Cejudo et al. (2013) was used. The MCQ-30 is made up of 30 items (5 subscales with 6 items each). The instrument measures beliefs about worry and cognition and examines the tendency to monitor one's own thoughts and cognitive processes. Respondents to the MCQ-30 are asked to indicate the extent to which they agree with a series of statements. They respond on a four-point Likert-type scale, ranging from 1 ("I do not agree") to 4 ("I agree very much"). Total scores can

range from 30 to 120 points, with higher scores indicating greater degrees of dysfunctional metacognition. The subscales of the MCQ-30 measure the following dimensions of dysfunctional metacognitive beliefs: positive beliefs about worry (which measures how useful the person believes worrying to be; e.g., "Worrying helps me cope"); negative beliefs about the uncontrollability and danger of worry (measuring the extent to which the person believes his or her worries to be out of control or dangerous; e.g., "I can't ignore the thoughts that worry me"); cognitive confidence (measuring the person's confidence in his or her own thought processes, memory and attention; e.g., "My memory can play tricks on me"); beliefs about the need for control of thoughts (measuring the extent to which the person feels the need to control his or her own thoughts and the expected consequences of not controlling them; e.g., "I have to control my thoughts all the time"); and cognitive self-consciousness (measuring the tendency to monitor one's own thoughts and cognitive processes; e.g., "I pay a lot of attention to the way my mind works"). The MCQ-30 has shown acceptable indices of reliability and validity when used in various populations (e.g., Marković et al., 2019; Wells & Cartwright-Hatton, 2004), and the Spanish adaptation has also displayed acceptable degrees of reliability and validity for samples of the general population and of patients with psychological disorders. In one study of the Spanish general population, Martín et al. (2014) found a Cronbach's alpha coefficient of .87 for the overall score and alpha coefficients greater than .70 for all the subscales except for the one measuring need for control, for which the coefficient was .69. The following alpha coefficients were found for the sample in the current study: .89 (overall scale), .85 (positive beliefs about worry), .76 (negative beliefs about the uncontrollability and danger of worry), .89 (cognitive confidence), .71 (beliefs about the need for control of thoughts), and .80 (cognitive self-consciousness).

Self-Absorption Scale (SAS; McKenzie & Hoyle, 2008). The Spanish adaptation by Perona-Garcelán et al. (2014) was used. The SAS is made up of 17 items that assess the tendency toward dysfunctional self-focused attention (or self-absorption). In other words, the scale assesses the tendency toward excessive, sustained and rigid self-focus. Respondents are asked to indicate the frequency with which they focus their attention on themselves in a dysfunctional way. The items are answered on a five-point Likert-type scale, ranging from 0 ("never") to 4 ("always"). Total scores can range from 0 to 68 points, with higher scores indicating a greater tendency toward self-absorption. In addition to the total score, the SAS yields separate scores for its two subscales. The first assesses private self-absorption (8 items). This subscales measures the tendency to pay attention on internal aspects such as thoughts, feelings, and emotions (e.g., "Sometimes I am so deep in thought about my life, I am not aware of my surroundings"). The second subscale (9 items) assesses public self-absorption. This subscale measures the tendency to pay attention to external or physical aspects of oneself, one's outward appearance or the impression one makes on others (e.g., "I have difficulty focusing on what others are talking about because I wonder what they are thinking of me"). Both subscales have shown acceptable indices of reliability and validity when used in various populations (DaSilveira et al., 2011; McKenzie & Hoyle, 2008). The Spanish version has also been found to have acceptable psychometric properties for use with university students (e.g., alpha = .81 and .89 for the Public and Private Self-Absorption subscales, respectively; Perona-Garcelán et al. 2014). Among the participants in the current study, item 14 on the Private Self-Absorption subscale displayed very poor psychometric indices, with corrected item-total correlations of -.058 and -.069 with the scores on the Private Self-Absorption subscale and the overall Self-Absorption scale, respectively. Therefore, this item was excluded from the calculations of the scores for these two measures. In light of this modification, the alpha coefficients for internal consistency for the SAS scores were as follows: .87 (overall self-absorption score), .74 (private self-absorption), and .85 (public self-absorption).

Procedure

All participants signed an informed consent document expressing their willingness to collaborate in a broader research project on personality and posttraumatic stress. Later, the Psychology undergraduate student who had invited each participant administered the following instruments in this order: BDI-II, LOT-R, SAS, MCQ-30, EEI, PCL-5, PTGI, and EADT-PG. All the Psychology students who gathered data had been specifically trained in the administration of the questionnaires in a seminar led by the first two authors of this study.

Data Analysis

The statistical analyses for this study were carried out with the software program SPSS, version 25. In order to analyze the factors potentially related to the presence of PTG, the Pearson correlations were calculated between the PTGI scores and the following sociodemographic, clinic, traumatic event-related, and cognitive variables: sex (1 = woman; 0 = man), age, education (no formal education, primary, secondary or university), marital status (married or living with partner vs. single, divorced, separated or widowed), posttraumatic stress symptomatology, depressive symptomatology, years since the traumatic event, number of traumatic experiences, direct or indirect traumatic experience (whether the victim was the participant him- or herself or a family member or loved one), type of traumatic event (life-threatening vs. others), attitudes assuming a dangerous world, attitudes implying a negative view of society and humanity, attitudes implying the chronification of distress, private self-absorption, public self-absorption, positive beliefs about worry, negative beliefs about the uncontrollability and danger of worry, cognitive confidence, beliefs about the need for control of thoughts, and cognitive self-consciousness.

Then, in order to examine the potential presence of curvilinear, inverted U-shaped relations between PTG and the variables related to emotional symptomatology, number of traumatic events, years since the traumatic event, dysfunctional trauma-related attitudes, self-absorption and metacognitive beliefs, the scores for these variables were first centered with respect to the mean (by subtracting the mean from each score) and then squared to create the quadratic term for these variables. Hierarchical multiple regression analyses were carried out for each measure of PTG and, in each analysis, the effect or linear term of each variable (the centered variable) was included in the first step, while the effect or quadratic term (the centered variable squared) was included in the second step. This was done in order to determine whether the inclusion of the quadratic term led to a statistically significant increase in the degree to which the variance of the PTG measure was explained.

Then, multiple regression analyses were carried out for each of the PTG measures, taking as predictors the variables that had displayed statistically significant correlations ($p < .05$) in the correlational analyses and the hierarchical regression analyses described above. Prior to the multiple regression analysis, the potential for collinearity problems among the predictors was investigated by calculating the indices of tolerance and the variance inflation factor (VIF). Tolerance indices of less than .20 indicate potential collinearity problems, and indices under .10 indicate serious problems, and VIF values over 12 also suggest collinearity problems (Martínez Arias et al., 2015).

Results

Variables Related with Posttraumatic Growth: Linear Relationships

Table 1 shows the linear correlations between the measures of PTG (the overall PTGI score and the scores for each of the PTGI subscales) and the sociodemographic and clinical variables, as well as variables related to the terrorist attacks, metacognitive beliefs, self-absorption and dysfunctional trauma-related attitudes. The results shown on Table 1 indicate that the only variable with statistically significant correlations with all six measures of PTG was the number of traumatic experiences. The coefficients for these relationships were positive, and the effect sizes were in the small and nearly medium ranges, running from a coefficient of.17 (for spiritual change) to .26 (overall PTG). These coefficients indicate that a greater number of traumatic events was associated with a higher degree of overall PTG and with higher levels of all the individual dimensions of this construct. There were four variables, posttraumatic stress symptomatology, private self-absorption, public self-absorption, and cognitive self-consciousness, that displayed statistically significant positive correlations with four of the six measures of PTG, with correlations ranging from small to medium-sized. One variable, optimism, had statistically significant positive relationships with three measures of PTG, with small coefficients ranging from .13 (for overall PTG) to .17 (with appreciation of life). Finally, each of four variables (age, years since the traumatic event, negative beliefs about the uncontrollability and danger of worry, and beliefs about the need for control of thoughts) showed statistically significant positive correlations with a single measure of PTG. The coefficients were also small in all of these cases, ranging from .15 (the correlation between new possibilities and negative beliefs about the uncontrollability and danger of worry) to .18 (the correlation between years since the traumatic event and spiritual change).

Table 1.
Correlations of the measures of posttraumatic growth (PTGI) with the sociodemographic and clinical variables, and with variables related to dysfunctional trauma-related attitudes, self-absorption and metacognitive beliefs

Variable	Measures of posttraumatic growth (PTGI)					
	Total score	Relating to others	New possibilities	Personal strength	Appreciation of life	Spiritual change
Sex (1 = woman; 0 = man)	.040	-.010	.061	-.027	.108	.010
Age	-.015	-.042	-.033	-.018	.001	.160*
Marital status (1 = married or living with partner; 0 = other)	-.096	-.084	-.126	-.073	-.044	.028
Education	-.023	-.004	-.025	-.048	.024	.001
Depressive symptomatology (BDI-II)	.054	.079	.077	.008	-.011	.019
Posttraumatic stress symptomatology (PCL-5)	.208**	.221**	.216**	.123	.164**	.080
Optimism (LOT-R)	.135*	.058	.121	.165*	.168**	.101
Number of traumatic experiences	.264**	.243**	.226**	.218**	.214**	.169**
Type of traumatic event (1 = life-threatening; 0 = other)	-.023	.044	-.073	-.084	.006	.014
Victim of traumatic event (1 = participant; 0 = loved one)	-.013	-.016	.010	.000	-.030	.024
Years since traumatic event	-.017	-.056	-.028	.013	-.051	.182**
Dysfunctional trauma-related attitudes (EADT-PG)						
Dangerous world	.116	.124	.085	.063	.081	.106
Negative view of humanity/society	.037	.031	.014	.035	.035	.023
Chronification of distress	-.044	.011	-.046	-.105	-.079	-.025
Total score	.066	.081	.047	.014	.030	.052
Self-absorption (SAS)						
Private	.183**	.203**	.189**	.078	.039	.265**
Public	.156*	.206**	.131*	.064	.069	.149*
Total score	.187**	.230**	.171**	.078	.066	.213**
Metacognitive beliefs (MCQ-30)						
Positive beliefs about worry	.084	.109	.047	.035	.036	.052
Negative beliefs about the uncontrollability and danger of worry	.125	.119	.146*	.058	.091	.079
Cognitive confidence	.024	.080	.013	-.025	.027	-.013
Beliefs about the need for control of thoughts	.130	.168**	.111	.061	.066	.101
Cognitive self-consciousness	.166**	.166*	.195**	.166*	.060	.027
Total score	.145*	.170**	.146*	.085	.091	.055

Note. *Correlations considered statistically significant at $p < .05$ (bilateral test). ** Correlations considered statistically significant at $p < .01$ (bilateral test). *BDI-II: Beck Depression Inventory-II.* EADT-PG: Dysfunctional Traumatic Attitude Scale, version for the general population. LOT-R: Life Orientation Test - Revised. MCQ-30: Metacognitions Questionnaire 30. PCL-5: PTSD Checklist for the DSM-5. PTGI: Posttraumatic Growth Inventory. SAS: Self-Absorption Scale.

Table 2.
Multiple linear and curvilinear relationships between continuous predictors and the PTGI measures of posttraumatic growth: results of the multiple regression analyses

Predictor	Criterion variable: PTGI measures of posttraumatic growth											
	Total PTGI		Relating to others		New possibilities		Personal strength		Appreciation of life		Spiritual change	
	B	Δ R^2	β	Δ R^2	β	Δ R^2	β	Δ R^2	β	Δ R^2	β	Δ R^2
Posttraumatic stress (PCL-5)												
Step 1: linear term	.208	.043*	.221	.049*	.216	.047*	.123	.015	.164	.027*	.080	.006
Step 2: quadratic term	-.291	.042*	-.229	.026*	-.284	.041*	-.263	.034*	-.260	.034*	-.111	.006
Depressive symptoms (BDI-II)												
Step 1: linear term	.054	.003	.079	.006	.077	.006	.008	.000	-.011	.000	.019	.000
Step 2: quadratic term	-.235	.036*	-.238	.037*	-.233	.036*	-.134	.012	-.228	.034*	-.120	.009
Years since traumatic event												
Step 1: linear term	-.017	.000	-.056	.003	-.028	.001	.013	.000	-.051	.000	.182	.033*
Step 2: quadratic term	-.128	.008	-.141	.009	-.154	.011	-.236	.026*	-.012	.003	.069	.002
Optimism (LOT-R)												
Step 1: linear term	.135	.018*	.058	.003	.121	.015	.165	.027*	.168	.028*	.101	.010
Step 2: quadratic term	-.062	.003	-.043	.002	-.065	.004	-.089	.006	-.017	.000	-.068	.004
Number of traumatic events												
Step 1: linear term	.264	-070*	.243	.059*	.226	.051	.218	.048*	.214	.046*	.169	.029*
Step 2: quadratic term	.078	.003	.050	.001	.102	.005	.076	.003	.074	.003	.034	.001
Private self-absorption (SAS)												
Step 1: linear term	.183	.034*	.203	.041*	.189	.036	.078	.006	.039	.002	.265	.070*
Step 2: quadratic term	-.027	.000	-.072	.002	-.057	.002	.017	.000	.096	.004	-.005	.000
Public self-absorption (SAS)												
Step 1: linear term	.156	.024*	.206	.043*	.131	.017*	.064	.004	.069	.005	.149	.022*
Step 2: quadratic term	-.094	.005	-.078	.003	-.131	.010	-.080	.004	-.085	.004	-.050	.001
Negative beliefs about worry (MCQ-30)												
Step 1: linear term	.125	.016	.119	.014	.146	.021*	.058	.003	.091	.008	.079	.006
Step 2: quadratic term	-.160	.013	-.166	.014	-.162	.014	-.063	.002	-.114	.007	-.231	.028*
Need for control (MCQ-30)												
Step 1: linear term	.130	.017*	.168	.028*	.111	.012	.061	.004	.066	.004	.101	.010
Step 2: quadratic term	-.034	.001	-.086	.005	-.025	.000	.021	.000	.015	.000	-.061	.002
Cognitive self-consciousness (MCQ-30)												
Step 1: linear term	.166	.028*	.166	.028*	.195	.038*	.166	.028*	.060	.004	.027	.001
Step 2: quadratic term	-.060	.003	-.093	.007	-.057	.003	.006	.000	-.010	.000	-.095	.007
Chronification of distress (EADT-PG)												
Step 1: linear term	-.044	.002	.011	.000	-.046	.002	-.105	.011	-.079	.006	-.025	.001
Step 2: quadratic term	-.131	.017*	-.143	.020*	-.099	.010	-.154	.024*	-.075	.006	-.056	.003

Nota. *Predictor considered statistically significant at $p < .05$. The measures of cognitive beliefs (MCQ-30) and dysfunctional trauma-related attitudes (EADT-PG) that do not appear on this table were not found to be significant predictors, either in the linear term or in the quadratic term (metacognitive beliefs: positive beliefs about worry and cognitive confidence; dysfunctional trauma-related attitudes: dangerous world and negative view of humanity/society). BDI-II: Beck Depression Inventory-II. EADT-PG: Dysfunctional Traumatic Attitude Scale, version for the general population. LOT-R: Life Orientation Test - Revised. MCQ-30: Metacognitions Questionnaire 30. PCL-5: PTSD Checklist for the DSM-5. PTGI: Posttraumatic Growth Inventory. SAS: Self-Absorption Scale.

Table 3.
Multiple linear regression on the measures of posttraumatic growth (PTG) (continued)

PTG measure / Predictor	Beta	*t*	*p*	*Partial r*
Total PTGI				
Posttraumatic stress (PCL-5), centered	**.315**	**3.50**	**.001**	**.233**
Posttraumatic stress (PCL-5), quadratic	-.133	-1.47	.141	-.101
Depression (BDI-II), quadratic	-.135	-1.86	.064	-.127
Optimism (LOT-R)	**.263**	**3.80**	**.001**	**.252**
Number of traumatic events	**.256**	**4.20**	**.001**	**.277**
Private self-absorption (SAS)	.074	0.97	.331	.067
Public self-absorption (SAS)	.146	1.72	.085	.118
Cognitive self-consciousness (MCQ-30)	.131	1.96	.051	.133
Chronification of distress (EADT), quadratic	-.095	-1.56	.120	-.106
Relating to others (PTGI)				
Posttraumatic stress (PCL-5), centered	**.203**	**2.07**	**.039**	**.143**
Posttraumatic stress (PCL-5), quadratic	-.017	-0.17	.863	-.012
Depression (BDI-II), quadratic	**-.212**	**-2.80**	**.005**	**-.191**
Number of traumatic events	**.247**	**3.90**	**.001**	**.262**
Private self-absorption (SAS)	.067	0.84	.400	.058
Public self-absorption (SAS)	.116	1.33	.182	.093
Beliefs about need for control (MCQ-30)	.053	0.64	.518	.045
Cognitive self-consciousness (MCQ-30)	.113	1.56	.120	.108
Chronification of distress (EADT-PG), quadratic	**-.135**	**-2.11**	**.036**	**-.145**
New possibilities (PTGI)				
Posttraumatic stress (PCL-5), centered	**.312**	**3.41**	**.001**	**.222**
Posttraumatic stress (PCL-5), quadratic	-.153	-1.65	.100	-.110
Depression (BDI-II), quadratic	**-.174**	**-2.27**	**.024**	**-.150**
Number of traumatic events	**.193**	**3.10**	**.002**	**.203**
Private self-absorption (SAS)	.097	1.23	.220	.082
Public self-absorption (SAS)	-.020	-0.24	.808	-.016
Negative beliefs about worry (MCQ-30)	.038	0.50	.615	.034
Cognitive self-consciousness(MCQ-30)	**.147**	**2.06**	**.040**	**.136**
Personal strength (PTGI)				
Posttraumatic stress (PCL-5), quadratic	-.031	-0.44	.661	-.032
Years since event, quadratic	-.096	-1.43	.153	-.103
Optimism (LOT-R)	**.188**	**2.67**	**.008**	**.190**
Number of traumatic events	**.243**	**3.62**	**.001**	**.254**
Cognitive self-consciousness (MCQ-30)	**.201**	**2.92**	**.004**	**.207**

None of the rest of the variables in the study (sex, marital status, education, depressive symptomatology, type of traumatic event, type of victim, the three measures of dysfunctional trauma-related attitudes, positive beliefs about worry, and cognitive self-confidence) displayed any statistically significant correlations with any of the six measures of PTG yielded by the PTGI.

Variables Related to Posttraumatic Growth: Curvilinear Relationships

Table 2 presents the results of the hierarchical regression analyses carried out to examine the possible curvilinear relationships between the measures of PTG and the variables measuring emotional symptomatology, number of traumatic experiences, years since the traumatic event, dysfunctional trauma-related attitudes, self-absorption and metacognitive beliefs. In most cases, the inclusion, in a second step of analysis, of the quadratic term of the variable in question (e.g., optimism, number of traumatic events, private self-absorption, public self-absorption) did not lead to a statistically significant increase in the percentage of variance in the measures of PTG that was explained by the variable. In other words, there was no significant increase in explanatory power beyond what was found in the regression model in the first step which had used only the linear term of each variable. One ex-

Table 3.
Multiple linear regression on the measures of posttraumatic growth (PTG) (continued)

PTG measure / Predictor	Beta	*t*	*p*	*Partial r*
Chronification of distress (EADT-PG), quadratic	**-.149**	**-2.20**	**.029**	**-.158**
Appreciation of life (PTGI)				
Posttraumatic stress (PCL-5), centered	**.382**	**4.50**	**.001**	**.280**
Posttraumatic stress (PCL-5), quadratic	-.162	-1.79	.074	-.116
Depression (BDI-II), quadratic	-.142	-1.95	.052	-.126
Optimism (LOT-R)	**.211**	**3.14**	**.002**	**.200**
Number of traumatic events	**.188**	**3.14**	**.002**	**.200**
Spiritual change (PTGI)				
Age	**.247**	**3.11**	**.002**	**.213**
Number of traumatic events	**.181**	**2.80**	**.006**	**.192**
Years since event	.032	0.39	.690	.028
Private self-absorption (SAS)	**.259**	**3.33**	**.001**	**.227**
Public self-absorption (SAS)	.085	1.07	.286	.075
Negative beliefs about worry (MCQ-30), quadratic	**-.141**	**-2.14**	**.033**	**-.148**

Note. Predictors which were statistically significant at $p < .05$ in bold. *BDI-II:* Beck Depression Inventory-II. EADT-PG: Dysfunctional Traumatic Attitude Scale, version for the general population. LOT-R: Life Orientation Test - Revised. MCQ-30: Metacognitions Questionnaire 30. PCL-5: PTSD Checklist for the DSM-5. PTGI: Posttraumatic Growth Inventory. SAS: Self-absorption Scale.

ception was that the quadratic components of the predictors were found to be statistically significant when it came to the link between symptoms of posttraumatic stress and four of the measures of PTG (relating to others, new possibilities, appreciation of life, and overall PTG). Additionally, the use of the quadratic term for the variable measuring dysfunctional attitudes related to chronification of distress showed a greater role in explaining three of the measures of PTG (relating to others, personal strength, and overall PTG). This was also the case for the number of years since the traumatic event in relation with the personal strength dimension of PTG, as well as for negative beliefs about worry in relation with the spiritual change dimension of PTG. In all of these cases, the fact that the statistically significant standardized coefficients of regression of the quadratic terms were negative indicated that the significant curvilinear relations between these variables and the measures of PTG were of an inverted U-shape. In other words, moderate levels of symptoms of posttraumatic stress and depression, dysfunctional attitudes related to chronification of distress, number of years since the traumatic event, and negative beliefs about the uncontrollability and danger of worry were all associated with higher levels of overall PTG or with some of its dimensions.

Multiple Regression Analysis of Posttraumatic Growth

In the cases in which the variables showed statistically significant correlations or in which the quadratic terms had statistically significant relationships with one or more of the measures of PTG on the PTGI, these variables were included as predictors in the multiple regression analyses carried out for each of the measurements of PTG. The results of this analysis, which are presented in Table 3, show that, after controlling for the effects of the rest of the predictors, the variable of the number of traumatic experiences was the only one that displayed significant associations with all the measures of PTG.

A regression model including nine predictors was able to significantly predict 25.6% of the variance in overall scores on the PTGI (R^2 = .256, F = 8.13, $p < .001$), but, in terms of individual predictors, only the number of traumatic events, optimism and the level of posttraumatic stress symptoms were significantly associated with the total scores on the PTGI. The size and sign of the beta coefficients and the partial correlations presented on Table 3 show that the number of traumatic events was the variable that played the biggest role in explaining variance in overall PTG (*partial r* = .28), followed by optimism (*partial r* = .25) and the scores for posttraumatic stress symptomatology (*partial r* = .23). In other words, people who had suffered more traumatic events, who displayed a higher level of optimism and had a greater number of posttraumatic stress symptoms (in that order of importance) were more likely to have greater overall PTG (see Table 3).

As Table 3 also makes clear, a regression model including nine predictors was able to significantly explain 22.2% of the variance in the scores for relating to others (R^2 = .222, F = 6.56, $p < .001$). There were significant correlations between the scores for this aspect of PTG and the number of traumatic events, the quadratic term of depressive symptoms, the quadratic term of dysfunctional attitudes related to chronification of distress, and the symptoms of posttraumatic stress. The number of traumatic events (*partial r* = .26) had the most important role in explaining the variance in relating to others, followed by the quadratic term of depressive symptoms (*partial r* = -.191), the quadratic term of dysfunctional attitudes related to chronification of distress (*partial r* = -.145), and symptoms of posttraumatic stress (*partial r* = .143). In other words, people who had had more traumatic experiences, suffered from moderate levels of depressive symptoms, displayed moderate levels of dysfunctional attitudes related to chronification of distress, and showed greater levels of symptoms of posttraumatic stress (in that order of importance) were more likely to score higher for the PTG dimension of improved relationships with others (see Table 3).

With regard to the dimension of PTG reflecting new possibilities, a regression model with eight predictors was able to significantly explain 18.1% of the variance (R^2 = .181, F = 6.20, $p <$ .001). In terms of individual predictors, however, only the level of symptoms of posttraumatic stress, the number of traumatic expe-

riences, the quadratic term of depressive symptoms and metacognitions involving cognitive self-consciousness were significantly associated with the scores for new possibilities (see Table 3). The level of posttraumatic stress symptoms was the most important variable in predicting the variance in new possibilities (*partial r* = .22), followed by the number of traumatic events (*partial r* = .20), the quadratic term of depressive symptoms (*partial r* = -.15), and cognitive self-consciousness (*partial r* = .136). This means that greater levels of posttraumatic stress symptoms, having experienced more traumatic events, moderate levels of depressive symptoms and greater degrees of cognitive self-consciousness were all linked, in that order of importance, to higher scores for new possibilities.

The results on Table 3 also show that a model with six predictors was able to explain 15.6% of the variance in the scores for the PTG dimension of personal strength (R^2 = .156, F = 5.88, p < .001). The number of traumatic events, cognitive self-consciousness, optimism and the quadratic term of dysfunctional attitudes related to chronification of distress were significantly associated with personal strength (*partial r* = .25, .21, .19 y -.16, respectively). These associations indicate that having had more traumatic events, displaying higher levels of optimism, having greater degrees of cognitive self-consciousness and having a moderate level of dysfunctional attitudes related to chronification of distress were associated (in that order of importance) with greater levels of personal strength.

A regression model with five predictors was able to significantly explain 16.2% of the variance in the scores for the PTG dimension of appreciation of life (R^2 = .162, F = 9.20, p < .001). However, the only variables that displayed significant relations with this dimension were posttraumatic stress symptomatology, the number of traumatic events and optimism (*partial r* = .28, .20 y .20, respectively). This indicates that higher levels of posttraumatic stress symptomatology and optimism, as well as having experienced a greater number of traumatic events were also associated with higher degrees of new appreciation for life.

Finally, a regression model with six predictors was able to significantly predict 19.1% of the variance in the scores for the PTG dimension of spiritual change (R^2 = .191, F = 8.04, p < .001). However, only private self-absorption, age, number of traumatic events and the quadratic term of negative beliefs about the uncontrollability and danger of worry displayed significant associations with spiritual change (*partial r* = .23, .21, .19 y -.15, respectively). This indicates that higher levels of private self-absorption, greater age, a larger number of traumatic experiences and a moderate level of negative beliefs about the uncontrollability and danger of worry were associated with spiritual change.

The results of the multiple regressions analyses were not affected by problems of collinearity, as the tolerance indices were all greater than .39 and the FIV were under 2.54.

Discussion

The overall objective of this study was to examine the association between PTG and dysfunctional metacognitive beliefs, self-absorption, and dysfunctional trauma-related ttitudes among the members of the Spanish general population who have experienced traumatic events. The results show that some of the dimensions of these three cognitive constructs are significantly associated with at least one of the dimensions of PTG.

Specifically, when it came to dysfunctional metacognitive beliefs, the study found significant positive associations between two aspects of PTG, new possibilities and personal strength, and cognitive self-consciousness. In other words, people who had suffered a traumatic experience and believed that in its wake they had developed new interests or a new direction in life, or that they felt stronger and more self-confident, were also more likely to monitor their own thoughts and cognitive processes. Furthermore, higher levels of the spiritual change dimension of PTG displayed a significant, inverted U-shaped curvilinear association with negative beliefs about the uncontrollability and danger of worry. This means that those who had felt that after a traumatic experience they had become more religious or grown spiritually were also likely to believe, to a moderate extent, that worrying is unmanageable and dangerous.

These findings are groundbreaking in that, to the best of our knowledge, only two prior studies had analyzed the relationship between metacognitive beliefs and PTG (Clauss et al., 2021; Nalipay & Mordeno, 2018). Indeed, the results of the present study that show an inverted U-shaped curvilinear relationship between PTG and negative metacognitive beliefs about worry could help shed light on the reasons for the pattern of non-significant and inconsistent results in these previous studies. For example, Clauss et al. (2021) did not find any significant relationships between the overall PTG score yielded by the abridged version of the PTGI and the measures of negative and positive metacognitive beliefs from the MCQ-30, the same instrument used in this study. What sets our study apart is that, unlike these prior researchers, it examines the relationships between these dysfunctional metacognitive beliefs and the individual dimensions of PTG. The present study also went beyond earlier research in examining whether these relationships might be curvilinear rather than linear. Because the previous studies did not analyze their data in this way, it is possible that among their sample of US university students who had had at least one traumatic experience, there might also have been a curvilinear, inverted U-shaped relationship between the spiritual change dimension of PTG and negative metacognitive beliefs about worry. The possible existence of such inverted U-shaped curvilinear relations between the various dimensions of PTG and different kinds of metacognitive beliefs might also help explain the seemingly contradictory results of the study by Nalipay and Mordeno (2018). These researchers found that some of the dimensions of positive metacognitive beliefs had significant positive associations with all of the dimensions of PTG, while another dimension of positive metacognitive beliefs was found to have significant negative associations with all of the dimensions of PTG. In short, future research should follow the current study in examining both linear and curvilinear relationships between PTG and (dysfunctional and positive) metacognitive beliefs.

With regard to self-absorption, the findings here indicate that higher levels of the spiritual change dimension of PTG are significantly and positively associated with greater degrees of private self-absorption. This would mean that after experiencing traumatic events, people who felt they had developed more religious faith or had grown spiritually were also more likely to pay close attention to their own thoughts, feelings and emotions.

Once again, this is a novel finding. To our knowledge, this is the first study to have analyzed the specific relationship between self-absorption (dysfunctional self-focused attention) and PTG. While this is an original finding, it does make theoretical sense, as self-focused attention, especially the private self-focused attention, is at the heart of the ruminative cognitive processes (whether intrusive, automatic rumination or reflective, deliberate rumination) that are also central to the PTG model created by Tedeschi et al. (2018).

Finally, the results with regard to dysfunctional trauma-related attitudes indicate that higher scores for the relating to others and personal strength dimensions of PTG had a significant inverted U-shaped curvilinear relationship with dysfunctional attitudes

related to chronification of distress. That is, people who had suffered a traumatic event and who afterwards felt closer to others or believed they could rely on others in a crisis, or those who felt stronger and more self-confident, were also likely to believe that the emotional distress caused by the traumatic experience would be moderately chronic and that the psychological damage they had suffered would be moderately irreversible. This finding echoes the results of a study by Liébana et al. (2022), which found that the likelihood of victims of terrorist attacks to express new appreciation for life had an inverted U-shaped relationship with the overall level of dysfunctional trauma-related attitudes and, especially, with the level of dysfunctional attitudes expecting distress to be chronic. Therefore, both the results of the present study and those of Liébana et al. (2022) lend support to the arguments of Janoff-Bulman (2004), who maintained that, over time, the basic positive attitudes and beliefs of many of those who have had traumatic experiences are rebuilt, but that at the same time these people also adopt negative or dysfunctional beliefs. In short, the results from the study of victims of terrorist attacks in Spain (Liébana et al., 2022) and those of this study of the general population of the same country are consistent in that both found that, after a traumatic event, people who believe themselves to have experienced growth are likely to have moderately dysfunctional trauma-related attitudes or beliefs (and corresponding moderate levels of positive trauma-related attitudes or beliefs).

As a whole, the results of this study lend support to the idea that PTG is associated with metacognitive beliefs, self-focused attention, and certain basic attitudes or beliefs with regard to trauma. This reinforces the essentially cognitive character of Tedeschi and Calhoun's PTG model (1995; Tedeschi et al., 2018), especially when it comes to the model's assumptions about the key role played by basic beliefs or attitudes and by rumination processes.

Indeed, it is worth highlighting that, in this study, the relationships between PTG and metacognitive beliefs, self-focused attention and basic beliefs or attitudes toward trauma existed independently of the relationship between these constructs and variables measuring emotional distress, especially posttraumatic stress and depressive symptomatology. There are indications in the literature that there is a significant positive relationship between PTG and posttraumatic stress symptoms (see the meta-analysis by Liu et al., 2017). On the other hand, both the theoretical cognitive models and the results of empirical studies point to the existence of significant positive relationships between metacognitive beliefs and posttraumatic stress symptoms (Jelinek et al., 2013), between self-focused attention and emotional distress (Mor & Winquist, 2002), and between dysfunctional attitudes and posttraumatic stress symptoms (Navarro et al., 2022). All this raises the question of whether the relationship between PTG and these three cognitive constructs might actually be explained by a third variable, either posttraumatic stress symptomatology or depressive symptomatology. However, the results of the multiple regression analyses revealed that the associations between PTG and metacognitive beliefs, self-focused attention and basic beliefs and attitudes about trauma remained in effect even after controlling for the effects of these emotional symptoms.

It should be noted, however, that the factors that displayed the greatest and most consistent association with PTG were not, in fact, the three cognitive constructs discussed above. Instead, in order of importance, the most relevant factors were the number of traumatic events, the degree of posttraumatic stress symptomatology, optimism, and depressive symptomatology.

The variable most consistently and significantly associated with the measure of PTG was the number of traumatic experiences. The association between this variable and the overall score for PTG and its five dimensions was positive and linear, but there was no curvilinear (quadratic) association. This finding is also consistent with the results of previous studies that have observed that having had different kinds of traumatic experiences (accumulated trauma) is positively related with overall PTG and with several of its dimensions including, for example, appreciation of life, personal strength, and new possibilities (Kira et al., 2013). Taken as a whole, these results underscore the need to look closely at the characteristics of certain life experiences in order to better understand the presence of PTG.

The second variable that was most significantly and consistently related to the measures of PTG was posttraumatic stress symptomatology. This variable had a positive linear association (but not a curvilinear quadratic relationship) with the overall scores for PTG and with three of its dimensions, namely, relating to others, new possibilities and appreciation of life. This finding aligns with the results of the meta-analysis by Liu et al. (2017). However, the lack of a curvilinear relationship between PTG and posttraumatic stress symptoms contradicts the results of another meta-analysis by Shakespeare-Finch and Lurie-Beck (2014). In fact, not only did the latter study find a significant quadratic relationship, but it also indicated that this association was even stronger than the linear relationship. Nonetheless, it is worth highlighting that neither of these two studies examined the effects of the time elapsed since the traumatic experience on these linear and curvilinear relationships, even though they did recognize the importance of this variable. In the present study, an average of 14.5 years had passed between the most traumatic event that the participants had experienced and the time of assessment. Thus, it might be the case that the lack of a quadratic relationship between PTG and posttraumatic stress symptoms is specific to long-term PTG (cases in which it has been at least five years since the traumatic experience), as suggested by the results of this study and those of Fausor et al. (2022).

In short, the positive relationship found here between posttraumatic stress symptomatology and PTG reinforces the idea that experiencing a certain degree of emotional distress as a result of trauma might be a precondition for PTG (Tedeschi et al., 2018). Positive psychological changes might not be enough to fully eliminate the continued suffering caused by having experienced a traumatic event.

The third variable that was most significantly and consistently related to the measures of PTG was optimism. This variable had a positive linear association (but not a curvilinear quadratic relationship) with the overall scores for PTG and with two of its dimensions, specifically, personal strength and appreciation of life. This finding is consistent with the results of the meta-analysis by Prati and Pietrantoni (2009), which found a positive linear relationship between PTG and optimism among people who had experienced a wide range of traumatic events.

The fourth variable that was most significantly and consistently associated with PTG was depressive symptomatology, which had an inverted U-shaped relationship, but no linear relationship, with the PTG dimensions of relating to others and new possibilities. The lack of a significant linear relationship between PTG and depressive symptomatology is consistent with the results of the meta-analysis by Long et al. (2021), while the curvilinear relationship found here points to a need for future research into the possible existence of associations of this type between PTG and depression. The potential for these associations was not examined in the meta-analysis by Long et al. (2021), nor has it been considered by most of the studies on this topic (one exception is Fausor et al., 2022, who did not find data to support the existence of a linear or curvilinear relationship between PTG and depression in a sample of victims of terrorist attacks).

When it comes to the rest of the sociodemographic and clinical variables assessed in the present study, as well as the variables related to the traumatic events themselves, the results show some

positive associations, for example between the spiritual change dimension of PTG and age. However, no evidence was found for either linear or quadratic relations between PTG or any of its dimensions and sex, marital status, education, type of traumatic event (life-threatening or others), type of victim (the participant or a loved one) or the time since the traumatic experience.

The lack of a significant relationship between PTG and sex stands in contrast to the results of the meta-analysis by Vishnevsky et al. (2010), who found a significant difference on PTG as a function of sex, specifically that women tended to report greater degrees of PTG than men. However, Vishnevsky et al. (2010) themselves speculated that the differences they found between men and women might be mediated by other differences between the sexes in cognitive factors related to PTG. Therefore, the fact that this study considered cognitive factors such as metacognitive beliefs, self-focused attention and dysfunctional traumatic attitudes and found significant associations with PTG might explain why sex was not found to be a significant predictor of PTG here.

On the other hand, with regard to the lack of a significant relationship between PTG and the time since the traumatic experience, it should be noted that the amount of time since the events in this study ranged from two to 83 years, while in the meta-analysis by Wu et al. (2019), which did find a significant negative relationship between time elapsed and PTG, the periods examined ranged from only a few days or months to a few years after the event. This suggests that the significant negative relationship found in that meta-analysis might disappear after several years.

This potential interpretation underlines the need for more research into PTG to attempt to overcome the limitations of the present study, which should be taken into account when assessing its results and conclusions. Among these limitations is the cross-sectional design of the study. It would be desirable to carry out longitudinal studies to better assess the evolution of PTG over time and the influence of other factors on this evolution. Another limitation is connected to questions about the possibility of assessing PTG after an average of 14.5 years since the traumatic experience. This limitation is discussed in greater detail in Fausor et al. (2022) and Liébana et al. (2022), and it suggests that future research should examine the degree of consistency between self-reported PTG and the changes observed in a person by his or her family, friends and colleagues. Such research should also include a control group to ensure that the growth recorded is really a result of the event and not merely of the passage of time.

Despite these limitations, this study offers groundbreaking results on the role that cognitive factors such as metacognitive beliefs, self-focused attention and trauma-related attitudes play in PTG. The prior research into these factors is scarce, but they are highly relevant to the cognitive models of PTG such as that of Tedeschi and Calhoun (1995; Tedeschi et al., 2018), which inform the approaches that currently predominate in the study of PTG and the positive reactions people can have in the wake of a traumatic experience. From a practical point of view, the results would suggest that prevention and treatment programs for people who have suffered a traumatic event should include, among their therapeutic objectives, addressing metacognitive beliefs, self-focused attention and trauma-related attitudes, not only to reduce their psychopathological impact, but also to promote PTG. For example, the use of techniques that involve the development of coherent narratives that integrate life before the traumatic event, the event itself and the consequences of the event can adaptively activate those cognitive factors that would help, precisely, relieve symptoms and promote PTG (see Tedeschi et al., 2018, for an expansion of post-traumatic intervention proposals based directly on their cognitive model of PTG).

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