



The
University
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Sheffield.

**Psychological growth during the COVID-19 pandemic: A systematic
review and research report.**

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A thesis submitted in partial fulfilment of the requirements for the award of
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Clinical and Applied Psychology Unit

Department of Psychology

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Declaration:

The subsequent thesis is submitted in partial fulfilment for the award of Doctorate in Clinical Psychology at the University of Sheffield. This work has not been submitted for any other degree or to any other institution.

Structure and Word Count

Part I: Literature review

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Lay summary

Post-traumatic Growth (PTG) and its reported development following traumatic experiences or adversity is often overlooked, with research mainly focusing on undesirable, negative, outcomes of adversity and trauma. Nevertheless, a significant proportion of the population regularly reflects and identifies positive life changes, appreciation, and thriving following a multitude of traumatic events, including chronic illness, natural disasters, war, or bereavement. The understanding of which factors may facilitate the development of PTG can have important clinical implications in the proactive planning of mental health services, policy decisions, and allocation of resources. This thesis has aimed to investigate the emergence of PTG in the population during this recent and ongoing global challenge: the COVID-19 pandemic.

The first part of this thesis involves a systematic literature review identifying and synthesising research on PTG during the COVID-19 pandemic in the general adult population. The main aim was to examine whether important demographic and psychosocial factors that enable PTG have been identified, and whether barriers to PTG have been similarly explored in the population. 26 relevant studies were included in this review, and while the relevance of demographic factors remained unclear, there was evidence that social support, coping skills, and PTSD/PTS symptoms all facilitated PTG during this time.

The second part of the thesis involves the report of a quantitative empirical study which was conducted to explore PTG during the COVID-19 period in people who have a diagnosis of asthma. This population was selected as potentially particularly affected during this period, due to the respiratory complications of COVID-19, their vulnerability as a population to higher anxiety and depression, and the possible impact of managing a chronic condition during this period. The aim of this study was to examine whether people with severe asthma would show differences in their reported PTG in comparison to people with

mild/moderate asthma, and to further identify how PTG during this period may be related to social support, coping, thriving, and prior adverse life experiences in this vulnerable population. Even though the role of prior adverse life experiences, social support, and coping skills were found to be non-significant in the subsequent analysis, there was a significant negative relationship identified between prior traumatic experiences and coping skills.

Together, these two studies aim to increase understanding of both PTG in general, but also specifically in the context of the COVID-19 pandemic. However, it is proposed that longitudinal research in this area may be necessary in order to fully understand whether the pandemic has been a catalyst for PTG, and whether the reported PTG in the populations is sustained following this period.

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Part 1: Literature Review

Psychosocial facilitators and barriers associated with psychological growth in the general population during the COVID-19 pandemic

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Part 2: Empirical Research Report

Understanding Psychological Growth, Perceived Social Support, and Coping Skills in People with Asthma following/during the COVID-19 Global Health Crisis.

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Part 1: Literature review

Psychosocial facilitators and barriers associated with psychological growth in the general population during the COVID-19 pandemic

Abstract

Objectives. This systematic literature review aimed to identify, evaluate, and present current literature on post-traumatic growth of adults in the general population during the COVID-19 pandemic. The focus of the synthesis was to report on demographic and psychosocial facilitators and barriers of psychological growth (positive and negative correlates).

Design and Method. A PRISMA search strategy, with structured exclusion and inclusion criteria was conducted in three databases (SCOPUS, PsychInfo, MEDLINE) in November 2021. Studies meeting the criteria were assessed for quality and had their data extracted.

Results. A total of 26 studies were eligible to be included in this review. Demographic correlates of psychological growth remained unclear, with studies reporting inconsistent findings. Social support, deliberate rumination, coping skills, experience of loneliness, PTSD and PTS symptoms were identified as positive correlates of psychological growth.

Conclusions. This is the first systematic literature review exploring psychological growth as a potential outcome of COVID-19 in the general population. The results of this review are somewhat consistent with previous reviews on psychological growth, which have identified social support, PTSD, and rumination as factors facilitating growth. Limitations, considerations, and implications for future research are further discussed.

Practitioner Points:

- Social support has been identified as a significant factor in the development of psychological growth in a number of studies, the positive impact of social support in developing PTG should be taken into account if it is necessary to consider restrictive measures in the future.

- Practitioners should consider that female clients may report higher levels of PTG; Male respondents tended to report lower levels of PTG, however other demographic correlates were inconclusive through this review.
- Mental health practitioners working with populations who report PTSD or PTS related to the COVID-19 pandemic should examine the availability of coping skills and deliberate rumination skills in the population and consider positive outcomes of growth alongside the impact of trauma.

Keywords: psychological growth; posttraumatic growth; COVID-19; adult

Introduction

Adverse events have been established as catalysts for post-traumatic growth (PTG) (Carver, 1998). Initially tentatively described as an overlooked positive impact of negative events, it was theorised that these perceived benefits involve changes in self-perception, interpersonal relations, and philosophy of life that are beneficial to the individual following the experience of a traumatic event (Tedeschi & Calhoun, 1996). Since its conceptualisation, PTG has been further referred to as “stress-related growth (Liu et al., 2021), or “psychological growth” (Martin et al., 2017), and it has been explored in populations following various traumatic events such as chronic illness, natural disasters, or bereavement. In this sense, PTG is a phenomenon that can be experienced in people who face a “wide variety of traumatic circumstances” and who experience important and profound changes, beyond a return to their pre-adversity “baseline” (Tedeschi & Calhoun, 2004), without necessarily meeting criteria for mental health trauma responses such as PTSD. Moreover, PTG has been described to be a process of discovery comparable to wisdom, through which individuals realise growth via self-reflection and comparison of their current state to their previous understanding of the self (Nolen-Hoeksema & Davis, 2004). Since its conceptualisation, researchers exploring outcomes of personal experiences of such trauma in various forms (e.g., natural disasters, chronic illness, bereavement) have aimed to identify PTG and understand the clinical, societal, and mental health implications of such. For instance, Teodorescu et al. (2012) proposed that psychological health in a traumatised refugee sample was significantly related to PTG, more so than other contributing factors such as depressive symptomatology and suggested that addressing positive changes following trauma should be part of standard psychological treatment.

Prior to the COVID-19 pandemic, systematic exploration of PTG research proposed that cognitive engagement with the traumatic event in the form of rumination, being able to

share the negative experiences with trusted others (social support), ability to engage in coping strategies, and personality traits such as Agreeableness, Extraversion, and Openness, were all significant correlates to higher reported PTG (Henson et al., 2021). On the other hand, the same review reported that there were unclear findings on the role of resilience in the development of PTG, with some studies reporting that it was correlated to higher PTG, and others indicating a negative relationship between the two (Henson et al., 2021). Moreover, there were indications that participants of female gender were more likely to report PTG than males, as well as people from an ethnic minority background, whereas age, education, and employment were similarly unclear factors with research indicating significant results in both directions (Henson et al., 2021).

In 2019, the emergence of COVID-19 and its trajectory as a global pandemic has posed novel challenges for the global population, inclusive of trauma. Psychological practitioners and clinicians rapidly identified that this period would likely be traumatic for the population, with measures taken by governments world-wide in order to safeguard the physical health of vulnerable groups and the continuity of critical health services (for example, through restrictive “lockdowns”) hypothesized to add additional burden to the mental health of the population during this period through the experience of unresolved grief, isolation, and chronic stress (Silver, 2020). A large-scale European study involving participants from Denmark, France, and the UK, identified that people who lived alone during lockdowns had significantly worse mental health outcomes to people who lived with others, attributing this to lack of social support and loneliness (Keller et al., 2022). A further large-scale meta-analytic study examining world-wide data identified that in adult working populations (excluding healthcare workers), there was a 22% prevalence of depression and 14% prevalence of PTSD symptomatology, whereas the general adult population was reporting a 21% prevalence in anxiety symptoms and 35% prevalence in sleep problems

during the early stages of the pandemic (Dragiotti et al., 2021). With regard to the UK, a meta-analytic study examining 11 longitudinal research papers on the mental health outcomes of the UK public during the pandemic (including up to the time of lifted lockdown restrictions in the summer of 2020) reported that the mental health of the population deteriorated since the onset of the pandemic, without indication of recovery at that timepoint. In addition, they proposed that women, university-educated people and young adults (25-44 years of age) were the most impacted by negative mental health outcomes (Patel et al., 2022).

Parallel to research identifying trauma and distressing mental health outcomes, further studies have emerged which explore reported PTG during this same period. It has been proposed that the COVID-19 pandemic exhibits unique trauma inducing features in the aspects of low event anticipation and lack of familiarity which means that it cannot be directly compared to previous literature on PTG (Celdran et al., 2021). For instance, PTG in healthcare worker populations such as nurses (Jiang et al., 2022) and surgical residents (Rasic et al., 2021) are two examples of specific populations having been explored due to having faced specific trauma due to the health impact of COVID-19, same as adolescents who have may not have yet fully developed coping resources and resilience skills (Li et al., 2022). However, since the impact of the pandemic has widely affected the global population, research exploring PTG in adults in the general population has also been carried out, in order to better understand the outcomes of this unprecedented period, facilitate policy planning and decision-making (for example, decisions around further lockdowns, service disruptions and their impact) as well as implement practical approaches of trauma-informed leadership (Koloroutis & Pole, 2021), and guide future development of services through the understanding of the needs and experiences of the population (e.g., planning of COVID-19-related psychological services focusing on fostering client strengths and coping skills).

Aims of this review

The following systematic review aims to identify and summarise research literature on PTG in adults from the general population during the period of the COVID-19 pandemic, and report on psychosocial factors that may be facilitators or barriers to the development of PTG. Moreover, demographic participant characteristics will be explored in order to ascertain whether they are identified as correlates of PTG. At this time, this is the first review of this kind attempting to explore the research following a systematic methodology. The specific questions that this review aims to answer are the following:

1. Do adults from the general population report PTG during this period?
2. Are there demographic correlates of PTG in the general adult population identified during this period?
3. What facilitators (positive correlates) of PTG have been identified in general population adults during this period?
4. What barriers (negative correlates) of PTG have been identified in general population adults during this period?

Method

The protocol for this review was registered on the Open Science Framework (https://osf.io/dxs64/?view_only=727a28e7f17140ef802c5b7319ec399a).

Search Strategy

An initial brief scoping search was undertaken using the SCOPUS database, to estimate whether relevant literature was emerging that would be relevant to this systematic review. Using search terms such as “post-traumatic growth” and “COVID-19”, there was indication of emerging recent literature that would justify continuing with a systematic review. Therefore, a “keyword, abstract, title” search was conducted in three databases (MEDLINE, SCOPUS, PsycInfo), on the 5th of November 2021. The search terms for PTG

were influenced by previous recently published systematic reviews on psychological growth (i.e., Martin et al., 2017; Ulloa et al., 2015). The following terms were thus employed in the databases: “Posttraumatic growth”; “post-traumatic growth”; “post traumatic growth”; “psychological growth”; “adversarial growth”; “thriving”; “PTG”; “stress-related growth”; “psychological adjustment”; “psychological adaptation”. These were subsequently combined with terms pertaining to COVID-19: “COVID-19”; “coronavirus”; “COVID”; “SARS-CoV-2”. Backwards and forwards citation searches were conducted on all full-text articles selected for the review.

Inclusion and Exclusion Criteria

Full text, peer-reviewed published studies up to 5th November 2021 were included in this review. Inclusion criteria were defined as follows:

1. Studies available in the English language examining the correlates of PTG in the general adult population as a psychological outcome of the COVID-19 pandemic.
2. Studies including a validated quantitative measure of PTG.
3. Mixed-sample studies where the majority of the sample (>50%) consisted of general population adults.

Exclusion criteria for this review were defined as follows:

1. Scoping, critical, and literature reviews were excluded from this study.
2. Studies exploring only specific sub-groups of the population uniquely affected by the pandemic (e.g., healthcare workers, adults with ongoing chronic health conditions unrelated to COVID-19).
3. Studies exploring only sub-scales of PTG measures.
4. Unpublished datasets (conference papers, dissertations, and theses) were excluded in order to ensure methodological quality, even though it is understood that this decision could increase the risk of publication bias (Macaskill et al., 2010).

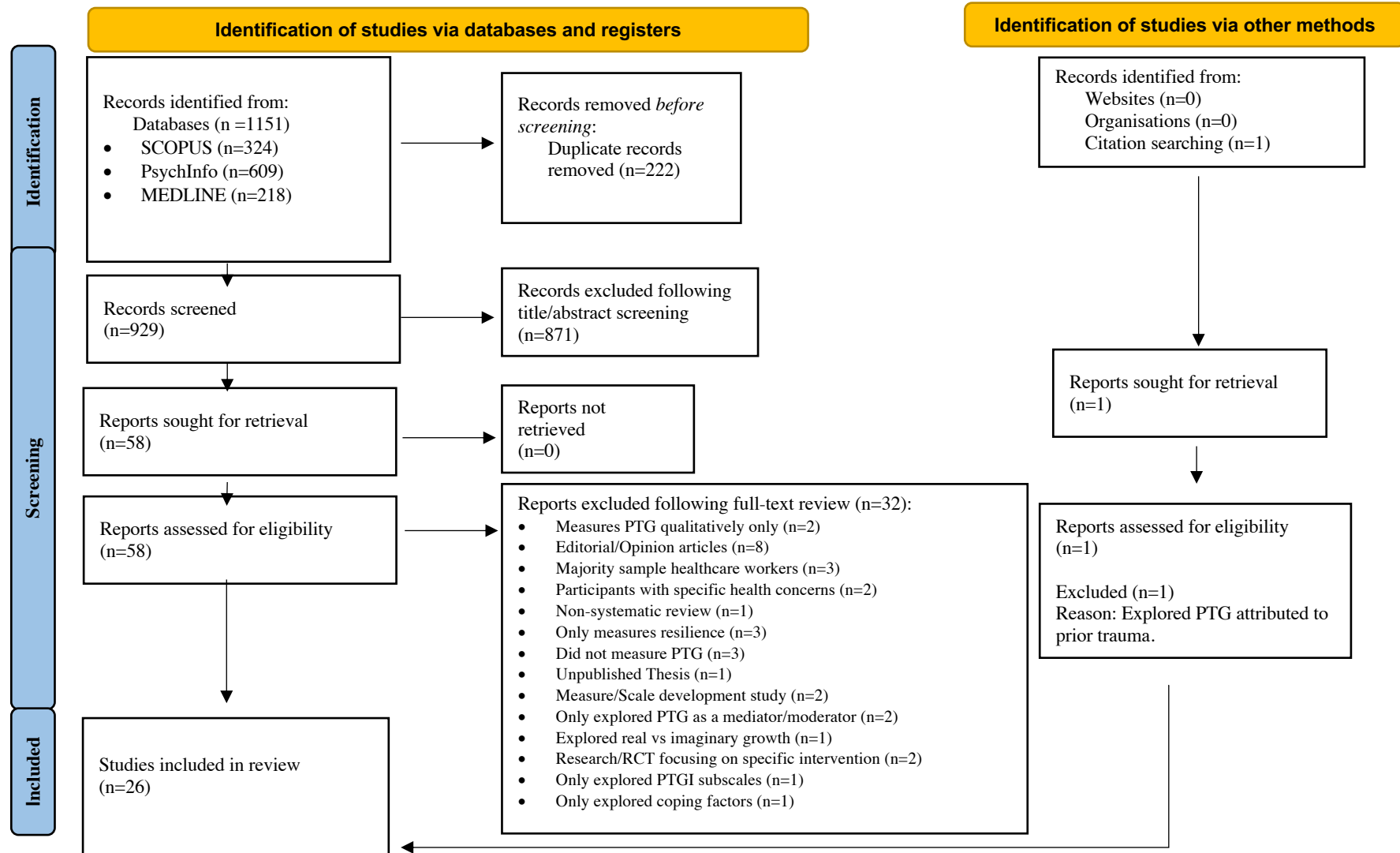
5. Qualitative research.

Study Selection

The study selection process is shown in Figure 1, using the PRISMA 2020 flow diagram (Page et al., 2021). The database searches returned a total of 1151 articles, which were merged using EndNote software (EndNote 20, 2013). Following removal of duplicates and screening of titles and abstracts, a total of 26 studies met the inclusion criteria and have been included in this review.

Figure 1.

PRISMA flow Diagram



Quality Appraisal

The purpose of this appraisal was to examine the quality of the studies as a further way of assessing the strength of the evidence and risk of bias, and not to further exclude studies from the review. Therefore, regardless of the appraisal classification, all 26 studies have been included in the synthesis.

All eligible studies were assessed by the principal investigator for methodological quality using the “Appraisal tool for Cross-Sectional Studies” (AXIS; Downes et al., 2016), chosen a priori, as the scoping searches indicated that the eligible studies would likely be cross-sectional, and this tool was designed and specifically recommended for research of this type (Ma et al., 2020). The AXIS tool included 11 questions that assess study procedures, design, and quality of measures used to produce a categorical rating for each assessed study’s quality (low, moderate, high). Moreover 20% of the eligible studies ($n = 6$) were independently examined by a peer Trainee Clinical Psychologist. Initial agreement between the two raters was fair (73.33%; $k = 0.375$), and disagreements were resolved through discussion. The quality appraisal table of questions and scoring method is included in the Appendix (Appendix A).

Data Extraction and Synthesis Strategy

Relevant data extracted for this qualitative review included the following: authors, year and country of publication, research design, participant demographic factors (gender, age, education), total number of participants, sample type, measure of PTG used in the study, other measures used in the study, main findings of facilitators and barriers of psychological growth (including effect size where available), and non-significant findings relative to psychological growth. Where studies used hierarchical regressions using multiple models, only the model identified by the authors as the one with the best fit was included in the data extraction and subsequent synthesis. Due to the expected heterogeneity of the studies as

indicated in the scoping stage, a meta-analysis was not considered appropriate for this review. Following the data extraction, a narrative synthesis was used to examine the research questions of this review. The narrative approach was selected due to the studies being too diverse to combine into a meta-analysis (due to using several different outcome measures and exploring different constructs as part of their hypotheses), even though it is understood that it results in a more subjective process and discussion (Centre for Reviews and Dissemination, 2009). The narrative synthesis included a tabulated description of the included studies, followed by a synthesis of the findings which explores the relationship of the findings between the studies in a thematic manner.

Results

Study characteristics

Each of the 26 included studies in this literature review explored psychological growth in the general adult population during the period of COVID-19. Most studies were published either in 2020 or 2021, with only a single study from 2022 being available at the time. An overview of the study characteristics and key findings is shown in Table 1. The majority of studies were cross-sectional, and most used convenience sampling methods. Seven studies were conducted in China, and another seven in the USA. A further three studies were conducted in Spain, with the rest of the studies originating from different countries (e.g., UK, Italy, Greece, etc.). 16 of the studies had a higher female participant sample (>60% female), and only one study had a participant sample size <100.

Four of the studies were examining the impact of COVID-19 on mental health of the population (Arnout & Al-Sufyani, 2021; Chi et al., 2020; Koliouli & Canellopoulos, 2021; Zhao et al., 2021), two studies examined bereavement during this period (Carson et al., 2021; Chen & Tang, 2021), one study explored character strengths as correlates of PTG (Casali et

al., 2021), and another the emergence of PTG following a period of lockdown (Celdran et al., 2021).

Three of the studies aimed at understanding social support during COVID-19 (Dominick et al., 2021; Laslo-Roth et al., 2020; Northfield & Johnston, 2021), and one study explored family support (Luu, 2022) and leisure experiences (Liu et al., 2021).

Death concerns and participant wellbeing were explored in one study (Cox et al., 2021), whereas PTG in populations such as students and general populations were examined in four of the studies included (Feng et al., 2021; Huyun et al., 2021; Ikizer et al., 2021; Na et al., 2021).

With regards to psychological correlates of PTG, two studies explored rumination (Shigemoto, 2021, Zeng et al., 2021), whereas one study each explored the concepts of attribution of responsibility (Fu et al., 2021), consequences of COVID-19 towards growth (Kaloeti et al., 2021), meaning-making and religiosity (Prieto-Ursua & Jodar, 2020), existential anxiety (Tomaszek & Muchacka-Cymerman, 2020), positive core beliefs (Vazquez et al., 2021), and emotional creativity (Zhai et al., 2021).

The most commonly used measure to explore PTG was the validated Post-Traumatic Growth Inventory (Tedeschi & Calhoun, 1996), or an adapted version of the same (e.g., PTGI Short Form, PTGI-42 item). Overall, the PTGI was used in 22 of the studies, with three studies measuring PTG through the Stress-Related Growth scale (SRG), and one study using the Benefit-Finding questionnaire (BF). The PTGI (Tedeschi & Calhoun, 1996) is a 21-item questionnaire that measures the presence of psychological growth in five areas: Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation for Life. Meta-analytic research has indicated that the mean alpha reliability of this measure is excellent ($\alpha=.94$) (Lenz et al., 2020). The SRG is a 50-item scale that invites individuals to rate how they have changed as a result of a stressful event. It measures initial and current

stressfulness, perceived success in coping, controllability, reversibility of the event's outcome, and perceived growth from the event. It has been found to be a valid questionnaire for PTG ($\alpha=.95$) (Park et al., 1996). Finally, the BF scale is a 14-item scale that explores the reflection of beneficial effects of the traumatic event in the domains of close relationships, acceptance, adjustment, productivity, gratefulness, patience, and engagement in activities. Previously validated in exploring benefit-finding in women with cancer (Tomich & Helgeson, 2004), it achieved good reliability in the one study that used it in this review ($\alpha = .89$).

Quality Appraisal

The quality appraisal of the studies is shown in Table 2. The majority of the studies ($n=21$) achieved a “moderate” quality rating and 4 of the studies were of “high” quality. Only one study was found to have low quality. From the quality appraisal table (Table 2), it can be seen that the majority of the studies were assessed to have risk of bias with regard to their sample selection (Question 5: “was the sample taken from an appropriate population base so that it closely represented the target/reference population under investigation?” & Question 6: “was the selection process likely to select participants that were representative of the target/reference population under investigation?”). The majority of the studies used convenience and self-selected sampling methodology, and the study recruitment was taking place under rapidly changing COVID-19 restrictions world-wide, which likely affected the rigour and ability to have specificity with regard to participant recruitment.

Furthermore, a second common area of risk of bias was around inclusion criteria and definition of the target population (Questions 3 & 4). This can be explained by the fact that eligible studies involved general population adults, however these were often not clearly defined (e.g., demographics, language abilities, whether individuals with contributing factors such as chronic illness were excluded etc.). The majority of the studies (likely impacted by

COVID-19-related restrictions) collected data through online, self-administered surveys which also impacted on the quality and increased the risk of bias with regards to ensuring inclusion criteria were appropriately maintained. Nevertheless, most studies explored clear research aims and hypotheses, used validated measures to explore PTG and other outcomes relevant to their aims, and appropriate statistical analyses to test these.

Table 1.*Study Characteristics and Data Extraction Table*

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|--|-------------------------|-----------------|-----|-----------------------|--|--|--|-------------------|--------------------|--|--|--|
| Arnout, A. A., & Al-Sufyani, H. H. (2021). | Kingdom of Saudi Arabia | Cross-sectional | 365 | F= 68.2% M= 31.8% | r= 20-60 | Randomised whole population sample | Primary school (0.8%) Middle school (11%) University (71.8%) Master's (14.2%) PhD (2.2%) | PTGI ² | -- | Gender was a correlate of PTG, with Females indicating higher PTG than Males. 40–60-year-olds reported higher PTG. Marital status – higher PTG in divorcees and widowed participants. Income – Higher PTG in participants reporting lower income. | -- | Educational status. |
| Carson et al. (2021). | UK | Cross-sectional | 135 | F= 92.4% M= 21.26% | 123 participants r=45-64; 12 participants >65 | Self-selected (COVID-related bereaved individuals) | -- | PTGI | IES-R, CABLE | Coping Skills correlated with higher PTG (Hedge's g=0.88). Younger participants had higher PTG (Hedge's g=.50) | Lack of coping skills correlated with less PTG | Relatives content with funeral arrangements did not report higher PTG. |
| Casali et al. (2021). | Italy | Longitudinal | 254 | F=78.74% M=21.26% | M=36.05, r=19-75, SD=14.04 | Self-selected (snowball) | Primary school (1.18%) Secondary (35.4%) University (46.45%) Post-graduate (16.9%) | PTGI | VIA-IS-120, GHQ-12 | Character strengths predicted higher PTG ($\beta = .25$) "Humanity" as a virtue correlated to higher PTG ($\beta = .19$) | | No age or gender differences |

¹ Effect size reported only where available

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|------------------------|---------|-----------------|------|---------------------|-----------------------|--|---|-------------|---|--|--|--|
| Celdran et al. (2021). | Spain | Cross-sectional | 1009 | F=61.7% M=38.3% | r= 55-88 | Self-selected | Sample of senior university students | PTGI-SF | -- | Higher PTG correlated to female gender, younger age, experiencing meaningful conversations during lockdown and loneliness (both increase and decrease) (model $r^2=.116$). | -- | Having recovered from COVID-19. |
| Chen & Tang (2021). | China | Cross-sectional | 422 | F=44.5% M= 55.5% | M=32.74, SD=9.31 | Self-selected (COVID-related bereaved individuals) | Secondary school =5%, Senior school=15.6%, College=75.8%, Postgraduate=3.6% | PTGI | ICD-11, PLC-5 | Higher PTG was correlated to close relationship with the deceased and attribution of death to COVID-19 | PTG was lower when there were conflicted relationships with the deceased, younger age of deceased, attribution of death to pre-existing condition. | Gender, occupation, religion, education, marital status or gender of the deceased. |
| Chi et al. (2020). | China | Cross-sectional | 2038 | F=63% M=37% | M=20.56, SD=1.9 | Self-selected | University students | PTGI | Z-SAS, PHQ-9, PCL, ACE, AAS, CD-RISC, SES | Higher levels of PTG correlated with higher subjective SES ($\beta = .09$), knowing people who have been isolated ($\beta = .04$), lower number of confirmed cases in the area ($\beta = -.07$), fewer ACEs ($\beta = -.07$), lower levels of avoidant attachment ($\beta = -.20$), higher levels of resilience ($\beta = -.23$) (model D $r^2=.183$) | Higher number of area cases were indicative of lower PTG. | Age, gender, anxious attachment style. |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|---------------------|---------|-----------------|-----|----------------------|---------------------------|--|--------------------------------|-------------|---|---|---|--------------------------|
| Cox et al. | USA | Cross-sectional | 238 | -- | M=25.03, SD=8.68, r=17-71 | n=116 university students, n=122 Mturk workers | Not reported for Mturk workers | BF | I-PANAS-SF, PSS-4, CESD-10, SWLS, MLQ, Self-esteem Scale, GSF, LOT-R, CD-RISC | PTG was correlated to COVID death concerns (FOD=fear of death) ($\beta = .19$). | -- | -- |
| Dominick et al. | USA | Cross-sectional | 420 | F=80% M=20% | M=32.51, SD= 13.02 | Self-selected | -- | PTGI-X | LPAS, MSPSS, COPE, CBI | Higher PTG was correlated to knowing someone who died of COVID-19, increased social support ($\beta = 0.22$). Attachment to pets (but not ownership) was positively correlated to PTG ($\beta = 0.13$). | Participants reporting having had COVID or thinking they have had COVID resulted in lower PTG, as did disrupted core beliefs. | -- |
| Feng et al. (2021). | China | Cross-sectional | 581 | F=70.22% M=29.77% | r=16-81 | Convenience & Snowball | -- | PTGI | -- | Education levels (high school ($\beta = 1.02$) and university ($\beta = 0.75$)) were positive predictors of PTG, as was self-perceived good fitness ($\beta = 0.40$). | History of infectious disease in family ($\beta = -.55$), less knowledge about infectious disease ($\beta = -.72$), introvert ($\beta = -.78$)/"middle" ($\beta = -.74$) personality, not reading | -- |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|-----------------------|---------|-----------------|------|----------------------------------|-----------------------|-------------------------------------|--|-------------|---|--|---|--|
| Fu et al. (2021). | China | Cross-sectional | 2441 | F=47.6% M= 52.4% | r=25-50 | Convenience | Middle school=11% Highschool=14.99% Secondary school=18.56% Undergraduate=42.85% Postgraduate=12.54% | PTGI | PTSD Checklist , AoR Scale, SCSQ | Individual-prone attribution of responsibility was associated with higher PTG; both negative ($\beta = .098$) and positive ($\beta = 0.37$) coping related to higher PTG. | Attribution of Responsibility to the government was associated with lower PTG | -- |
| Hyun et al. (2021). | USA | Cross-sectional | 805 | F=84.8% M=11.3% Other=3.9% | M=24.8, SD=3.3 | Convenience sampling (young adults) | -- | PTGI-SF | CD-RISC-10, DTS, FCS, PHQ-8, GAD-7, PLC-C | PTSD symptoms ($\beta = .21$) and COVID-19 worry ($\beta = .18$) predicted higher levels of PTG; resilience ($\beta = .23$) and family connectedness ($\beta = .07$) positively correlated with PTG. | Participants from Asian ethnicity were less likely to report PTG ($\beta = -.15$). Depressive symptoms were negatively correlated to PTG ($\beta = -.14$). Distress tolerance significantly predicted lower PTG ($\beta = -.16$). | Age, gender, ethnicity, income levels, student status, anxiety symptoms. |
| Ikizer et al. (2021). | Turkey | Cross-sectional | 685 | F=63.6% M=34.6% Other=1.8% | M=34.62, SD=15.04 | Self-selected, snowball | Secondary school=.4% Highschool=30.2% | PTGI-42 | PSS PCL-5 ERRI | There was, positive relationship between PTS and PTG ($r = .30$). Higher PTG was associated with lower | -- | Age, gender, marital status, pandemic-related financial loss, social media use |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|---------------------------------|-----------|-----------------|-----|---------------------|---------------------------------|--------------------------------------|---|-------------|--|--|----------------------------|---|
| | | | | | | | Vocational school=3.1% University=38% Master's=16.2% PhD/Doctorate=12.1% | | | education ($\beta = -.10$), anticipation of financial risks due to pandemic ($\beta = .12$), and deliberate rumination ($\beta = .42$). | | for covid-related news, time spent at home, perceived health risks of covid-19, perceived stress level, intrusive rumination. |
| Kaloeti et al. (2021). | Indonesia | Cross-sectional | 119 | F=91.15% M=8.85% | M=19.94, r=18-70 | Non-probability convenience sampling | -- | SRG-15 | IES-R, FQCI | Active coping strategies ($\beta = .20$) and positive affirmation ($\beta = .47$) positively correlated to PTG. | -- | Gender was not found statistically significant as a moderator between PTS and PTG nor as a moderator between coping strategies and PTG. Covid-related trauma was not found to affect PTG. |
| Koliouli & Canelopoulos (2021). | Greece | Cross-sectional | 167 | F=69.5% M=30.5% | M=33.26, r=18-70, SD=10.6 | Self-selected | -- | PTGI | PSS, LOTR, IES | Perceived stress positively correlated to PTG; PTG was predicted by dispositional optimism ($\beta = .261$) and PTSD symptoms ($\beta = .317$) (avoidance behaviours specifically) | -- | -- |
| Laslo-Roth et al. (2020). | Israel | Cross-sectional | 275 | F=78.2% M=21.8% | M=33.42, SD=13.63 | Self-selected | -- | PTGI | Social Participation Scale, ASHS, MSPSS, ERQ | Positive correlations between PTG and cognitive reappraisal ($r = .32$), social participation ($r = .15$), hope (pathways agency $r = .29$, | -- | No gender or age difference. |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|--------------------|---------|-----------------|-----|------------------------------------|-------------------------------|-------------------------------------|---|-------------|---|---|----------------------------|---|
| | | | | | | | | | | pathways thinking $r = .26$, social support $r = .22$). Social participation predicted PTG directly ($B=0.19$) and indirectly through hope ($B=0.27$), social support ($B=.21$), and cognitive reappraisal ($B=.38$) (overall model variance 15.3%). | | |
| Liu et al. (2021). | USA | Cross-sectional | 470 | F=49.3% M= 49.5% Other= 1.3% | M=33, r=20-59, SD=5.2 | Convenience | Highschool = 3.2%, Some College = 15.2%, Technical Degree = 16.2%, associate degree = 20%, Bachelor's Degree = 34.5%, Graduate Degree = 10.9% | SRG-R | LNMS, LPI | PTG predictors: participation in social activities ($\beta = .10$), meeting leisure needs ($\beta = .42$), leisure satisfaction ($\beta = .17$), perception of COVID as a serious disease ($\beta = .21$), high income ($\beta = .18$), middle income ($\beta = .17$) (overall model $r^2 = .43$). | -- | Gender and age. |
| Luu, T. T. (2022). | Vietnam | Cross-sectional | 384 | F=57.6% M=42.04% | M=33.4, r=18-62, SD=7.1 | Self-selected, tourism workers only | -- | PTGI | Not named, but used scales for family support, ruminating thinking, positive stress mindset | PTG was correlated to: Younger age ($B=-.13$), gender (female)($B=.09$), event-exposure stress ($B=-.16$), family support ($B=.32$), Positive stress mindset ($B=.43$). | | Marital status, education, employee's organisational tenure, family size. |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|-------------------------------|---------|-----------------|------|--------------------|------------------------------|--------------------------------------|---|-------------|---|--|----------------------------|--------------------------|
| Na et al. (2021). | USA | Cross-sectional | 3078 | F=8.4% M=91.6% | M=63.3, SD=14.7 | Convenience – Military veterans only | College or higher education = 34.2% | PTGI-SF | PHQ-4, LEC-5, ACE, TIPI, DUREL, MOSSSS-5, CDRISC-10, LOT-R, GQ, CAEI-II | Sociodemographic characteristics associated with higher PTG: female gender, non-white ethnicity, agreeableness. Psychosocial characteristics; purpose in life (OR 1.04), religiosity, earlier PTG (relating to others OR= 1.10, new possibilities OR =1.09), pandemic-related worries (physical health OR= 1.22), mental/emotional health OR =1.16, social restriction stress (stress of changes in social contacts OR =1.30), financial difficulties (stability of living situation OR =1.30), PTSD symptoms (avoidance OR 1.24). | -- | Age |
| Northfield & Johnston (2021). | USA | Cross-sectional | 296 | F=58.8% M=41.2% | M=39.7, r=18-78, SD=16 | Convenience | Highschool = 24.3%, Undergraduate degree = 62.1%, Postgraduate studies = 7.6% | PTGI | IES-R MSPSS | Strong positive correlation between psychological distress and PTG (r=.54). More psychological growth was identified at higher levels of social support. Predictors of psychological growth included: lower age ($\beta = -.20$), perceived social support from | -- | Gender, education |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|--------------------------------------|---------|-----------------|------|--------------------------------|--|--|---|-------------|------------------------|---|--|---|
| | | | | | | | | | | family ($\beta = .14$), perceived social support from friends ($\beta = .23$) (overall model $r^2 = .18$). African American individuals had significantly higher levels of PTG than Caucasians. | | |
| Prieto-Ursua & Jodar (2020). | Spain | Cross-sectional | 1091 | F=69.4% M=30.6% | 19-29 years = 34.4%, 30-39 years = 22%, 40-49 years = 18.1%, 50-59 years = 22%, 60+ = 16.5% | Convenience | University education = 79.8% | CPTGI | PIL-10 | Higher PTG was correlated to older age ($\beta = 0.79$), female gender ($\beta = 4.68$), having goals and purposes in life ($\beta = 4.61$). Perceived Religiosity a predictor of PTG ($\beta = 1.38$), personal diagnosis of covid ($\beta = 1.81$), knowing people who have died of covid ($\beta = 3.85$). | | Having had loved ones in hospital or ICU, having loved ones who have died (not-covid), perceived spirituality, satisfaction, and sense of life. |
| Shigemoto, Y. (2021). | USA | Cross-sectional | 71 | F=46.5% M=53.5% | -- | Convenience | Some high school = 1.4%, Highschool = 8.5%, Some college = 28.2%, College degree = 43.7%, Graduate degree = 18.3% | PTGI-SF | ERRI | Deliberate rumination was positively associated with PTG, as was reported religiosity. | As time elapsed, there was a decrease in PTG. White/European Americans reported lower PTG. | Age, gender, educational level, intrusive rumination. |
| Tomaszek & Muchacka-Cymerman (2020). | Poland | Cross-sectional | 199 | F=84.9% M=15.1% n/a=7.5% | M=21.92, r=18-48, SD=4.70 | Convenience (university students only) | -- | PTGI | IES-R, SNE, SWLS | Life satisfaction was positively correlated to PTG (Pearson's $r = 0.23$), existential anxiety was a mediator for PTG ($\beta = .20$), PTSD had an indirect | PTG negatively correlated with anxiety of fate and death | Traumatic symptoms. |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|------------------------|---------|-----------------|------|----------------------------------|----------------------------------|--------------------------------------|--|-------------|--------------------------------------|---|--|--------------------------|
| | | | | | | | | | | effect on PTG ($\beta = 0.09$), and severity of trauma had a significant effect on PTG ($\beta = 0.84$) | (Person's $r = .37$) | |
| Vasquez et al. (2021). | Spain | Cross-sectional | 2122 | F=47.1% M=52.7% Other=0.2% | M=45.16, r=18-75, SD=12.78 | Purposeful | No education = 0.3%, primary education = 2.8%, High school = 31.19%, University graduate = 37.2%, University postgraduate = 12.9%, Vocational training = 15% | PTGI-SF | ITQ, SF-PaDS, IUS, DAI, PI, IWAH, OF | Primal beliefs (specifically, beliefs about living in a "good world") were directly associated with PTG ($\beta = .20$), as was identification with humanity ($\beta = .10$). There was a further positive association between PTS and PTG ($\beta = 0.19$). | -- | -- |
| Zeng et al. (2021). | China | Cross-sectional | 881 | F=64% M=36% | -- | Convenience-University students only | -- | PTGI | GSE, PRS, ERRI | PTG was positively correlated with deliberate rumination ($r = 0.353$), general self-efficacy was predictive towards PTG ($B = 0.895$). When participants had low deliberate rumination, self-efficacy had a significant positive relationship to PTG (effect = 0.867). | With high deliberate rumination, higher resilience had a negative effect on PTG (effect = 0.684) | -- |
| Zhai et al. (2021). | China | Cross-sectional | 439 | F=64.25% M=35.75% | M=29.96, r=18-51, SD=6.07 | Convenience | Not reported, but 54.21% college students | SRG-SF | ECI, RES, MSPSS, BSI, | Emotional creativity positively correlated with PTG ($r = 0.474$), and also found to be a mediator for PTG ($\beta = 0.256$) | -- | -- |

| Authors, (Year) | Country | Study Design | N | Gender (%) | Age (mean, range, SD) | Sampling | Education (%) | PTG measure | Other measures | PTG facilitators (effect size) ¹ | PTG barriers (effect size) | Non-significant findings |
|---------------------|---------|-----------------|-----------|----------------|-----------------------|-------------|----------------------------------|-------------|----------------|---|---|--------------------------|
| Zhao et al. (2021). | China | Cross-sectional | 2911 8 | F=32% M=68% | M=23.47, SD=7.26 | Convenience | 60.3% University education | PTGI | PCL-C | Males indicated significantly more PTG than females (Cohen's d = 0.33). Middle aged groups (40's-50's) had significantly more reported PTGI than the two youth groups (20 - 40 year olds). Participants in their 20's had higher PTG than participants >20 and in their 30's. | Post-graduate educated participants had lowest PTG, and University-educated participants had lower PTG than the next two low educated groups (junior high and high school). Junior high school participants also scored lower on PTGI than the high school group. | -- |

AAS = Adult Attachment Scale; AAQ-II= Acceptance and Action Questionnaire -II; ACE = Adverse Childhood Experiences Questionnaire; AoR = Attribution of Responsibility Scale; ASHS = Adult State Hope Scale; BF = Benefit Finding measure; BRS = Brief Resilience Scale; BSI = Brief Symptom Inventory; CABLE = Coping Assessment for Bereavement and Loss Experience; CAEI-II = Curiosity and Exploration Inventory – II; CBI = Core Beliefs Inventory; CBTS = City Birth Trauma Scale; CD-RISC =Connor-Davidson Resilience Scale; CDS= COVID-19 Disability scale; CESD-10 = Center for Epidemiologic Studies Depression scale; CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; CLS-H= Compassionate Love Scale for Humanity; COPE = Brief Coping Orientation to Problems Experienced Inventory; CPTGI = Community Post-Traumatic Growth Inventory; CSS = Covid Stress Scales; DAI = Death Anxiety Inventory; DTS = Distress Tolerance Scale; DUREL = Duke University Religion Index; ECI = Emotional Creativity Inventory; EPDS = Edinburgh Postnatal Depression Scale; ERRI = Event-Related Rumination Inventory; ERQ = Emotion Regulation Questionnaire; FCS = Family Connectedness Scale; FFMW = Five Facet Mindfulness Questionnaire; FQCI = Freiburg Questionnaire of Coping with Illness; GAD-2 = Generalized Anxiety Disorder Questionnaire -2; GAD-7 = Generalised Anxiety Disorder Scale -7; GHQ-12 = General Health Questionnaire- 12; GSE =General Self-efficacy scale; GQ-6 = Gratitude Questionnaire -6 ; HADS = Hospital Anxiety and Depression Scale; HHI = Herth Hope Index; ICD-11 = International ICD-11 Prolonged Grief Disorder Scale; IERQ = Interpersonal Emotional Regulation Questionnaire; IES-R = Impact of Events Scale – Revised; I-PANAS-SF = International Positive and Negative Affect Short-Form; IPQ-B = Brief Illness Perception Questionnaire; ITQ = International Trauma Questionnaire; IUS = Intolerance of Uncertainty Scale; IWAH = Identification with All Humanity Scale; LNMS = Leisure Need or Motives Scale; LOT-R = Revised Life Orientation Test; LPAS = Lexington Pet Attachment Scale; LPI = Leisure Participation Involvement; MCSD-SF = Marlowe-Crowne Social Desirability Scale Short Form; MLQ = Meaning in Life Questionnaire; MOSSSS-5 = Medical Outcomes Study Social Support Scale – 5; MSPSS = Multidimensional Scale of Perceived Social Support; OF = Openness to the Future Scale; PANAS = Positive and Negative Affect Schedule; PCIBS = Preventative Covid Infection Behaviours Scale; PCL = Abbreviated PTSD Checklist; PCL-5 = Post-traumatic Stress Disorder Checklist for DSM-5 ; PCL-C = PTSD Checklist- Civilian Version; PHQ-2 = Patient Health Questionnaire -2; PHQ-4 = Patient Health Questionnaire – 4; PHQ-8 = Patient Health Questionnaire – 8; PHQ-9 = Patient Health Questionnaire -9; PI = Primal World Beliefs Inventory; PIL-10 = Purpose in Life Test – 10 items; PRS = Psychological Resilience Scale; PS = Perceived Stress Scale; PSS-4 = Perceived Stress Scale -4; PSS-10 =Perceived Stress Scale; PTGI = Post-Traumatic Growth Inventory; PTGI-42 = Post-Traumatic Growth Inventory – 42 item; PTGI-SF = Post-traumatic Growth Inventory Short Form; PTGI-X = Post-traumatic Growth Inventory Expanded Version; PWB = Psychological Well-Being Scales; QGBEP-R = Psychological General Wellbeing Index; RES = Regulatory Emotional Self-Efficacy Scale; SCSQ = Simplified Coping Style Questionnaire; SF-PaDS = Short-Form Persecution and Deservedness Scale; SGW = Scales of General Wellbeing; SHAI = Short Health Anxiety Inventory; SNE = Existential

Anxiety and Fear Scale; SOC-13 = Sense of Coherence – 13 item; SRG-15 = Stress-Related Growth 15 item; SRG-R = Stress-Related Growth Scale – Revised; SRGS-SF = Stress Related Growth Scale – Short Form; STAI = Spielberger Trait Anxiety Inventory; STS = Secondary Traumatic Stress Scale; SWLS = Satisfaction with Life Scale; TIPI = Ten-Item Personality Inventory; TSC = Covid-19 Traumatic Stress; VIA-IS-120 = Values In Action Inventory of Strengths

Table 2.*Quality Appraisal³*

| Paper | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Total score & quality rating/11 |
|---|---|---|---|---|---|---|---|---|---|----|----|---------------------------------|
| 1. Arnout & Al-Sufyani (2021) | 1 | 0 | 1 | 1 | 1 | X | 1 | 1 | 1 | 1 | 0 | 8 - Moderate |
| 2. Carson et al. (2021) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 3. Casali et al. (2021) | 1 | 1 | 1 | 1 | X | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 4. Celdran et al. (2021) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 5. Chen & Tang (2021) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 6. Chi et al. (2020) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 - High |
| 7. Cox et al. (2021) | 1 | 1 | 0 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 8. Dominick et al. (2021) | 1 | 1 | X | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 9. Feng et al. (2021) | 1 | 1 | 1 | 1 | 1 | X | 1 | 1 | 1 | 1 | 0 | 9 - Moderate |
| 10. Fu et al. (2021) | 1 | 1 | 0 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 11. Hyun et al. (2021) | 1 | 0 | 0 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 6 - Moderate |
| 12. Ikizer et al. (2021) | 1 | 1 | 0 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 13. Kaloeti et al. (2021) | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 14. Koliouli & Canellopoulos (2021) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 15. Laslo-Roth et al. (2020) | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 6 - Moderate |
| 16. Liu et al (2021) | 0 | 1 | 0 | 0 | 0 | 0 | X | 1 | 1 | 1 | 1 | 5 - Low |
| 17. Luu, T. T. (2022) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 - High |
| 18. Na et al (2021) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 - High |
| 19. Northfield & Johnston (2021) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 20. Prieto-Ursua & Jodar (2020) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 9 - Moderate |
| 21. Shigemoto (2021) | 1 | 1 | 0 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 7 - Moderate |
| 22. Tomaszek & Muchacka-Cymerman (2020) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 8 - Moderate |
| 23. Vasquez et al. (2021) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11 - High |
| 24. Zeng et al. (2021) | 1 | 1 | 1 | 0 | X | X | 1 | 1 | 1 | 1 | 1 | 8 - Moderate |
| 25. Zhai et al. (2021) | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 8 - Moderate |
| 26. Zhao et al. (2021) | 1 | 0 | 1 | 1 | X | X | 1 | 1 | 1 | 1 | 1 | 8 - Moderate |

³ Green = Yes, Red = No, Orange = Cannot Tell. Summary of criteria questions: 1. Were the hypothesis/aims/objectives of the studies clear? 2. Was the method of obtaining the data clearly described? 3. Were criteria for inclusion in the sample clearly defined? 4. Was the target population clearly defined? 5. Was the sample taken from an appropriate population base so that it closely represented the target/reference population under investigation? 6. Was the selection process likely to select participants that were representative of the target population under investigation? 7. Were the outcome variables measured using validated and reliable means? 8. Was the independent variable measured using validated and reliable means? 9. Was appropriate statistical analysis used? 10. Were the methods sufficiently described to enable them to be repeated? 11. Did the study describe any limitations? (Appendix A)

Synthesis of results

The following synthesis presents the literature review results narratively. In order to examine and contrast the different findings from the selected studies, correlates of PTG will be grouped together in two main categories: demographic correlates, and psychosocial correlates of PTG. The psychosocial correlates will include the main factors identified, i.e., social, coping skills and resilience, mental health, attachment, personality, and COVID-19-specific correlates.

Demographic correlates of PTG.

Several of the studies explored demographic factors as potential correlates of PTG in the process of examining their research questions. Significant gender differences were identified in some, but not all, of the studies. Females were found to report significantly higher levels of PTG in five of the studies explored (Arnout & Al-Sufyani, 2021; Celdran et al., 2021; Luu, T. T., 2022; Na et al., 2021; Prieto-Ursua & Jodar, 2020). Males were only found to report significantly higher PTG in one study (Zhao et al., 2021), whereas in all the remaining studies which statistically evaluated gender (n= 9) no significant differences were identified. Therefore, the evidence for gender as a correlate of PTG remains unclear, with female participants showing a more significant improvement than males in several studies.

Age was also examined as a correlate of PTG in several of the studies; however, it was found to be non-significant in the majority of those (n=8). However, two of these studies involved young adults and university student samples, thus exploring a much narrower age-range population sample. Three of the remaining studies identified that younger participants reported significantly higher PTG (Celdran et al., 2021; Liu et al., 2021; Northfield & Johnston, 2021). However, Celdran et al.'s (2021) study involved a participant sample older than 55 years of age which may have inflated the PTG estimates. Only one study identified younger age as a negative correlate for PTG (Chen & Tang, 2021). Finally, two studies

identified a “middle age” group as reporting significantly higher PTG (Arnout & Al-Sufyani, 2021; Zhao et al., 2021), and only a single study reported significantly higher PTG for older adults (Prieto-Ursua & Jodar, 2020). The restricted and inconsistent age ranges used in the research samples therefore limit the possible interpretations about the impact of age in the reporting of PTG in the population during this period.

Education was a non-significant correlate of PTG in four of the studies that examined this factor, whereas three studies identified significant differences in PTG in relation to this factor. In one study, lower education was found to be correlated with higher PTG (Ikizer et al., 2021), whereas in Feng et al. (2021), high school and university-educated participants reported significantly higher PTG. Moreover, in Zhao et al.’s (2021) study, post-graduate educated participants reported the lowest PTG of all educational groups, and university educated participants reported lower PTG than the junior high school and high school groups. Therefore, education status was also not considered as a significant overall correlate of PTG in the population during the COVID-19 period.

Similarly, examinations of economic and financial factors yielded different outcomes in a number of the studies and were thus not considered to be overall correlates of PTG in this review. Lower income and financial difficulties were found to be significantly positively correlated with PTG in three studies (Arnout & Al-Sufyani, 2021; Na et al., 2021; Ikizer et al., 2021), whereas two studies identified middle- and high-income status as positively correlated with PTG (Chi et al., 2020; Liu et al., 2021). However, only one study found no significant difference in income levels in relation to PTG (Hyun et al., 2021). Pandemic-related financial loss, type of occupation, and organizational tenure were non-significant factors in the studies that explored them (Ikizer et al., 2021; Chen & Tang, 2021; Luu, T. T. 2022).

Further demographic factors were examined in studies in relation to particular hypotheses. Ethnicity was identified as a significant correlate in three studies, with non-white and African American populations reporting higher PTG (Na et al., 2021; Northfield & Johnston, 2021), and participants of Asian and White (American) ethnicity reporting significantly lower PTG (Shigemoto, 2021). However, in a further study exploring differences between ethnic groups, this was found to be non-significant (Hyun et al., 2021). Marital status was reported non-significant in three studies (Chen & Tang, 2021; Ikizer et al., 2021; Luu, 2022), however one study (Arnout & Al-Sufyani, 2021) identified significant positive correlation between PTG and being divorced or widowed. Knowing someone who passed away due to COVID-19 was identified as a further positive correlate to PTG in two of the studies (Dominick et al., 2021; Prieto-Ursua & Jodar, 2020). On the other hand, having had loved ones in the hospital/ICU or experiencing bereavement during this period for reasons other than COVID-19 were both found to be non-significant (Prieto-Ursua & Jodar, 2020). Finally, participants having recovered from COVID-19 reported higher PTG in one study (Prieto-Ursua & Jodar, 2020), but this was not reported as significant in another study that explored this factor (Celdran et al., 2021). As all those factors were only examined in the minority of the studies and there was not strong evidence for them, they were not considered as consistent correlates of PTG. However, it should also be noted that ethnic differences may have been harder to identify as most studies used a predominantly homogenous sample (either white participants, or majority ethnicity participants in studies taking place in China). Similarly, there was a tendency in the studies for majority female participants, which should be taken into account when considering both findings and non-findings of gender differences in the results.

Psychosocial correlates of PTG.

Social Correlates. Social support, loneliness, participation, and inclusion were factors that were explored in five of the included studies, as researchers considered that during this unprecedented period of the pandemic, national lockdowns and social limitation were common measures taken by governments to limit the impact and spread of COVID-19. Social support was positively correlated to higher levels of reported PTG in only four studies (Dominick et al., 2021; Laslo-Roth et al., 2020; Luu, 2022; Northfield & Johnston, 2021). Moreover, social participation was also positively correlated to higher levels of PTG in two studies (Laslo-Roth et al., 2020; Liu et al., 2021). Being able to meet leisure needs and maintaining leisure satisfaction during the pandemic (Liu et al., 2021), having meaningful conversations during lockdowns (Celdran et al., 2021), reporting higher levels of family connectedness (Hyun et al., 2021), knowing people who have had to isolate (Chi et al., 2020), were also all positively related to higher reported PTG. Interestingly, in Celdran et al. (2021), both an increase and a decrease in loneliness were associated with higher reported PTG, whereas Na et al. (2021) identified that experiencing higher levels of stress from social restrictions also led to increased PTG. On the other hand, family size (Luu, 2022), time spent at home (Ikizer et al., 2021), use of social media to stay informed for pandemic-related news (Ikizer et al., 2021), and being content with funeral arrangements when losing a loved one during the pandemic (Carson et al., 2021), were all found to be non-significant factors in the experience of PTG. As these factors were only explored in a minority of studies, there can be no strong conclusions concerning the relationship with social support. However, as social support was identified as a consistent positive correlate in the majority of the studies that did explore this construct, there is evidence for the relationship, but the evidence base is small.

Coping skills and resilience. Coping and resilience were examined as correlates of PTG in a number of the eligible studies, but it was commonly examined as a secondary

research question rather than the main research aim (e.g., Fu et al., 2021). Similar to social support, it was hypothesized that the pandemic period would pose novel challenges to a large portion of the population, for example through sudden bereavement during lockdown leading to complicated grief (Carson et al., 2021). Individuals' ability to cope with the difficulties associated with bereavement during the pandemic was related to higher reported PTG in Carson et al.'s study (2021), where a lack of coping skills was also identified as a negative correlate of PTG. Moreover, Fu et al. (2021) identified that both positive (problem-focused cognitive and behavioural strategies) and negative (negative cognitions and emotion-focused activities) coping strategies were related to higher PTG. However, Kaloeti et al. (2021), proposed a relationship specifically between active coping and PTG, as well as positive affirmation. A final coping resource identified as related to higher PTG was emotional regulation through cognitive reappraisal strategies (Laslo-Roth et al., 2020). Higher levels of resilience were associated with increased PTG in both studies that explored this construct (Chi et al., 2020; Hyun et al., 2021), whereas a single study proposed a relationship between higher reported self-efficacy and higher PTG (Zeng et al., 2021). However, higher levels of distress tolerance (defined as the acceptance of aversive experiences) were negatively correlated to PTG (Hyun et al., 2021). In conclusion, even though there was heterogeneity in the studies in terms of how coping skills were defined and measured, there was clear evidence that coping skills as a whole construct can be an important correlate in the development of PTG.

Mental health correlates. Post-Traumatic Stress Disorder (PTSD) and related mental health symptoms such as Post-Traumatic Stress were examined in five studies, both to explore the mental health and wellbeing of populations, but also to identify links between significant distress and PTG during this period. In two studies, PTSD symptoms were positively correlated with higher reported PTG (Hyun et al., 2021; Tomaszek & Muchacka-

Cymerman, 2020), whereas two further studies found a positive relationship between PTSD avoidance behaviours and PTG (Koliouli & Canellopoulos, 2021; Na et al, 2021). Post-traumatic stress symptoms were additionally correlated with PTG in two studies (Ikizer et al., 2021; Vazquez et al., 2021), both indicating a positive relationship. On the other hand, Hyun et al. (2021) proposed that the experience of depressive symptoms during the pandemic had a negative effect on reported PTG, however since this was only examined in one study so there is limited evidence for the association with depressive symptoms and PTG.

Rumination was also examined in relation to PTG during the pandemic. A positive relationship was supported between deliberate rumination and PTG (Ikizer et al., 2021; Shigemoto, 2021; Zeng et al., 2021), however, the experiences of intrusive rumination were not significant (Ikizer et al., 2021; Shigemoto, 2021). Moreover, Zeng et al. (2021) reported that in individuals with higher levels of deliberate rumination, higher resilience led to lower reported PTG. Perceived stress levels were a significant positive correlate of PTG in one study (Koliouli & Canellopoulos, 2021), but not significant in two others (Ikizer et al., 2021, Hyun et al., 2021). In contrast, other studies found significant positive relationships between PTG and event-exposure stress and positive stress mindset (Luu, T. T., 2022), higher reported psychological distress during the pandemic (Northfield & Johnston, 2021), and better reported mental health (Na et al., 2021). However, specific anxiety around fate and death was identified as a negative correlate for PTG in one study (Tomaszek, K., & Muchacka-Cymerman, A., 2020). Finally, when exploring prior trauma, fewer adverse childhood events (ACEs) were correlated with higher reported PTG (Chi et al., 2020), and higher severity of prior trauma was positively related to PTG (Tomaszek & Muchacka-Cymerman, 2020). Nevertheless, COVID-related trauma specifically was not identified as a significant factor (Kaloeti et al., 2021).

Attachment Correlates of PTG. The concept of attachment was examined in two of the studies, however one of these investigated attachment specifically to pets during the pandemic (Dominick et al., 2021). In this study, they identified that attachment to a pet (but not necessarily pet-ownership), was significantly positively correlated with increased reported PTG during this period. The second study that explored attachment (Chi et al., 2020) identified a significant relationship between lower reported avoidant attachment patterns and higher PTG, with further non-significant associations between anxious attachment and PTG. Furthermore, in a study examining bereavement during the COVID-19 pandemic, having a conflicted relationship between bereaved participants and the deceased loved one, as well as the attribution of their death to pre-existing conditions (non-COVID-19-related bereavement), led to lower reported PTG (Chen & Tang, 2021). The studies examining attachment correlates were few and significantly heterogenous, not exploring a well-defined construct of “attachment”; therefore, no conclusions were drawn for this correlate.

Personality correlates of PTG. Various personality characteristics were identified as correlates of PTG in the studies. “Character strengths” (i.e., wisdom and knowledge, courage, humanity, justice, temperance, and transcendence) were positively correlated with higher levels of PTG (Casali et al., 2021). “Identifying with Humanity” was further positively related to PTG in Vazquez et al. (2021). Reporting “purpose in life” was positively related to PTG in two studies (Na et al., 2021; Prieto-Ursua & Jodar, 2020), however “life satisfaction” was positively related to PTG in one study only (Tomaszek & Muchacka-Cymerman, 2020), and non-significant in another (Prieto-Ursua & Jodar, 2020). Hope (Laslo-Roth et al., 2020), dispositional optimism (Koliouli & Canellopoulos, 2021), agreeableness (Na et al., 2021), individual-prone distribution of responsibility (Fu et al., 2021), and beliefs about living in a “good world” (Vazquez et al., 2021), were also all identified as having significant positive correlations with reported PTG.

On the other hand, attribution of responsibility to the government (external attribution) was found as a factor for lower PTG (Fu et al., 2021), whereas participants with introversive and “middle” type personalities (non-extroverts) were found significantly less likely to report PTG during this period (Feng et al., 2021). Finally, religiosity was found positively correlated to PTG in two studies (Na et al., 2021; Prieto-Ursua & Jodar, 2020), but non-significant in a third study (Chen & Tang, 2021), and spirituality was identified as a positive correlate in the study by Prieto-Ursua & Jodar (2020).

COVID-Specific correlates of PTG. Finally, a number of studies examined the impact of the COVID-19 pandemic health perceptions as facilitators or barriers for PTG. Specifically, COVID-19-related worries and fear of death were found to significantly increase reported PTG in three of the studies (Cox et al., 2021; Hyun et al., 2021; Na et al., 2021). However, having become ill with COVID-19 or believing so (non-confirmed caseness) was reported to negatively impact PTG (Dominick et al., 2021). Self-perceived good fitness of health was also identified as a facilitator of PTG in one study (Feng et al., 2021), however, a similar concept (perceived health risks from COVID-19), was found non-significant in another (Ikizet et al., 2021). In addition, a higher number of area cases where participants lived was negatively correlated with PTG (Chi et al., 2020). Finally, Feng et al. (2021) reported that higher previous instances of infectious disease in the family and less reported personal knowledge on infectious diseases both were negative correlates of PTG during this period. Similarly to attachment correlates, both personality and COVID-specific correlates of PTG were all explored in very small and heterogenous studies; therefore it is unclear whether these are consistent correlates of PTG.

Discussion

The current systematic review aimed to identify and synthesize research investigating the correlates (facilitators and barriers) of PTG in the general adult population during the COVID-19 pandemic. With respect to the demographic background of the study participants, there was not a clear indication whether specific demographic characteristics were consistently identified as stronger in their relationship with PTG. However, psychosocial factors, such as social support, coping skills, and PTSD symptoms were consistently identified as positive correlates in the reported experience of PTG.

Even though females reported higher PTG in five studies, there were no gender differences in nine other studies, with one further study indicating that males reported higher PTG during this period. Even though this finding is consistent with previous research on PTG (e.g., Henson et al., 2021; Xiaoli et al., 2019), it should be noted that in the majority of studies participants were female, and one study with a majority male sample (Zhao et al., 2021), identified higher PTG in males. Similarly, age, education, economic and educational status, where examined, indicated varied and inconsistent evidence.

On the other hand, social factors were more consistently correlated with higher reported PTG. Social support and participation, leisure needs, meaningful conversations and family connectedness were all positive correlates of PTG. It can be hypothesised that, due to government responses to the pandemic (e.g., national lockdowns, mandated limited social interaction), individuals who were able to meet and feel satisfaction from social support and social needs may have been more likely to experience growth in the context of this pandemic. This hypothesis is supported by findings that suggest that social distancing and isolation were perceived by the adult public as traumatic events (Koliouli & Canellopoulos, 2021). Moreover, this finding is in agreement with Calhoun and Tedeschi's (2013) hypothesis that social support promotes higher levels of PTG through the supportive disclosure and

evaluation of internal cognitive processes (cited in Henson, 2021). Interestingly, both increased and decreased reported “loneliness” were identified as facilitators of PTG. It could be hypothesised that some participants who experienced significant loneliness were able to transform this into an experience facilitating growth, while other participants who were able to increase their meaningful social connections also identified growth during this period. Similar to social support, coping skills were also consistently correlated with increased reported PTG by the participants during this period. Specifically, both problem-focused and behavioural strategies as well as negative coping were positively related to PTG. Cognitive reappraisal as a means to achieve emotional regulation, self-efficacy, and resilience were similarly positively related to increased PTG.

PTSD symptoms and PTS were also identified as having positive relationships to PTG, as was the experience of deliberate rumination. A number of personality correlates were explored and reported as significant in the emerge of PTG, however most of those were only evaluated in a few studies, using different scales and personality trait classifications, and therefore were not considered as sufficiently evidenced for this review. With regards to barriers for PTG, the studies where negative correlates emerged were significantly fewer and heterogenous, therefore it was not possible to evaluate and draw conclusions around these.

Strengths and Limitations

The above review should be considered in light of a number of strengths and limitations. The majority of the studies involved self-selected and convenience sampling, with statistical analyses involving mainly correlational outcomes resulting in a weaker methodological quality and generalisability of the results. Moreover, the participant sample was overwhelmingly female; Carson et al. (2021) noted in their research that women are more likely to complete online surveys than men, which may explain the skewness of the sample. In addition, due to practical constraints, only a percentage of the selected studies

were assessed for quality by a second researcher, and available grey literature was not included in the review.

However, this review included studies that were conducted in many different countries, including significant research from non-Western countries (China, Vietnam, Indonesia, Kingdom of Saudi Arabia), which can be protective against “Western” bias in the overall review. Even though most studies did not include a power analysis in their methodology, only one study had a sample size < 100 participants, indicating that the studies likely had sufficient power in their results. Finally, a meta-analysis was not considered for this review paper; this is due to the diversity of the selected papers, with most examining different main correlates of PTG, and the majority of the studies indicating a moderate risk of bias in their quality assessment.

Clinical Implications

This early evidence summarised in this review can facilitate in both clinical and policy decision-making either in the context of this (currently) ongoing pandemic, and for future outbreaks of similar global circumstances in order to maintain and promote the well-being of populations. Social access and satisfaction have been identified as a significant predictor of PTG in several of the referenced studies and it should be an important consideration when balancing conflicting demands (e.g., needs for national lockdowns). The evidence presented supports that effort should be made to ensure that population social support needs are maintained throughout such circumstances in the future, for example through outreach initiatives, and promoting the development of local community links.

Moreover, active coping skills have been identified as a positive correlate of PTG during this period. Clinicians who are working with adults who are experiencing psychological distress involving the pandemic should focus on fostering and developing such skills with clients. Practitioners who engage with adults who are experiencing PTSD (either

diagnosed or PTSD symptomatology), should remain aware of the possible growth that can be developed as an outcome of the distressing experience and support clients in their reflections of growth throughout this traumatic event, and consider aspects of PTG in the collaborative exploration of protective factors with clients. Similarly, psychological interventions focusing on minimising intrusive rumination, promoting deliberate rumination and cognitive reappraisal should be considered in populations during this time.

Future Directions

Future research should continue to examine PTG in the population, in order to understand how to support communities and populations in making sense of traumatic events. Secondly, it will be interesting to explore how reported growth may change (in any direction) with the progression of time, and whether reported growth is maintained following the end of the pandemic globally to indicate a sustained effect. Potential repeated research exploring the same or similar populations as measured in studies reviewed in this review can facilitate this process of understanding PTG and increase reflections and understanding around the long-term impact of this period. Systematically reviewing different populations (e.g., children and adolescents, healthcare workers) and their experience of PTG during this period can also be helpful in understanding the wider impact of the pandemic.

Finally, it is proposed that, with global ease of relevant restrictions, future studies examining PTG in the population post-COVID-19 pandemic can focus on methodological improvements, for example through more rigorous approaches to recruitment of participants and sampling methodology.

Conclusion

This systematic literature review evaluated and summarised current findings on reported PTG in the adult population during the COVID-19 pandemic. Social support and participation were significant positive correlates of PTG, alongside coping strategies such as

deliberate rumination and cognitive reappraisal. From the findings of this review, a number of recommendations for clinical practice and suggestions for future research have been suggested.

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Appendix A. Quality Appraisal Questions (adapted from Appraisal tool for Cross-Sectional Studies, AXIS).

Question 1. Were the hypothesis/aims/objectives of the study clear?

Question 2. Was the method of obtaining the data clearly described?

Question 3. Were criteria for inclusion in the sample clearly defined?

Question 4. Was the target population clearly defined?

Question 5. Was the sample taken from an appropriate population base so that it closely represented the target/reference population under investigation?

Question 6. Was the selection process likely to select participants that were representative of the target/reference population under investigation?

Question 7. Were the outcome variables measured using validated and reliable means?

Question 8. Was the independent variable measured using validated and reliable means?

Question 9. Was appropriate statistical analysis used?

Question 10. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?

Question 11. Did the study describe any limitations?

Score: 0 = No, 1 = Yes, X = Don't know, can't determine.

Quality Score:

0 – 5 Low

6 – 9 Moderate

10 – 11 High

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Part 2: Empirical Study Report

Understanding Psychological Growth, Perceived Social Support, and Coping Skills in People with Asthma following/during the COVID-19 Global Health Crisis.

Abstract

Objective: People with asthma were classified as “extremely clinically vulnerable” by the UK government during the initial stages of the COVID-19 pandemic. This study investigated the role of severe and mild/moderate asthma in the reporting of post-traumatic growth (PTG), alongside differences in coping, social support, and their relationship with previous traumatic life experiences.

Methods: A sample of 113 people with asthma were recruited through convenience sampling and completed an online survey including validated and reliable measures used to assess their asthma severity, reported PTG, coping efficacy, social support, psychological thriving, and earlier adverse life experiences.

Results: Participants with mild/moderate asthma reported higher coping efficacy compared to people with severe asthma ($t(111) = -5.567, p < .05$). Younger age and higher self-reported asthma severity were both associated with higher psychological growth ($t = -2.725, p < 0.05$; $t = -2.325, p < 0.05$). The relationship between earlier adverse experiences and PTG was not significant, however prior adverse life experiences were negatively correlated with coping efficacy ($b = -.4121, s.e. = .1081, p < .05$).

Conclusions: This is the first research exploring PTG as a potential outcome of the COVID-19 pandemic in people with asthma. Even though previous research has identified that social support is a significant correlate of PTG, in this research the impact of social support as a mediator of PTG was found to be non-significant. Therefore, results of this research are somewhat consistent with pre-existing literature on PTG, with some demographic correlates (female gender, younger age) identified as significant correlates of PTG.

Practitioner Points:

- PTG did not differ as a function of asthma severity as measured by the Asthma Control Test (ACT) questionnaire.
- Participants who self-disclosed higher medication intake and compliance reported higher PTG; however, the reliability of the self-disclosure question means that this should be interpreted with caution.
- People with mild/moderate asthma reported higher coping efficacy in relation to participants with severe asthma.
- Younger age was associated with higher PTG.
- A significant negative relationship was identified between adverse earlier life experiences and coping efficacy.

Keywords: psychological growth; posttraumatic growth; coping; asthma; COVID-19

Introduction

The emergence of COVID-19 and its impact on the mental health of the population and people who have asthma

In December 2019, a new type of Coronavirus (COVID-19) was identified and subsequently spread globally. COVID-19 is a respiratory physical illness that reached global pandemic levels causing governments across the world to make rapid and unprecedented policy responses inclusive of workplace and school closures, cancellation of events, stay-at-home restrictions, and international and domestic travel bans (Ritchie et al., 2020). The associated stressors of this pandemic were thought likely to have serious mental health consequences for the population (Silver, 2020), with mental health risks identified early in the period of the pandemic inclusive of increased prevalence of depression, post-traumatic stress disorder (PTSD), and suicide in the general adult population (Xiong et al., 2020). A recent meta-analysis exploring the prevalence of PTSD in the general population during the pandemic reported that there was a 17.34% prevalence of PTSD symptomatology in populations that were not health professionals and not directly exposed to COVID-19 and was described as an “unprecedented threat to mental health” (Yunitiri et al., 2022).

COVID-19 is a respiratory illness which was rapidly understood likely to have a greater impact and pose a bigger risk on the physical health of vulnerable populations, including people with underlying medical problems such as lung conditions, heart conditions, kidney disease and liver conditions among others (NHS England, 2020). In addition to the general population, the impact of this physical threat on the mental health of medically vulnerable groups has been under exploration throughout the period of this pandemic. A study exploring African American cancer survivors identified that 99% of the participant sample reported changes in their daily activities in response to the risk of infection, with more than 40% reporting symptoms of anxiety, depression, and/or isolation (Beebe-Dimmer

et al., 2022). A further time-series study in Denmark indicated that participants with chronic illness reported poorer quality of life and increased worries in comparison to those without an illness during the initial 16 months of the pandemic (Pedersen et al., 2022).

Preliminary hospital death data between the period of 1st February 2020 and 25th April 2020 identified severe asthma as one of the correlates of higher risk of death from COVID-19 (Williamson et al., 2020). In addition, people impacted by severe asthma were classified as “extremely clinically vulnerable” and were included in the UK shielding guidance until 1st August 2020 (Public Health England, 2020). This likely impacted a large proportion of the population: in the UK, 1 in 12 adults are currently receiving asthma treatment, and a life-threatening asthma attack takes place every ten seconds daily, regardless of COVID-19 (Asthma UK, 2022).

As the COVID-19 pandemic became better understood, the immediate vulnerability of people with asthma was reconsidered. However, the initial guidance for people with asthma during this time was reported to have had a negative impact on the mental health of people with asthma who were under the understanding that COVID-19 was likely lethal for their health group (Hashim & Ramadhan, 2021). In consequence, research during the pandemic period indicated that mean depression and anxiety scores were significantly higher among people who had asthma (e.g., Tasnim et al., 2021; Sayeed et al., 2020).

Protective factors and the mechanism of Post-traumatic Growth

In recognition of pandemic-related trauma and the mental health challenges during this period, initiatives promoting mental well-being and resilience were developed for the population such as the “psychological first aid for COVID-19” training developed by NHS England (2021). As this has been an unprecedented and traumatic period for significant portions of the population, it may have therefore be thought to have resulted in Post-Traumatic Growth (PTG).

The exploration of Post-Traumatic Growth (PTG) as a psychological process was conceptualised following repeated observations of reported benefit emerging in individuals exposed to traumatic events (Tedeschi & Calhoun, 1996). PTG refers to the concept of personal development following adversity, exceeding pre-adversity levels of functioning as an outcome (Carver, 1998). Carver (1998) proposed that PTG differs from resilience, a “distinct and separate” outcome of adversity, referring to the individual’s return to unchanged pre-adversity levels of functioning. In addition to PTG and resilience, two other potential outcomes of adversity suggested are detrimental “succumbing”, where the individual’s wellness trajectory is a continued downwards slide to negative outcomes and less impactful levels of “impairment”, where the individual, even though they survive, they are impaired to some extent (Carver, 1998).

PTG is a phenomenon that can be experienced in people who face a “wide variety of traumatic circumstances” and who experience important and profound changes, beyond a return to their pre-adversity “baseline” (Tedeschi & Calhoun, 2004). These traumatic circumstances are often considered as “seismic” events, which challenge prior schematic structures that were guiding established concepts of understanding, decision making, and “meaning-making” within the individual as they navigate their new reality (Tedeschi & Calhoun, 2004). Among others, the experience of PTG has been explored in the context of individuals living with serious medical conditions (e.g., Barskova & Oesterreich, 2009) and individuals exposed to disease outbreaks, for example following the SARS outbreak in Hong-Kong (Mak et al., 2009). Finally, the construct of “thriving”, considered synonymous with PTG in some previous research, has more recently been examined as a separate dimension. It is now proposed to represent personal expectations of future PTG as an individual navigates ongoing challenges, such as chronic illness (Sirois & Hirsch, 2013).

Moreover, qualitative research has indicated that experiences with significant previous life events and facing hardship help people make meaning and cope with diagnosis of a health condition (Moye et al., 2020). Barskova & Oesterreich's (2009) systematic review also indicated that minority group members may face routine stressors and disadvantages as previous life experiences which may enhance their ability to grow following illness-related hardship. This review identified two further correlates of psychological growth: younger age and gender, with females found to experience higher PTG (Barskova & Oesterreich, 2009). The benefits of psychological growth include an increased appreciation for life in general, shifting life priorities, more intimate and meaningful personal relationships, a sense of increased personal strength, and spiritual and existential growth (Tedeschi & Calhoun, 2004).

Post-traumatic Growth during COVID

In addition to the exploration of psychological distress experienced by both the general population and the population considered physically vulnerable during the pandemic, emerging research has also been aiming to establish whether this period has been a catalyst for PTG, and which factors (internal or external) are related to positive personal outcomes during this period in parts of the population (e.g., Laslo-Roth et al., 2020; Na et al., 2021). Identifying either presence of development or lack of psychological growth has been understood to be meaningful in the planning of immediate, and the anticipating of future population needs in terms of psychological input and development of services that are better positioned to meet such needs. In agreement with prior research on PTG, research during this pandemic has identified facilitators of PTG in the general population inclusive of social support and coping skills, which have consistently been positively correlated with PTG during this period (e.g., Dominick et al., 2021; Kaloeti et al., 2021; Laslo-Roth et al., 2020; Luu, T. T., 2022; Northfield & Johnston, 2021). On the other hand, the relationship between traumatic previous life experiences and PTG during the pandemic has been less researched,

however studies identified that fewer adverse childhood events were associated with higher PTG (Chi et al., 2020), and higher severity of prior trauma was similarly positively correlated with PTG (Tomaszek & Muchacka-Cymerman, 2020).

In clinical practice, psychological practitioners are likely to engage with people who have asthma and may want to identify protective factors for this population. People with asthma have previously been identified as having a higher prevalence of anxiety and depression in comparison to the general population (Kew et al., 2016), therefore clinical contact with this population could be either a direct or indirect consequence of the COVID-19 pandemic. Evidence that demonstrates that PTG may be reported during this period can provide clinical practitioners with a balanced understanding of the client experience. Moreover, understanding how factors such as social support, prior thriving, coping efficacy, and previous traumatic life experiences may interact with the development of PTG, can inform clinical practice and give direction to clinicians on how to support this population.

Aims of current study

This quantitative research study investigates the following questions related to psychological growth in people with asthma during the period of the COVID-19 pandemic:

1. What is the difference in psychological growth between those with mild/moderate and severe Asthma self-report following the emergence of the COVID-19 pandemic?
2. How are prior adverse life experiences, thriving, effective coping skills, and social support associated with psychological growth during the COVID-19 pandemic?
3. Are there differences in coping, social support, psychological growth, thriving, and previous life experiences between those with mild/moderate and severe asthma?

In order to achieve these aims, the following hypotheses will be tested:

1. There will be significant differences in coping, social support, thriving, adverse life experiences, and PTG, when comparing people with mild/moderate and severe asthma.
2. Coping skills, social support, thriving, and adverse life experiences will significantly predict higher PTG in people with asthma when adjusting for demographic factors.
3. The association between adverse life experiences and PTG will be mediated by higher levels of coping efficacy and social support.

Method

Design

This cross-sectional study involved the completion of an online questionnaire using convenience and snowball sampling. Participants were recruited through advertisements in targeted asthma and COVID-19-related forums, social media, and through the newsletter of the British Lung Foundation. The main dependent variable measured was PTG, as a function of several independent variables as per the hypotheses: asthma severity, coping efficacy, previous adverse life experiences, thriving, asthma medication compliance, and social support.

Participants and Procedure

A total of 113 people with asthma were recruited (35 males, 78 females), with a mean age of 40.4 years old ($SD = 15.63$) via a targeted advertisement. Participants were offered an incentive in the form of an opt-in prize draw for one of two £25 amazon vouchers. The study advertisement is available in the Appendix (Appendix A).

Through the study advertisement, participants could follow an online link which connected them to the University of Sheffield Qualtrics platform where the study was hosted. After following this link, potential participants would see the study information sheet which provided study information, ethical approval, and the researchers' contact details (Appendix

B). Participation to this research was voluntary and open to adults (aged 18 and over) who self-reported having a diagnosis of asthma (more detail below) and provided consent to participate in this study. The consent form for this study is available in the Appendix (Appendix C). Participants who did not self-identify as having asthma, or who did not agree to electronically sign the consent form were excluded from the study.

Individuals who consented to participate in the study were presented with a questionnaire which included all the study measures (described below). To minimise the risk of “order effects”, the survey was programmed to present to the participants the outcome questionnaires in a randomised order. In order to ensure that there would not be any missing responses, the survey was coded so that participants could not skip questions. At the end of the survey, participants were given the option to opt-in for the incentive prize draw, at which point they were redirected to a separate, de-coupled, questionnaire in order to maintain their confidentiality. Participants were able to withdraw from the study up until they submitted their answers by simply closing their internet browser. At the end of the survey, there was a debriefing page signposting participants to further information and relevant support (Appendix D). The data collection period for this study was between March and October 2021.

Measures

Demographic information. The following demographic information was completed by the participants at the beginning of the survey: age, gender, ethnicity, country of residence, whether they had a long-term chronic condition other than asthma, whether their asthma was treated with high dose corticosteroids and a second controller medication to prevent it from becoming “uncontrolled” (medication compliance and management), self-rating of overall health, and whether they know someone who has been infected with COVID-19.

Moreover, the following validated questionnaires were included, using George and Mallery's (2003) criteria to examine their internal consistency. As per George and Mallery (2003), alpha values $> .90$ indicate excellent consistency, whereas good internal consistency is indicated between values of $.80-.90$. Alpha values between $.70-.80$ are acceptable, $.60-.70$ are questionable, $.50-.60$ are poor, whereas alpha values $< .50$ are unacceptable (George & Mallery, 2003).

Post-traumatic growth inventory. The Post-Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) is a 21-item questionnaire that measures the presence of psychological growth in five areas: Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation for Life. The PTGI has been used previously in research with people who have chronic health conditions such as asthma (e.g., Jones et al., 2018). There is no cut-off score for identifying psychological growth. Items are rated on a 6-point Likert scale ranging from 1 ("I did not experience this change") to 6 ("I experienced this change to a very great degree"). Higher scores on the PTGI indicate that the individual perceives experiencing psychological growth. Prior meta-analytic research has indicated that the mean alpha reliability of this measure is excellent ($\alpha=.94$) (Lenz et al., 2020). In this study, this measure achieved "good" reliability ($\alpha=.87$) It should be noted that unfortunately there was an error in the transcription of the PTGI on the Qualtrics platform; instead of the six possible answers to each item of the scale, only five of those were transferred to the survey questionnaire – this was only discovered during statistical analysis. The missing answer was the midpoint one "I experienced this change to a *moderate* degree" (value = 3). It was agreed that the questionnaire would be scored with scores between 1-5 instead; the impact of missing this possible response will be further discussed as a limitation in the discussion of this paper.

Coping efficacy scale. Coping efficacy was measured using the adapted three-item coping efficacy scale (CES), which invites individuals to report on how well they have been dealing with the different aspects of asthma (symptoms, daily life, and emotional impact). Items are rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating better reported coping ability. This scale has demonstrated very good internal consistency (Cronbach's alpha = .91) in people who have arthritis (Gignac et al., 2000), and was adapted to change the questions for relevance to people during COVID. In this study, the reliability analysis of the adapted scale indicated good reliability (alpha = .89).

Life events checklist. Prior adverse life experiences were measured using the Life Events Checklist (LEC) (Blake et al, 1995; as cited in Gray et al., 2004). The LEC is a screening measure that contains 16 items inquiring about the experience of 16 different events that are known to result in post-traumatic difficulties (Grey et al., 2004). The scale invites responders to report whether an event “happened to me, witnessed it, learned about it” for each adverse life experience. It also gives the option for the participant to report that they are “unsure” about the experience or if it “does not apply” to them, indicating an absence of the adverse event. The LEC has been identified as a reliable measure of direct exposure to events; only one of its items was found to have a Kappa coefficient lower than 0.40 (pertaining to the item “sudden, unexpected death of a loved one, Kappa = 0.38), and all other Kappas achieved scores above 0.50 ($p < .001$). (Grey et al., 2004). In agreement with previous research, the LEC in this study was scored as follows: for each of the LEC items, a score of 1 was assigned for an answer indicating that a respondent personally and directly experienced an event (“happened to me”), while a score of 0 was assigned for any other response (Grey et al., 2004).

Social support. Social support was measured using the Oslo Social Support Scale (OSSS-3) (Kocalevent et al., 2018). The OSSS-3 is a short questionnaire consisting of three items that ask questions about people's perception of having social support from others (such as close connections and neighbours). The response options are not standardised throughout the measure and are dependent on each question. For example, the first question "How many people are so close to you that you can count on them if you have great personal problems" has four response options (None, 1-2, 3-5, 5+). However, the scale produces a final score based on each of the questions, with higher scores indicating stronger levels of social support which can be categorised between poor, moderate, and strong social support. This measure has been identified as having questionable Cronbach's alpha ($\alpha = .64$) in the general population (Kocalevent et al., 2018). In this study, the OSSS-3 scale indicated a similar reliability ($\alpha = .69$).

Psychological Thriving. The Psychological Thriving scale (PT) (Sirois & Hirsch, 2013) was used to capture the participant's perception of changes in their life since before the outbreak of COVID-19. This scale consists of three questions that capture personal reflections around life satisfaction, personal change, and quality of relationships, and it can be adapted to specific conditions. Items are rated on a 4-point Likert-type scale which are individualised for each question. The first option in each item identifies positive changes, the second "no changes", the third slight negative change, and the fourth a large negative change. The items are reverse scored into a final score, with higher scores reflecting greater positive change. This scale has been previously used with people who have arthritis and inflammatory bowel disease and has been proposed to have good internal consistency ($\alpha = 0.8$) (Sirois & Hirsch, 2013). However, in this study, this measure achieved a questionable reliability score of .68 (Cronbach's alpha).

Asthma severity. To differentiate between participants who have mild/moderate and severe asthma, the definition of severe asthma in this study has followed the “international guidelines on definition, evaluation, and treatment of severe asthma” (Chung et al., 2014), which indicates that severe asthma requires treatment with high dose corticosteroids plus a second controller to prevent it from becoming uncontrolled, or that remains uncontrolled despite this therapy. In order to identify the cases in the participants, we included the asthma control questionnaire (ACT) in order to ensure that asthma severity and control is best captured in the participants. The asthma control questionnaire (ACT) is a five item self-report questionnaire that assesses an individual’s level of asthma control (Nathan et al., 2004). Each item is scored on a Likert-type scale, with individualised answers for each of the questions. For example, the question “during the last 4 weeks, how much of the time has your asthma kept you from getting as much done at work, school, or home?” is scored between 1 (none of the time) and 5 (all of the time). The ACT questionnaire has been identified as having high concordance with physician-reported asthma control and has been reported as having good internal consistency in studies with scores ≤ 19 indicating poor control ($\alpha=.86$) (Fidler et al., 2019). In this study, the ACT indicated a similarly good internal consistency ($\alpha = .85$). The use of the ACT requires a licencing agreement, which was acquired prior to data collection. All questionnaires are available in the Appendix (Appendix E). In addition, we asked participants to report their use of asthma-related medication in accordance with the above definition, as part of the demographic questionnaire.

Power Calculation

An a-priori power calculation was conducted using Cohen’s table (Cohen, 1992), based on the most statistically demanding hypotheses (hypothesis 2, which would require a regression analysis). Assuming a medium effect size (calculated based on a meta-analysis on the relationship between optimism, social support, and coping strategies as factors of PTG by

Prati & Pietrantonio, 2009), a significance level of $\alpha = 0.05$, two groups of participants (participants with mild/moderate and severe asthma), and an estimated seven predictors for the hierarchical regression (hypothesis 1 and 2), a total sample size of 102 participants was required in order to achieve 80% power. The final sample size of participants in this research was 113, which indicates sufficient study power.

Ethical Implications Data Collection, Security and Management

The study had ethical approval by the University of Sheffield Research Ethics Committee (Appendix F). This internet-mediated research followed the same ethical standards as set-up in the Code of Human Research Practice (British Psychological Society, 2017), and was inclusive of information being available to participants in the study via an information sheet around consent to participate, right of withdrawal, participant data management, as well as contact information for the principal investigator and supervisor. The data controller for this research has been the University of Sheffield.

Approach to Statistical Data Analysis

Collected data were downloaded from the Qualtrics platform into a single file at the end of the data collection, and all analyses were conducted using IBM SPSS Statistics (Version 26) software. Initially, the scales were appropriately scored, with cut-off points added for categorisation of questionnaires (e.g., mild/moderate and severe asthma, as indicated in the earlier section describing the questionnaires). Subsequently, the data were screened to explore the presence of outliers, with normality assumptions tested through exploring the skewness and kurtosis of the data distributions, in order to identify parametricity in the data. The second part of the analysis involved the reporting of descriptive statistics, including analysis of demographics and descriptive reporting of all questionnaires. Specific regression assumptions were also assessed including an inspection of the residuals (where values exceeding ± 3 were considered outliers). In order to test hypothesis 1 an

independent samples t-test was conducted grouping participants between severe and mild/moderate asthma presentation. This examined differences in PTGI, thriving, coping efficacy, social support and life experiences. In order to test hypothesis two, simple and hierarchical regression analysis was conducted, with PTGI as the criterion variable, with demographic factors, medication compliance, asthma severity, coping efficacy, thriving, social support, and prior adverse life experiences as the predictor variables. Finally, in order to test hypothesis 3, a mediation analysis using the PROCESS macro (Model 4) through the SPSS software was conducted (Hayes, 2022), in order to explore whether previous adverse life experiences would predict PTG, mediated by social support and coping efficacy.

Results

Statistical Assumptions and Outliers

As proposed by George & Mallory (2010), the acceptable range suggested to consider the data normally distributed through their skewness and kurtosis would be ± 1.96 . In this study, the PTGI, Thriving Scale, and OSSC-3 all were within these acceptable limits. The CES was within acceptable limits for participants with severe asthma, but not for participants with mild/moderate asthma. Similarly, the LEC indicated acceptable limits in participants with severe asthma, but not in participants with mild/moderate asthma. However, since the majority of the data were normally distributed, and the sample size was large enough (>20), it was deemed appropriate to proceed with parametric analysis (Glen, 2022).

Moreover, the questionnaire data were examined to identify the presence of outliers using the distribution “box and whisker” plots. On the CES, there were two extreme outlier responses identified on the severe asthma group (participants 57 and 87). The OSSS-3 data contained no outliers, the PTGI total data contained no extreme outliers but one mild outlier on the mild/moderate asthma group (participant 104). Similarly, the TS contained no extreme outliers, but one mild outlier in the mild/moderate asthma group. Considering that the

extreme outliers were not repeatedly the same participants, it was decided not to remove these from the sample data.

With regard to the linear regression analyses, the residuals visually indicated a normal distribution, and the graph and p-p plot is available in the Appendix (Appendix G). Similarly, the assumption of independence of residuals was also met; the Durbin-Watson statistics were very close to a value of 2 (Model 1 = 2.126, Model 2 = 2.012). The residual outlier analysis indicated only one participant had a residual above 3, therefore it was acceptable to be included in the analyses as this was <5% of the overall sample. Finally, the assumption of multicollinearity was met for all the multiple linear regressions, with all Variance Inflation Factor (VIF) statistics <10. Therefore, the data for were considered suitable for the regression analysis.

Descriptive statistics

Demographics. The majority of the participants were female, white, and the primary residence of the sample was the United Kingdom (see Table 1).

Measures/Questionnaires. All questionnaires were appropriately reversed (where applicable) and scored. A summary of the outcomes for each questionnaire is presented in the following table (Table 2).

Table 1*Sample Demographics*

| Variable | n (%) | Mean (SD) |
|---|-----------|--------------|
| Gender | | |
| Female | 78 (69) | |
| Age | n/a | 40.4 (15.63) |
| Severe Asthma Severity (ACT*) | 65 (57.5) | |
| Asthma Medication intake and compliance | 73 (64.6) | |
| Residence | | |
| United Kingdom | 99 (87.6) | |
| Ethnic Background (self-report) | | |
| White | 97 (86) | |
| Other | 16 (14) | |
| Additional long-term health conditions | | |
| Yes | 44 (38.9) | |
| Health-rating (self-report) | | |
| Good or better health | 87 (76.9) | |
| Personal COVID experience | | |
| I/someone I know has tested positive | 91 (80.5) | |

*ACT = Asthma Control Questionnaire

Tests of Main Hypotheses

To explore differences in coping, social support, and psychological growth between people with mild/moderate and severe asthma, a series of independent samples means tests were initially conducted, using asthma severity as the grouping variable, which are presented in Table 2.

Table 2.*Independent Samples T-tests between participants with Severe and Mild/Moderate asthma*

| | Severe Asthma | | Mild/Moderate Asthma | | T (111) | p | Cohen's d |
|--------|---------------|-------|----------------------|-------|---------|--------|-----------|
| | M | SD | M | SD | | | |
| CES* | 10.45 | 2.51 | 13.1 | 2.41 | -5.567 | .000** | 1.07 |
| OSSS-3 | 8.95 | 2.56 | 9.1 | 2.16 | .330 | .742 | |
| LEQ | 3.52 | 2.33 | 2.75 | 2.22 | 1.781 | .078 | |
| TS | 7.83 | 1.64 | 7.96 | 2.95 | -.368 | .714 | |
| PTGI | 23.7 | 12.95 | 22.81 | 15.43 | .329 | .743 | |

*CES = Coping Efficacy Scale; LEQ = Life Experiences Questionnaire; OSSS-3 = Oslo Social Support Scale; PTGI = Post Traumatic

Growth Inventory; TS = Thriving Scale.

** p<.05

The analysis indicated that apart from Coping Efficacy, all other variables were not significantly different between the two groups (Hypothesis 1 and 2). With regard to Coping Efficacy, there was a statistically significant difference between people with severe asthma and people with mild/moderate asthma as measured by the ACT, $t(111) = -5.567$, $p < .05$. People with mild/moderate asthma reported higher coping efficacy ($M = 13.1$, $SD = 2.41$) compared to people with severe asthma ($M = 10.45$, $SD = 2.51$).

Moreover, in order to fully explore the effect of the variables on PTG (hypothesis 2), a simple (Model 1) and a hierarchical (Model 2) linear regression analysis was conducted on the data.

Model 1. This analysis was carried out to investigate the influence of asthma severity on PTGI. This was not a statistically significant model ($F(1,111) = .108$, $p > .05$). The adjusted R^2 indicated that .8% of the variance on PTGI can be explained by asthma severity. This was shown to be a non-significant weak positive correlation which explained only .8% of the variance in the relationship ($t = -.329$, $R = .031$, $p > .05$) (see Table 3).

Hierarchical Model 2. This analysis was carried out to firstly explore the effect of demographic factors on PTGI (block 1), and secondly to explore the effect of the main variables (CES, OSSS-3, LEQ, TS) on the same (Block 2). Block 1 predicted 10.7% of the variance in PTGI scores (adjusted $R^2 = .107$). This model was a significant fit to the data ($F(5,107) = 3.695, p < .05$), with younger age ($t = -2.491, p < 0.05$) and higher asthma medication intake and compliance ($t = -2.282, p < 0.05$) being the only significant predictors to the model.

The inclusion of the main variables (Block 2) only added a 1.1% of the variance in the results (adjusted $R^2 = .112$), which was not significant. As with model 1, this model was also an overall significant fit to the data ($F(10,102) = 2.407, p < 0.05$), with younger age ($t = -2.725, p < 0.05$) and higher asthma medication intake and compliance ($t = -2.325, p < 0.05$) remaining as the only two significant predictors to the model (Table 4). In both blocks, individuals with higher asthma medication intake and compliance had significantly higher reported PTG, however the effect of asthma as measured by the ACT was non-significant.

Table 3

*Regression Analysis Summary for Asthma Severity Predicting PTGI**

| Variable | B | R | Adjusted R Squared | β | t | p | CI |
|----------|-------|-------|--------------------|---------|--------|-------|----------------|
| PTGI* | -.088 | .0031 | -0.008 | -0.031 | -0.329 | 0.743 | -6.179 – 4.419 |

*PTGI = Post Traumatic Growth Inventory

Table 4*Hierarchical Regression Analysis Summary with PTGI as the Criterion Variable*

| Variable | Adjusted R Squared | B | β | t | p | CI -lower | CI- higher |
|-----------------------|--------------------|-------|---------|-------|-------|-----------|------------|
| Block 1 | | | | | | | |
| Constant | .107 | 27.96 | | 2.53 | .004* | 6.06 | 48.87 |
| Gender | | 3.99 | 0.13 | 1.43 | .155 | -1.53 | 9.51 |
| Age | | -0.21 | -0.24 | -2.49 | .014* | -0.38 | -0.04 |
| Other Conditions | | 4.25 | 0.15 | 1.52 | .131 | -1.28 | 9.78 |
| Asthma Medication | | -6.23 | -0.21 | -2.28 | .024* | -11.65 | -0.82 |
| Intake and Compliance | | | | | | | |
| Self-reported Health | | -0.43 | -0.03 | -0.28 | .778 | -3.43 | 2.58 |
| Block 2 | | | | | | | |
| Constant | .112 | 24.66 | | 1.66 | .013* | -4.73 | 54.12 |
| Gender | | 4.2 | 0.14 | 1.47 | .146 | -1.48 | 9.88 |
| Age | | -0.24 | -0.27 | -2.73 | .008* | -0.41 | -0.07 |
| Other Conditions | | 3.33 | 0.17 | 1.18 | .241 | -2.27 | 8.93 |
| Asthma Medication | | -6.99 | -0.24 | -2.33 | .022* | -12.95 | -1.03 |
| Intake and Compliance | | | | | | | |
| Self-reported Health | | 0.17 | 0.01 | 0.1 | .921 | -3.25 | 3.59 |
| ACT** | | 0.48 | 0.02 | 0.16 | .876 | -5.6 | 6.55 |
| CES | | -0.04 | -0.01 | -.71 | .943 | -1.25 | 1.16 |
| OSSS-3 | | -0.69 | -0.03 | -0.35 | .726 | -4.58 | 3.2 |
| LEQ | | -0.96 | -0.16 | -1.6 | .112 | -2.15 | 0.23 |
| TS | | 1.12 | 0.16 | 1.54 | .127 | -0.32 | 2.55 |

* p<.05

** ACT = Asthms Control Test; CES = Coping Efficacy Scale; LEQ = Life Experiences Questionnaire; OSSS-3 = Oslo Social Support Scale; PTGI = Post Traumatic Growth Inventory; TS = Thriving Scale.

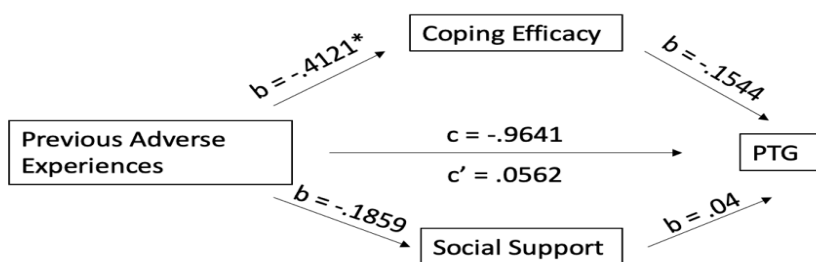
Mediation analysis (Hypothesis 3). Finally, in order to explore whether earlier adverse life experiences have an effect on PTG, mediated by coping efficacy and social support, a parallel mediation analysis was conducted. The mediation model is presented in the following figure (Figure 1).

Previous adverse life experiences were a not significant predictor of social support in this model ($b = -.1859$, $s.e. = .0968$, $p > .05$), but they were a significant negative predictor of coping efficacy ($b = -.4121$, $s.e. = .1081$, $p < .05$), indicating that individuals with a higher number of reported adverse experiences were reporting lower levels of coping efficacy. Moreover, consistent with the previous analyses, none of the variables were significant predictors of PTGI; Previous life experiences did not directly predict PTG ($b = -.9641$, $s.e. = .6183$, $p > .05$), and neither did coping efficacy ($b = -.1544$, $s.e. = .5067$, $p > .05$) and social support ($b = .04$, $s.e. = .5661$, $p > .05$).

Moreover, the indirect effect of both social support and coping efficacy were tested using confidence intervals and were found to not be statistically significant, as 0 fell between the confidence intervals for both variables. Similarly, the total indirect effect was also not statistically significant (BCa CI $-.42$ to $.49$).

Figure 1

Mediation Analysis of Previous Adverse Experiences as a Factor of PTGI



* $p < .05$

Discussion

This study set out to identify reported PTG and explore differences in social support, coping, thriving, and the impact of earlier traumatic experiences in the population of people with severe and mild/moderate asthma.

Contrary to the hypothesis, participants with mild/moderate and severe asthma as measured by the ACT questionnaire showed no differences in perceived social support and reported psychological growth during the period of the COVID-19 pandemic. However, there were significant differences in reported coping efficacy, with participants with mild/moderate asthma indicating significantly higher coping compared to participants who have severe asthma. Moreover, coping was not identified as a factor related to higher perceived psychological growth. However, the hierarchical regression identified younger age and higher asthma medication intake and compliance as predictors of psychological growth in the participants, even though asthma severity as measured by the ACT remained not significant as a predictor. Overall, even though 57.5% of participants were grouped into the “severe” asthma group based on their ACT questionnaire answers, 64.6% self-disclosed medical management of severe asthma.

Finally, contrary to the initial hypothesis, earlier adverse life experiences were not related to greater psychological growth. Moreover, the mediation analysis did not indicate neither a direct nor indirect effect of adverse early life experiences, coping efficacy and social support on psychological growth. However, there was a significant negative effect of previous adverse life experiences on coping efficacy, indicating participants with higher earlier adversity were reporting lower coping with their asthma during the period of COVID-19.

The findings of this research are somewhat consistent with prior research on PTG during the COVID-19 pandemic. Younger age has been reported as a correlate of PTG in

recent as well as studies prior to the COVID-19 pandemic (e.g., Liu et al., 2021; Northfield & Johnston, 2021), however in other research studies of PTG this has not been found as significant (Henson et al., 2021). In addition, contrary to other recent research on PTG, this study did not indicate social support as a significant factor for reported PTG. Similarly, coping skills were not found as significant predictors of PTG in this sample, which is not consistent with research on PTG in the general population (Kaloeti et al., 2021; Laslo-Roth et al., 2020). These two findings are somewhat surprising, however, they may be related to the timing of the data collection, as they were collected in the months following the UK COVID-19 vaccine rollout, which may have been an influencing factor in participant's perceptions of coping and social support, and not during a time of severe restrictions (e.g., lockdown). Another hypothesis for the outcomes of this study may involve the ethnic background of the participants in this study (86% ethnically white). Studies conducted during the COVID-19 period have identified that non-white ethnicity was significantly associated with higher PTG (e.g., Na et al., 2021; Northfield & Johnston, 2021); with a predominantly White British sample of participants, it could be that PTG differences in non-white ethnic minorities with asthma may have not been able to be identified. Finally, in addition to the above methodological hypotheses, a hypothesis for these unexpected outcomes may be that people with severe asthma did not experience differences in PTG relative to people with mild/moderate asthma during the period of the data collection. This may imply that the COVID-19 pandemic has not been a seismic event for people with severe asthma contrary to the original hypothesis of the study.

Limitations

Prior to further exploring the implications of this research study, a number of limitations should be considered. As noted earlier, the "midpoint" answer of the PTGI was accidentally omitted in the survey provided to the participants. There has been evidence that

purposefully omitting a midpoint eliminates the possibility that responders will misuse it. Moreover, omitting a midpoint has been suggested to use in research where participants may be unfamiliar with and not expected to have a pre-formed opinion about the topic being studied (Chyung et al., 2017). However, it is important to acknowledge that this may bias the data by “forcing” participants to choose a specific side and it is recommended that when such an omission occurs through a planned approach an option of “I don’t know/Not applicable” is offered to participants instead (Chyung et al., 2017).

Furthermore, this empirical research was not pre-registered, and utilised a solely self-selected participant sample, recruited through advertising in social media, asthma-related forums, and the newsletter of the British Lung Foundation. This self-selection resulted in a final sample of 65 participants with severe and 48 participants with mild/moderate asthma, which was not a planned distribution of the group size. Even though this wide approach attempted to diversify the participant population and limit recruitment from one single source, it nevertheless maintains the limitations of self-selected samples such as selection bias. Moreover, the sample was largely female (69%) and ethnically white (86%), which introduces further bias in the sample of this research. Nevertheless, these limitations have been common in this type of research during the COVID-19 pandemic, with females being identified as more likely to complete online surveys than men overall (Carson et al., 2021).

Finally, it should be noted that this study did not involve a control group of general population adults. Even though this was beyond the scope of this research, it could be that the addition of a sample of non-asthmatic participants may have indicated whether people with asthma reported differences in psychological growth in comparison to the general population during this period.

Implications for Clinical Practice

The current study identified that there have been no differences in reported PTG between participants who reported mild/moderate and severe asthma. Psychological practitioners working with such populations should not expect that this period may have been a seismic event for this population. Participants with severe asthma reported lower coping efficacy than participants with mild/moderate asthma. Considering prior research indicative of mental health difficulties within this population (e.g., Kew et al., 2016), psychological practitioners should engage in techniques fostering coping efficacy (such as active coping skills). Finally, younger age was associated with higher PTG in this sample of participants. As younger age has been consistently identified as a predictor of PTG in different populations, clinicians working across the lifespan should consider how the age of clients may act as a protective factor fostering PTG.

Future directions

Future research should continue exploring the psychological outcomes and mental health needs of the population and the impact of the pandemic. It will be helpful to understand whether vulnerable groups have overall differences in their experience of distress, resilience, and growth during the COVID-19 pandemic and whether these are different to the general adult population. As the understanding of the pandemic was still in the process of being formulated while this research was being designed, it would be of interest to explore whether a similar research design would yield different results following the removal of all COVID-19 related restrictions both in the UK, and globally, and whether any reports of growth are sustained. Researchers have proposed that there are indications that PTG during the pandemic may be “illusory” and reflect maladaptive attempts at coping with the challenging situation, especially if accompanied by other deterioration in well-being such as alcohol misuse (Asmundson et al., 2021). Psychological practitioners working with individuals

who have severe asthma should not expect to identify differences in psychological growth of the population during this time and should continue fostering skills known to develop psychological growth, such as active coping techniques (Kaloeti et al., 2021).

Conclusion

The findings of this research study are only somewhat consistent with other research emerging on psychological growth during the COVID-19 pandemic. The main research findings indicate that younger age, and higher asthma-related medication intake and compliance were significant predictors of PTG. Recent research has indicated that female gender and an age range between 40-60 was a factor in higher reported growth (Arnout & Al-Sufyani, 2021), whereas other research has suggested that coping skills have been related to higher PTG (Carson et al., 2021). Moreover, a number of studies have indicated that increased social support was related to higher reported PTG (e.g., Dominick et al., 2021; Laslo-Roth et al., 2020). However, none of these studies explored populations who had a diagnosis of asthma or other chronic respiratory conditions, which may explain the differences with the findings of this study. In addition, these inconsistent results may be explained by the limitations of the current study mentioned above, or by other unexplored factors such as the timing of when the data was collected within the timeframe of the progress of the pandemic; data for this research was collected following the rollout of the vaccination programme in the UK, which could have been a significant factor in the experience of COVID-19-related distress. Overall, this study has aimed to add to the current knowledge base of PTG in the population during the COVID-19 pandemic and has contrasted the findings with already available research in order to guide researchers, clinicians, and the population.

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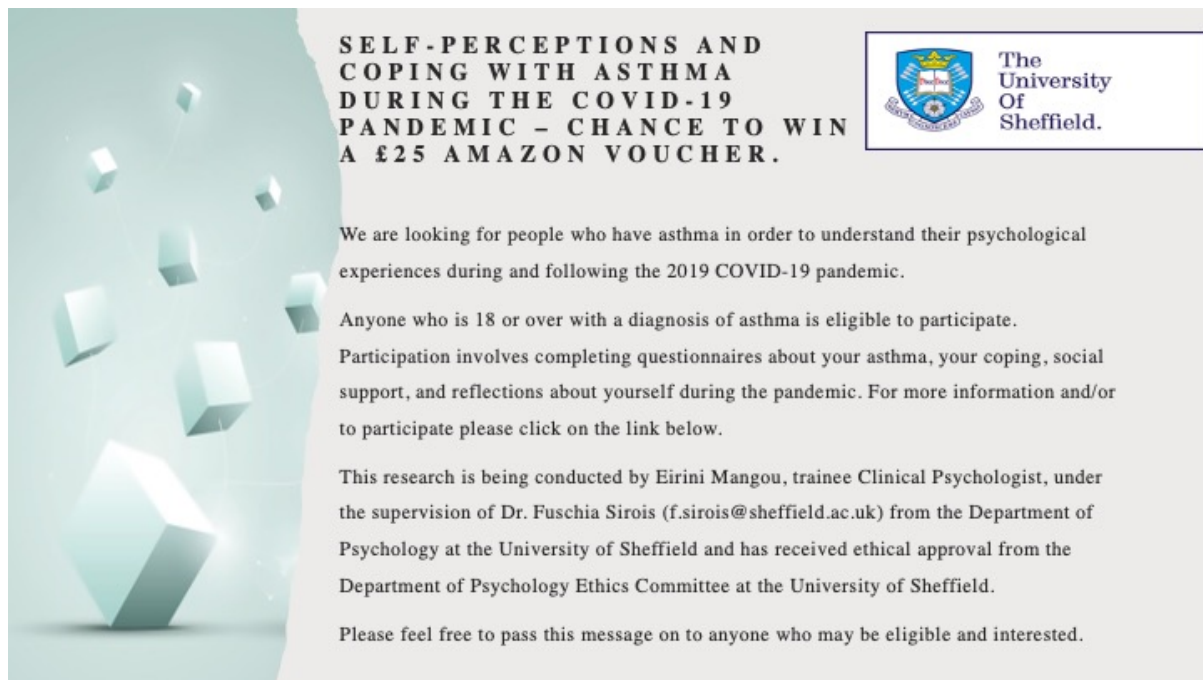
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Appendix A – Study Advertisement




SELF-PERCEPTIONS AND COPING WITH ASTHMA DURING THE COVID-19 PANDEMIC – CHANCE TO WIN A £25 AMAZON VOUCHER.

We are looking for people who have asthma in order to understand their psychological experiences during and following the 2019 COVID-19 pandemic.

Anyone who is 18 or over with a diagnosis of asthma is eligible to participate. Participation involves completing questionnaires about your asthma, your coping, social support, and reflections about yourself during the pandemic. For more information and/or to participate please click on the link below.

This research is being conducted by Eirini Mangou, trainee Clinical Psychologist, under the supervision of Dr. Fuschia Sirois (f.sirois@sheffield.ac.uk) from the Department of Psychology at the University of Sheffield and has received ethical approval from the Department of Psychology Ethics Committee at the University of Sheffield.

Please feel free to pass this message on to anyone who may be eligible and interested.



Appendix B – Participant Information Sheet

Research Project:

“Self-Perceptions and Coping with Asthma during the COVID-19 pandemic”.

What the study is about:

We are looking for people who have asthma in order to understand their psychological experiences during and following the 2019 COVID-19 pandemic. Anyone 18 or over with a diagnosis of asthma is eligible to participate in this research. This research forms part of the academic requirements for the Doctorate in Clinical Psychology (thesis).

What participation in the study involves:

Participating in this study will involve completing online questionnaires. The questionnaires will ask questions about your asthma, your coping, social support, and reflections about yourself during the pandemic. One of the questionnaires asks questions about previous difficult life events you may have witnessed or experienced. Participation in this study will take approximately 10-15 minutes, although individual completion times may vary.

For participating, you will be given the chance to win one of two £25 Amazon vouchers after you complete the survey.

Your rights:

The research project is entirely voluntary, and it is up to you to decide whether or not to take part. If you wish to not participate after reading this information sheet, there will be no negative consequences. You have the right to withdraw at any point during the study up to the point that you submit your responses by simply closing the questionnaire from your browser. If you complete the study, it will not be possible to withdraw at a later date, as your information will be anonymous and will have been added to the pool of collected data.

Thinking about difficult life events can be emotional for some people, and at the end of the questionnaire there will be information on what to do if you feel you need extra support following this. If you feel distressed or negatively affected by your participation in this study please seek further help from available resources, some of which are available below:

- The Samaritans Telephone Line: 116 123 (<https://www.samaritans.org/>)
- Victim Support Telephone: 08 08 16 89 111 (<https://www.victimsupport.org.uk/>)
- If you are worried about your mental health or feeling unable to keep yourself safe, please contact your GP, phone 111, or attend A&E in an emergency.

Your data:

All the information and data collected during the study will be kept strictly confidential and anonymous. Your responses will be anonymous, and the numerical data you provide will be aggregated with that of other respondents, to give the researcher an idea about general trends, rather than individuals. Your data may also be used by the researchers for subsequent studies,

or by other researchers e.g. through the University of Sheffield's Open Access platform, or alongside any scientific publications that arise from the data. However, if the data is used in this way, your responses will remain anonymous. The data controller is the University of Sheffield.

If you wish to be added into the prize draw you will be asked to provide your email address. This however this will be asked for separately and therefore will not be linked to your survey responses, ensuring your anonymity. All records of email addresses collected will be stored on a password protect computer by the researchers and deleted once the study has concluded and the draw is completed.

If you win the prize draw for this study, then you will be asked to electronically sign a form confirming that you have received this prize when you collect it. This form will be kept securely in a locked cabinet or as a digital copy for at 7 years after the end of the project, accessible by University finance and administrative staff for reference in the event of a financial audit.

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly. The project has been ethically approved and reviewed via 'the University of Sheffield's Ethics Review Procedure, as administered by the Professional Services'. The University's Research Ethics

Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

Contact information:

This research is being conducted by Eirini Mangou, trainee Clinical Psychologist, under the supervision of Dr. Fuschia Sirois (f.sirois@sheffield.ac.uk) from the Department of Psychology at the University of Sheffield and has received ethical approval from the Department of Psychology Ethics Committee at the University of Sheffield.

If you wish to raise a complaint, or have any questions regarding the study, its purpose or procedures you should contact the Principal Investigator (emangou1@sheffield.ac.uk) or her supervisor (f.sirois@sheffield.ac.uk). If you feel your complaint is not handled to your satisfaction, you can then contact the Head of the Department of Psychology (e.milne@sheffield.ac.uk) If the complaint relates to how your personal data has been handled, information on how to raise a complaint can be found in the University's Privacy Notice: <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

Appendix C – Consent Form

Consent Form

| <i>Please tick the appropriate boxes</i> | Yes | No |
|---|--------------------------|--------------------------|
| Taking Part in the Project | | |
| I have read and understood the project information sheet dated 22/01/21 or the project has been fully explained to me. (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.) | <input type="checkbox"/> | <input type="checkbox"/> |
| I have been given the opportunity to ask questions about the project. | <input type="checkbox"/> | <input type="checkbox"/> |
| I agree to take part in the project. I understand that taking part in the project will include completing online questionnaires. | <input type="checkbox"/> | <input type="checkbox"/> |
| I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield. | <input type="checkbox"/> | <input type="checkbox"/> |
| I understand that my taking part is voluntary and that I can withdraw from the study at any time/before I submit the survey; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw. | <input type="checkbox"/> | <input type="checkbox"/> |
| How my information will be used during and after the project | | |
| I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form. | <input type="checkbox"/> | <input type="checkbox"/> |
| I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form. | <input type="checkbox"/> | <input type="checkbox"/> |
| I give permission for the questionnaire data that I provide to be deposited in password-protected drives so it can be used for future research and learning | <input type="checkbox"/> | <input type="checkbox"/> |
| So that the information you provide can be used legally by the researchers | | |
| I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield. | <input type="checkbox"/> | <input type="checkbox"/> |

Do you wish to continue? To acknowledge that you have read and understood this information and would like to continue with the research study, please click on “I agree”.

Appendix D – Debrief Page

Debrief Information

Thank you very much for taking part in this study. Your responses will be valuable in understanding the experiences and needs of people who have asthma following the COVID-19 pandemic.

People sometimes report that during and following difficult times or experiences, they feel that they have developed on a personal level. We call this development “psychological growth”. The purpose of the study was to explore whether people who have asthma identify psychological growth for themselves during the COVID-19 pandemic.

Please be assured that your responses will remain anonymous.

You may feel that you require some extra support following the completion of the questionnaires. Some available resources are below:

- The Samaritans Telephone Line: 116 123 (<https://www.samaritans.org/>)
- Victim Support Telephone: 08 08 16 89 111 (<https://www.victimsupport.org.uk/>)
- If you are worried about your mental health or feeling unable to keep yourself safe, please contact your GP, phone 111, or attend A&E in an emergency.

If you would like to opt-in to a prize draw for one of two 25£ Amazon gift vouchers, please enter your email and name below. This form is independent of the questionnaires you completed and will not be linked to your answers.

If you have any further questions about this study, or you wish to make a complaint, you can contact me at emangoul@sheffield.ac.uk . Alternatively, you can contact my supervisor (f.sirois@sheffield.ac.uk). If you feel your complaint is not handled to your satisfaction, you can then contact the Head of the Department of Psychology (e.milne@sheffield.ac.uk) If the complaint relates to how your personal data has been handled, information on how to raise a complaint can be found in the University's Privacy Notice:

<https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

Thank you very much - your participation is greatly appreciated!

Eirini Mangou

University of Sheffield

Supervised by Dr Fuschia Sirois,

University of Sheffield

Appendix E – Questionnaires

Demographic Questions and Questionnaires

Demographic Questions Table

| Demographic | Options |
|--|--|
| Sex | Female Male Other |
| Age | |
| In what country/continent do you currently live? | UK Europe Canada USA Australia South America Other (please list) |
| Ethnic Group | |
| Other than asthma, do you have another long-term chronic condition? | Yes No |
| Are you regularly treating your asthma with high-dose corticosteroids and a second controller medication to prevent it from becoming uncontrolled? | Yes No |
| How do you rate your current health? (Check the one most appropriate box) | Excellent <input type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> |

| | |
|--|--|
| Do you know someone (including yourself) who has become infected with the coronavirus? | <ul style="list-style-type: none"> • <input type="radio"/> Yes, I/someone I know has tested positive for COVID19 • <input type="radio"/> Probably yes, but there has not been a test to confirm • <input type="radio"/> Don't know/unsure • <input type="radio"/> Probably not, but there has not been a test to confirm • <input type="radio"/> No, I/someone I know has tested negative for COVID19 |
|--|--|

| Asthma Control Questionnaire | 1 | 2 | 3 | 4 | 5 |
|---|-------------------------|-----------------------|-----------------------|----------------------|-----------------------|
| During the last 4 weeks, how much of the time has your asthma kept you from getting as much done at work, school, or home? | All of the time | Most of the time | Some of the time | A little of the time | None of the time |
| During the last 4 weeks how often have you had shortness of breath? | More than once a day | Once a day | 3-6 times a week | Once or twice a week | Not at all |
| During the last 4 weeks, how often have your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) woken you up at night or earlier than usual in the morning? | 4 or more nights a week | 2 to 3 nights a week | Once a week | Once or twice | Not at all |
| During the last 4 weeks, how often have you used your rescue inhaler or nebuliser medication (such as salbutamol)? | 3 or more times per day | Once or twice per day | 2 or 3 times per week | Once a week or less | Not at all |
| How would you rate your asthma control during the last 4 weeks? | Not controlled at all | Poorly controlled | Somewhat controlled | Well controlled | Completely controlled |

Post-Traumatic Growth Inventory

Post Traumatic Growth Inventory

Indicate for each of the statements below the degree to which this change occurred in your life as a result of COVID-19, using the following scale.

1 = I did not experience this change as a result of COVID-19.

2 = I experienced this change to a very small degree as a result of COVID-19

3 = I experienced this change to a small degree as a result of COVID-19.

4 = I experienced this change to a great degree as a result of COVID-19.

5 = I experienced this change to a very great degree as a result of COVID-19.

| Possible Areas of Growth and Change | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life | | | | | |
| 2. I have a greater appreciation for the value of my own life | | | | | |
| 3. I developed new interests | | | | | |
| 4. I have a greater feeling of self-reliance | | | | | |
| 5. I have a better understanding of spiritual matters. | | | | | |
| 6. I more clearly see that I can count on people in times of trouble. | | | | | |
| 7. I established a new path for my life | | | | | |
| 8. I have a greater sense of closeness with others | | | | | |
| 9. I am more willing to express my emotions | | | | | |
| 10. I know better that I can handle difficulties | | | | | |
| 11. I am able to do better things with my life | | | | | |
| 12. I am better able to accept the way things work out | | | | | |
| 13. I can better appreciate each day | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| 14. New opportunities are available which wouldn't have been otherwise | | | | | |
| 15. I have more compassion for others | | | | | |
| 16. I put more effort into my relationships | | | | | |
| 17. I am more likely to try to change things which need changing | | | | | |
| 18. I have a stronger religious faith | | | | | |
| 19. I discovered that I'm stronger than I thought I was | | | | | |
| 20. I learned a great deal about how wonderful people are | | | | | |
| 21. I better accept needing others | | | | | |

Coping Efficacy Scale

Please indicate how well you feel you have been dealing with the different aspects of your asthma in general by checking a box for each question.

| | Strongly Disagree | Disagree | Neither agree or Disagree | Agree | Strongly Agree |
|---|-------------------|----------|---------------------------|-------|----------------|
| a) I am successfully coping with the symptoms of asthma | | | | | |
| b) I am successfully coping with the day to day problems that living with asthma creates | | | | | |
| c) I am successfully coping with the emotional aspects of asthma | | | | | |

OSSS-3

| Question | Response options | | | | |
|--|------------------|-----------|-----------|------|-----------|
| 1. How many people are so close to you that you can count on them if you have great personal problems? | None | 1-2 | 3-5 | 5+ | |
| 2. How much interest and concern do people show in what you do? | None | Little | Uncertain | Some | A lot |
| 3. How easy is it to get practical help from neighbours if you should need it? | Very difficult | Difficult | Possible | Easy | Very easy |

1. Life Events Checklist (LEC)

Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it *happened to you* personally, (b) you *witnessed it* happen to someone else, (c) you *learned about it* happening to someone close to you, (d) you're *not sure* if it fits, or (e) it *doesn't apply* to you.

Be sure to consider your *entire life* (growing up as well as adulthood) as you go through the list of events.

| Event | Happened to me | Witnessed it | Learned about it | Not sure | Doesn't Apply |
|--|----------------|--------------|------------------|----------|---------------|
| 1. Natural disaster (for example, flood, hurricane, tornado, earthquake) | | | | | |
| 2. Fire or explosion | | | | | |
| 3. Transportation accident (for example car accident, boat accident, train wreck, plane crash) | | | | | |
| 4. Serious accident at work, home, or during recreational activity | | | | | |
| 5. Exposure to toxic substance (for example dangerous chemicals, radiation) | | | | | |
| 6. Physical assault (for example being attacked, hit, slapped, kicked, beaten up) | | | | | |
| 7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb). | | | | | |
| 8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through | | | | | |

| | | | | | |
|---|--|--|--|--|--|
| force or threat of harm) | | | | | |
| 9. Other unwanted or uncomfortable sexual experience | | | | | |
| 10. Combat or exposure to a warzone (in the military or as a civilian) | | | | | |
| 11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war) | | | | | |
| 12. Life-threatening illness or injury | | | | | |
| 13. Severe human suffering | | | | | |
| 14. Sudden, violent death (for example, homicide, suicide) | | | | | |
| 15. Sudden, unexpected death of someone close to you | | | | | |
| 16. Serious injury, harm, or death you caused to someone else | | | | | |
| 17. Any other very stressful event or experience | | | | | |

Psychological Thriving Scale

Compared to how satisfied I was with my life **before** the COVID-19 pandemic, right **now** I am

| | |
|--|--|
| | more satisfied with most aspects of my life now. |
| | just as satisfied with most aspects of my life now. |
| | less satisfied with most aspects of my life now. |
| | extremely dissatisfied with most aspects of my life now. |

Compared to the person I was **before** the COVID-19 pandemic **right now** I am

| | |
|--|--|
| | a better person now in most ways, that is more like the person I always wanted to be. |
| | essentially the same person I was before in most ways. |
| | not quite the person I was before in most ways. |
| | a worse person now in most ways, and not at all like the person I always wanted to be. |

Compared to the quality of my relationships **before** the COVID-19 pandemic, **right now** my relationships are

| | |
|--|---|
| | much more satisfying and emotionally rewarding. |
| | just as satisfying and emotionally rewarding. |
| | somewhat less satisfying and emotionally rewarding. |
| | very unsatisfying and emotionally unrewarding. |

Appendix F – Ethics Approval



Downloaded: 17/02/2021
Approved: 16/02/2021

Eirini Mangou
Registration number: 190218021
Psychology
Programme: Doctorate in Clinical Psychology

Dear Eirini

PROJECT TITLE: Understanding Psychological Growth, Perceived Social Support, and Coping Skills in People with Asthma following/during the COVID-18 Global Health Crisis

APPLICATION: Reference Number 037780

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 16/02/2021 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 037780 (form submission date: 12/02/2021); (expected project end date: 01/05/2022).
- Participant information sheet 1086679 version 2 (12/02/2021).
- Participant consent form 1086680 version 1 (26/01/2021).

If during the course of the project you need to [deviate significantly from the above-approved documentation](#) please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Department Of Psychology Research Ethics Committee
Ethics Administrator
Psychology

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy:
<https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/approval-procedure>
- The project must abide by the University's Good Research & Innovation Practices Policy:
https://www.sheffield.ac.uk/polopoly_fs/1.6710661/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix G – Statistical Graphs

