



Retrospective Accounts of Bullying Victimization at School: Associations with Post-Traumatic Stress Disorder Symptoms and Post-Traumatic Growth among University Students

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Abstract

This retrospective study investigated the association between bullying victimization experiences at school, current post-traumatic stress disorder (PTSD) symptoms and post-traumatic growth (PTG) among Greek university students. A sample of 400 university students aged 17 to 40 years ($M age = 20.33$, $SD = 3.18$) completed self-reported scales measuring school bullying victimization experiences, post-traumatic stress disorder symptoms and post-traumatic growth. Results showed that victims of school bullying reported mild levels of PTSD and moderate feelings of post-traumatic growth. Females presented higher scores of post-traumatic growth. Duration and frequency of victimization of school bullying were found to present a significant effect on PTSD symptoms and PTG, respectively. Post-traumatic growth as a result of school-bullying victimization was related to PTSD symptom severity and this relationship was curvilinear. The findings have implications in terms of informing prospective interventions targeting the enhancement of students' sense of growth for handling peer aggression effectively.

Keywords School-bullying · Victimization · Post-traumatic stress · Post-traumatic growth

Bullying victimization at school has become a topic of international concern over the past decades, as it is estimated that approximately 20% to 45% of children in various countries report involvement in bully/victim incidents (Craig et al. 2009; Skrzypiec et al. 2018). Bullying has been defined as aggressive behaviors or acts by peers with the aim to harm; these behaviors are carried out repeatedly and involve an imbalance of power, either actual or perceived, between the victim and the bully (Olweus 1995). School bullying is a cause of concern; research findings suggest that children and adolescents who are involved in bullying victimization exhibit negative emotions, poor physical health, and school avoidance (Ortega et al. 2009; Rigby 2003). They are also at higher risk for mental health problems, such as internalizing disorders

(Arseneault et al. 2010) and post-traumatic stress disorder (Tehrani 2004).

Even though a great deal of the literature on school bullying has focused on children and adolescents, fewer studies have paid attention to the long-term effects of childhood bullying victimization experiences among young adult populations. Recent findings suggest that the psychosocial effects of childhood bullying are evident beyond childhood and adolescence. For example, children who were victims of bullying have been consistently found to be at higher risk for various mental health disorders in adulthood, particularly anxiety disorder and depression (Copeland et al. 2013; Takizawa et al. 2014; Ttofi et al. 2011). When a distinction is made between victims and bully/victims it has been shown that usually bully/victims have a slightly higher risk for anxiety, depression, psychotic experiences, suicide attempts and poor general health than pure victims (Copeland et al. 2013). Moreover, it has been suggested that school bullying can have significant and lasting trauma effects similar to those experienced in survivors of child abuse (Carlisle and Rofes 2007).

Indeed, Newman et al. (2005) suggested that being a victim of school bullying is a chronic stressor that results in traumatic responses. Although exposure to bullying constitutes a systematic exposure to a series of negative events over a

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prolonged time period, rather than a single traumatic event, it has been claimed that the distress many of the victims experience resembles the stress associated with traumatic events. Building on Janoff-Bulman's (1989) hypothesis of shattered assumptions, it has been proposed that chronic exposure to victimization impairs the victim's basic cognitive schemas resulting in traumatization (Mikkelsen and Einarsen 2002). Since bullying can be perceived as a traumatic experience, it is conceivable to argue that youth exposed to bullying might develop post-traumatic stress disorder (PTSD) symptomatology or even a diagnosis of PTSD. Individuals with PTSD develop a specific pattern of symptoms as a result of the traumatic event, usually manifested as re-experiencing, avoidance, negative cognitions, and arousal (APA 2013). Over the past decade, a great deal of research work has focused on the relation between PTSD symptomatology and school bullying.

Studies in various countries have consistently shown that children and adolescents who have been victimized at school exhibit higher rates of PTSD symptomatology than non-victims, with approximately one third of the children displaying clinically significant levels of PTSD (Baldry et al. 2018; Crosby et al. 2010; Idsoe et al. 2012; McKenney et al. 2005; Storch and Esposito 2003). Females seem to be at higher risk as they show more severe symptoms than their male counterparts, especially in the domain of avoidance. Moreover, the highest rate of PTSD symptomatology has been reported by individuals who were involved in school bullying incidents with the double role of bully/victim (Idsoe et al. 2012). Retrospective studies investigating the associations between childhood victimization and later PTSD showed similar patterns, indicating that bullying victimization at school might have long-term effects in young adulthood (Albuquerque and Williams 2015; Espelage et al. 2016; Mc Guckin et al. 2011).

Certain temporal factors of the victimization experiences also seem to be relevant in the development of PTSD symptoms. Duration, frequency, and age of occurrence of victimization have been reported as significant predictors of PTSD symptom severity. For example, students who experience chronic victimization tend to have more social and psychiatric problems (Wolke et al. 2013). It is possible that the longer children experience peer victimization, the more negative outcomes they tend to face as consequences accumulate (Albuquerque and Williams 2015). In addition, frequent bullying has been found to be a predictor of various psychiatric problems, including PTSD symptoms (Cerni Obrdalj et al. 2013; Newman et al. 2005). Age of victimization might also play a role in predicting PTSD symptomatology as older children tend to be less vulnerable to the effects of traumatic stress, probably because they develop more coping mechanisms to deal with adversity (McKenney et al. 2005). It is possible that the temporal characteristics of bullying victimization, specifically the stability and chronicity over time might

be a risk factor for developing PTSD because they require a higher load for adaptation. The role of individual characteristics and other contextual factors in the development of PTSD symptomatology has not yet been investigated.

Whilst a great amount of research has focused on the negative outcomes of bullying and its association with PTSD symptomatology, very little attention has been paid to the potential post-traumatic growth of students exposed to school bullying. A growing body of empirical studies reveals that many trauma survivors also experience positive psychological changes after trauma (Zoellner and Maercker 2006). These findings indirectly support the salutogenic approach (Antonovsky 1997), which suggests that stressful events may have some positive outcomes. People report those positive outcomes following extremely stressful situations, either as a direct result of the event or as a kind of learning that occurred through their efforts to cope with the events (Park and Folkman 1997). The experience of significant positive change arising from a struggle of a life crisis has been defined as post-traumatic growth (Calhoun et al. 2000). Post-traumatic growth (PTG), therefore, refers to the experience of individuals who do not only recover from trauma, but also use it as an opportunity for further individual development. Those individuals overcome trauma with improved psychological functioning in specific domains, such as an increased appreciation of life, setting of new life priorities, a sense of increased personal strength, identification of new possibilities, improved closeness of intimate relationships, or positive spiritual change (Tedeschi, Park, and Calhoun, 1998).

To the best of our knowledge, only one study to date has investigated the association between bullying and PTG in a small sample of adults and adolescents with visual impairments (Ratcliff et al. 2017). The results of the study showed that more than one third of bullied adults reported spontaneous expressions of PTG in response to their bullying experiences. It was also found that, among 16 children with victimization experiences, PTG correlated with severity of victimization. Even though these findings provided preliminary evidence that positive psychological changes may be related to bullying victimization experiences, the sample size used was very small and limited to a group of individuals with visual impairments. In addition, Ratcliff et al. (2017) investigated only the link between PTG and severity of victimization. It is possible that other contextual factors of the bullying experience might also influence post-traumatic growth. It is important that this line of work should be extended, which is the aim of this study.

Concerning the relation between PTSD and PTG findings remain controversial. Some studies report a negative relation between the constructs, meaning that individuals with higher levels of PTSD reported less PTG (Frazier et al. 2001; Hall et al. 2008). Others found no association between post-traumatic stress severity and PTG (e.g. Wei et al. 2017).

Some other studies showed that growth co-occurs with distress. According to Tedeschi and Calhoun (2004), the gains following adverse experiences do not necessarily take away from the emotional distress caused by a traumatic stressor; instead, often trauma-related distress co-exists with PTG. This co-occurrence is usually reported in a linear relationship (Butler et al., (2005); Taku et al. 2008). Taken as a whole, it is unclear whether PTG and PTSD are related or are distinct and independent of each other.

A possible explanation for these inconsistent results is the suggestion that the relationship between positive outcomes and distress may not be strictly linear, as most afore-mentioned studies assumed, but curvilinear. There are a few studies that tested for such a nonlinear relation, and indeed found quadratic relationships between PTSD symptoms and growth (Butler et al. 2005; Kleim and Ehlers 2009; Lechner et al. 2006; Levine et al. 2008; Solomon and Dekel 2007). It is possible that moderate distress is needed to set PTG in motion and maintain it. Curvilinear associations between growth and PTSD may help determine inconsistencies among studies because the relationships found may depend on what range of perceived trauma and growth a population occupies (Kleim and Ehlers 2009). It would be important to examine whether such a curvilinear relationship can be replicated in samples that have experiences of other types of trauma, such as school bullying.

The present study aims to investigate both pathogenic (i.e. post-traumatic stress symptoms) and salutogenic (i.e. post-traumatic growth) outcomes among university students exposed to bullying victimization at school. Specifically, we explored further the association between bullying victimization experiences at school among a sample of university students from Greece and their long-term impact upon post-traumatic stress (PTSD) symptoms and post-traumatic growth (PTG). We were particularly interested in the contribution of specific temporal and contextual features of school bullying victimization experiences that influence adult PTSD symptoms and PTG. It was hypothesised that bullied females would score higher than males on both PTSD symptomatology and self-reported PTG. We also expected to find a positive relation between the frequency and duration of exposure to bullying and PTSD symptom severity. In addition, bully/victims were expected to show the highest scores of PTSD symptomatology. We also examined whether growth as a result of school bullying victimization is related to PTSD symptom severity and whether this relationship is curvilinear. No study to date has investigated this relationship in victims of school bullying, however based on previous findings it is possible that post-traumatic symptomatology could be related to growth in a curvilinear way. Finally, with respect to post-traumatic growth, we wanted to examine the relation between school bullying victimization experiences and post-traumatic growth. No specific predictions were made, as this part of the study was exploratory.

Method

Participants & Procedure

Initially, a baseline sample of 400 university students aged 17 to 40 years (M age = 20.33, SD = 3.18, 68% (N = 272) females) attending six departments at the University of Thessaly in Greece completed a survey consisting of three self-reported measures. Out of 400 participants who completed the survey, 150 (37.5%) (M age = 20.00, SD = 2.77, 52 males, 98 females) individuals self-identified as having direct experiences of school-based bullying victimization. These individuals formed the final sample of the study. Overall, 250 (62.5%) participants reported they had not experienced bullying victimization at school, 115 (28.8%) reported having been victims of bullying (this included bystanders who were also victims), and 35 (8.8%) reported being “bully/victims”. We did not include respondents who were not victimized in statistical analysis, as in the present study we were only interested in direct victimization experiences.

The measures were administered, following permission from Heads of Departments and instructors, in the classrooms of the University that the study took place. A research assistant was responsible for explaining the study aims and procedures to potential participants and administering the research questionnaires. All data were collected using paper-and-pencil questionnaires, with the use of an anonymous drop box to ensure participant anonymity. All procedures performed were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. Efforts were made to include at least one class of the six departments. Thus, 25.5% of students were from science, engineering, and technological courses, and 74.5% from the humanities and social sciences. Participants did not receive compensation for participation.

Measures

Victimization Students were first given to read the following definition of school bullying prior to completing the survey: “A student is being bullied or victimized when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students. These actions can happen frequently and it is difficult for the young person to defend himself or herself. It is not bullying when the teasing is done in a friendly and playful way” (Olweus 1994, p. 9). They were then asked to recollect their school years (in primary and secondary education) and to recall the school bullying events they had experienced, as well as the role they had played in them. Students have subsequently been asked to answer “yes or no” statements about their personal experiences of bullying at

school (e.g. *I have never been a witness, nor have I ever been involved in school bullying; At different times, I was both a victim and a perpetrator of school bullying*). The “yes” responses were used to classify the respondents into three categories (i.e. not victimized, victims, bully-victims).

A previously adapted inventory based on the Olweus Bully/Victim Questionnaire (Olweus 1994), was used to measure victimization experiences (Rivers 2001). We selected this measure because of its previous use in retrospective studies of childhood bullying among similar samples of adolescents and adults (Rivers 2001, 2004; Rivers et al. 2009). The inventory includes a list of 10 forms of bullying behaviors which are scored 0 = No, 1 = Yes. We summed the students’ reports of the different forms of bullying behaviors they experienced to calculate the total number of victimization experiences score. The reliability coefficient for the items assessing total number of victimization experiences was satisfactory ($\alpha = .65$). The questionnaire also asked at what age victimization experiences occurred, the duration and frequency of victimization, and the number and age of perpetrators.

Post-Traumatic Stress Disorder Symptomatology Symptoms of PTSD were explored using the PTSD Checklist-civilian scale (PCL-C) (Weathers et al. 1994). This self-report measure includes 17 items forming a total score and three subscales, which investigate three types of symptoms of PTSD (i.e., re-experiencing, avoidance, and hyper-arousal). The scale has been translated and validated in a heterogeneous sample of Greek adults supporting the three-factor solution (Calbari and Anagnostopoulos 2010). Higher scores suggest more severe PTSD symptoms. The cut-off score method indicates that a total score of 50 or more suggest a diagnosis of PTSD with an efficient balance of sensitivity and specificity (equal to .82 and .83, respectively). The overall Cronbach’s alpha for the scale in this study was .92. The alphas for the sub-scales were also strong: (.89 for re-experiencing, .88 for avoidance, and .82 for hyperarousal).

Post-Traumatic Growth An adapted version of the Post-traumatic Inventory (PTGI) developed by Tedeschi and Calhoun (1996) was used to assess positive changes experienced, as a result of school bullying. The scale consisted of 21 items, rated on a 6-point Likert scale, ranging from 0 (*I did not experience this change as a result of school bullying*) to 5 (*I experienced this change to a very great degree as a result of school bullying*). Higher scores indicated a greater degree of positive changes experienced. Internal consistency of total PTGI scores for this study was excellent ($\alpha = .97$). Because the items of the PTGI have been adapted to reflect bullying experiences and because the modified scale has never been used in a similar population in Greece, data were subjected to factor analysis using Principal Axis Factoring and orthogonal Varimax rotation. All KMO values for the individual items

(>.90) were well above .5 and the Kaiser-Meyer-Olkin measure was .96 indicating the data were sufficient for exploratory factor analysis. The Bartlett’s test of sphericity was significant ($\chi^2(210) = 5855.18, p < .001$). Using an eigenvalue cut-off of 1.0, there were 2 factors that explained a cumulative variance of 66.87%. The two factors were labeled: 1) “*new possibilities (about life, the world and relationships)*” ($N = 14$ items; eigenvalue = 13.02 $\alpha = 0.96$; 35.76% of variance); and 2) “*spirituality/personal strength*” ($N = 7$, eigenvalue = 2.02, $\alpha = 0.96$, 31.11% of variance). Correlations among the factors showed that the scales were moderately independent from each other ($r = 0.77$). Although a two-factor solution was tenable, this structure should be considered preliminary at this point, pending confirmatory work. The mean score of PTGI global and the two dimensions resulted in standardized scores ranging from 0 to 5.

Data Analyses

Statistical analyses were performed using the Statistical Package for the Social Science Version 24. Variables were checked for normality and homogeneity assumptions of parametric tests. No outliers were found. Analyses were conducted at two levels. Firstly, profiles of victimization, PTSD symptomatology and post-traumatic growth were examined. Moreover, differences in PTSD symptoms total score and PTGI mean score and subsequent scales (i.e. PTSD re-experiencing, PTSD avoidance, PTSD hyperarousal, PTGI spirituality/personal change, PTGI new possibilities) between males and females (gender-based examination) as well as between victims and bully/victims (involvement type examination) were investigated in a series of independent t-tests. Second, we constructed a series of General Linear Models (GLM) to examine the effect of victimization features (i.e. age of occurrence of victimization, duration of victimization, frequency of victimization, total number of victimization behaviors, age of perpetrators, & number of perpetrators) and control variables (age of victims and gender) on PTSD symptoms and PTG scores (i.e. PTSD symptoms total score, PTSD re-experiencing, PTSD avoidance, PTSD hyperarousal, PTGI mean score, PTG spirituality/personal change, and PTG new possibilities sub-scales). Each one of the PTSD symptoms and PTG scales served as the outcome variable each time, while victimization features and control variables served as predictors variables. Categorical predictors (i.e., duration and frequency of victimization, gender, number and age of perpetrators) were entered as Fixed Factor while continuous predictors (i.e., age of occurrence of victimization, total number of victimization behaviors, and age of victims) were entered as Covariates. The linear regression model that was produced each time (UNIANOVA procedure) internally generated a set of dummy variables for each factor. The main effect of predictors on outcomes variables was investigated.

Results

Profiles of Victimization, Post-Traumatic Stress Disorder Symptomatology & Post-Traumatic Growth

The mean age between the age of onset of victimization and current age was 9.62 (SD =4.36) years. Other variables related to the experience of school victimization (i.e. frequency, duration, perpetrator) can be seen in Table 1. Overall, PCL-C total scores averaged 27.94 with SD = 11.51, indicating a mild severity of PTSD symptoms. However, 10% (n = 15) of respondents met the cut off (>50) criteria for probable PTSD diagnosis. In order to further examine whether PTSD sub-scales presented differentiated severity of symptoms, a repeated measures ANOVA including all 3 sub-scales (i.e. re-experiencing, avoidance, hyper-arousal) was run, revealing a non-significant effect ($F(2,1.014) = 1.492, p > .05$).

Levels of post-traumatic growth were divided as follows: low levels of growth (mean scores of 0–1.4), moderate levels of growth (1.5–3.4), high levels of growth (3.5–5). The mean of the PTG global index was moderate 2.23 (SD = 1.21) and the means of the sub-scales were 2.19 (SD = 1.30) for “spirituality/personal strength”, and 2.25 (SD = 1.24) for “new possibilities”. While only a very small percentage of respondents reported a high level of growth (4.6%), more than half (55%) reported moderate growth.

A series of independent samples t-tests was run to examine gender differences in PTSD and PTGI total scores as well as their subscales. Results indicated that there were no statistically significant gender differences neither in PTSD symptoms total score [$t(136) = .19, p = .85$] nor its three subscales: re-experiencing [$t(145) = -.49, p = .62$], avoidance [t

(140) = .71, $p = .48$] and hyper-arousal [$t(145) = .20, p = .84$]. With regard to PTGI scores, females were found to exhibit higher scores than males [$t(135) = -2.17, p = .03$]. On the same pattern, females also demonstrated higher scores in PTGI “spirituality/personal strength” sub-scale than males [$t(139) = -1.99, p = .049$], as well as in PTGI “new possibilities” sub-scale [$t(136) = -2.13, p = .035$]. Means and SDs for gender differences can be found in Table 2.

A second series of independent samples t-tests was run to examine differences in PTSD symptoms and PTGI scores (including their subscales) between victims and bully/victims. Results indicated that there were no significant (between group) differences in any of the PTSD symptoms sub-scales: PTSD symptoms total score [$t(135) = .16, p = .88$], re-experiencing [$t(144) = .88, p = .38$], avoidance [$t(139) = -.05, p = .96$] and hyper-arousal [$t(144) = -.54, p = .59$]. Similarly, victims and bully/victims showed no significant differences in PTGI mean score [$t(134) = 1.28, p = .2$], PTGI spirituality/personal strength sub-scale [$t(138) = .74, p = .46$], and PTGI new possibilities sub-scale [$t(135) = 1.53, p = .13$]. Means and SDs can be found in Table 3.

Predictors of Post-Traumatic Stress Symptoms

Findings of the first GLM run (GLM_1; $R^2 = .29, p = .003$) showed no significant main effect of gender, frequency of victimization, age of perpetrators, age of victims, age of occurrence of victimization, number of perpetrators and total victimization behaviors on PTSD symptoms total score ($p > .05$). Duration of victimization presented a marginally significant effect on PTSD symptoms total score [$F(3, 124) = 2.66, p = .042$]. Longer duration of victimization may lead to higher PTSD symptoms for participating students.

With regard to PTSD re-experiencing scale, GLM_2 ($R^2 = .23, p = .022$) results showed that only the number of perpetrators variable demonstrated a significant main effect on the outcome variable [$F(4, 132) = 3.03, p = .02$]. Bullying experiences with larger groups of perpetrators led to higher PTSD re-experiencing scores for victimized students.

GLM_3 ($R^2 = .28, p = .005$) for PTSD avoidance scale indicated that only the duration of victimization variable presented a significant main effect [$F(3, 127) = 2.79, p = .044$] on this scale. Longer duration of victimization led to higher PTSD avoidance scores for participating students.

Finally, in terms of PTSD hyperarousal scale, GLM_4 ($R^2 = .27, p = .004$) results showed that only the age of perpetrators variable demonstrated a significant main effect on outcome variable [$F(3, 131) = 3.58, p = .02$]. Victimization experiences with older perpetrators led to higher PTSD hyperarousal scores for participating students.

Table 1 Variables related to school victimization

Variables		%
Duration	Days or weeks	50
	Months	16.9
	One year or years	33.1
Frequency	Once	20.9
	Few times a month	29.1
	Once a week	12.2
	Many times a week	27.7
Number of perpetrators	Everyday	10.1
	One	45.2
	Two	35.6
	More than two	19.2
Age of perpetrators	Younger	3.4
	Same age	70.7
	One year older	19.1
	More than one year older	6.8

Table 2 Means and SDs for gender differences (males vs females) in PTSD symptoms and PTGI scores

	Males		Females		<i>t</i> -test
	Mean	SD	Mean	SD	
Total PTSD score	28.21	14.38	27.81	9.73	.19
PTSD re-experiencing subscale	8.27	4.21	8.58	3.20	-.49
PTSD avoidance subscale	11.78	6.35	11.06	3.97	.71
PTSD hyperarousal subscale	8.27	4.53	8.14	3.72	.20
PTGI mean score	1.92	1.26	2.39	1.17	-2.17*
PTGI spirituality/personal strength subscale	1.89	1.36	2.35	1.26	-1.99*
PTGI new possibilities subscale	1.95	1.26	2.42	1.21	-2.13*

* $p < 0.5$

Relations between Victimization Features, Post-Traumatic Stress Severity and Post-Traumatic Growth

First, curve estimation regression analyses were carried out to determine the applicability of a curvilinear relationship between post-traumatic stress severity (i.e. PTSD symptoms total) and growth outcomes prior to inclusion in subsequent analyses. The quadratic PTSD symptoms severity term was created by squaring the centered linear variable. Curve estimation regression analyses examining PTSD severity symptoms indicated that quadratic relationships were significant for all post-traumatic growth outcomes (mean *PTGI*: $\beta = -.171$, $R^2 = .188$ $p < .01$; new possibilities: $\beta = -.093$, $R^2 = .135$ $p < .01$; spirituality/personal strength: $\beta = -.176$, $R^2 = .215$ $p < .01$). The negative signs for partial correlations indicate that the shape of the relation was such that moderate PTSD symptom severity was associated with high growth, whereas low and high PTSD symptomatology was related to lower growth.

Similar to PTSD symptoms analysis, a series of GLM approaches was conducted in order to examine the effect of the same victimization features and control variables on PTGI scores (i.e. mean PTGI, PTGI spirituality/personal strength & PTGI new possibilities). The latter variables served as the

outcome variable each time, and the victimization features as predictors. Considering the significant association of PTSD quadratic term with PTGI scales as shown above, we decided to include PTSD quadratic term (i.e. intermediate level PTSD symptoms) as a predictor in the following series of analysis.

Findings of GLM_5 ($R^2 = .34$, $p = .001$) run for PTGI mean scores showed a significant main effect of gender [$F(1, 115) = 5.43$, $p = .022$], frequency of victimization [$F(4, 115) = 2.82$, $p = .029$], and PTSD symptoms [$F(1, 115) = 7.05$, $p = .009$]. These results show that females presented higher PTG scores and that less frequent victimization experiences and intermediate PTSD symptoms led to higher PTGI scores.

Results of GLM_6 ($R^2 = .36$, $p < .001$) run for *PTGI* spirituality/personal strength sub-scale demonstrated that only PTSD symptoms [$F(1, 117) = 9.36$, $p = .003$] and frequency of victimization [$F(4, 117) = 3.15$, $p = .018$] had a significant main effect on this sub-scales. Less frequent victimization experiences led to higher PTG scores.

Finally, GLM_7 ($R^2 = .29$, $p = .009$) results showed that only PTSD symptoms [$F(1, 116) = 4.67$, $p = .03$] and gender [$F(1, 116) = 5.28$, $p = .024$] presented significant main effects on PTGI new possibilities sub-scale. Females presented higher PTG scores.

Table 3 Means and SDs for involvement type differences (victims vs bully/victims) in PTSD symptoms & PTGI scores

	Males		Females		<i>t</i> -test
	Mean	SD	Mean	SD	
Total PTSD score	28.11	11.28	27.74	12.47	.16
PTSD re-experiencing subscale	8.64	3.56	8.03	3.61	.88
PTSD avoidance subscale	11.33	4.67	11.38	5.74	-.05
PTSD hyperarousal subscale	8.11	4.06	8.53	3.87	-.54
PTGI mean score	2.32	1.17	2.00	1.31	1.28
PTGI spirituality/personal strength subscale	2.26	1.28	2.06	1.37	.74
PTGI new possibilities subscale	2.36	1.19	1.97	1.33	1.53

Discussion

The present study investigated the associations between retrospective accounts of peer victimization experiences at school and current PTSD symptoms and PTG among Greek university students. Findings showed that group differences (males vs females) emerged only in PTGI scale (and not in PTSD symptoms severity scale), with females presenting higher post-traumatic growth. In addition, the present study indicated that post-traumatic growth as a result of school bullying victimization was related to PTSD symptom severity and that this relationship was curvilinear. Finally, selective features of school bullying victimization experiences (i.e. duration and frequency of victimization) were found to present a significant effect on PTSD symptoms and PTG, respectively.

Before discussing our main findings it is important to note that student reports indicated a 37.5% prevalence rate of exposure to bullying victimization, which is within the range of findings from relevant prevalence studies (Craig et al. 2009; Skrzypiec et al. 2018). This is important because it suggests that retrospective self-reports are a viable alternative to measure earlier victimization experiences in the absence of longitudinal data. Indeed, previous studies suggest that memories of childhood victimization can be accurately reported later and are stable over time (Rivers 2001, 2004). On this basis, we feel that the recollections of bullying victimization experiences have enough validity to provide important information about our main aim, which was to investigate the associations between school bullying victimization and PTSD symptoms and PTG.

Our findings show that only 10% of students who reported school victimization experiences report a clinically significant level of PTSD symptoms. The level of PTSD symptoms among the formerly bullied students was mild, in contrast to concurrent studies on children who report a much higher level of PTSD symptomatology (Baldry et al. 2018; Idsoe et al. 2012). The low level of significantly clinical PTSD was expected, as a significant proportion of PTSD sufferers seem to remit over time, even without any treatment (Kolassa et al. 2010). What is more interesting is that even at non-clinical levels, some PTSD symptoms tend to persist on average nine years after the onset of victimization. As this is the first publication, to our knowledge, studying the long-term effects of PTSD symptoms in Greek students with school bullying experiences, more studies are needed to clarify the prevalence of PTSD symptoms in this population.

When examining group differences, our findings do not support our hypothesis that the level of PTSD symptoms would be higher among females. As shown in a quantitative review (Tolin and Foa 2006), gender differences in PTSD are not always consistent and even if found they can be attributed to a dearth of factors. Much more research is needed before strong conclusions can be reached whether gender acts as a vulnerability trauma factor. When it comes to the bully/

victims, we also did not find that belonging to this group had any additional effect on PTSD symptoms. It is possible that bully/victims can be similar to victims regarding PTSD, as in other aspects of internalizing disorders (O'Brennan et al. 2009) because of their lack of sufficient interpersonal resources to cope with others' aggressive behavior effectively (Camodeca and Goossens 2005). Despite the low levels of PTSD symptomatology, our study supports that PTSD symptoms are still evident years after exposure to school bullying.

According to our main hypothesis, we expected temporal and contextual factors of victimization to be related to the level of PTSD symptoms. From our series of general linear models we found an effect of duration of exposure to bullying and PTSD symptoms. This finding supports recent data in the literature showing the importance of the duration or chronicity of aversive school experiences for the development of PTSD symptoms in victims (Albuquerque and Williams 2015; Idsoe et al. 2012). Our results are therefore in agreement with the wider PTSD literature, which suggests that chronic exposure to traumatic events experienced is associated with higher severity of PTSD symptoms.

Moreover, we found that higher number and older age of perpetrators had a significant effect on specific PTSD symptom severity, namely, re-experiencing and hyperarousal, respectively. This agrees with the idea that victimization relates to being harassed by an unfair number and power of bullies (Zapf and Einarsen 2003). Our results, consistent with Olweus's (1995) original definition, also confirm that bullying is directed against a less powerful individual. The findings further contribute to current discussion about the conceptual definition of bullying showing support to the notion that an imbalance of power is a central feature of bullying which in turn leads to serious negative outcomes for the victim (Volk et al. 2014). Indeed, it seems that specific characteristics of the perpetrators may also play a long-term effect in the mental health of victims. Overall, our findings support the idea that school-bullying victimization is a form of psychological stress that could be traumatic for some youth and that specific factors contribute to its severity.

With regard to post-traumatic growth, our results showed that more than half of respondents reported a moderate level of growth and that females specifically presented higher levels of growth than males. The present results are generally consistent with others in highlighting that gender differences may be important to understanding and predicting who will experience growth (Zwahlen et al. 2006). Tedeschi and Calhoun (2004) stressed that post-traumatic growth results from actively struggling to come to terms with the aftermath of the traumatic event, by using emotion-focused coping mechanisms. It has been reported that women use more emotion-focused coping strategies than males (Tolin and Foa 2006), and hence are engaging in a process that is related to the core mechanisms in the post-traumatic growth experience.

According to our next hypothesis, the finding of a curvilinear (inverted U) relationship between PTSD symptoms and post-traumatic growth is in agreement with previous studies that looked for such a relationship (Butler et al. 2005; Kleim and Ehlers 2009; Levine et al. 2008; Solomon and Dekel 2007). Discrepant past findings with respect to PTSD and growth may be due to the failure to test for curvilinearity. In our study, those students who reported intermediate levels of PTSD symptoms as a result of school bullying reported the highest growth, suggesting that there may be a range of victimization experience that is sufficient to drive growth. It is also worth noting that the peaks of the curves of growth tended to fall around the score of 30 on the PCL. It appears, in agreement with Butler et al. (2005), that when the response to traumatic experience moves from symptom to disorder there is a meaningful reduction in the probability of growth. These findings are in agreement with the notion that growth and distress can co-exist (Tedeschi and Calhoun 1995). The findings are also consistent with the “shattering of assumptions” hypothesis (Janoff-Bulman 1989) in that people who experience PTSD symptoms would be expected to report growth changes. It is possible that people who attach moderate significance to the traumatic experience may be motivated to search for new meanings and directions in their life, thus facilitating perceived growth. The best explanation for the consistent curvilinear association between PTG and PTSD across studies is that PTG occurs when the trauma has been upsetting enough to promote engagement in a search for a positive meaning of the event but not too overwhelming for survivors to handle.

Complicating the relationship between PTSD and PTG, our results also suggested that low frequency of victimization and being a female also gives rise to growth. Given that females tend to perceive aggression more hurtful than boys regardless of actual frequency (Russell et al. 2010), this finding suggests that perceived harm of bullying experience may play a crucial role to both PTSD symptomatology and PTG. Perceived growth, however, may be different from actual growth. Recent findings suggest that perceptions of growth may be illusory and a way of coping with distress (Owenz and Fowers 2018). In our study PTG was assessed through retrospective self-reports and may not reflect actual positive changes following victimization. Future studies should use additional methods (e.g., open-ended interviews) to provide better evidence of PTG.

The current work contributes to the very limited literature on bullying experiences as a potential source of PTG. Only one previous study reported growth in response to bullying (Ratcliff et al. 2017), and our study extends this line of research suggesting that a combination of temporal, demographic and levels of distress factors might facilitate specific aspects of growth in victims of bullying. Individuals, particularly females, in the face of frequent trauma, may be prone to enhance

personal strength and live life to the fullest. More research is needed to examine how unique peer victimization experiences might be related to growth. The crucial step will be to disentangle subgroups of school bullying victims or bullying contexts in which PTG is put into action. It is possible that such subgroups would need different types of interventions.

A number of limitations for the present study must be noted. First, the measure of victimization experiences was based on one self-report measure with five possible answers. This breakdown does not encompass all aspects of bullying, which is a complex phenomenon. Examining different types of bullying was beyond the scope of the current study; however, future studies should look at types of bullying to obtain a more comprehensive understanding of the long-term effects of bullying. Moreover, the current investigation relies on retrospective reports of bullying experiences, which involves a risk of recall bias. The cross-sectional nature of the data precludes any examination of potential mediators or moderators that might explain the association between bullying victimization experiences and psychological outcomes. Optimally, information on the experience of bullying should have been collected at several points in time during school ages. For the pathways between bullying victimization and long-term effects to be found, more longitudinal studies with measurements over a long period of time are required. Longitudinal studies concerning post-traumatic changes across time may also shed important light on the development of resilience and maintenance of mental health throughout the life span.

Despite these limitations, the results of the present study suggest that although being bullied in school is distressing and often results in adverse outcomes, positive sequelae are also possible. Although statements of causation cannot be made, our findings do support the possibility that bullying victimization experiences, are important to assess among university students. Practitioners working in university well-being services need to collect information about the duration and frequency of bullying experiences, which might help to identify those at highest risk of experiencing post-traumatic stress symptoms. In addition, educational psychologists and university counsellors need to make all efforts to develop intervention programs that increase victimized students' sense of growth as they transit through university and adulthood.

Finally, strategies and techniques proposed to facilitate PTG in clinical settings, (e.g., generate a good attitude for change, work with strengths, give meaning to experience, promote relational growth, promotion of optimism, etc., see Vázquez et al. 2014) can be incorporated in anti-bullying interventions with the aim to promote growth and resilience. Bonanno (2004) has suggested that resilience after exposure to violence contributes to fewer PTSD and trauma symptoms, while school violence prevention programmes designed to address youth development and well-being seem to advance students' capacity to overcome adverse experiences (Andreou

2015). The intersection between positive development and resilience should be taken into account by counsellors when they attempt to promote adaptive coping skills to cultivate PTG and its related positive outcomes to victims or potential victims of school bullying. Further investigation of both PTSD and PTG may shed light on the human capacity to respond to stressors related to victimization adaptively, as well as the skills that mental health professionals can bring to bear in nurturing growth.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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