The Relationship Between Post-Traumatic Stress, Post-Traumatic Growth, Emotion Regulation and Core Beliefs in the COVID-19 Pandemic*

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*This study is based on the master's degree dissertation in clinical psychology submitted by the first author, Agit Akyel to Istanbul Aydin University.

Abstract

Objective: The characteristics of the COVID-19 pandemic such as increased cases and deaths, quarantine and curfews that lasted for days, restrictions in personal and social lives had been potentially traumatic for many individuals. This study examined the relationship between the impact of the COVID-19 pandemic ((ICP; Post-traumatic Stress Symptoms (PTS symptoms)), post-traumatic growth (PTG), disruption in core beliefs (DCB), and cognitive emotion regulation strategies (CERS).

Method: The sample of the study consisted of 655 individuals living in Türkiye, of which 384 were female and 271 were male. In addition to Demographic Information Form, data were gathered by using the Impact of Events Scale (IES-R), the Post-Traumatic Growth Inventory (PTGI), the Core Beliefs Inventory (CBI) and the Cognitive Emotion Regulation Scale (CERS). Data were analysed by using SPSS IBM 23 program and PROCESS Macro v.4.1 plug-in.

Results: The findings showed that PTG was positively and significantly associated with ICP, DCB and CERS. The findings also showed that DCB and some CERS mediated the relationship between the ICP and PTG.

Conclusion: Findings indicated that during the COVID-19 pandemic, PTS symptoms and PTG could occur together. Moreover, findings indicated that during this process DCB and CERS played an important role. The present findings were discussed in the light of the relevant literature, and various recommendations were made for clinical practice and future research.

Keywords: COVID-19 Pandemic, Post-Traumatic Stress Symptoms, Post-Traumatic Growth, Disruption in Core Beliefs, Cognitive Emotion Regulation Strategies

COVID-19 Pandemisinde Travma Sonrası Stres, Travma Sonrası Büyüme, Duygu Düzenleme ve Temel İnançlar Arasındaki İlişki

Öz

Amaç: COVID-19 pandemi sürecinin artan vaka ve ölümler, günlerce süren karantina ve sokağa çıkma yasakları, bireysel ve sosyal yaşam alanlarının kısıtlanması gibi özellikleri birçok birey için travmatik bir deneyim niteliğinde olmuştur. Bu araştırmada, COVID-19 pandemisinin etkisi (TSS belirtileri), travma sonrası büyüme, temel inançlarda sarsılma ve bilişsel duygu düzenleme stratejileri arasındaki ilişki incelenmiştir.

Yöntem: Örneklem, Türkiye'de yaşayan 384'ü kadın, 271'i erkek olmak üzere toplam 655 yetişkin bireyden oluşmuştur. Demografik bilgi formuna ek olarak veriler olayların etkisi ölçeği (IES-R), travma sonrası büyüme ölçeği (TSBÖ), temel inançlar envanteri (TİE) ve bilişsel duygu düzenleme ölçeği (BDDÖ) kullanılarak toplanmıştır. Verilerin analizi, SPSS IBM 23 programı ve PROCESS Macro v.4.1 eklentisi aracılığıyla yapılmıştır.

Bulgular: Bulgular travma sonrası büyümenin; COVID-19 pandemi etkisi (TSS belirtileri), temel inançlarda sarsılma ve bilişsel duygu düzenleme stratejileri ile anlamlı düzeyde pozitif bir ilişki içinde olduğunu göstermiştir. Ayrıca bulgular, bazı bilişsel duygu düzenleme stratejilerinin ve temel inançlarda sarsılmanın COVID-19 pandemi etkisi (TSS belirtileri) ile travma sonrası büyüme arasındaki ilişkiye aracılık ettiğini göstermiştir.

Sonuç: Bulgular COVID-19 pandemi döneminde travma sonrası stres belirtilerinin ve travma sonrası büyümenin birlikte ortaya çıkabileceğine işaret etmiştir. Ayrıca, bulgular bu süreçte temel inançlarda sarsılmanın ve bilişsel duygu düzenleme stratejilerinin önemli bir rol oynadığına işaret etmiştir. Bulgular ilgili literatür ışığında tartışılmış, klinik uygulamalar ve gelecekteki araştırmalar için çeşitli önerilerde bulunulmuştur.

Anahtar Kelimeler: COVID-19 Pandemisi, Travma Sonrası Stres Belirtileri, Travma Sonrası Büyüme, Temel İnançlarda Sarsılma, Bilişsel Duygu Düzenleme Stratejileri

Introduction

Humankind has been exposed to many pandemics causing death and life-threatening diseases such as black plague, Spanish flu. In December 2019, the COVID-19 pandemic which started in Wuhan, China, quickly spread to the whole world and WHO declared a pandemic on March 11, 2020. The conditions caused by this pandemic had the potential to impact on daily life, physical and psychological health (Yang et al., 2021). Therefore, COVID-19 pandemic was addressed as a traumatic experience that threatened the lives of many individuals (Masiero et al., 2020).

Theoretically, people have three basic assumptions including benevolence of the world, meaningfulness of the world and self-worth on the basis of which they appraise new events (Janoff-Bulman, 1989). Accordingly, the new events consistent with the hypothetical world help to maintain the internal balance and facilitate adaptive processes. However, the new events which are inconsistent with the hypothetical world lead to questioning of, and disruption in the core beliefs. Consistent with these theoretical assumptions, traumatic events are sudden, unexpected, unusual and difficult to control. These events are also powerful and overwhelming (Tedeschi & Calhoun, 1995). The magnitude of the threat posed by such events usually exceeds the coping ability of the individuals and creates an imbalance. Such experiences can significantly interfere with one's sense of control (Spiegel, 1988). The individuals exposed to traumatic events become reluctant to take action because of perceived lack of control. As a result, in a state of fear, helplessness, insecurity, confusion and anger they start to show acute stress reactions (Zara, 2011). Acute stress reactions range from panic to shock, indifference and apathy (Levine & Frederick, 2021). Although acute stress reactions are essentially natural and protective responses to abnormal situations, the prolongation of these reactions may lay the grounds for many psychological problems including post-traumatic stress disorder (PTSD) (Zara, 2011).

Traumatic stress is known to have an impact on emotions. Traumatic experiences can lead to the experience of negative emotions such as including fear, anxiety, post-traumatic stress, depression and to difficulties in regulating emotions (Wild & Paivio, 2004). Therefore, one of the factors shaping the PTS symptoms may be the ability to manage intense negative emotions (Tedeschi & Calhoun, 2004; Wild & Paivio, 2004).

Recent studies have shown that this pandemic is related to an increase in many psychological difficulties including fear, anxiety, post-trauma stress, depression, panic disorder in the general population (Brooks et al., 2020; Parlapani et al., 2020). Although studies have reported the relationship of traumatic experiences with psychological problems such as PTSD, not everyone who has gone through traumatic experiences develop psychological problems. While studies have focused on the negative effects of traumatic experiences for many years, it has been argued that traumatic experiences may also have transformative effects (Park et al., 1996; Tedeschi & Calhoun, 1995). It is well-known that some individuals experience positive transformations after traumatic experiences (Levine et al., 2008; Linley & Joseph, 2004; Tedeschi & Calhoun, 1996; Tedeschi & Calhoun, 2004). COVID-19 pandemic may have brought positive transformations along with negative psychological outcomes (Vazquez et al., 2021). In the literature, such changes are explained on the basis of the construct of post-traumatic growth (PTG). This construct refers to a positive transformation that an individual experiences while struggling with traumatic experiences rather than a specific coping style and to a re-creation rather than a return to the state of existence before the traumatic event (Tedeschi & Calhoun, 2004; Tedeschi et al., 1998; Tedeschi et al., 2018).

It is argued that a change in the cognitions play an important role in PTG and that in essence PTG is the reconstruction of the shattered basic assumptions (Tedeschi & Calhoun, 2004). On the other hand, post-traumatic stress is also known to have an effect on emotions as well. Traumatic experiences may lead to negative feelings and to difficulties in regulating emotions (Wild & Paivio, 2004). For this reason, one of the factors that shape PTG may be the ability to manage intense negative emotions (Tedeschi & Calhoun, 2004; Wild & Paivio, 2004). Studies have shown the relationship of cognitive regulation strategies (CERS) with PTS symptoms (Hussain & Bhushan, 2011; Puechlong et al., 2020). Same can be the case for PTG (Orejuela-Dávila et al., 2019). There is a few studies on this area (Garnefski et al., 2008; Hussain & Bhushan, 2011).

The present study examined the relationship between the impact of COVID-19 pandemic (ICP; PTS symptoms), post-traumatic growth (PTG), disruption in the core beliefs (DCB), and CERS. The following hypotheses have been tested in the present study: H1: There is a significant relationship between ICP (PTS symptoms) and PTG.; H2: There is a significant relationship between ICP (PTS symptoms) and DCB.; H3: There is a significant relationship between DCB and PTG.; H4: There is a significant relationship between ICP (PTS symptoms) and the subscales of the CERS.; H5: There is a significant relationship between the subscales of the CERS and PTG.; H6: There is a mediating effect of DCB in the relationship of ICP (PTS symptoms) and PTG.; H7: There is a mediating effect of the subscales of the CERS in the relationship of ICP (PTS symptoms) and PTG.

Method

In the present study, the relational survey model was used in accordance with the aim of the present study.

Participants

Convenience sampling method was used as the sampling method. The sample consisted of 655 people in total, 384 (58.6%) of whom were female and 271 (41.4%) of whom were male. The exclusion criteria included any physical or cognitive disability preventing participation. More detailed information on the demographic characteristics of the sample is given in the findings section.

Measurement Tools

In addition to Demographic Information Form, the data were collected by using certain scales including Impact of Events Scale-Revised (IES-R), Post-Traumatic Growth Scale (PTGI), Core Beliefs Inventory (CBI) and Cognitive Emotion Regulation Scale (CERS).

Demographic information form

This form was developed by the present authors, and included questions related to the demographic characteristics such as age, sex and characteristics related to the COVID-19 pandemic and trauma history.

Impact of Events Scale-Revised (IES-R)

This scale (Weiss & Marmar, 1997) was a self-report scale consisting of 22 items rated on a 5-point Likert scale ranging from 0 and 4 (0=Never, 1=Rarely, 2=Sometimes, 3=Most of the time, 4=Always) according to symptoms experienced in the last seven days. The scale was adapted to people living in Türkiye to measure PTS symptoms (Çorapçıoğlu et al., 2006). This adaptation study was undertaken with 104 people between the ages of 18-65 who were diagnosed with PTSD and 65 people who were not diagnosed with PTSD. The internal consistency coefficient of the scale adapted into Turkish was calculated as 0.94. In the present study the Cronbach's alpha coefficient of the scale was calculated as 0.94.

Post-Traumatic Growth Inventory (PTGI)

This inventory (Tedeschi & Calhoun, 1996) which was a self-report measure consisting of 21 items rated on 6-point Likert scale was used to measure the positive changes that occurred after traumatic experiences ranging from 0 to 5 (0=I have not experienced, 1=I have experienced very little, 2= I have experienced a little, 3=I have experienced moderately, 4=I have experienced quite a lot, 5=I have experienced a lot). The maximum score that can be obtained from the scale is 105. A high score indicates a high level of growth after the trauma experience. The internal consistency coefficient of the original scale was calculated as 0.90 (Tedeschi & Calhoun, 1996). The scale was adapted to people living in Türkiye (Dürü, 2006). In the present study, the internal consistency coefficient was calculated as 0.93. Although the adaptation study formed the basis of a dissertation, this scale was also used in previous studies (Karaman, 2018). The Cronbach's alpha coefficient was calculated as 0.96 in the present study.

Core Beliefs Inventory (CBI)

This inventory (CBI) (Cann et al., 2010) consisted of 9 items rated on a 6-point Likert scale which measured the potential changes in core beliefs ranging from 0 to 5 (0=not at all, 1=very little, 2=little, 3=medium, 4=large, 5=very large). A high score on the scale indicates high disruption in the core beliefs. The original study (Cann et al., 2010) was undertaken in 3 sample groups (two university students and leukemia patients) aged between 18-81 years and the findings showed that the scale had a single-factor structure. Cronbach's alpha coefficients ranged from 0.82 and 0.90 and the test-retest reliability coefficient was 0.69. Findings also showed that the single-factor structure explained 42 to 53% of the variance. The scale was adapted to people living in Türkiye (Haselden, 2014). The adaptation study was undertaken with a total of

574 undergraduate students from different universities and faculties aged between 17-50 years. The Cronbach's alpha coefficient obtained for the scale was calculated as 0.87. Although the adaptation study formed the basis of a dissertation, this scale was also used in previous studies (Özyanık & Tarlacı, 2023). The Cronbach's alpha coefficient was calculated as 0.93 in the present study.

Cognitive Emotion Regulation Scale (CERS)

This scale (CERS) (Garnefski et al., 2001) consisted of 36 items rated on a 5-point Likert scale ranging from 1=ever, 2=rarely, 3=sometimes, 4=frequently, 5=almost always and 9 sub-scales pertaining to 9 cognitive coping styles used after negative or stressful life events. The scores that can be obtained from sub-scales ranged from 4 to 20. A high score in any sub-scale means that the strategy in question is used more. The Acceptance subscale measures thoughts that express acceptance or surrendering to the event experienced. The Positive Refocusing subscale measures the extent to which one thinks about positive things instead of thinking about negative events. Refocus on Planning measures thoughts about what to do against the negative event. Putting into perspective subscale measures thoughts that evaluate the event in a way that underestimates its importance or seriousness. Positive Reappraisal subscale measures thoughts that evaluate the event as an opportunity for personal development. These subscales are considered as strategies that facilitate adaptation. Blaming Others subscale measures the perception that others are the culprit of the negative event. Self-Blame subscale measures the perception that oneself is the culprit of the negative event. Rumination subscale measures repetitive thinking about feelings and thoughts related to the negative event. Catastrophizing subscale measures

thoughts that highlight the most disturbing aspects of the event. These subscales are considered as strategies that make adaptation difficult.

The scale was adapted to people living in Türkiye (Onat & Otrar, 2010) in 466 undergraduate students between the ages of 18 and 33. The internal consistency coefficient for the whole scale was calculated as 0.78 and the test-retest reliability coefficient was calculated as 1.00. Cronbach's alpha coefficients calculated for the sub-scales ranged from 0.67 to 0.84 in the present study.

Procedure

After obtaining the ethics committee approval (E-88083623-020-51930), the data were collected through the scales between June 2022 and August 2022 and were then transferred to the online forms (Google). The participants filled in the scales after signing the informed consent form.

Data Analysis

Data analysis was undertaken via SPSS IBM 23 program. Lost data and extreme values were firstly checked, and then skewness and kurtosis values were computed to check whether the data met the normality assumptions. Skewness and kurtosis values of all scales and their sub-scales were in the range of ± 1.5 indicating a normal distribution. Cronbach's Alpha (α) reliability coefficients were computed to examine internal consistency of the scales. Pearson Product Moment Correlation Coefficients were computed for the relationships between variables. Mediation analyses were carried out via IBM SPSS program with the PROCESS Macro v.4.1 plug-in to examine the mediating effects of DCB and the subscales of the CERS in the relationship of the ICP (PTS symptoms) with PTG.

Results

Demographic Characteristics and Characteristics Related to COVID-19 Pandemic and Trauma History

Table 1. Demographic Characteristics and Characteristics Related to the COVID-19 Pandemic and Trauma History

		N	%
Age	18-24	129	19.7
	25-34	316	48.3
	35-44	90	13.7
	45-54	68	10.4
	55-64	40	6.1
	65+	12	1.8
Sex	Female	384	58.6
	Male	271	41.4
Educational Status	Literate	5	0.8
	Primary School	31	4.7
	Secondary School	12	1.8
	High School	57	8.7
	University Degree	422	64.4
	Postgraduate Degree	128	19.6
Marital Status	Single	316	48.2
	Engaged	32	4.9
	Married	290	44.3
	Divorced	14	2.1
	Windowed	3	0.5
Income	Low	163	24.9
	Medium	389	59.4
	High	103	15.7
Employment Status	Yes	463	70.7
	No	192	29.3
COVID-19 Diagnosis	Yes	216	33.00
	No	439	67.00
Type of Treatment	Home	210	97.22
	Hospital	6	2.78
Quarantine Duration	5-7 Days	73	33.80
	7-14 Days	115	53.24
	14 Days and Over	28	12.96
Trauma History	Yes	216	33.00
	No	439	67.00
Type of Trauma	Natural Disaster	50	16.60
	Accident or Wounding	52	17.30
	Bereavement and Loss	144	47.80
	Physical and Sexual Assault	8	2.70
	Serious Illness	16	5.30
	Other	31	10.30

19.7% (129) were aged between 18 and 24, 48.3% (316) between 25 and 43, 13.7% (90) between 35 and 44, 10.4% (68) between 45 and 54, 6.1% (40) between 55 and 64 and 1.8% were at and above 65. 0.8% (5) were literate, %4.7 (31) were graduated from elementary school, 1.8% (12) from secondary school and 8.7% (57) from high-school, 64.4% (422) had a university degree and 19.6% (128) had a post graduate degree. 48.2% (316) were single, 4.9% (32) were engaged, 44.3% (290) were married, 2.1% (14) were divorced and 0.5% (3) were widowed. Information on the demographic characteristics is detailed in Table 1.

33% (216) reported to have a diagnosis of the COVID-19 disease. 97.22% (210) of those who had such diagnosis received treatment at home and 2.78% (6) at a hospital. Of those who had such diagnosis 33.80% (73) were quarantined for 5 to 7 days, 53.24% (115) for 7 to 14 days, 12.96% (28) for 14 days and above. 33% (216) reported to have a history of trauma, some had a history of more than one type of trauma. Accordingly, 16.6% (50) reported to have experienced a natural disaster, 17.3% (52) an accident or injury, 47.8% (144) a loss/grief, 2.7% (8) a physical or sexual assault, 5.3% (16) a severe illness and 10.3% (31) another type of trauma such as intrafamilial trauma, violence, economic crisis. Information on the characteristics related to the COVID-19 pandemic and trauma history is detailed in Table 1.

Correlation Analyses

The results of correlation analyses are given in Table 2.

Findings showed that there were positive relationships between IES-R total score and PTGI total score (r=0.30, p<0.01), between IES-R total score and CBI total score (r=0.37, p< 0.01), and between CBI total score and PTGI total score (r=0.68, p<0.01). These findings provided support for the first, second and third hypotheses.

Findings also showed that there were positive relationships between IES-R total score and the sub-scales of the CERS including self-blame (r=0.31, p<0.01), catastrophizing (r=0.49, p<0.01), blaming others (r=0.39, p<0.01), acceptance (r=0.21, p<0.01), rumination (r=0.18, p<0.01), positive refocusing (r=0.19, p<0.01), and putting into perspective (r=0.15, p<0.01). Contrary to these findings, there was no significant relationship between IES-R total score, and refocus on planning (r=-0.01, p>0.05) and positive reappraisal (r=0.02, p>0.05) sub-scales of the CERS. These findings provided partial support for the fourth hypothesis.

Moreover, there were positive relationships between PTGI total score, and rumination (r=0.37, p<0.01), positive refocusing (r=0.38, p<0.01), refocus on planning (r=0.32, p<0.01), positive reappraisal (r=0.37, p<0.01), putting into perspective (r=0.37, p<0.01), catastrophizing (r=0.30, p<0.01), self-blame (r=0.20, p<0.01), acceptance (r=0.25, p<0.01), and blaming others (r=0.23, p<0.01) subscales of the CERS. These findings provided support for the fifth hypothesis.

Mediation Analyses

Different models were tested through mediation analyses. The results of these analyses are given in Figures 1-10 and Table 3.

Findings showed that disruption in the core beliefs mediated the relationship between the ICP (PTS symptoms) and PTG. These findings provided support for the sixth hypothesis. Findings also showed that some CERS subscales including self-blame, acceptance, rumination, positive refocusing, putting into perspective, catastrophizing and blaming others had a mediating effect in the relationship between ICP (PTS symptoms) and PTG. However, other subscales of the CERS including refocus on planning and positive

reappraisal did not have a mediating effect in the same relationship. These findings provided partial support for the seventh hypothesis.

Discussion

This study examined the relationship between ICP (PTS symptoms), PTG, DCB, and the subscales of the CERS.

Findings showed that as ICP (PTS symptoms) increased PTG levels increased. This finding provides support for the first hypothesis and is consistent with the views that the traumatic events need to trigger some degree of distress for positive transformations to occur and that the post-traumatic negative outcomes (PTS symptoms) and positive outcomes (PTG) can be experienced simultaneously (Calhoun & Tedeschi, 1998; Tedeschi & Calhoun, 2004; Tedeschi et al., 1998). In addition, this finding is consistent with previous findings obtained in contexts other than COVID-19 pandemic (Jin et al., 2014; Kleim & Ehlers, 2009; Whealin et al., 2020) and in COVID-19 pandemic (Koliouli et al., 2021; Vazquez et al., 2021). Accordingly, this finding indicated that the COVID-19 pandemic may have positive outcomes as well as negative outcomes. Considering a traumatic experience such as the COVID-19 pandemic as an opportunity for positive transformations can be promising for psychological health. That is, arguably, keeping PTS symptoms at an optimal level may increase PTG. During difficult times such as the COVID-19 pandemic, psycho-educational interventions aiming at keeping PTS symptoms at optimal levels can be useful if the aim is to increase PTG levels. In particular, these psycho-educational interventions may raise awareness and help participants learn cognitive, emotional and behavioural strategies to reduce PTS symptoms to an optimal level. Future studies can examine this mechanism.

Another finding of the present study was that as ICP (PTS symptoms) increased the levels of DCB increased. This finding provides support for
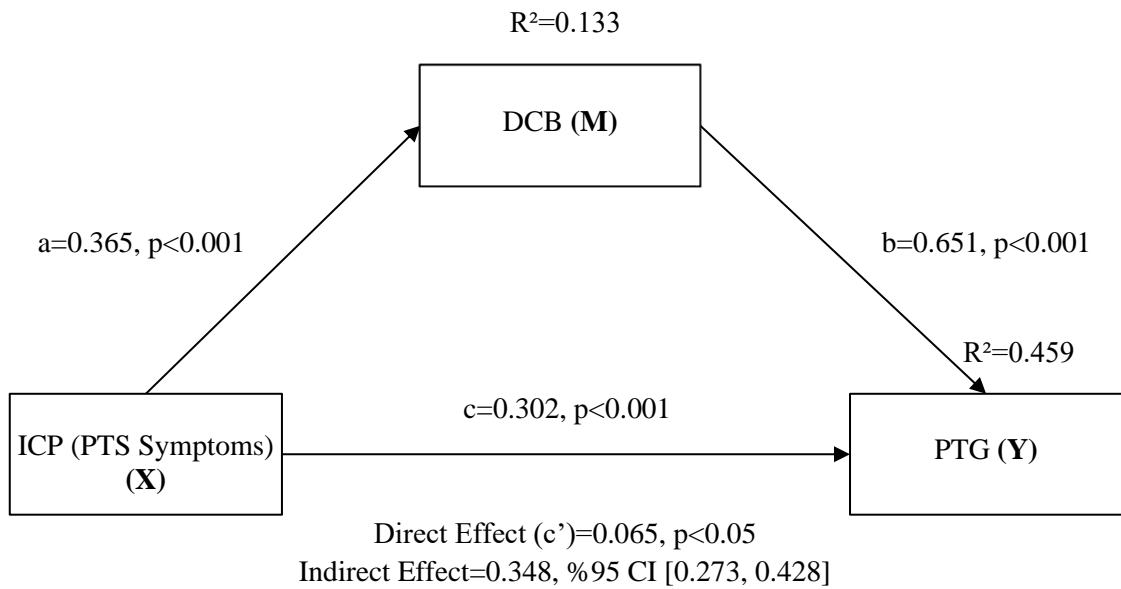
Table 2. Correlational Analyses

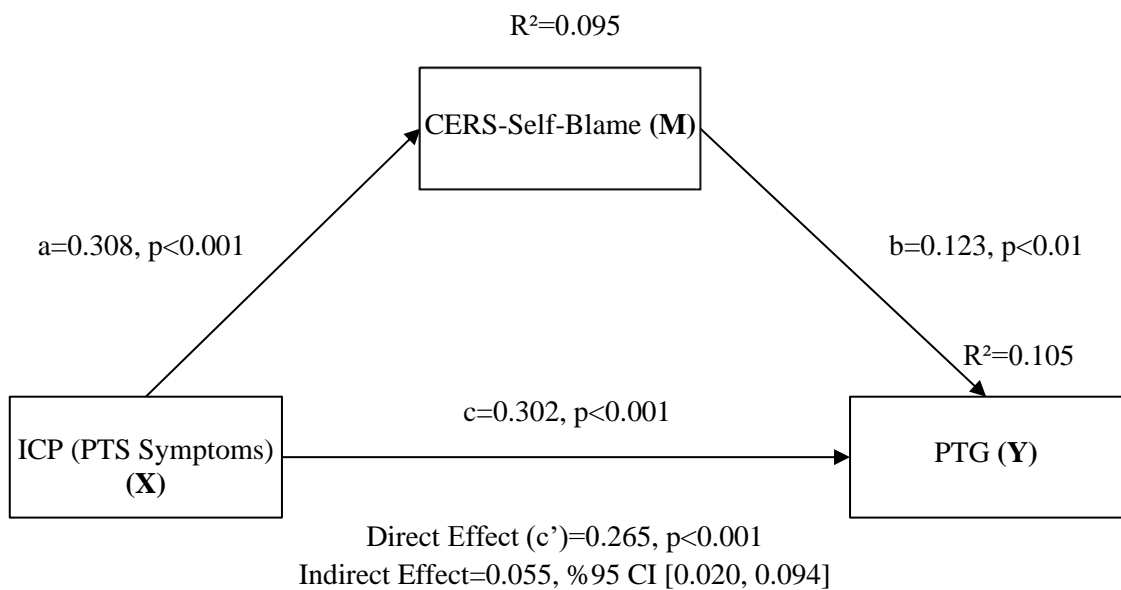| Variables		1	2	3	4	5	6	7	8	9	10	11	12
1. IES-R	r	1											
2. PTGI	r	0.30**	1										
3. CBI	r	0.37**	0.68**	1									
4. CERS-Self-Blame	r	0.31**	0.20**	0.32**	1								
5. CERS-Acceptance	r	0.21**	0.25**	0.36**	0.50**	1							
6. CERS-Rumination	r	0.18**	0.37**	0.48**	0.52**	0.55**	1						
7. CERS-Positive Refocusing	r	0.19**	0.38**	0.30**	0.20**	0.40**	0.30**	1					
8. CERS-Refocus on Planning	r	-0.01	0.32**	0.28**	0.19**	0.44**	0.52**	0.56**	1				
9. CERS-Positive Reappraisal	r	0.02	0.37**	0.29**	0.13**	0.45**	0.45**	0.60**	0.80**	1			
10.CERS-Putting into Perspective	r	0.15**	0.37**	0.31**	0.29**	0.47**	0.42**	0.56**	0.54**	0.62**	1		
11.CERS-Catastrophizing	r	0.49**	0.30**	0.37**	0.46**	0.35**	0.34**	0.21**	0.05	0.04	0.31**	1	
12.CERS-Blaming Others	r	0.39**	0.23**	0.32**	0.35**	0.28**	0.30**	0.30**	0.12**	0.13**	0.32**	0.65**	1

$*p<0.05, **p<0.01$

the second hypothesis and indicates that the COVID-19 pandemic is associated with DCB and is consistent with previous findings obtained in contexts other than the COVID-19 pandemic (Dekel et al., 2011; Ginzburg, 2004) and in the COVID-19 pandemic (Dominick, 2022; Dominick et al., 2022; Matsudaira et al., 2021). The COVID-19 pandemic may have created extraordinary conditions that are difficult to explain on the basis of existing core beliefs. Arguably, the extraordinary circumstances such as the gradual increase in the COVID-19 cases and death rates during the pandemic, the lockdown and curfews lasting for days and the increased uncertainty may have disrupted individuals' assumptions that the world is benevolent and meaningful and the self being valuable.

Findings also showed that there was a positive relationship between CBI total score and PTGI total score. That is, as post traumatic growth increased the levels of disruption in the core beliefs increased. This finding provides support for the third hypothesis and indicates that the disruption in the core beliefs can be an important factor for PTG. During a collective and multidimensional traumatic experience such as the COVID-19 pandemic, arguably the disruption in the core beliefs can be a factor that is worth considering. The psycho-educational interventions that will be offered to individuals in difficult circumstances such as the COVID-19 pandemic in the future may aim at reconstructing the core beliefs in a positive way. These interventions in turn may foster post-traumatic growth. These interventions may aim at raising awareness and
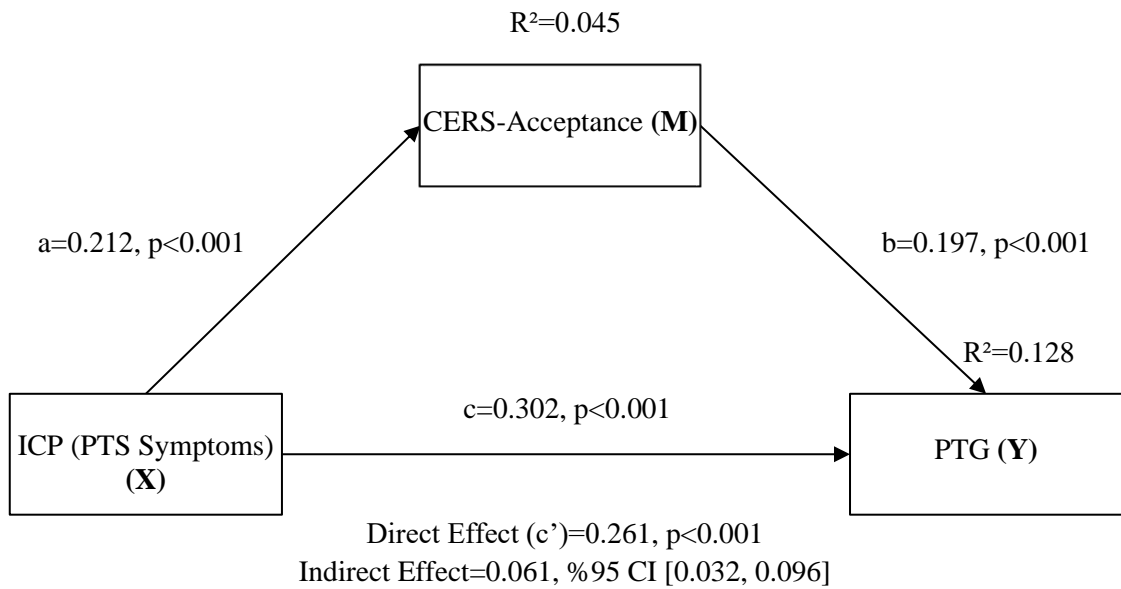
R²=0.133

DCB **(M)**

a=0.365, p<0.001

b=0.651, p<0.001

R²=0.459

ICP (PTS Symptoms) **(X)**

c=0.302, p<0.001

PTG **(Y)**

Direct Effect (c')=0.065, p<0.05
Indirect Effect=0.348, %95 CI [0.273, 0.428]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 1. Model 1: DCB

R²=0.095

CERS-Self-Blame **(M)**

a=0.308, p<0.001

b=0.123, p<0.01

R²=0.105

ICP (PTS Symptoms) **(X)**

c=0.302, p<0.001

PTG **(Y)**

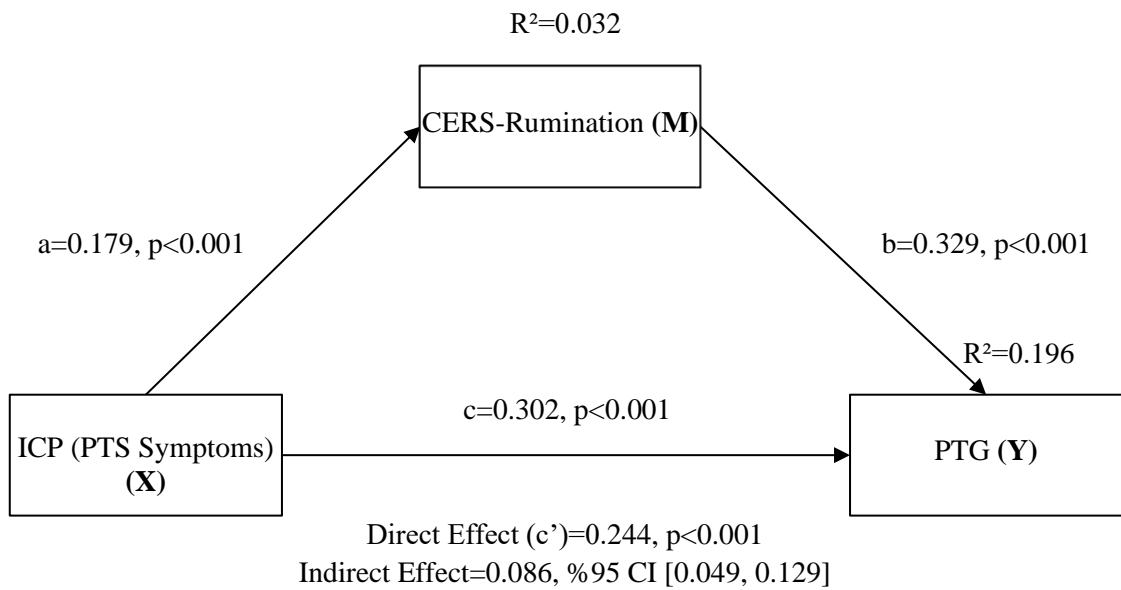Direct Effect (c')=0.265, p<0.001
Indirect Effect=0.055, %95 CI [0.020, 0.094]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 2. Model 2a: CERS-Self-Blame

R²=0.045

CERS-Acceptance (**M**)

a=0.212, p<0.001

b=0.197, p<0.001

R²=0.128

ICP (PTS Symptoms) (**X**)

c=0.302, p<0.001

PTG (**Y**)

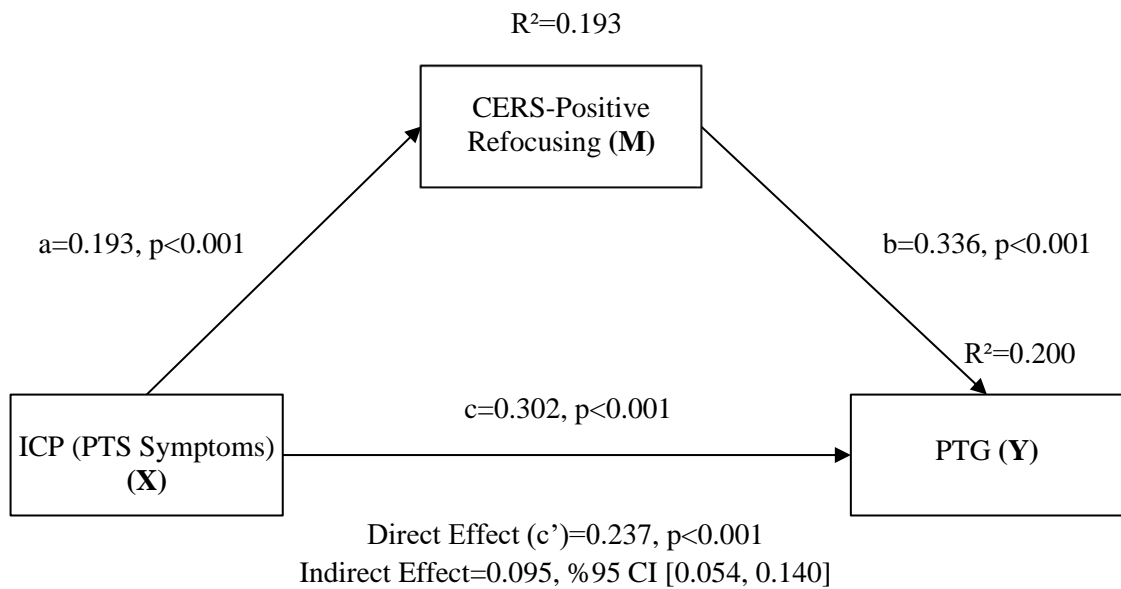Direct Effect (c')=0.261, p<0.001
Indirect Effect=0.061, %95 CI [0.032, 0.096]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 3. Model 2b: CERS-Acceptance

R²=0.032

CERS-Rumination (**M**)

a=0.179, p<0.001

b=0.329, p<0.001

R²=0.196

ICP (PTS Symptoms) (**X**)

c=0.302, p<0.001

PTG (**Y**)

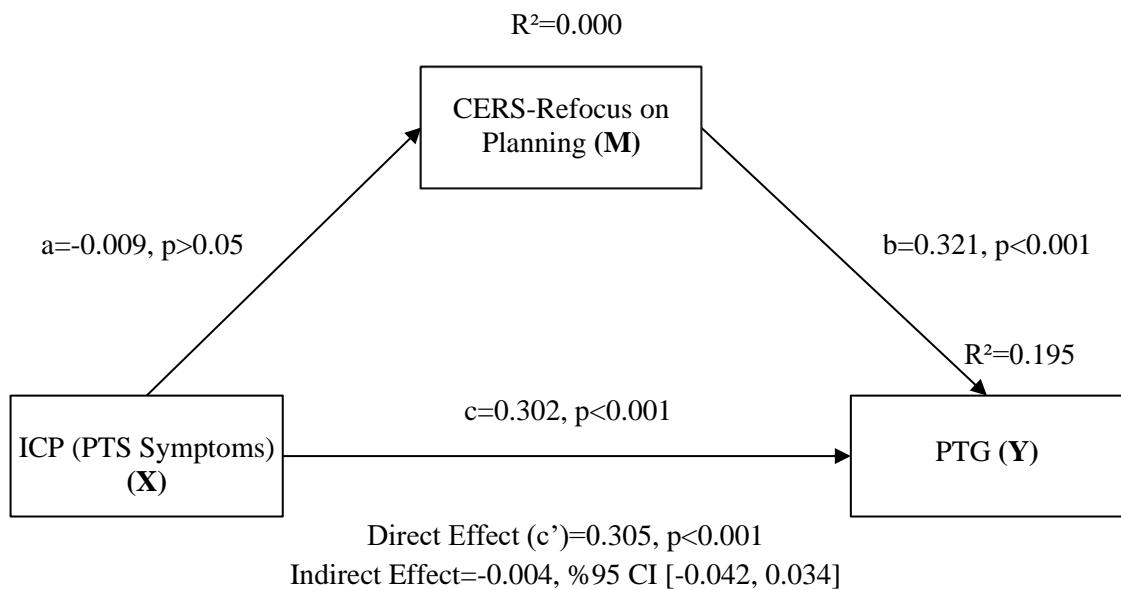Direct Effect (c')=0.244, p<0.001
Indirect Effect=0.086, %95 CI [0.049, 0.129]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 4. Model 2c: CERS-Rumination

R²=0.193

CERS-Positive
Refocusing (**M**)

a=0.193, p<0.001

b=0.336, p<0.001

R²=0.200

ICP (PTS Symptoms)
(**X**)

c=0.302, p<0.001

PTG (**Y**)

Direct Effect (c')=0.237, p<0.001
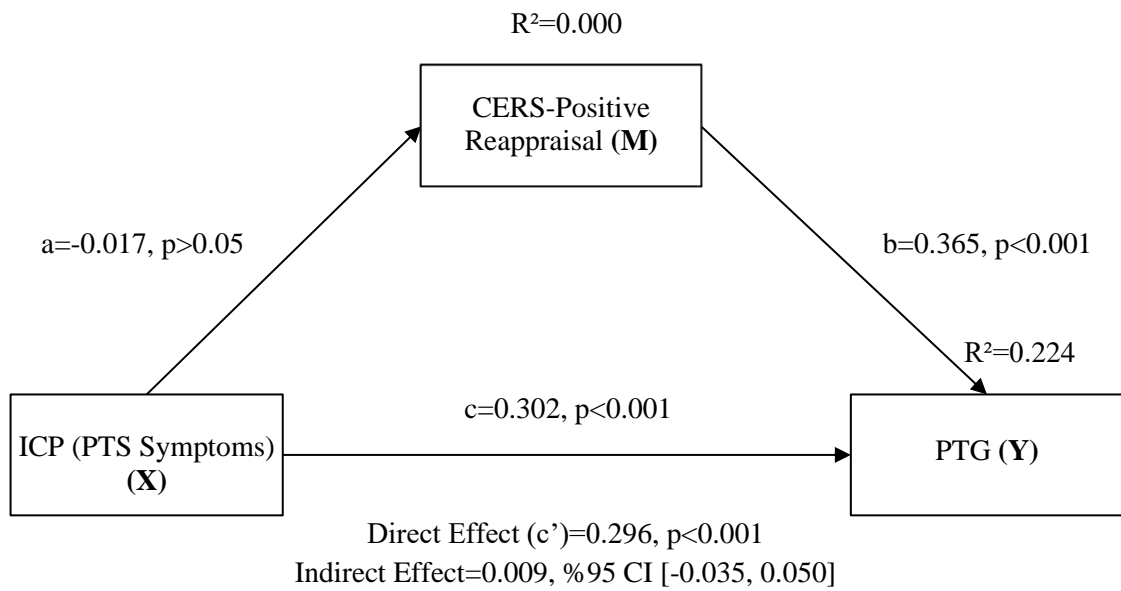Indirect Effect=0.095, %95 CI [0.054, 0.140]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 5. Model 2d: CERS-Positive Refocusing

R²=0.000

CERS-Refocus on
Planning (**M**)

a=-0.009, p>0.05

b=0.321, p<0.001

R²=0.195

ICP (PTS Symptoms)
(**X**)

c=0.302, p<0.001

PTG (**Y**)

Direct Effect (c')=0.305, p<0.001
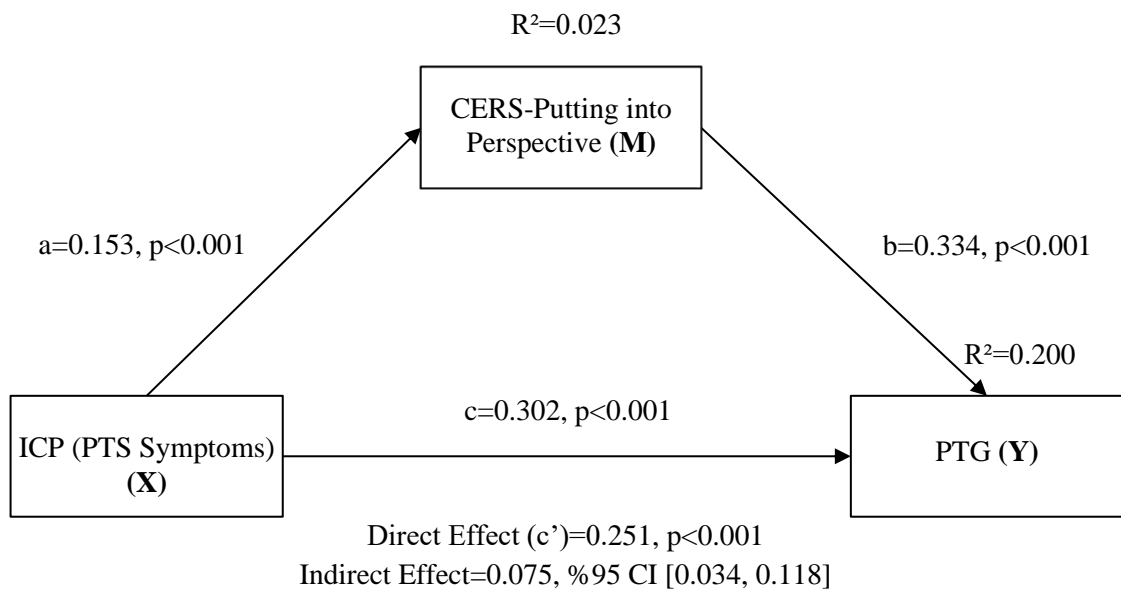Indirect Effect=-0.004, %95 CI [-0.042, 0.034]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 6. Model 2e: CERS-Refocus on Planning

R²=0.000

CERS-Positive
Reappraisal (**M**)

a=-0.017, p>0.05

b=0.365, p<0.001

R²=0.224

ICP (PTS Symptoms)
(**X**)

c=0.302, p<0.001

PTG (**Y**)

Direct Effect (c')=0.296, p<0.001
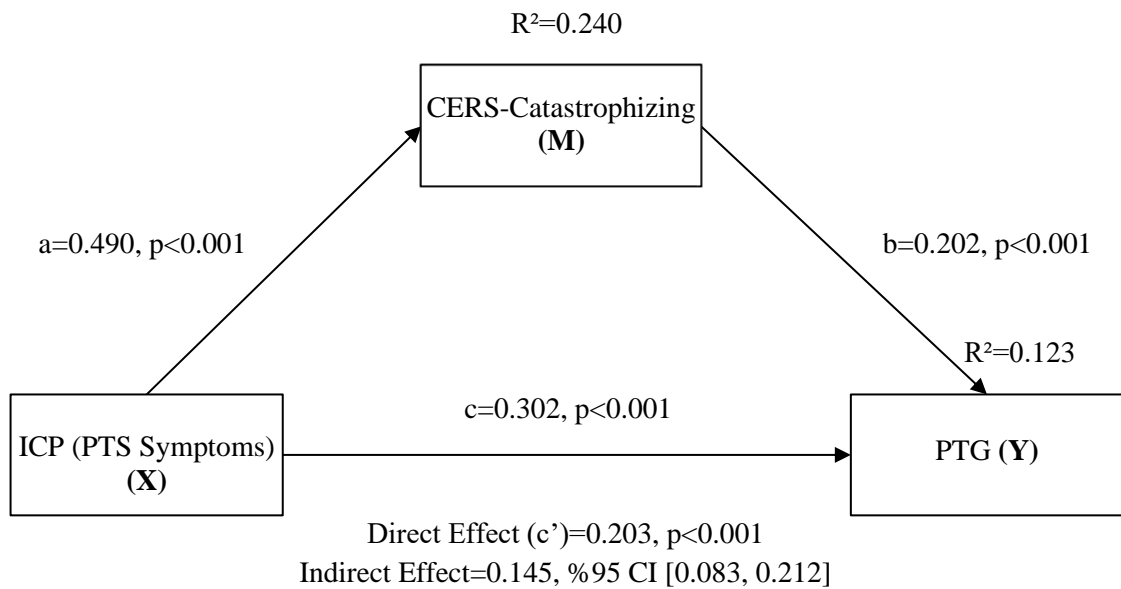Indirect Effect=0.009, %95 CI [-0.035, 0.050]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

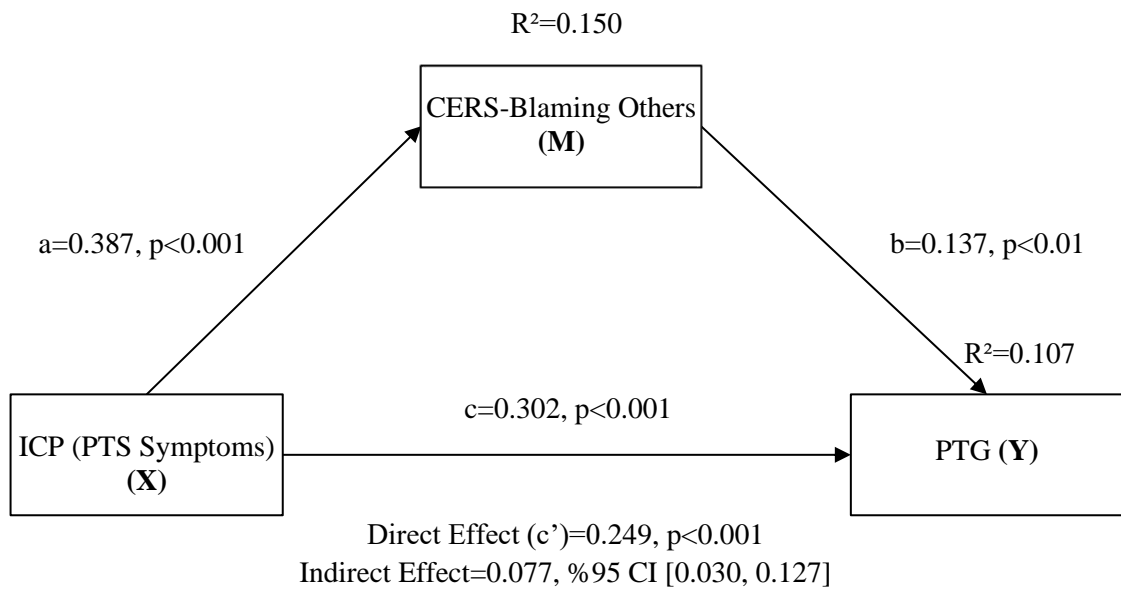**Figure 7.** Model 2f: CERS-Positive Reappraisal

R²=0.023

CERS-Putting into
Perspective (**M**)

a=0.153, p<0.001

b=0.334, p<0.001

R²=0.200

ICP (PTS Symptoms)
(**X**)

c=0.302, p<0.001

PTG (**Y**)

Direct Effect (c')=0.251, p<0.001
Indirect Effect=0.075, %95 CI [0.034, 0.118]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 8. Model 2g: CERS-Putting into Perspective

R²=0.240

CERS-Catastrophizing
(M)

a=0.490, p<0.001

b=0.202, p<0.001

R²=0.123

ICP (PTS Symptoms)
(X)

c=0.302, p<0.001

PTG **(Y)**

Direct Effect (c')=0.203, p<0.001
Indirect Effect=0.145, %95 CI [0.083, 0.212]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 9. Model 2h: CERS-Catastrophizing

R²=0.150

CERS-Blaming Others
(M)

a=0.387, p<0.001

b=0.137, p<0.01

R²=0.107

ICP (PTS Symptoms)
(X)

c=0.302, p<0.001

PTG **(Y)**

Direct Effect (c')=0.249, p<0.001
Indirect Effect=0.077, %95 CI [0.030, 0.127]

Not: Standardized beta coefficients have been reported, confidence interval
R²=Explained variance

Figure 10. Model 2i: CERS-Blaming Others

Table 3. Mediation Effects

		Effect	BootSE	%95 Confidence Interval		K²
				BootLLCI	BootULCI	
DCB	Indirect Effect	0.348	0.040	0.273	0.428	0.237
CERS-Self-Blame	Indirect Effect	0.055	0.019	0.020	0.094	0.038
CERS-Acceptance	Indirect Effect	0.061	0.017	0.032	0.096	0.042
CERS- Rumination	Indirect Effect	0.086	0.020	0.049	0.129	0.059
CERS-Positive Refocusing	Indirect Effect	0.095	0.022	0.054	0.140	0.065
CERS-Refocus on Planning	Indirect Effect	-0.004	0.019	-0.042	0.034	-0.003
CERS-Positive Reappraisal	Indirect Effect	0.009	0.021	-0.035	0.050	0.006
CERS-Putting into Perspective	Indirect Effect	0.075	0.021	0.034	0.118	0.051
CERS-Catastrophizing	Indirect Effect	0.145	0.033	0.083	0.212	0.099
CERS-Blaming Others	Indirect Effect	0.077	0.025	0.030	0.127	0.053

teaching cognitive coping strategies and metacognitive strategies that will help to question existing core beliefs and reconstruct more positive ones.

The findings of the present study also showed that self-blame, acceptance, rumination, positive refocusing, putting into perspective, catastrophizing and blaming others increased as ICP (PTS symptoms) increased. This finding provided support for the fourth hypothesis and can be evaluated in two ways: On one hand, this finding may suggest that as ICP (PTS symptoms) increases, the individuals blame themselves and the others more, and dwell and think more negatively about the event. On the other hand, this may suggest that as ICP increases (PTS symptoms), the individuals tend to accept the event more, to think more positively, and to put the event into perspective. In this sense, it can be argued that the individuals use both adaptive and maladaptive CERS at the same time during the COVID-19 pandemic. Although this finding is consistent with the findings of previous studies obtained in the contexts other than the COVID-19 pandemic (Hussain & Bhushan, 2011; Puechlong et al., 2020; Sheykhan et al., 2016),

as far as the authors are aware no such finding has been reported during the COVID-19 pandemic.

An important finding that strengthens the above-mentioned arguments is that the strategies of positive reappraisal and refocus on planning, which are expected to have a negative relationship with the PTS symptoms, did not do so. Cultural differences may explain these unexpected findings. Studies have been mostly undertaken in international samples. Indeed, studies have shown that the use of cognitive strategies is associated with the cultural factors (Megreya et al., 2016). That is, the same CERS exist in different cultures. However, in some cultures some strategies may be preferred more than others and these preferences vary across different cultures. On the other hand, the unique characteristics of the COVID-19 pandemic and its extraordinary circumstances can also be explanatory in this regard. The COVID-19 pandemic refers to a traumatic experience on a global scale, which has spread in an extent and rate that has never occurred before, has an impact on both social and personal levels, and threatens the life of the whole humankind. In the future, offering preventive and informative

psycho-educational interventions aiming at decreasing the maladaptive CERS in difficult times such as the COVID-19 pandemic may provide positive outcomes. These interventions may aim at raising awareness about different maladaptive and adaptive CERS and fostering the use of a wide range of adaptive CERS in difficult times.

Findings showed that the use of both adaptive and maladaptive CERS increased as the level of PTG increased. This finding provides support for the fifth hypothesis. There are very few studies on this subject in and outside the context of the COVID-19 pandemic. The relevant studies have shown inconsistent findings on the association of adaptive and maladaptive strategies with PTG (Garnefski et al., 2008; Shand et al., 2015; Thomas et al., 2020). CERS refer to the cognitive dimension of the ability to be aware, understand and manage emotions (Garnefski et al., 2001). Therefore, particularly adaptive strategies are expected to contribute to PTG (Garnefski et al., 2008; Kim & Jang, 2019; Orejuela-Dávila et al., 2019). In addition, the finding that the maladaptive strategies have a positive relationship with PTG supports the theoretical view that in order to positive transformations to occur, a traumatic event is required to trigger some degree of emotional distress (Tedeschi & Calhoun, 2004). That is, the maladaptive strategies may have contributed positively to the distress that is deemed necessary for the PTG. As far as the authors are aware, no such finding has been reported in the context of the COVID-19 pandemic. In the light of these findings, adaptive CERS can be used to reduce the negative psychological effects of the COVID-19 pandemic and to promote the positive transformations. Accordingly, educational and supportive intervention programs aiming at developing adaptive CERS can be developed. On the other hand, maladaptive CERS have an impact on the negative effects of a given traumatic event and on PTG. However, it can be

argued that these strategies can lead to negative outcomes when these are used intensively over a period of time. Therefore, intervention programs aiming at raising awareness on maladaptive strategies can be also offered.

The present findings showed that DCB mediated the relationship between ICP (PTS symptoms) and PTG positively. This finding provides support for the sixth hypothesis. Theoretically, the traumatic experiences that cannot be explained on the basis of existing core beliefs disrupt these core beliefs (Janoff-Bulman, 1992). PTG underlies the reconstruction of the core beliefs that are disrupted as a result of a traumatic event (Tedeschi & Calhoun, 2004). By nature, the COVID-19 pandemic has been a traumatic event which has not been experienced before. Because of extraordinary circumstances that the COVID-19 pandemic created, it can be argued that this has likely impacted drastically on the current core beliefs. Consistent with both theoretical assumptions and previous findings; present findings showed that DCB played a mediating role in the relationship of ICP (PTS symptoms) with PTG. This finding underlies the role that DCB plays during the growth process in the COVID-19 pandemic. Therefore, it is important that future research examines this mediating effect in a bigger sample by using more comprehensive analyses.

The present findings also showed that self-blame, acceptance, rumination, positive refocusing, putting into perspective, catastrophizing and blaming others mediated the relationship between ICP (PTS symptoms) and PTG positively. This finding provides support for the seventh hypothesis and indicates that both adaptive and maladaptive strategies mediated the relationship of ICP (PTS symptoms) and PTG. PTS symptoms are known to be effective on cognitions as well as feelings. Within the context of traumatic experiences, the individuals experience negative emotions such as fear and anxiety and

difficulties in regulating their emotions (Wild & Paivio, 2004). CERS have been shown to have a critical importance on the negative or positive outcomes following a traumatic event (Garnefski et al., 2001). The present finding, which seems to be contradictory at first, gives important clues about the dynamics of the process of PTG which can incorporate the pain and development regardless of the level of distress or happiness. There are theoretical views stating that a high level of stress and traumatic painful memories are required for post traumatic growth (Calhoun & Tedeschi, 1998; Tedeschi & Calhoun, 2004; Tedeschi et al., 2018). Accordingly, the present finding suggests that adaptive and maladaptive strategies contribute to growth in a way that is consistent with two opposite sides of the PTG. Therefore, within the context of the COVID-19 pandemic, it is important to take into account the role that CERS played in PTG. Therefore, it is important that future research examines this mediating effect in a bigger sample by using more comprehensive analyses.

On the other hand, findings showed that positive reappraisal and refocus on planning did not mediate the relationship of ICP (PTS symptoms) and PTG significantly. This finding is partially consistent with the findings of a meta-analysis undertaken outside the context of the COVID-19 pandemic (Seligowski et al., 2015). This metanalysis showed that although many emotion regulation strategies had a significant effect on PTS symptoms in different samples, other strategies such as acceptance and reappraisal did not. Positive reappraisal refers to the appraisal of a negative experience as an opportunity for personal development whereas refocus on planning refers to the thoughts on what to do in order to cope with negative experiences (Garnefski et al., 2001). The finding that these CERS do not have a significant mediating effect can be explained on the basis of the fact that the COVID-19 pandemic poses a global threat for all people

and requires extensive planning which concerns the public health beyond personal concerns. The extraordinary circumstances created by the COVID-19 pandemic may have inhibited personal development and planning as well as the ability to think about its positive aspects and possible solutions. Therefore, it is important that future research examines this mediating effect in a bigger sample by using more comprehensive analyses.

The present study examined the relationship between ICP (PTS symptoms), PTG, DCB, and the subscales of the CERS. Findings indicated that during the COVID-19 pandemic, PTS symptoms and PTG could occur together. Findings also showed that the PTS symptoms resulting from COVID-19 pandemic, DCB and CERS were important factors for PTG during the COVID-19 pandemic.

The present study was a cross-sectional study. The COVID-19 pandemic had been a traumatic experience that extended over a long period of time. The nature of the relationships that have been studied in the present study can vary across different periods of time. Similar studies but those using a longitudinal method may deepen the understanding of the experience of the COVID-19 pandemic. Moreover, in the present study, the total scores of PTGI and CBI were used to measure PTG and DCB. Future research may also use the scores on the subscales in order to get a more in depth understanding on the relationships between ICP (PTS symptoms), PTG, DCB, and the subscales of the CERS.

In the present study, the relationship between ICP (PTS symptoms) and PTG was examined, but the nature of this relationship was not examined in detail. Previous studies undertaken in contexts other than the COVID-19 pandemic suggest that there is a curvilinear relationship, rather than a linear relationship, between PTS symptoms and PTG, and that a moderate level of PTS symptoms are associated with a higher

level of PTG (Joseph et al., 2012; Shakespeare-Finch & Lurie-Beck, 2014). The nature of the relationship between these two variables can be examined further and different relationship profiles can be developed in future studies.

In the present study, the direct and indirect effects of the COVID-19 pandemic were examined using the whole sample. In the future studies, these effects can be also examined by taking into account variables such as the diagnosis of the COVID-19 disease and history of trauma in a larger sample. Moreover, further studies may also examine whether these effects vary across various demographic characteristics such as sex, age and characteristics related to the COVID-19 pandemic and trauma history.

PTG is a phenomenon which needs to be understood further. There are only a few studies that examined the role that CERS played in PTG. More research needs to be undertaken if the aim is to understand further the process of PTG and the relationship between CERS and PTG.

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