Compassion protects mental health and social safeness during the COVID-19 pandemic across 21 countries

Short title: Compassion as a protective factor against perceived threat of COVID-19

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The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Abstract

Background The COVID-19 pandemic is having an unprecedented detrimental impact on mental health in people around the world. It is important therefore to explore factors that may buffer or accentuate risk of mental health problems in this context. Given that compassion has numerous benefits for mental health, emotion regulation and social relationships, this study examines the buffering effects of different flows of compassion (for self, for others, from others) against the impact of perceived threat of COVID-19 on depression, anxiety and stress, and social safeness.

Methods The study was conducted in a sample of 4057 adult participants from the general community population, collected across 21 countries from Europe, Middle East, North America, South America, Asia and Oceania. Participants completed self-report measures of perceived threat of COVID-19, compassion (for self, for others, from others), depression, anxiety, stress, and social safeness.

Results Perceived threat of COVID-19 predicted higher scores in depression, anxiety and stress, and lower scores in social safeness. Self-compassion and compassion from others predicted lower psychological distress and higher social safeness. Compassion to others predicted lower anxiety. Self-compassion moderated the impact of perceived threat of COVID-19 on depression, anxiety and stress, whereas compassion from others moderated the effects of fears of contracting COVID-19 on social safeness. These effects were consistent across all countries.

Conclusions Our findings highlight the universal protective role of compassion, in particular self-compassion and compassion from others, in promoting resilience by buffering against the harmful effects of the COVID-19 pandemic on mental health and social safeness.

Keywords: Compassion; Mental health; Social safeness; Moderator effect; Perceived Threat of COVID-19; COVID-19 pandemic; Multinational study

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Introduction

With nearly 100 million people infected, and over 2 million deaths to date and rising, the COVID-19 pandemic has had a pervasive impact on human society (Worldometer, 2021). In an effort to reduce the spread of the virus and related pressures on healthcare services, many countries around the world have implemented community level restrictions, such as self-isolation or lockdown procedures, causing significant disruption to key aspects of people's daily life. Furthermore, the highly contagious and invisible nature of the virus has transformed core human behaviours such as social interactions (e.g., shaking hands, hugging) into threatening and potentially deadly experiences. The uncertainty of living with this new pathogen and the ensuing isolation and restrictions to human interaction pose as a severe risk to the mental health of the general population (Prout et al., 2020; WHO, 2020).

Confrontation with a major threat, such as a pandemic, has a range of negative consequences to mental health and psychosocial well-being. Evidence is already emerging that the implementation of lockdown measures is significantly impacting on mental health, with increasing presentations or exacerbation of stress, depression, anxiety and sleep problems (Gloster et al., 2021; Lee et al., 2020; Murphy et al., 2020; Serafini et al., 2020; van Tilburg et al., 2020; Wang et al., 2020a, 2020b; Wong et al., 2020). Heightened fear of COVID-19 has been associated with poor mental health indicators, including depression and anxiety (e.g., Ahorsu et al., 2020; Fitzpatrick et al., 2020; Bitan et al., 2020; Kanovsky & Halamová, 2020). While the unprecedented physical distancing measures have resulted in significant changes to people's social lives and feelings of social safeness, research has documented that social connectedness may buffer against the negative physical and mental health impact of the pandemic, and promote resilience (Nitschke et al., 2020; Palgi et al., 2020; Saltzman et al., 2020).

Therefore, investigating the protective factors that might mitigate the mental health effects of the COVID-19 pandemic and promote resilience during these adverse times is critical and a research priority for mental health science (Holmes et al., 2020; Vinkers et al., 2020). Compassion plays a pivotal role in emotion regulation, mental states, social relationships and behaviour (Seppälä et al., 2017), and may emerge as a key protective factor against the pervasive impact of the pandemic on mental health. The current study is part of a broader

multinational longitudinal study investigating the buffering effects of compassion during the COVID-19 pandemic.

Compassion definition

Although compassion can be variously defined (Mascaro et al., 2020), evolutionary-focused models (Gilbert, 2019, 2020) and ancient Buddhist traditions (Dalai Lama, 1995) conceptualize compassion as a prosocial motivation, defined as "*the sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it*" (Gilbert, 2014, p. 19). Being sensitive to and engaged with sources of distress rather than avoid, dissociate from or deny them requires courage, especially in the case of the COVID-19 pandemic. Compassion, evolving from the mammalian care-giving systems, comes with a range of physiological and emotional regulating systems, particularly for down-regulating threat and allowing states of '*rest and digest*' (Brown & Brown, 2015; Carter et al., 2017; Mayseless, 2016). Hence, compassion is supported by evolved physiological (e.g., the myelinated vagus nerve, oxytocin) and psychological mechanisms (e.g., social intelligence and competencies) that underpin caring motives and behaviour (Carter, 2014; Porges, 2007). Compassion emerges from the combination of an innate mammalian caring motivation and complex human cognitive competencies that have evolved over the last two million years (Dunbar, 2016; Gilbert, 2019). Compassionate competencies encompass the social intelligences of knowing/mind awareness, empathic awareness and knowing intentionality, that transform basic caring motives into potentials for compassion (Dunbar, 2016; Gilbert, 2019, 2020; Kirby & Gilbert, 2017).

When individuals are under stress, being cared for and supported by others has powerful physiological effects (Porges, 2007, 2017). Compassion can therefore be seen as a dynamic intra- and interpersonal process that unfolds in a social interactional context: there is the compassion we can express *to others*, the compassion that can be expressed to us *from others*, and our ability to be *self-compassionate* (Gilbert et al., 2011). These three flows of compassion are highly interactive and can influence each other (Gilbert, 2014; Gilbert et al., 2017), but they can also be independent, in that one may struggle with being compassionate towards oneself but be able to direct compassion to others (Lopez et al., 2018).

Compassion as a buffer

Burgeoning research has demonstrated the benefits of compassion for mental health and emotion regulation (e.g., MacBeth & Gumley, 2012), physiological health (e.g., Fredrickson et al., 2013; Kim et al., 2020; Klimecki et al., 2014), and interpersonal and social relationships (e.g., Crocker & Canevello, 2012; Yarnell & Neff, 2013). In particular, self-compassion has been

shown to be a protective factor, increasing resilience to common mental health issues (MacBeth & Gumley, 2012; Muris & Petrocchi, 2017) and promoting wellbeing (Zessin et al., 2015). For example, self-compassion has been shown to moderate the relationship between stress, shame or stigma and psychological distress (Blackie & Kocovski, 2019; Heath et al., 2018; Luo et al., 2018; Oliveira et al., 2018; Wong et al., 2016). Being compassionate to others has also been associated with mental health benefits (Miller, Kahle, Lopez, & Hastings, 2015) and stronger social connections (Cozolino, 2007; Crocker & Canevello, 2012). Moreover, the ability to be open to receiving compassion from others may buffer against depressive symptoms (Hermanto et al., 2016; Steindl et al., 2018). In addition to compassion offering wellbeing benefits, compassion can also be cultivated and enhanced through interventions such as Compassion Focused Therapy (CFT; for patients) and Compassionate Mind Training (CMT; for the general public) (Gilbert & Procter, 2006; Gilbert, 2014, 2020) where it has been shown to diminish mental health issues (e.g., depression, anxiety, stress, self-criticism, shame) (Craig et al., 2020 and Kirby et al., 2017 for reviews; Irons & Heriot-Maitland, 2020; Matos et al, 2017).

In relation to the pandemic, self-compassion has been found to improve life satisfaction and coping (Li et al. 2021), cohabitation (Jimenez et al., 2020), and mediated the effect of the perceived COVID-19 threat on death anxiety (Kavakli et al., 2020) and depression, anxiety and stress (Lau et al., 2020). Going beyond cross-sectional data, in an experimental study, Cheli et al. (2020) found that an online compassion-focused intervention reduced depression, anxiety and stress in patients at high risk of psychosis during the pandemic.

However, the majority of the aforementioned studies examined a unidimensional construct of self-compassion, using the Self-Compassion Scale (Neff, 2003). The proposed study builds on this literature by using a multidimensional measure which distinguishes the three flows of compassion (Compassion Engagement and Action Scales, CEAS; Gilbert et al., 2017). This scale also further distinguishes compassionate engagement (being sensitive and empathic to distress and motivated to engage with it rather than avoid it) from compassionate action (having the wisdom and skills to take the most appropriate action to alleviate distress). This offers an important distinction because being sensitive to distress but not knowing what actions to take can increase rather than decrease distress (Gilbert et al., 2017) and result in burnout (Ricard, 2015). For example, COVID-19 frontline health professionals not only require courage to engage with patients but also extensive technical competencies.

In previous studies, the flows of compassion for self, for others and from others (as measured by the CEAS) have demonstrated their distinct qualities. For example, self-compassion (in

particular) and receiving compassion from others tend to show the strongest associations and be the greatest predictors of depression, anxiety, stress and positive affect (Gilbert et al., 2017; Lindsey, 2019; Matos et al., 2017; Steindl et al., 2018). Self-compassion and compassion from others moderate the relationship between negative appraisal of major life events and decreased psychological quality of life (Ferreira et al., 2020). Compassion for others shows weaker associations with distress (Gilbert et al., 2017). The general public report having higher rates of compassion for others, than for themselves or from others (Lindsey, 2019). However, all flows of compassion have been shown to be improved through CMT (Irons & Heriot-Maitland, 2020; Matos et al., 2017).

Aims

To date, no study has explored these multiple dimensions of compassion to self and others in the context of the COVID-19 pandemic. The current study aimed to explore the impact of perceived threat of COVID-19 and the three flows of compassion on mental health indicators and social connectedness, in a global adult population across 21 countries from Europe, Middle East, North America, South America, Asia and Oceania. In particular, this study aimed to examine cross-nationally whether self-compassion, compassion to others and receiving compassion from others would moderate the effects of perceived threat of COVID-19 (i.e., fear and likelihood of contracting SARS-Cov-2) on symptoms of depression, anxiety and stress and feelings of social safeness. Given that previous studies have demonstrated the buffering effect of self-compassion against psychological distress (Blackie & Kocovski, 2019; Heath et al., 2018; Luo et al., 2018; Oliveira et al., 2018; Wong et al., 2016) we hypothesised that self-compassion would be a protective factor and significant moderator between perceived threat of COVID-19 and depression, anxiety and stress. It was also hypothesised that compassion from others and to others (although to a lesser degree) would also act as protective factors moderating the impact of fears of COVID-19 on depression, anxiety and stress. Furthermore, compassion is a predictor of social safeness (Akin & Akin, 2015; Kelly & Dupasquier, 2016), hence it was hypothesised that compassion would act as a protective factor between perceived threat of COVID-19 and social safeness.

Methods

Participants

The research sample was gathered from 23 different countries. We excluded the data from Peru (*N* = 16) and Uruguay (*N* = 23) due to small sample size. The total sample consisted of 21

countries with 4057 participants, mean age 41.45 (*SD* = 14.96), with 80.8% (*N* = 3279) women, 18.2% (*N* = 739) men, 0.4% (*N* = 15) other, and 0.6% (*N* = 24) preferred not to respond. For demographic details per country see Supplementary Online Material 1.

Measures

The online survey collected sociodemographic information (nationality, country of residence, age, gender) and administered self-report instruments assessing perceived threat of COVID-19, compassion (for self, for others, from others), mental health (depression, anxiety and stress), and social safeness.

The Perceived Coronavirus Risk Scale (PCRS; Kanovský & Halamová, 2020, adapted from Napper et al., 2012) is an 8-item self-report questionnaire that assesses participants' fear of getting infected with SARS-Cov-2 in two dimensions: Fear of Contraction (affective aspect) and Likelihood of Contraction (cognitive aspect). Participants are asked to rate on a five-point Likert scale how much they agree with each sentence from 1 (strongly disagree) to 5 (strongly agree). It has one reversed item. Higher scores represent higher perceived threat of COVID-19. In the original study, Kanovsky and Halamová (2020) reported internal consistency to be acceptable (Fear of Contraction α = .72; Likelihood of Contraction α =.71). In the present study, internal consistency was acceptable (Fear of Contraction α = .70; Likelihood of Contraction α = .70).

Compassionate Engagement and Action Scales (CEAS; Gilbert et al., 2017) includes three scales that assess the three flows of compassion: self-compassion, compassion to others and compassion received from others, with 13 items each. Each scale measures different elements of compassion *Engagement* (6 items and 2 filler items) and *Action* (4 items and 1 filler item). Participants are asked to rate each item on a ten-point Likert scale, based on how frequently it occurs, from 1 (never) to 10 (always). Each scale can be analysed in terms of the Engagement and Action components separately or as a single factor. Here we use each of the three flows of compassion as a single factor scales. In the original study, the CEAS showed good internal consistencies and temporal reliability (Gilbert et al., 2017). In the present study, internal consistency ranged between good and excellent: Compassion for self-Engagement α = .74/Action α = .89; Compassion for others-Engagement α = .81/Action α = .88; Compassion from others-Engagement α = .91/Action α = .93.

Depression, Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995) is a 21-item self-report instrument that measures three mood states: depression, anxiety and stress, with

seven items each. Participants are asked to rate on a four-point Likert scale how often items applied to them over the past week from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Higher scores represent higher severity of symptoms. Lovibond and Lovibond (1995) found the subscales internal consistency to range between excellent and good (Depression α = .91; Anxiety α = .84; Stress α = .90). In the present study internal consistency also ranged from good to excellent (Depression α = .91, Anxiety α = .87, Stress α = .88).

Social Safeness and Pleasure Scale (SSPS; Gilbert et al., 2008) is an 11-item self-report measure that assesses the extent to which people usually experience their social world as safe, warm and soothing and how connected they feel to others. Participants are asked to rate on a five-point Likert scale how often they feel as described in each sentence from 1 (almost never) to 5 (almost all the time). Higher scores represent higher perceived social safeness and connectedness to others. In the original study, internal consistency was excellent (α= .92). In the present study, internal consistency is excellent (α=.94).

Procedures

This study is part of a broader longitudinal multinational study on compassion, social connectedness and trauma resilience during the COVID-19 pandemic. The study was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra (UC; CEDI22.04.2020) and was conducted in compliance with the 1964 Helsinki Declaration and its later amendments. When necessary, local national ethical approval was also obtained. The current analysis used cross-sectional data collected between mid-April 2020 and mid-May 2020, across 21 countries from Europe, (United Kingdom, Portugal, Spain, Italy, France, Greece, Cyprus, Poland, Slovakia, Denmark), North America (USA, Canada), South America (Brazil, Argentina, Chile, Colombia, Mexico), Asia (China, Japan), Oceania (Australia), and Middle East (Saudi Arabia).

An online survey, combining existing and novel measures, was created by the research team in English and translated to 11 other languages using forward/backward procedures. In instances where a self-report questionnaire had already been validated for a particular language/country that version was selected. The surveys were hosted at the UC institutional account in the online platform https://www.limesurvey.org/pt/, and a website was created to support the dissemination of the study across countries (https://www.fpce.uc.pt/covid19study/). The study was disseminated through social and

traditional media platforms and institutional/professional emailing lists in each country, using snowball sampling. In addition, Facebook ads were used to promote participation among the general population in some countries. Before the completion of the survey, participants were informed about the aims of the study, procedures and the voluntary and anonymous nature of participation. Confidentiality of the collected data was assured, and written informed consent was obtained before the completion of the study protocol. The survey was self-paced and about 25min long. There was no payment for completing the survey.

Data analysis

Given the data includes multiple dependent variables, a multivariate multilevel model must be considered, at least for the three-dimensional DASS-21 scale (depression, anxiety and stress). Despite multivariate analysis increasing the complexity in a multilevel context, it enables the performance of a single test of the joint effects of our independent variables on several dependent variables (Hox et al., 2017; Snijders & Bosker, 2012). Data were collected from respondents who were clustered within countries. Three separate models may have sacrificed the overall picture. Therefore, multivariate multilevel analysis was preferable and has the capability of increasing statistical power. Each of the models had three levels: measurements of dimensions of the DASS-21 were the level 1 units, the respondents were the level 2 units, and the countries were the level 3 units.

The statistical procedure for the three-dimensional DASS-21 was as follows: (1) fitting six multilevel multivariate models, each with three dependent variables (depression, anxiety, stress): a) PCRS fear of contraction as the predictor, CEAS self-compassion as the predictor, and their interaction (CEAS self-compassion being the moderator); b) PCRS likelihood of contraction as the predictor, the CEAS self-compassion as the predictor, and their interaction (CEAS self-compassion being the moderator); c) PCRS fear of contraction as the predictor, CEAS compassion for others as the predictor, and their interaction (CEAS compassion for others being the moderator); d) PCRS likelihood of contraction as the predictor, CEAS compassion for others as the predictor, and their interaction (CEAS compassion for others being the moderator); e) PCRS fear of contraction as the predictor, CEAS compassion from others as the predictor, and their interaction (CEAS compassion from others being the moderator); f) PCRS likelihood of contraction as the predictor, CEAS compassion from others as the predictor, and their interaction (CEAS compassion from others being the moderator); (2) for each model, we tested the fit of three nested models with the data by two likelihood-

ratio tests and information criteria AIC (Akaike information criterion) and BIC (Bayes Schwarz information criterion): a) the first model was the multilevel model without taking into account three dimensions of the DASS-21, and having two main predictors without the moderation; b) the second model was the multivariate multilevel model taking into account three dimensions of the DASS-21, and having two main predictors without the moderation; and finally c) the third model was the multivariate multilevel model taking into account three dimensions of the DASS-21, and having two predictors with the moderation. Our hypothesis in its strict form could have been retained if and only if: a) the second model had a better fit than the first one (taking into account the dimensions of the DASS-21 was justified – respondents provided different answers in DASS-21 different dimensions, otherwise the use of the multivariate model would not be warranted); b) the third model had the better fit than the second one – adding moderation should improve the fit. If not, only main effects (and no moderation) could have had an impact; (3) if the third model had the best fit, we would report and interpret its coefficient (p-values would be corrected by Bonferroni procedure to account for multiple testing); (4) Otherwise, we would report coefficients of any model with the best fit; we also provided the graphical representations of effects.

Since the SSPS is a unidimensional scale the univariate multilevel model was sufficient. Two models were fitted: a) PCRS fear of contraction as the predictor, and b) PCRS likelihood of contraction as predictor, and both models contained the same set of three moderators: compassion for self, compassion for others, and compassion from others.

For statistical analyses we used the R program version 4.0.3 (R Core Team, 2020), "lme4" package (Bates et al., 2015). The effects were displayed through "sjPlot" package (Lüdecke, 2018). As fixed effects, we entered the mean-centred PCRS subscale scores in an interaction with the mean-centred CEAS scales scores for each dimension of DASS-21, and for the SSPS. As random effects, we used intercepts for participants and countries for each dimension of DASS-21 and intercept for countries for the SSPS. For mean centering we used "questionr" package (Barnier et al., 2017).

The R code syntax for the model is included in Supplementary Online Material 2. R^2 ('variance explained') statistics were used to measure the effect size of the model. However, there is no consensus as to the most appropriate definition of R^2 statistics in relation to mixed-effect models (Edwards et al., 2008; Nakagawa & Schielzeth, 2013; LaHuis et al., 2014; Jaeger et al., 2016). Even though several methods for estimating the coefficient of determination (R^2) for mixed-effect models are accessible, the estimation of R^2 marginal and R^2 conditional in "MuMIn" package (Barton, 2015) was performed. The marginal R^2 is the proportion of

variability explained by the fixed effects/predictors, the conditional R^2 is the proportion of variability explained by both fixed and random effects (differences between respondents and differences between countries).

Results

In Table 1, the likelihood-ratio tests and information criteria AIC and BIC are presented.

[Insert Table 1 here]

It is evident from Table 1 that all multivariate models (b-models) consistently had a better fit than models that did not take dimensionality into account. However, only models with self-compassion as moderator (1c and 2c) had a better fit than models without moderation.

Compassion for self

Table 2 presents coefficients of best fitting models for self-compassion (1c, 2c).

[Insert Table 2 here]

The main effects of fear of contraction on depression, anxiety and stress were all significant (and positive). The main effects of self-compassion on all three dimensions of the DASS-21 were all significant as well (but negative). Interaction effects were significant in all three dimensions of the DASS-21 indicating that self-compassion significantly moderates the impact of the fear of contraction on depression, anxiety and stress, across all countries. The variability among respondents was lowest in anxiety, and so was the variability among countries, which was in general larger than the individual variability, especially in depression and stress. Fig. 1. displays marginal effects of moderation of self-compassion in the case of fear of contraction: all slopes for highly self-compassionate subjects (green) were less steep than other slopes, therefore self-compassion buffers against the impact of fear of contraction on depression, anxiety and stress, with the largest effect of moderation (the least parallel lines) being for anxiety, followed by stress and depression.

[Insert Figure 1 here]

A similar pattern was present when likelihood of contraction was the predictor, but main effects were weaker. Self-compassion significantly moderated the impact of the likelihood of contraction on anxiety and stress (across all countries), but not depression.

Compassion for others

Table 3 presents coefficients of best fitting models for compassion for others (3b, 4b).

[Insert Table 3 here]

The main effects of fear of contraction on depression, anxiety and stress were again all significant (and positive), but the main effect of the compassion for others was significant (and negative) only in depression. Interaction effects were not tested, since the model with them did not significantly improve the fit with the data (see Table 1 above). The variability among respondents was again lowest in anxiety, and so was the variability among countries, which was larger than the individual variability, in both depression and stress. An identical pattern was discernible for the likelihood of contraction.

Compassion from others

Table 4 presents the coefficients of best fitting models for compassion from others (5b, 6b).

[Insert Table 4 here]

The main effects of fear of contraction and likelihood of contraction on depression, anxiety and stress were all significant (and positive), and so were all main effects of compassion from others (but negative). Interaction effects were not tested, since the model with them did not significantly improve the fit with the data (see Table 1 above). The variability among respondents was lowest in anxiety, and so was the variability among countries, which was larger than the individual variability, both in depression and stress. Again, the likelihood of contraction as the predictor variable showed a similar pattern of results, and thus the same conclusion can be reached.

Social safeness

Table 5 presents coefficients of two models with the SSPS social safeness.

[Insert Table 5 here]

The main effect of fear of contraction on SSPS was significant (and negative), and main effects for self-compassion and compassion from others were significant (and positive). The main effect for compassion for others was found to be non-significant. Only compassion from others significantly moderated the effect of fear of contraction on the SSPS across all countries. While the same pattern of main effects can be seen when likelihood of contraction is the predictor variable, no moderation effect was found.

Discussion

The aims of this study were to assess how different flows of compassion (for self, to others, from others) act as a protective factor against perceived threat of COVID-19 on mental health and social safeness. Given that previous studies have demonstrated the buffering effect of self-compassion against psychological distress (Blackie & Kocovski, 2019; Heath et al., 2018; Luo et al., 2018; Oliveira et al., 2018; Wong et al., 2016), including in the context of COVID-19 (Kavakli et al., 2020; Jimenez et al., 2020; Lau et al., 2020; Li et al. 2021) it was hypothesised that self-compassion would be a protective factor and significant moderator between the perceived threat of COVID-19 (i.e., fear and likelihood of contraction) and depression, anxiety and stress. This hypothesis was supported and self-compassion was found to significantly moderate the impact of fear of contracting COVID-19 on depression, anxiety and stress, acting as a protective factor. Furthermore, self-compassion moderated the effects of the perceived likelihood of contraction on anxiety and stress. This moderator effect of self-compassion was particularly strong between perceived threat of COVID-19 and anxiety. This effect was consistent across all 21 countries and was not affected by differences in questionnaire responses between countries.

Unique to this study was the multidimensional measurement of compassion which considers the flows of self-compassion, and compassion for others and from others. It was hypothesised that compassion for others and from others (although to a lesser degree than self-compassion) would also act as protective factors moderating the impact of perceived threat of COVID-19 on depression, anxiety and stress. These hypotheses were not supported. Whilst the flows of compassion for others was a significant predictor of depression; and whilst compassion from others was a significant predictor of depression, anxiety and stress across all countries, these flows of compassion were not significant moderators and therefore cannot be said to be protective factors against the impact of perceived threat of COVID-19 on developing or exacerbating symptoms of depression, anxiety or stress.

A second aim of this study was to consider the impact of perceived threat of COVID-19 on social safeness, as well as the moderating role of compassion. Previous research found that social connectedness can buffer against the negative physical and mental health impact of the coronavirus pandemic, and promote resilience (Nitschke et al., 2020; Palgi et al., 2020; Saltzman et al., 2020), however, the effect perceived of COVID-19 might have on one's sense of social safeness has not been explored to date. We hypothesised that COVID-19 would have

a negative relationship with social safeness, and this hypothesis was supported by our findings. Furthermore, given compassion is a motivation and competency which evolved from mammalian caring and is highly associated with social safeness (Akin & Akin, 2015; Kelly & Dupasquier, 2016) it was hypothesised that compassion would act as a protective factor between perceived threat of COVID-19 and social safeness. This hypothesis was partially supported. Self-compassion was a significant predictor of social safeness but did not moderate the impact of fear or likelihood of contracting COVID-19 on social safeness. Compassion for others was not a significant predictor of social safeness. However, compassion from others did emerge as a significant moderator of the negative impact of fear of contracting COVID-19 on social safeness and connectedness to others. This buffering effect was consistent across all 21 countries and again was not affected by individual differences between countries.

Given that self-compassion seems to buffer the potential effects of perceived threat of COVID-19 on psychological distress and given the ability of compassion from others to support social safeness in the context of fears of COVID-19, it would seem that compassion-based interventions and dissemination of compassionate strategies of public communication could be implemented to protect against mental health difficulties during and following the pandemic. Individual and group compassion-based interventions, in particular CFT (for patients) or CMT (for public) (Gilbert, 2014, 2020), cultivate compassion across the three flows including self-compassion and receiving compassion from others, and are widely evidenced to reduce psychological distress in a range of conditions and populations (Craig et al., 2020; Leaviss & Utley, 2014; Kirby et al., 2017, for reviews). Therefore, providing greater access to individual and/or group CFT and CMT, including via Telehealth, might be pertinent. In fact, in the specific context of the pandemic, an online compassion-focused intervention was found to reduce depression, anxiety and stress in patients at high risk of psychosis (Cheli et al. 2020). Moreover, graded online compassion focused interventions, including psycho-education and information sharing, guided practices and strategies, and behavioural applications could be offered more widely to benefit public mental health.

The implementation of community-based strategies to support resilience during the COVID-19 pandemic is an important goal (Serafini et al., 2020). The current findings highlight that self-compassion and compassion from others may mitigate the psychological impact of the ongoing and long-term threat induced by the COVID-19 pandemic. Knowledge accumulated in recent research, coupled with the current study, needs to be integrated by authorities and policy makers who should rapidly adopt compassionate focused strategies, such as compassionate social marketing and public health communications, to reduce the mental

health consequences of this pandemic. These compassion focused interventions and strategies should particularly focus on cultivating compassion towards oneself and openness to receiving compassion from others, perhaps by developing abilities to be sensitive to and tolerant of distress in oneself, and competencies to compassionate action to prevent or alleviate it, as well as being receptive to care, support and help from others.

Limitations and future directions

Differences across the 21 countries in terms of rates of COVID-19 and the timing of peaks of infection and associated lockdown measures may have affected variables such as the perceived threat of COVID-19 and the amount of participants' social contact. Nevertheless, a key strength of the current study was the multivariate multilevel methodology used and the consistency of the results across all 21 countries, which were not dominated by individual differences in responses between countries, thus supporting the universality of compassion as a protective factor against mental health problems and lack of social safeness. Another limitation is that the study did not have representation from all continents. Researchers from Africa were invited but were unable to participate. Future studies should more rigorously pursue participation from less represented continents and regions. This study had an unequal gender distribution, with more female respondents. Even though no gender differences have been reported in the CEAS self-compassion and compassion from others scales, women were found to score higher than men in compassion for others (Gilbert et al., 2017). Thus, in the future research should attempt to recruit more men. Additionally, mounting research has established that many individuals can develop fears, blocks and resistances to compassion (for self, for others and from others) and that these increase vulnerability to mental health problems (Gilbert et al., 2011; Kirby et al., 2019 for a review). Hence, given the current findings, future studies could investigate the role of fears of compassion as potential magnifying factors of the impact of perceived threat of COVID-19 on mental health and social safeness. Finally, the cross-sectional nature of the study prevents the establishment of causality. This study is part of a broader project that is collecting longitudinal data and aims to prospectively investigate the buffering effects of compassion throughout the pandemic. Another way to establish causality would be to evaluate the effects of a compassion focused intervention on decreasing psychological distress, and/or increasing social safeness.

In conclusion, this study provides evidence for the universal protective effects of compassion, in particular self-compassion and compassion from others, against the harmful effects of the COVID-19 pandemic on mental health and reduced social safeness. Given the damaging effects of the COVID-19 crisis on mental wellbeing (e.g., Gloster et al., 2021) and the anticipated second-wave mental health pandemic (Prout et al., 2020), the promotion of mental health should constitute a public health priority. Compassion focused interventions and communications should be prioritized by public health policy-makers and providers to promote resilience and address mental health problems during and following the pandemic.

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Table 1

The likelihood-ratio tests and information criteria AIC and BIC for the different models

Model	Predictor	Moderator	deviance	χ^2 (df)	p-value	AIC	BIC
1a			66772			66782	66819
1b	fear of contraction	compassion for self	63099	3673 (14)	< .001	63137	63278
1c			63051	48 (3)	< .001	63095	63258
2a			66955			66965	67002
2b	likelihood of contraction	compassion for self	63333	3623 (14)	< .001	63371	63517
2c			63310	23 (3)	< .001	63354	63512
3a			67251			67261	67298
3b	fear of contraction	compassion for others	63686	3565 (14)	< .001	63724	63864
3c			63685	0.89 (3)	.823	63729	63892
4a			67443			67453	67490
4b	likelihood of contraction	compassion for others	63931	3512 (14)	< .001	63969	64110
4c			63930	0.55 (3)	.908	63975	64138
5a			67087			67097	67134
5b	fear of contraction	compassion from others	63455	3632 (14)	< .001	63493	63634
5c			63454	1.82 (3)	.610	63498	63660
6a			67284			67294	67331
6b	likelihood of contraction	compassion from others	63702	3582 (14)	< .001	63740	63881
6c			63696	6.32 (3)	.097	63740	63903

Table 2

Coefficients of the best-fitting models for self-compassion

	fixed effects		
Model 1c	**main effects**		**moderation**
β [95% CI]	**fear of contraction**	**compassion for self**	**fear:for self**
Anxiety	0.37 [0.33:0.41]***	-0.06 [-0.07:-0.05]***	-0.009 [-0.011:-0.006]***
Depression	0.27 [0.22:0.31]***	-0.13 [-0.14:-0.12]***	-0.005 [-0.008:-0.002]***
Stress	0.40 [0.35:0.45]***	-0.09 [-0.10:-0.08]***	-0.007 [-0.010:-0.004]***
	random effects		
σ^2	**respondents**	**countries**	
Anxiety	8.62	9.75	residual = 3.84
Depression	14.08	22.86	R^2 (marginal) = .073
Stress	14.28	37.92	R^2 (conditional) = .898
Model 2c	**main effects**		**moderation**
β [95% CI]	**likelihood of contraction**	**compassion for self**	**likelihood:for self**
Anxiety	0.19 [0.16:0.23]***	-0.07 [-0.08:-0.06]***	-0.006 [-0.008:-0.003]***
Depression	0.16 [0.11:0.20]***	-0.13 [-0.14:-0.12]***	-0.004 ns
Stress	0.26 [0.22:0.31]***	-0.09 [-0.10:-0.08]***	-0.005 [-0.008:-0.002]**
	random effects		
σ^2	**respondents**	**countries**	
Anxiety	8.62	9.75	residual = 3.60
Depression	14.08	22.86	R^2 (marginal) = .057
Stress	14.28	37.92	R^2 (conditional) = .894

Table 3

Coefficients of the best-fitting models for compassion for others

	fixed effects		
Model 3b	**main effects**		**Moderation**
β [95% CI]	**fear of contraction**	**compassion for others**	**fear:for others**
Anxiety	0.40 [0.36:0.44]***	0.002 ns	N/A
Depression	0.32 [0.27:0.37]***	-0.02 [-0.03:-0.01]**	N/A
Stress	0.44 [0.39:0.49]***	-0.002 ns	N/A
	random effects		
σ^2	**Respondents**	**Countries**	
Anxiety	8.73	10.10	residual = 4.60
Depression	16.22	23.52	R^2 (marginal) = .030
Stress	15.08	38.40	R^2 (conditional) = .896
Model 4b	**main effects**		**Moderation**
β [95% CI]	**likelihood of contraction**	**compassion for others**	**likelihood:for others**
Anxiety	0.21 [0.17:0.25]***	0.001 ns	N/A
Depression	0.19 [0.15:0.24]***	-0.02 [-0.03:-0.01]**	N/A
Stress	0.29 [0.24:0.33]***	-0.003 ns	N/A
	random effects		
σ^2	**Respondents**	**Countries**	
Anxiety	9.61	10.38	residual = 4.57
Depression	16.71	23.60	R^2 (marginal) = .013
Stress	15.88	38.62	R^2 (conditional) = .897

Table 4

Coefficients of best-fitting models for compassion from others

	fixed effects		
Model 5b	**main effects**		**Moderation**
β [95% CI]	**fear of contraction**	**compassion from others**	**fear:from others**
Anxiety	0.39 [0.35:0.43]***	-0.03 [-0.04:-0.02]***	N/A
Depression	0.30 [0.25:0.35]***	-0.06 [-0.07:-0.05]***	N/A
Stress	0.43 [0.38:0.48]***	-0.04 [-0.05:-0.03]***	N/A
	random effects		
σ^2	**Respondents**	**Countries**	
Anxiety	8.61	9.88	residual = 4.51
Depression	15.13	23.04	R^2 (marginal) = .046
Stress	14.72	38.13	R^2 (conditional) = .900
Model 6b	**main effects**		**Moderation**
β [95% CI]	**likelihood of contraction**	**compassion from others**	**likelihood:from others**
Anxiety	0.20 [0.17:0.25]***	-0.03 [-0.04:-0.02]***	N/A
Depression	0.18 [0.15:0.24]***	-0.06 [-0.07:-0.05]***	N/A
Stress	0.28 [0.24:0.33]***	-0.04 [-0.05:-0.03]***	N/A
	random effects		
σ^2	**Respondents**	**Countries**	
Anxiety	9.44	10.12	residual = 4.51
Depression	15.58	23.06	R^2 (marginal) = .028
Stress	15.48	38.29	R^2 (conditional) = .899

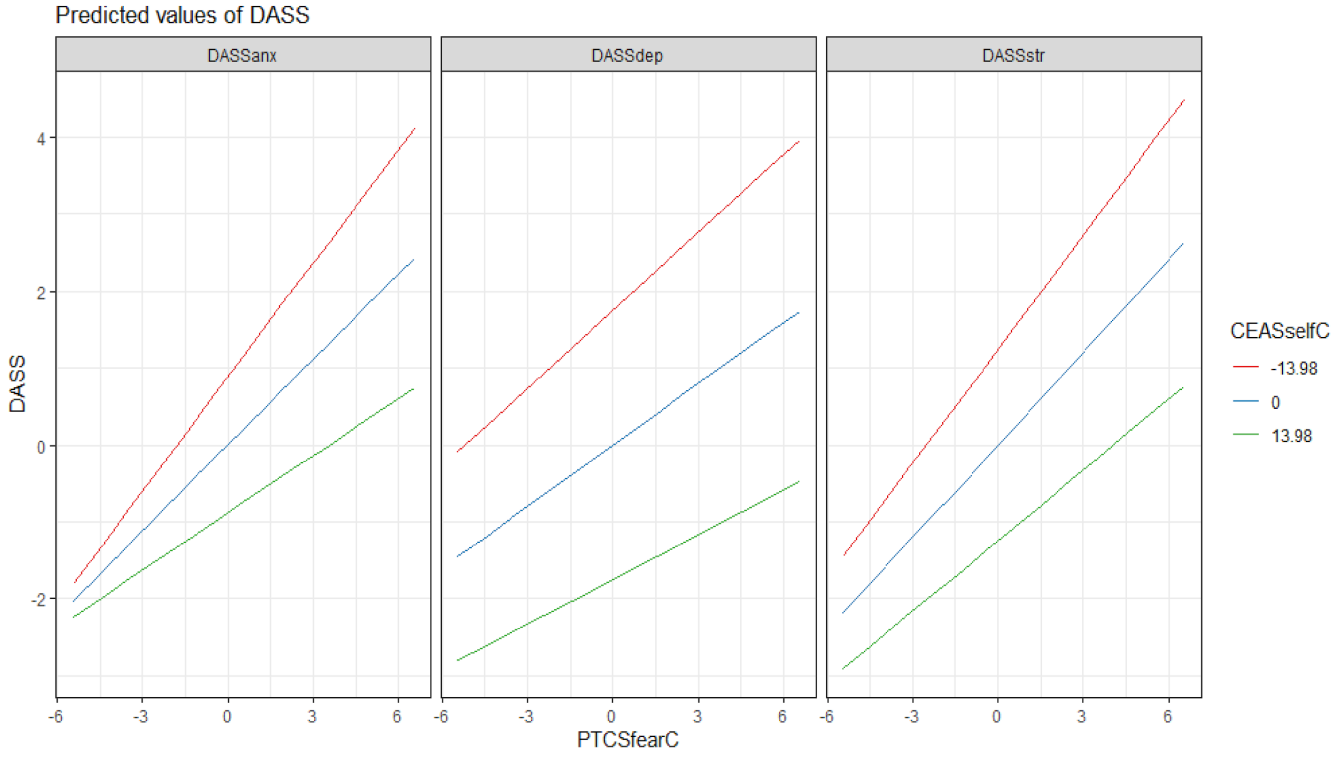
Table 5

Coefficients of the two models related to social safeness (SPSS)

Model 1		**fixed effects**	
	main effects		**moderation**
β [95% CI]	**Intercept**	**compassion from self**	**fear:for self**
	40.71 [39.81:41.61]***	0.19 [0.17:0.21]***	-0.001 ns
	fear of contraction	**compassion for others**	**fear:for others**
	-0.15 [-0.24:.0.07]***	0.01 ns	0.003 ns
		compassion from others	**fear:from others**
		0.25 [0.23:0.26]***	0.005 [0.004:0.006]*
		random effects	
σ^2	**countries**	**residual**	R^2 (marginal) = .37
	4.00	56.59	R^2 (conditional) = .41
Model 2		**fixed effects**	
	main effects		**Moderation**
β [95% CI]	**Intercept**	**compassion from self**	**likelihood:for self**
	40.71 [39.81:41.61]***	0.19 [0.17:0.21]***	N/A
	likelihood of contraction	**compassion for others**	**likelihood:for others**
	-0.14 [-0.24:.0.07]***	0.01 ns	N/A
		compassion from others	**likelihood:from others**
		0.25 [0.23:0.26]***	N/A
		random effects	
σ^2	**countries**	**Residual**	R^2 (marginal) = .37
	4.05	56.66	R^2 (conditional) = .41

Figure 1

Marginal effects of moderation of self-compassion (CEASselfC) on the impact of fear of contraction of COVID-19 (PTCSfearC) on depression, anxiety and stress (DASS)



Supplementary Online Material 1

Research samples with sociodemographic information

Country	Size	Male	Female	Other	I prefer not to respond	Mean Age	SD Age
Argentina	257	33	223	0	1	46.48	12.151
Australia	109	16	92	1	0	49.31	14.594
Brazil	299	31	267	1	0	42.79	12.534
Canada	115	24	89	0	2	48.41	18.886
China	77	28	48	0	1	39.95	15.024
Chile	282	32	250	0	0	45.91	11.498
Columbia	50	11	39	0	0	46.30	13.132
Cyprus	38	3	35	0	0	31.55	11.608
Denmark	141	23	118	0	0	48.82	11.869
France	115	21	94	0	0	46.71	16.337
Great Britain	268	30	236	1	1	46.62	13.808
Greece	145	15	130	0	0	35.60	13.532
Italy	160	40	120	0	0	41.47	12.988
Japan	522	183	326	4	9	29.56	13.421
Mexico	181	35	144	0	2	46.89	12.125
Poland	82	12	69	0	1	43.94	12.471
Portugal	394	82	310	1	1	42.16	12.838
Saudi Arabia	256	24	226	0	6	23.89	8.008
Slovakia	46	6	40	0	0	34.89	10.067
Spain	392	78	314	0	0	46.81	12.478
USA	128	12	109	7	0	48.18	14.817

Supplementary Online Materials 2

R code syntax for the model

```
library(lme4) # fit of model

library(questionr) # mean centaring

library(sjPlot) # graphs displaying

library(MuMIn) # R2 estimation

# Mean centering code

center_colmeans <- function(x) {

xcenter = colMeans(x)

x - rep(xcenter, rep.int(nrow(x), ncol(x)))

}

dat = subset(data,select=c(3,4,5,6,7)) # data manipulation

data1 = center_colmeans(dat) # mean centering

data1 = rename.variable(data1, "CEASself", "CEASselfC") # data manipulation

data1 = rename.variable(data1, "CEASto", "CEAStoC") # data manipulation

data1 = rename.variable(data1, "CEASfrom", "CEASfromC") # data manipulation

data1 = rename.variable(data1, "PTCSfear", "PTCSfearC") # data manipulation

data1 = rename.variable(data1, "PTCSlike", "PTCSlikeC") # data manipulation

data = cbind(data,data1) # data manipulation

# fitting of a multivariate multilevel model

mX = lmer(DASS~dim:(PTCSfearC*CEASselfC) – 1 + (0+dim|country) + (0+dim|subject), data = data, control = lmerControl(optCtrl = list(method = "nlminb"), optimizer = "bobyqa", check.nobs.vs.nlev = "ignore", check.nobs.vs.nRE = "ignore"))

# fitting of a univariate multilevel model

mX = lmer(SSPS~PTCSfearC+CEASselfC+CEASforC+CEASfromC+PTCSfearC:CEASselfC+PTCSfearC:CEASforC+PTCSfearC:CEASfromC + (1|country), data = data,

# plotting marginal fixed effects

plot_model(mX,type="pred",terms = c("PTCSfearC","CEASselfC","dim"))
```