OPEN ACCESS Freely available online

ISSN: 2475-319X
Journal of
Forensic Psychology

Research Article

Secondary Post-Traumatic Growth in Response to Trauma in Forensic Workplaces: Genuine Growth or Cognitive Bias?

Jessica Powell*

Department of Psychology, Manchester Metropolitan University, Manchester, United Kingdom

ABSTRACT

Background: Theories of Secondary Post-Traumatic Growth (SPTG), the positive changes experienced in various life domains by individuals who have experienced secondary trauma, have often focused primarily upon the benefits of facilitating this phenomenon. However, in more contemporary studies, a debate surrounding the legitimacy of this growth has stemmed from a link found between specific cognitive biases and self-reported SPTG. The current study aims to investigate this relationship between SPTG and social desirability bias, positive attention bias, and downward comparison bias. Furthermore, the current study focusses on a population of individuals working in forensic settings, due to the nature of their work being linked with increased likelihood to experience secondary trauma.

Method: The study was conducted online using a total of five psychological measures in the form of questionnaires. A multiple regression was carried out in order to assess the overall and combined impact of each assessed cognitive bias.

Results: The overall regression model was significant, with downward comparison bias in specific displaying as a significant predictor of SPTG. In contrast to this, social desirability and positive attention bias were found not to be significant predictors of SPTG, in contrast to much of the surrounding literature.

Conclusion: These findings are discussed in depth in relation to the surrounding literature and theories of secondary post-traumatic growth. Professional implications are highlighted particularly in relation to psychological well-being of forensic professionals, and directions for future research are presented.

Keywords: Secondary post-traumatic growth; Cognitive bias; Downward comparison bias; Social desirability bias; Positive attention bias; Forensic professionals; Psychological well-being; Trauma

INTRODUCTION

One of the challenges of working within a forensic setting is the impacts that frequent and continual contact with individuals who have experienced trauma may have upon the professionals themselves. For clarification, within this study the terms 'professionals working in forensic settings', and 'forensic professionals' will be used interchangeably in reference to individuals who work in roles or environments such as prison, police, probation, forensic mental health, forensic support services in the community, victim support services, etc. It is understood that directly experiencing a traumatizing event is not the only cause for traumatization, and that secondary exposure to this trauma, for example *via* a therapeutic relationship with a client, can impact upon the psychological well-being of that professional [1].

Correspondence to: Jessica Powell, Department of Psychology, Manchester Metropolitan University, Manchester, United Kingdom, E-mail: 22529979@stu.mmu.ac.uk

Received: 18-Jan-2024, Manuscript No. JFPY-24-24641; **Editor Assigned:** 22-Jan-2024, PreQC No. JFPY-24-24641 (PQ); **Reviewed:** 05-Feb-2024, QC No. JFPY-24-24641; **Revised:** 12-Feb-2024, Manuscript No. JFPY-24-24641 (R); **Published:** 19-Feb-2024, DOI: 10.35248/2475-319X.24.9.320

Citation: Powell J (2024) Secondary Post-Traumatic Growth in Response to Trauma in Forensic Workplaces: Genuine Growth or Cognitive Bias? J Foren Psy. 9:320.

Much of the research surrounding this secondary exposure has focused upon the harmful effects this can have such as burnout, career satisfaction, and other negative effects within the personal lives of the individual suffering from this secondary trauma [2-4]. However, there have been studies which have highlighted the potential positive effects that experiencing this secondary trauma may have, particularly in the form of Secondary Post-Traumatic Growth (SPTG) [5-7]. In more recent years, there has been some debate over the legitimacy of this perceived growth, and arguments have been made for the concept of 'illusory growth', suggesting that what initially appears to be a positive psychological change following adversity, may in fact be attributed more accurately to that of a coping mechanism or cognitive distortion [8,9].

Consequently, this study has been designed with the aims of investigating the relationship between SPTG and specific cognitive biases which have been frequently linked to SPTG in prior studies [9]. Throughout this study, every effort has been made to evaluate and understand the impacts of cognitive biases upon the legitimacy of SPTG, and inferences surrounding the professional implications of these findings will be made in reference to the relevant literature.

Secondary trauma and post-traumatic growth

Post-Traumatic Growth (PTG) has been defined as the positive psychological change which occurs as a result of a highly challenging life circumstance, such as experiencing a traumatic event [10]. The positive growth has been known to enhance an individual's wellbeing in a multitude of ways, generally characterized by a fundamental shift in worldview [11]. This shift in worldview has been further broken down into five key domains: relating to others, new possibilities, personal strength, spiritual changes, and appreciation of life [7,12]. It is important to highlight that this growth differs significantly from the concepts of resilience or recovery as individuals experiencing PTG exceed their baseline functioning and experience positive growth beyond this [13].

This positive growth is not exclusive to the first-hand experience of trauma however, with several studies highlighting the link between exposure to Secondary Traumatic Stress (STS) and outcomes of Secondary Post-Traumatic Growth (SPTG)[5,14,15]. STS was first defined by Figley as the emotional distress or disruption which is experienced by individuals who have had close contact with trauma survivors. This definition has been evaluated and adapted to emphasise the not only close but continual nature of the contact with the direct victims of trauma [16]. In more recent research, there has been a shift in focus towards professionals in occupations which are considered to be at a higher risk for experiencing indirect trauma, as it has been suggested that the utilizing narrower occupational samples may provide more consistent research findings [17].

Cognitive bias or genuine growth?

Researchers have suggested that by placing emphasis on more 'socially desirable' reactions to trauma, such as this phenomenon of PTG and SPTG, our understanding of the full range of trauma outcomes may be unintentionally limited or narrowed [18]. To expand upon this idea, previous research has indicated that there is a link between individuals who demonstrated positive psychological adjustment, adaptive coping, and effective emotional regulation, and an increased likelihood of reporting experiences of PTG in comparison to individuals who did not display these factors [19]. This would indicate that PTG is a positive phenomenon, resulting in genuine psychological growth for individuals who have experienced trauma. Therefore, leading researchers to theories that interventions to target and foster the development of PTG should be utilized, for example forms of Cognitive Behavioral Therapy or Mindfulness-based therapies [10,20,21]. However, more recent research has prompted theories that a more nuanced approach of this phenomenon should be considered. Despite a large proportion of the existing literature supporting the notion of PTG and SPTG being a positive form of psychological growth with the potential to enhance an individual's wellbeing, an increasing body of research has emphasized the potentially non-authentic nature of this perceived growth [8,11,22,23].

The term illusory growth has been used to describe the perceived growth experienced by an individual who has been subjected to a traumatic experience, whether primary or secondary, despite the fact that no concrete growth has occurred [7]. This perceived growth has been theorized to stem from certain cognitive biases held by individuals which may alter their perception of reality when self-reporting changes felt following an experience of traumatic stress [24,25]. This idea is further emphasized in a study conducted by Kalaitzaki et al, which found that there was a significant correlation between experiences of SPTG, and both adaptive and maladaptive coping mechanisms, in individuals working within a healthcare setting [26].

A meta-analysis conducted by Gower et al, reiterated this notion, with the findings revealing that across 47 studies, cognitive biases were significantly linked to self-reported perception of PTG. More specifically, in both this meta-analysis and much of the surrounding literature regarding the correlation between cognitive biases and PTG and SPTG, a select few biases are frequently referenced as having the most significant impact. These biases included Downward Comparison Bias, Positive Attention Bias, and Social Desirability Bias [27]. In the context of SPTG, Downward Comparison Bias has been described as a tendency to compare one's own experiences with those of others who are perceived as being 'worse-off', thus resulting in a positive bias towards one's own experience and an inflated sense of subjective wellbeing, potentially causing inaccurate or inflated self-reports [9,28]. Positive attention bias has been defined as a subconscious propensity to selectively focus upon the positive aspects of an experience or information, rather than the negative aspects, and is a bias which has been shown to be positively correlated with reports of PTG and SPTG several times [24,29-31].

Social desirability bias can manifest in a multitude of ways, such as the tendency to opt for responses which are deemed to be more socially acceptable in an effort to present more favorable

towards others, or self-deceptive enhancement which can result in positively biased self-reports to be made [32,33]. Specifically, research has indicated that social desirability bias may be more notable during periods of uncertainty or when faced with a threat, which is of relevance when investigating STS [34]. Furthermore, it has been highlighted that individuals are more likely to experience this bias when aiming to maintain the appearance of successful coping in front of peers or other members of their social network [35]. Each of these biases have been deemed to alter or distort an individual's perception of events [9]. Therefore, when researching concepts, such as SPTG, which are primarily measured using self-report techniques, the potential impacts of these biases must not be ignored.

This research evidences the notion that the phenomenon of SPTG is far more nuanced than previously assumed and indicates a need for further research into cognitive biases and maladaptive coping as facilitators for illusory perceived SPTG. The importance of this further research has been highlighted by Linley and Joseph, who stated that the overwhelming emphasis upon positive growth following experiences of traumatic stress may be harmful and lead individuals to a tendency to overlook negative aspects of these experiences. This then has the potential to delay or prevent an individual's ability to receive proper support to target the underlying trauma, while instead creating a reliance on coping mechanisms due to the overemphasis on this positive form of resilience. If an individual in these circumstances is experiencing illusory growth, rather than genuine growth, and therefore aren't receiving the proper support, they are at a higher risk of experiencing negative outcomes such as burnout, issues with mental health, and a reduced ability to cope with future challenging or traumatic events [36-38].

Professionals in forensic settings

One of the major theories as to why individuals in human care occupational fields have an overall tendency to leave their role prematurely, is experiences of STS [39]. Particularly, individuals who work within forensic settings are deemed to be one of the occupational groups who are at a higher risk of experiencing STS [40,41]. In an occupational environment such as a forensic setting, where a significant reduction of exposure to indirect trauma is typically extremely difficult or not possible to achieve, it is therefore of increased necessity to gain a comprehensive understanding of SPTG in this environment so as to assist the future facilitation of interventions which aim to effectively foster positive psychological wellbeing in the face of this trauma [42].

The importance of understanding SPTG in this population has been emphasized by Wayland et al, stating that alongside the negative impacts upon individual psychological wellbeing, there may also be indirect consequences for their professional practice. Furthermore, these professional implications have been suggested to have the potential to result in increased staff turnover and lower standards of care, highlighting the relevance of this topic area for both individuals as well as stakeholders [3, 43]. Therefore, in occupational environments such as forensic settings, where exposure to indirect trauma cannot be significantly reduced, it is crucial to gain a comprehensive understanding of SPTG. This understanding can assist the facilitation of interventions aiming to enhance positive psychological wellbeing in the face of trauma, which can contribute to the avoidance of negative consequences for professional practice [41].

MATERIALS AND METHODS

Design

This study is quantitative in nature, to ensure accurate measurement and operationalization of the research variables would be achieved, in addition to preventing researcher bias in the interpretation of any findings. A correlational research design is utilized, and the anonymous primary data used has been collected from voluntary participants.

A total of five variables were measured, with the outcome variable being 'SPTG' and the predictor variables being 'Secondary Traumatic Stress', 'Downward Comparison Bias', 'Positive Attention Bias', and 'Social Desirability Bias'.

Ethical approval

Ethical approval to conduct the study was requested by the primary researcher and granted by the Faculty of Health and Education Ethics Committee. The EthOS ID for this study was 55903.

Participants

The minimum number of participants required for this study was calculated with a G* Power analysis using a medium effect size of .5, with the conclusion being that a sample size of 30 would provide an appropriate amount of data. This effect size was chosen following the recommendations of Cohen because after evaluating similar studies in the surrounding literature, there did not appear to be a consistent effect size used [44].

There was a total of 39 participants who took part in the study, however following essential data cleaning procedures, 28 participant datasets were appropriate for analysis. The recruitment of participants was conducted by utilizing both snowball and convenience sampling methods. Specifically, word of mouth, in addition to placing advertisements on various social media platforms, were the methods chosen to recruit volunteer participants.

In terms of demographics data, information was collected regarding participant age, gender identity, and occupation. This data was collected both to ensure participants met the inclusion criteria, alongside providing additional context to the study in relation to a wider population. Length of time in role ranged from 1 year to 42 years, participant ages ranged from 23 to 68, and 75% of participants identified as female (21 participants) with the remaining 25% identifying as male. A total of five psychological measures in the form of questionnaires were used in this study.

The first questionnaire shown to participants was the Secondary Traumatic Stress Scale [STSS] [45]. This self-report questionnaire asks participants to consider the past 7 days when providing their responses and measures the extent to which an individual has experienced symptoms of traumatic stress as a result of exposure to the traumatic experiences of others. This is a 17-item scale, utilizing a Likert-type response format ranging from 1 to 5. These values each correspond to a label from "Never" to "Very Often". Participants use this scale to rate the degree to which they agree or disagree with statements such as "It seemed as if I was reliving the trauma(s) experienced by my client(s)", and "I had disturbing dreams about my work with clients". The scale is comprised of three subscales and can be scored by summing the scores for all items in the scale, and then dividing by the number of items to reach a mean score.

Participants were then asked to complete the Secondary Post Traumatic Growth Inventory (SPTGI) which measures self-reported SPTG of participants. This is a 12-item questionnaire, utilizing a Likert-scale with values ranging from 0 to 5 [40]. The scale has labels in the form of statements which range from "I have not experienced this change" to "I have experienced this change to a very great degree". Participants are asked to use these scales to score the extent to which they agree or disagree with statements such as "I have become a more mature person", and "I react more calmly to painful events". Higher scores on this scale are associated with more positive changes or growth, and it has been noted that a participants mean score can be directly compared to the values on the initial measuring scale (E.g., a mean score of 4 would correlate to the label "I have experienced this change to a great degree").

Following on from this, the next measure utilized in this study was the Balanced Inventory of Desirable Responding (BIDR) [46]. Specifically, the Self-deceptive positivity subscale was utilized to measure participants tendency to give enhanced self-reports due to a social desirability bias. The subscale used consisted of 20 total items, with 10 of these items being reverse-coded. Participants rated each item on a Likert-scale ranging from 1 to 7, with 1 correlating to the phrase "Not true", 4 being "Somewhat true", and 7 being "Very true". Participants are asked to use these values to rate the degree to which they agree or disagree with statements such as "I rarely appreciate criticism", and "The reason I vote is because my vote can make a difference". To score this scale, negatively keyed items were first reversed, one point is then added to any 'extreme' responses (noted by the original developer of the measure to be values of 6 and 7). Following this, total scores may then be summed to give an overall measure of the extent of socially desirable responding. High scores are only obtained by those giving exaggeratedly desirable responses.

Next, the Attention to Positive and Negative Information Scale (APNIS) was used to measure an individual's tendency to focus their attention on positive information rather than negative [29]. This is a 26-item scale, scored using a Likert-Scale ranging from 1 to 5. Values of 1 correlate to the phrase "Very untrue of me", 3 correlates to "Somewhat true of me", and 5 to "Very true of me". Each of the 26-items on this measure are statements to which participants are asked to rate the extent to which they agree or disagree. Examples of statements on the APNIS include "I mostly remember times when I was happy", and "I usually feel other people look happy".

The final measure used was the Cognitive Processing of Trauma Scale, specifically the Downward Comparison Subscale [47]. This subscale consists of just three items and measures the extent to which individuals display downward comparison bias in specific relation to traumatic experiences. A Likert-scale of –3 to 3 is used in this scale, with-3 correlating to the statement "Strongly disagree", 0 being "Neither mainly agree nor disagree", and 3 being "Strongly agree". Using these values, participants are asked to rate the extent to which they agree or disagree with statements such as "Other people have had worse experiences than mine", and "My situation is not so bad compared to other peoples' situations". To score this measure, instructions were given to add 3 to each Likert-type score, then to calculate the sum score of all three scale items combined, and finally to divide by the number of items to find the mean score.

Procedure

The study was conducted online, using the Qualtrics platform. The link for individuals to participate was circulated with advertisement materials explaining the study. Prior to confirming participation in the study, potential participants were first shown an information sheet summarizing the key information in addition to any expected benefits or risks of participation. Within this information sheet, the completely anonymous nature of the study was emphasized, and details of the withdrawal instructions were provided. The information sheet was fully comprehensive, with the only exception being that participants were unaware of the specific aims of the study regarding cognitive biases. This decision was made to reduce any unconscious participant bias in the self-reports, which is of particular importance when considering the variable of social desirability which has the potential to be heavily influenced by this due to the nature of the bias. Following this, participants were asked to sign a consent form, confirming their understanding of the study, and their awareness of how their data would be used. Next, participants were asked to create a unique code which could be used in the event of requesting their data be withdrawn from the study, for up to two weeks after completion of the questionnaire. Following this, participants were asked to answer some brief demographic questions which were followed by the measures listed in section 2.4.

Data analysis

To conduct the analysis, the data was transferred from the Qualtrics platform to IBM SPSS Statistics. Initial data cleaning was conducted to remove datasets with missing data. The assumptions of a multiple regression analysis were then tested for, namely independence of observations, outliers, homoscedasticity, normal distribution, linearity, and multicollinearity.

Following this, descriptive statistics were calculated, and a Pearson's bivariate correlational analysis was conducted. A Pearson's

analysis was selected as appropriate in this instance due to the continuous nature of the variables being assessed.

A multiple regression analysis was selected for the analysis as they can be utilized in predicting a continuous outcome variable (in this case SPTG) based on the influence of multiple predictor variables (STS, downward comparison bias, positive attention bias, and social desirability bias). This model also assists in determining the overall variance of the outcome variable that is explained by the predictor variables, in addition to the extent of the individual contribution of each predictor variable.

RESULTS

Descriptive statistics and correlations

Due to missing data, a total of 11 participants overall were removed from the dataset prior to conducting the assumptions testing, correlation analysis, and multiple regression analysis.

Descriptive statistics, and correlations between variables, can be seen in Table 1. The data was normally distributed, and a Pearson's bivariate correlation analysis was conducted in order to assess the individual relationships between each of the IVs (STS, social desirability bias, positive attention bias, and downward comparison bias) and the DV (SPTG). There was found to be a significant moderate positive correlation between downward comparison bias score and SPTG score [r (26)=.46, p>.05]. There was also found to be a significant moderate positive correlation between positive attention bias and downward comparison bias [r(26)=.38, p>.05]. For each of the other variables, no significant correlation was found, as shown in Table 1.

Regression assumptions

All eight assumptions of the multiple regression were met. Analysis of standard residuals was carried out in order to determine the presence of potential univariate outliers (STD ± 3.29), which found that no outliers were contained in the data (Std. Residual Min=-2.60, Std. Residual Ma=1.48). No data points were found to exceed the Mahalanobis Distance value (<18.46), Cook's Distance value (<1), or Leverage value (<.535). Therefore, no multivariate outliers were found to be significantly impacting the model.

Tests for the assumption of collinearity were then conducted, with results indicating multicollinearity was not a concern (Minimum Tolerance=.83, Average VIF=1.13). Residuals appeared to be independent and so the independence of observations assumption was met (Durbin-Watson=1.962).

Utilising both a histogram and a normal P-P plot of standardised residuals, the assumption of normal distribution was visually assessed as being met. Based on a further visual assessment of the scatterplot of standardised residuals, the data was found not to violate the assumption of homoscedasticity. Finally, the assumption of linearity was assessed and deemed to be met using a visual inspection of scatterplots for each IV against the DV.

Regression analysis

A multiple regression was conducted using the simultaneous method to determine whether secondary traumatic stress, downward comparison bias, positive attention bias, and social desirability bias were predictors of SPTG. The regression model (shown in Table 2) showed that overall, the variables were significant predictors of SPTG [F(4, 23)=3.435, p<.05], accounting for 26.5% of the total variation in SPTG scores (R^2= 37, R^2 adjusted=.27). Downward comparison bias was found to be a significant positive predictor of SPTG (β=.51, t(26)=2.79, p=.01). The remaining three predictors of STS (β=.30, t(26)=1.77, p=.09), social desirability bias (β=-.24, t(26)=-1.44, p=.16), and positive attention bias (β=-.03, t(26)=-.18, p=.86), were found to be non-significant in predicting SPTG.

Variable	M	SD	Min	Max	Skew	Kurt	1	2	3	4
SPTG	3.42	0.84	1	4.58	-1.44	1.83	-			
STS	2.21	2.21	1	4.35	0.45	0.77	0.33	-		
Social Desirability Bias	4.64	0.75	3.25	6.1	0.26	-0.15	-0.2	-0.13	-	
Downward Comparison Bias	5.94	1.19	2.67	7	-1.11	0.54	-.46*	0.01	0.16	-
Positive Attention Bias	3.41	0.27	2.62	3.81	-0.9	-1.51	0.21	0.2	0.04	.38*

Note: Min=mini mum reported value; Max=maxi mum reported value; Skew=skewness; Kurt=kurtosis;*p<.05.

Table 1: Descriptive statistics and correlation data between study variables (n=28).

	B	SE (B)	ß	95% CI	
				Lower	Upper
SPTG	2.16	1.94		-1.85	6.16
STS	0.33	0.19	0.3	-0.06	0.73
Social desirability bias	-0.28	0.19	-0.24	-0.67	0.12
Downward comparison bias	0.36	0.13	.51**	0.09	0.63
Positive attention bias	-0.1	0.57	-0.03	-1.27	1.07

Note: B=unstandardised beta; SE(B)=standard error of the beta; β=standardised beta; CI=confidence interval; *p<.05; **p<.01.

Table 2: Multiple regression results with SPTG as the criterion.

DISCUSSION

This study was undertaken with the aims of adding to an increasing body of literature surrounding the effects and implications of cognitive biases when self-reporting experiences of SPTG, in addition to investigating a narrower population sample of professionals who work in forensic settings due to the increased likelihood of exposure to potentially traumatic situations in these settings [41,48]. The hypotheses underpinning this study stated that individuals reporting higher levels of each cognitive bias would be more likely to report experiencing SPTG. The multiple regression model as a whole was found to be significant, accounting for 26.5% of the total variance in SPTG reported. The model found that STS, positive attention bias, and social desirability bias, were not significant predictors of self-reported SPTG, however, downward comparison bias was found to be a significant predictor. It should be highlighted prior to discussion of these findings that any conclusions drawn based on these results and discussed in this report are tentative due to the small sample size used resulting in a lack of statistical power.

Interestingly, there was not found to be a significant link between STS and SPTG. Initially, this finding appears to contrast much of the surrounding literature which emphasizes the essential role of traumatisation (whether primary or secondary) in facilitating this positive growth. This concept stems from Post-Traumatic Theory, in which it is highlighted that growth experienced is instigated by periods of reflection following a traumatic experience which causes altered perceptions of the world [49]. However, some studies have indicated that as an individual experiences vicarious trauma over longer periods of time, and/or to a higher degree, their experience of growth tends to decrease [50-52]. This aligns with the understanding that forensic professionals are more likely to experience vicarious trauma due to their unique occupational environment [41].

More specifically, forensic professionals are often in close contact with individuals who either have experienced or are currently experiencing traumatic events and are therefore repeatedly exposed to traumatic stories and distressing material [17]. Research into the experiences of STS and SPTG amongst healthcare professionals has been supportive of this concept, highlighting the curvilinear nature of the relationship [14,15]. The prior research emphasised the fact that when levels of STS increase beyond moderate levels, individuals are more likely to see an increase in psychological distress and a decrease in SPTG. With this context, the finding of a non-significant relationship between STS and SPTG amongst forensic professionals could be interpreted as tentatively supporting the link between decreased perceptions of growth after continual or repeated experiences of secondary trauma. In this study, the length of time spent working as a professional in a forensic setting ranged from one to 42 years.

Downward comparison bias was found to be a significant predictor of SPTG in this study, supporting the initial hypothesis that there would be a positive relationship found between these variables. Social psychological theory states that downward comparison occurs when an individual enhances their own subjective wellbeing, either subconsciously or consciously, through comparison with those who are perceived to be less fortunate [53]. This aligns with much of the surrounding literature regarding downward comparison bias in SPTG, specifically that downward comparison bias can be an influencing factor in enhanced or inaccurate self-reports [28]. Moreover, measures for similar growth concepts, such as Tedeschi and Calhoun's Post-Traumatic Growth Inventory, have been criticised for encouraging positive bias due to the phrasing of the items on the scale [54]. This positive bias has been suggested to result in enhanced self-report scores being given, due to a level of desirability bias.

Alternatively, it has been noted in the past that for individuals who have experienced primary trauma, downward comparison-based interventions have been found to be beneficial in reducing fear responses and increasing chances of successful adjustment [55]. The clinical success of this intervention indicates that downward comparison may be a beneficial factor in processing

trauma in a healthy way. This idea is corroborated by a more contemporary study on PTG which considered downward comparison to be an indicator of cognitive processing of trauma. The study by Gangstad et al, suggested that this cognitive processing using downward comparison may be a critical step in supporting genuine growth following trauma. This does not necessarily mean that the same will be true for secondary trauma victims, however, studies have highlighted the many similarities between symptoms displayed by those with PTSD, developed from primary trauma, and those with STS [56]. Further, it has been noted in a study on a population of healthcare workers that experience of SPTG positively correlated with both maladaptive and adaptive coping mechanisms Kalaitzaki et al., based on this, it is possible to interpret the findings of this study as tentative evidence towards downward comparison being a facilitator for genuine SPTG.

Furthermore, there was not found to be a significant link between the predictor variable of social desirability bias and the outcome of SPTG. This does not align with much of the surrounding literature which indicates that social desirability bias is a significant factor in self-reported SPTG [27]. In terms of social desirability bias, it has been noted by previous research that this can manifest in a multitude of ways including self-deception in addition to opting for certain behaviors and responses in order to appear more favorable to others [33,57]. Both of these manifestations of social desirability bias have been known to result in enhanced self-reports, however, for this study only self-deceptive social desirability bias was investigated. It may be that there is no significant link between self-deception and SPTG, but that presenting oneself in a more favorable light may impact more upon experiences of SPTG.

Finally, there was also not found to be a significant relationship between the predictor variable of positive attention bias and the outcome of SPTG. This again does not align with a vast amount of the surrounding literature, such as Cognitive adaptation theory which suggests that individuals have self-protective cognitive biases which influence which aspects of a negative experience are focused upon. This corroborates the understanding of how positive attention bias may impact upon self-reports of SPTG, as individuals' perception of a traumatic experience may be skewed by these biases to be more positive and enhanced. However, the lack of a significant relationship found between positive attention bias and SPTG in this study contrasts much of these theories despite the fact that this link has been reported in a multitude of studies. It may be that within this specific population of individuals working in forensic environments, this factor is not as significant as it is for other populations, and further research would be needed to understand this.

Implications of the research

The findings of this study have implications in both the support of individuals who have experienced STS, as well as in the potential facilitation of SPTG. Additional implications and directions for future research are discussed.

The findings of this study reinforce the need for appropriate support for professionals in forensic settings who may have been exposed to secondary trauma. As emphasised prior, the implementation of proper and effective support for individuals suffering from secondary traumatic stress is essential, not only for the professionals themselves, but also for their clients and stakeholders. This is because of the link between STS and lower standards of professional care, in addition to a higher rate of staff turnover [3,43]. Much of the literature surrounding SPTG discusses the potential to facilitate this growth in clinical and occupational environments based on factors which have been found to be influential, such as downward comparison bias. In the present study, consideration has been given to the theory that downward comparison bias may be a positive facilitator of genuine growth, in addition to the theory that downward comparison bias may actually be a predictor of illusory growth as a maladaptive coping mechanism. As it is impossible to ascertain the precise role of cognitive bias in self-reported SPTG from the data available, it is heavily suggested that efforts should be made to engage in frequent supervisory meetings with forensic staff members.

Strengths and limitations

A large amount of the surrounding literature was conducted using PTG scales such as the post-traumatic growth inventory to measure SPTG. In contrast to this, one of the strengths of the current study is the use of a contemporary measure developed specifically for measuring SPTG, namely the SPTGI [12,40]. This ensures previous criticisms surrounding the limited reach of PTG measures for SPTG have been rectified.

However, this study is limited in its statistical power, due to the lower number of participants obtained than was deemed necessary by the initial G*Power analysis. As a result of this, all findings and conclusions derived from the results of this study are tentative. This is highlighted throughout the discussion of the findings and should be reiterated here.

Another limitation of this research is the cross-sectional nature. As was emphasised previously, SPTG is a concept which individuals report differing throughout different periods of their lives [50,51]. This study was limited to a cross-sectional design due to time limitations, and therefore the findings are not predictive of the underpinning developmental processes involved in SPTG.

Directions for future research

In order to advance the overall understanding of SPTG and the influence of cognitive biases within a population of professionals working in forensic settings, several directions for future research are proposed. Initially, to address the limitations upon the statistical power and generalizability of this research, future studies should aim to work with a larger sample size.

Furthermore, as noted previously, it has been suggested that long-term and repeated exposure to secondary trauma may actually have an inverse relationship with SPTG [50-52].

Therefore, future research may benefit from shifting the focus towards the influence of years spent working as a professional in

a forensic environment on SPTG. This concept can be seen reiterated in a study conducted by Greene et al on secondary trauma and PTG in wives of ex-prisoners of war in which it was found that PTG was a predictor of subsequent avoidance symptoms [57]. The researchers went on to suggest that this avoidance can be interpreted as growth not being preventative of future distress development. As much of the literature surrounding SPTG is cross-sectional, it would be of extreme relevance to conduct longitudinal research into this phenomenon that appears to be occurring after sustained periods of secondary trauma. This is of particular importance when considering professionals in forensic environments, as staff support services may benefit from considering the long-term impact of this secondary traumatization when providing support to enhance staff wellbeing.

Finally, another suggested avenue for future research is the effect of engagement type on SPTG experienced by forensic professionals. More specifically, whether the nature of the contact between the professional in the forensic setting and the individuals who have experienced primary trauma (e.g., a therapeutic relationship in contrast to a less intensive relationship) is indicative of the extent to which the professional may or may not experience SPTG.

CONCLUSION

Overall, the findings of this study add to a growing body of evidence supporting the role of cognitive biases in facilitating SPTG. These findings have important implications for directions of future studies into SPTG which is a fast-developing area of research, specifically emphasizing the need for long-term studies when understanding the role of cognitive biases in the development and maintenance of SPTG. In addition to future research, this study also has implications for professional practice and approaches both on an individual level to self-care and psychological well-being, but also on an occupation-wide level for those creating staff support policies for forensic workplaces.

REFERENCES

1. Bride BE. Prevalence of secondary traumatic stress among social workers. Soc Work. 2007;52(1):63-70.
2. Starcher D, Stolzenberg SN. Burnout and secondary trauma among forensic interviewers. Child Fam Soc Work. 2020;25(4):924-934.
3. Levin AP, Putney H, Crimmins D, McGrath JG. Secondary traumatic stress, burnout, compassion satisfaction, and perceived organizational trauma readiness in forensic science professionals. J Forensic Sci. 2021;66(5).
4. Middleton J, Harris LM, Matera Bassett D, Nicotera N. "Your soul feels a little bruised": Forensic interviewers' experiences of vicarious trauma. Traumatology. 2022;28(1):74.
5. Arnold D, Calhoun LG, Tedeschi R, Cann A. Vicarious posttraumatic growth in psychotherapy. J Humanist Psychol. 2005;45(2):239-263.
6. Ghahramanlou M, Brodbeck C. Predictors of secondary trauma in sexual assault trauma counselors. Int J Emerg Ment Health.2000;2(4):229-240.
7. Joseph S, Linley PA. Positive adjustment to threatening events: An organismic valuing theory of growth through adversity. Rev Gen Psychol. 2005;9(3):262-280.
11. Barnicot K, McCabe R, Bogosian A, Papadopoulos R, Crawford M, Aitken P, et al. Predictors of post-traumatic growth in a sample of united kingdom mental and community healthcare workers during the COVID-19 pandemic. Int J Environ Res Public Health. 2023;20(4):3539.
12. Tedeschi RG, Calhoun LG. The Posttraumatic growth inventory: Measuring the positive legacy of trauma. J Trauma Stress. 1996;9:455-471.
13. McGrath JC. Posttraumatic growth and spirituality after brain injury. Brain Impairment. 2011;12(2):82-92.
14. Dar IA, Iqbal N. Beyond linear evidence: The curvilinear relationship between secondary traumatic stress and vicarious posttraumatic growth among healthcare professionals. Stress Health. 2020;36(2): 203-212.
15. Manning-Jones S, de Terte I, Stephens C. The relationship between vicarious posttraumatic growth and secondary traumatic stress among health professionals. J Loss Trauma. 2017;22(3):256-270.
16. Figley CR, Kleber RJ. Beyond the "victim" secondary traumatic stress. InBeyond trauma: Cultural and societal dynamics. Springer. 1995:75-98.
17. Tsirimokou A, Kloess JA, Dhinse SK. Vicarious post-traumatic growth in professionals exposed to traumatogenic material: A systematic literature review. Trauma Violence Abuse. 2023;24(3): 1848-1866.
18. Westphal M, Bonanno GA. Posttraumatic growth and resilience to trauma: different sides of the same coin or different coins? Applied Psychology. 2007;56(3):417-427.
19. Wild ND, Paivio SC. Psychological adjustment, coping, and emotion regulation as predictors of posttraumatic growth. J Aggres Maltreat Trau. 2004;8(4):97–122.
20. Sanki M, O Connor SA. Developing an understanding of post traumatic growth: implications and application for research and intervention. Int J Well. 2021 May 31;11(2):1–19.
21. Yılmaz G, Ustun B, Gunuşen NP. Effect of a nurse-led intervention programme on professional quality of life and post-traumatic growth in oncology nurses. Int J Nurs Pract. 2018;24(6):e12687.
22. Gunty AL, Frazier PA, Tennen H, Tomich P, Tashiro T, Park C. Moderators of the relation between perceived and actual posttraumatic growth. Psychol Trauma. 2011;3(1):61–66.
23. Johnson SF, Boals A. Refining our ability to measure posttraumatic growth. Psychol Trauma. 2015;7(5):422–9.
24. Jayawickreme E, Blackie LER. Post-traumatic growth as positive personality change: evidence, controversies and future directions. Europ J Person. 2014;28(4):312-31.
25. Tennen H, Affleck G. Assessing positive life change: In search of meticulous methods. Medical illness and positive life change: Can crisis lead to personal transformation? American Psychol Assoc. 2009;31–49.
26. Kalaitzaki A, Tamiolaki A, Tsouvelas G. From secondary traumatic stress to vicarious posttraumatic growth amid COVID-19 lockdown in Greece: The role of health care workers' coping strategies. Psychol Trauma. 2021;14(2):273-280
27. Noriega C, Sanchez-Cabaco A, Lopez J, Perez-Rojo G, Sitges E, Bonete-Lopez B. Protective and vulnerability factors of posttraumatic growth during the COVID-19 pandemic. Current Psychol. 2023.
28. Taylor SE, Wood JV, Lichtman RR. It could be worse: selective evaluation as a response to victimization. J Soc Issu. 1983;39(2):19–40.
29. Noguchi K, Gohm CL, Dalsky DJ. Cognitive tendencies of focusing on positive and negative information. J Res Person. 2006;40(6):891–910.

30. Pool E, Brosch T, Delplanque S, Sander D. Attentional bias for positive emotional stimuli: A meta-analytic investigation. Psychol Bull. 2016;142(1):79–106.
31. Alamdar S, Lv Y, Guo J, Lu J, Zhang Y. Attentional bias effect on post-traumatic outcomes in children after earthquake: Mediation role of rumination. PsyCh J. 2020;9(5):738–48.
32. Blome C, Augustin M. Measuring change in quality of life: bias in prospective and retrospective evaluation. Value Health. 2015;18(1): 110-5.
33. Paulhus DL. Measurement and control of response bias. Meas Personal Soc Psychol Att. 1991;17–59.
34. Renkema LJ, Stapel DA, Van Yperen NW. Go with the flow: conforming to others in the face of existential threat. Europ J Soc Psychol. 2008;38(4):747–56.
35. Frazier PA, Kaler ME. Assessing the validity of self-reported stress-related growth. J Consult Clin Psychol. 2006;74(5):859–69.
36. Doherty J, O'Brien D. A participatory action research study exploring midwives' understandings of the concept of burnout in Ireland. Women Birth. 2021;35(2):e163-e171.
37. Galek K, Flannelly KJ, Greene PB, Kudler T. Burnout, secondary traumatic stress, and social support. Pas Psychol. 2011;60(5):633–49.
38. Lee W, Lee YR, Yoon JH, Lee HJ, Kang MY. Occupational post-traumatic stress disorder: an updated systematic review. BMC Public Health. 2020;20(1).
39. Killen K. Secondary traumatic stress. Child Abuse Neg. 1998;22(3): 236–7.
40. Oginska-Bulik N, Juczyński Z. Assessing positive posttraumatic changes among professionals working with trauma victims: the secondary posttraumatic growth inventory. Roczniki Psychologiczne. 2022;99–120.
41. Wayland S, Cook O, Cartwright A, Ryan J, Brondolo E, Bassed R, et al. The nature and impact of occupational trauma exposure among staff working in a forensic medical and scientific service: A qualitative interview study. Austral J Foren Sci. 2021;55(2):1–12.
42. Perez LM, Jones J, Englert DR, Sachau D. Secondary traumatic stress and burnout among law enforcement investigators exposed to disturbing media images. J Pol Crim Psychol. 2010;25(2):113–24.
43. Oates J, Topping A, Ezhova I, Wadey E, Rafferty AM. Factors affecting high secure forensic mental health nursing workforce sustainability: Perspectives from frontline nurses and stakeholders. J Psychiatr Ment Health Nurs. 2021;28(6):1041-1051.
44. Cohen J. Statistical power analysis for the behavioral sciences. J Amer Stat Assoc. 1988;73(363):680.
45. Bride BE, Robinson MM, Yegidis B, Figley CR. Development and validation of the secondary traumatic stress scale. Res Soc Work Pract. 2004;14(1):27-35.
46. Paulhus DL. Balanced inventory of desirable responding. PsycTESTS. 1984.
47. Williams RM, Davis MC, Millsap RE. Development of the cognitive processing of trauma scale. Clin Psychol Psycho. 2002;9(5):349–60.
48. Slack DP. Trauma and coping mechanisms exhibited by forensic science practitioners: a literature review. Forensic Sci Int Synerg. 2020;15(3).
49. Zeligman M, Grossman L, Tanzosh A. Posttraumatic growth in trauma survivors: meaning making and locus of control. J Counsel Pract. 2019;10(2):1–21.
50. Ghahramanlou M, Brodbeck C. Predictors of secondary trauma in sexual assault trauma counselors. Int J Emerg Ment Health. 2000;2(4):229–40.
51. O Sullivan J, Whelan TA. Adversarial growth in telephone counsellors: Psychological and environmental influences. Britis J Guidance Counsel. 2011;39(4):307-23.
52. Zerach G, Shalev TBI. The relations between violence exposure, posttraumatic stress symptoms, secondary traumatization, vicarious post traumatic growth and illness attribution among psychiatric nurses. Arch Psychiatr Nurs. 2015;29(3):135-42.
53. Wills TA. Downward comparison principles in social psychology. Psychol Bull. 1981;90(2):245–71.
54. Ford JD, Tennen H, Albert D. Trauma, recovery, and growth. 2008.
55. Winkel FW, Blaauw E, Wisman F. Dissociation-focused victim support and coping with traumatic memory: An empirical search for evidence sustaining the effectiveness of downward comparison based interventions. Internation Rev Victimol. 1999;6(3):179-200.
56. Jenkins SR, Baird S. Secondary traumatic stress and vicarious trauma: A validational study. J Trauma Stress. 2002;15(5):423–32.
57. Taylor SE. Adjustment to threatening events: A theory of cognitive adaptation. American Psychol. 1983;38(11):1161–73.