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The Role of Psychological Flexibility in the Context of COVID-19:

Associations with Depression, Anxiety, and Insomnia

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Abstract

Evidence for detrimental impacts of the COVID-19 pandemic on mental health and well-being around the world is now accumulating. As it does a next step is to understand how such effects can be mitigated, by studying psychological capacities that may afford people immunity against these impacts. In this study, we explore psychological flexibility (PF) and **grit as potential resilience factors** in the context of COVID-19. Standardized measures of depression, anxiety, and insomnia as well as measures of PF (committed action and inflexibility) and grit (**perseverance of effort and consistency** of interest) were administered through a large scale national online survey (N = 1102; mean age 36,9 years; 75 % women). As predicted, the results show both PF and grit to be negatively associated with symptoms of depression, anxiety, and insomnia. Further, regression models including relevant background variables and both sets of resilience factors showed that total variance accounted for symptoms of depression, anxiety, and insomnia was substantial, 50.5%, 49.5%, and 28.8%, respectively, with the PF components accounting for most of the explained variance in mental health. We conclude that PF and to a lesser extent grit may be important psychological resilience factors against mental health problems in the context of COVID-19. Our findings are practically important as they point to **malleable** public health targets during the ongoing pandemic of COVID-19 and in the event of similar widespread health threats in the future.

Keywords: COVID-19, Mental Health, Psychological Resilience, Psychological Flexibility, Grit, Depression, Anxiety, Insomnia.

Introduction

During the first quarter of 2020 the world found itself in the grip of the COVID-19 pandemic. Its impacts have been substantial and extensive, felt in almost every sphere of human enterprise, a truly unprecedented event. On August 7 the total confirmed cases worldwide was 19,266,705 and confirmed deaths was 717,799 (Coronavirus Resource Center, Johns Hopkins University, 2020). While we count the impacts, the infection rate, persons locked down and isolated, lives lost, layoffs, business closures, and global financial impact, we also examine the impact on the mental health and wellbeing of people. It is now appropriate that we continue to explore and dig deeper into possible psychological resilience factors in relation to the pandemic in order to understand how to mitigate, reduce suffering, support a return to more prosperous times, and prevent such impacts in the future, if possible (Holmes et al., 2020).

We know from general population studies in China, (Ahmed et al., 2020; Gao et al., 2020; Wang, Di, Ye, & Wei, 2020, Wang et al., 2020) Italy, (Mazza et al., 2020) and Spain, (Rodriguez-Rey, Garrido-Hernansaiz, & Collado, 2020), conducted during the first quarter of 2020, that roughly between one out of six and one out of three of those surveyed reported significant levels of depression, anxiety, and stress. We conducted a study in Sweden (N = 1212) during four weeks beginning on 14 May (*reference blinded*) and found comparable figures to those of other countries for rates of depression and anxiety, 30% and 24.2%, respectively. We also assessed insomnia and found a rate of 38% meeting the threshold for a significant level. 45.6% of respondents reported a significant level of any one of these three problems and 16.9% reported a significant level of all three. In further analyses, we found the levels of depression, anxiety, and insomnia were correlated with self-rated overall health, history of mental health conditions, and specific worries related to COVID-19, particularly regarding personal finance (*reference blinded*).

Again, it is now time to identify ways to understand and to mitigate impacts of COVID-19 on mental health and wellbeing. One way to do this is to identify potentially modifiable psychological capacities that will afford people immunity or resilience against these impacts. Resilience factors can be described as the capacity to cope with stressful events in life through positive recovery from adversity and to adapt successfully to setbacks (Luthar & Cicchetti, 2000; Zautra, Hall, & Murray, 2008). One potential, evidence-based, model of these capacities is the psychological flexibility (PF) model. PF is defined as acting in accordance with personal goals and values, in the presence of potentially interfering thoughts and feelings, and with a greater appreciation of what their current situation or context allows (Hayes, Strosahl, & Wilson, 2012). Thus, the PF model is made up of processes related to acceptance, cognitive defusion, self-as-perspective or context, present moment awareness, values-based action, and committed action (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Villatte, Levin, & Hildebrandt, 2011). PF is typically regarded as a model underlying clinical psychology treatments, and interventions derived from it appear effective (A-Tjak et al., 2015). At the same time, it is also regarded as a “malleable public health target” (Gloster, Meyer, & Lieb, 2017). In fact, in a representative population-based study of adults in Switzerland (N = 1035), not during the current pandemic, it was found that PF significantly moderated the relationship between stressful life events, daily stress, and low social support on the one hand, and outcomes including physical health, healthcare utilization, mental health, and wellbeing, on the other. Here there was a dose response relationship with outcomes, higher PF afforded greater protection (Gloster et al., 2017). It has been argued that the predominance of threat and fear associated with the pandemic makes PF a highly suitable model for guiding interventions (Presti, McHugh, Gloster, Karekla, & Hayes, 2020).

Several recent published studies have included application of the PF model to the circumstances of the pandemic. In one particularly interesting study it was found that facets of

PF mitigated the detrimental impacts of the pandemic on mental health defined as COVID-19 peritraumatic distress, anxiety, depression, and **facets of psychological inflexibility exacerbated the impact of these risks** (Pakenham et al., 2020). Other studies have shown that PF is positively associated with wellbeing and inversely related to anxiety, depression, and COVID-19 related distress (Dawson & Golijani-Moghaddam, 2020), that psychological inflexibility facets are positively associated with COVID-19 stress, parenting and family discord, and parent and child distress, (Daks, Peltz, & Rogge) and with general and peritraumatic distress after controlling for pandemic adversity, (Kroska, Roche, Adamowittz, & Stegall, 2020). It has been found that psychological inflexibility also moderates suicide risk in the context of COVID-19 stressors (Crasta Daks, & Rogge, 2020), and mental health in the context of social isolation during COVID-19 (Smith, Twohy, & Smith, 2020). These studies have been conducted in Italy, the United Kingdom, and the US. All of these support a potential role for PF or its opposite processes in relation to mental health and wellbeing in pandemic circumstances. Continuing to examine the reliability and generality of such findings is important.

A second potential psychological resilience factor in relation to the negative impacts of the pandemic on mental health is grit. **Grit is as an aspect of self-control that pertains to the persistent pursuit of long-term goals despite obstacles and contains processes of perseverance and passion, also referred to as perseverance of effort and consistency of interest** (Duckworth & Gross, 2014). Grit has recently received increased research attention due to its robust link to **academic achievement, occupational success, and mental health** (e.g., Duckworth & Seligman, 2017).

Given that mental health and wellbeing are highly associated with psychological resilience (Harms, Brady, Wood, & Silard, 2018), the purpose of the current study was to further examine whether PF and grit represent potential immunity or resilience factors against

the psychological impacts of COVID-19. The current study is based on secondary analyses of our earlier reported study of psychological impacts of COVID-19 in Sweden. The first question asked here is whether higher PF corresponds with lower levels of reported symptoms of depression, anxiety, and insomnia in the Swedish population. It is expected that PF will be negatively associated with the mental health outcomes assessed. At the same time, it is important to verify this and to examine the strength of relations. In the second question we compare the role of PF with grit. Similarly to the prediction of PF, we expect that grit will be negatively associated with mental health outcomes. While this seems conceptually similar to PF we are not aware that these two sets of processes have been compared before and as such we do not make any predictions regarding whether either PF or grit will contribute with unique variance or a significantly larger increment in the explanation of symptoms of depression, anxiety and insomnia. Importantly, comparing these separate but overlapping psychological resilience factors can suggest their relative utility for further application

Method

Participants and Procedure

The present study is based on a population-based cross-sectional survey conducted in Sweden. Between the 14th of May and the 11th of June 2020 adult participants (≥ 18 years) were recruited through social media platforms (e.g., Facebook and Twitter), and *_blinded_* and *_blinded_*, to participate in our web-survey using the web-platform REDCap, which is a secure web application for building and managing online surveys procured by *_blinded_* University. The final sample consisted of 1102 participants (75% women) in Sweden. Demographic self-reports for country of birth indicated that 77.9% of respondents were born in Sweden, 2.8% were born in other Scandinavian countries, 9.2% were born in other European countries, 1.9% in Latin American countries, 1.7% in North American countries, 5.4% in Asian countries, 1% in African countries, and 0.1% in Oceanianic countries. The data

gathered consisted of basic demographic information, and standardized questionnaires for depression, anxiety and insomnia as well as questionnaires relevant to examine potential psychological resilience (i.e., PF and grit) against the impacts of COVID-19 on mental health. Further results, from the present project, regarding the impacts of COVID-19 on mental health and wellbeing in Sweden have been published elsewhere (*_reference blinded_*). The study was approved by the Swedish national ethical board (dnr 2020/1910).

Measures

Demographic information. Demographic variables in the present study included age, gender, education, and marital status.

Depression. The patient health questionnaire (PHQ) is a 9-item measure of depression based on the diagnose criteria of DSM IV. The PHQ-9 has a dual-purpose to screen for the presence of a depressive disorder as well as to grade depressive symptom severity. The tenth item of the PHQ-9 asks “How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?” This single item is a global rating of functional impairment related to depression (Kroenke & Spitzer, 2002). The PHQ-9 score ranges from 0 to 27, based on the 9 items scored from 0 = “not at all” to 3 = “nearly every day”. The suggested cut-points are 5, 10, 15, and 20, which represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively (Kroenke, Spitzer, Williams, 2001). PHQ-9 shows adequate internal consistency at pre- and post-treatment, $\alpha = .74$ and $.81$. Compared to Beck Depression Inventory II (BDI-II), PHQ-9 demonstrated adequate reliability, convergent/discriminant validity, and similar responsiveness to change (Titov, et al., 2011). The internal consistency for the PHQ-9 based on the current sample was $\alpha = 0.77$.

Anxiety. General Anxiety Disorder -7 (GAD-7) is a 7-item measure created as a screening tool for General Anxiety Disorder in primary care settings (Spitzer, Kroenke, Williams & Löwe, 2006). Today it is used as a measure of general anxiety symptoms across various settings and populations (Rutter & Brown, 2017; Beard & Björgvinsson, 2014; Löwe, et al., 2008). A cut-off score of 10 has been identified as the optimal point for **sensitivity (89%) and specificity (82%)** (Kroenke, Spitzer, Williams, Monahan & Löwe., 2007). GAD-7 has demonstrated **strong psychometric properties** in the general population, a confirmed 1-dimensional factor structure, and adequate internal consistency across subgroups ($\alpha = 0.89$). Normative data provided for the general population showed that approximately 5% of subjects had GAD-7 scores of 10 or greater, and 1% had GAD-7 scores of 15 or greater (Löwe et al., 2008). The internal consistency of the GAD-7 based on the current sample was $\alpha = 0.89$.

Insomnia. The Insomnia Severity Index (ISI) was used to measure insomnia. It consists of 7 items and assesses the nature, severity, and impact of insomnia. Items include severity of sleep onset, sleep maintenance, early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. A 5-point rating scale is used to rate each item, with 0 = no problem and 4 = very severe problem, yielding a total score ranging from 0 to 28. The total score is interpreted as follows: absence of insomnia (0–7), sub-threshold insomnia (8–14), moderate insomnia (15–21), and severe insomnia (22–28) (Bastien, Vallières & Morin, 2001). The ISI has been evaluated in a population-based sample and the internal consistency was excellent, $\alpha = 0.90$. It is suggested a cut-off score of 10 (86.1% sensitivity and 87.7% specificity) for detecting insomnia in a general population (Morin, Belleville, Bélanger & Ivers, 2011). The internal consistency for the ISI-7 in the present study was $\alpha = 0.90$.

Psychological flexibility (PF). In the present study, PF was measured with the **Committed Action Questionnaire (CAQ-8)** and the **Acceptance and Action Questionnaire (AAQ-II).**

The Committed Action Questionnaire (CAQ-8) measures goal-directed, flexible persistence with 8 items on a seven-point scale, with 0=never true and 6=always true (McCracken, 2013, McCracken, Chilcot, & Norton, 2014). The CAQ-8 includes four items that are positive phrased, such as “When I fail in reaching a goal, I can change how I approach it,” and the other component also consists of four items but they are negatively phrased, such as “When I fail to achieve what I want to do, I make a point to never do that again” – these items are reversed scored before deriving the summary score. CAQ-8 yields a total score ranging from 0 to 48 (McCracken et al., 2014). The Swedish version of CAQ-8 has demonstrated high levels of internal consistency (Åkerblom, Perrin, Rivano-Fischer, & McCracken, 2016). In the present study, α for the CAQ-8 was 0.83.

The Acceptance and Action Questionnaire (AAQ-II) is a seven item of experiential avoidance and psychological inflexibility based on an earlier instrument (Hayes, Luoma, Bond, Masuda & Lillis, 2006). Based on more recent studies it is found that the AAQ-II is best conceptualized, contrary to the terms “acceptance and action,” as a measure of inflexibility, which is how we refer to it here. For convenience, in order to speak of the variables as a set, we label both the committed action and inflexibility as PF. Here we scored the instrument so that higher scores indicate lower PF. Each item of this measure is rated on a seven-point scale, from 1=never true to 7=always true. Scores on the AAQ-II have been shown to have good reliability, $\alpha = 0.84$, and construct validity (Bond et al., 2011; see also Ong, Lee, Levin, & Twohig, 2019). The psychometric properties of the Swedish version of the AAQ-II (SAAQ-II with six items) are good, both the concurrent and convergent validity

and the internal consistency ($\alpha = 0.85$) are satisfying (Lundgren & Parling, 2017). The internal consistency for AAQ-II in the present study was $\alpha = 0.93$.

Grit. The Grit Scale aims to measure passion and perseverance to pursue long-term goals (Duckworth, Peterson, Mathews, & Kelly 2007). Duckworth et al. (2007) propose that grit is distinct from traditionally measured facets of Big Five Conscientiousness in its emphasis on stamina. Individuals high in grit do not diverge from their goals, even in the absence of positive feedback. The original scale consisted of 12 items with a two-factor structure. The questionnaire was later shortened to eight items with the two subscales, consistency of interest and perseverance of effort (Grit-S; Duckworth & Quinn, 2009). In the present study, Grit-S is used. Responses to each item are marked on a scale ranging from 1 = “Very much like me” to 5 = “Not like me at all”. The four items belonging to the consistency of interest subscale are negatively phrased, such as “I often set a goal but later choose to pursue a different one”, whereas the other four items forming the perseverance of effort subscale are positively phrased, such as “I finish whatever I begin”. Because the perseverance of interest items are reversed before deriving the total score for each subscale, a higher score of both scales indicates higher levels of grit. Confirmatory factor analyses have supported a two-factor structure of different version of the Grit-scale. Both factors show an adequate internal consistency (and are correlated, $r=.59$). The shorter version is psychometrically stronger than the 12-item Grit-scale (Duckworth & Quinn, 2009; van Zyl, Olckers, & Roll, 2020). Grit-S was first translated from English to Swedish by two researchers with expertise and this area of research and then back translated by a bilingual translator. The final translated version was carefully reviewed and verified by the last author of this paper. The internal consistency for the full grit scale in the current study was $\alpha = 0.81$ and for perseverance of effort $\alpha = 0.76$ and consistency of interest $\alpha = 0.80$.

Statistical analyses

Data were analyzed using IBM SPSS version 23.0. Bivariate relations between the predictors: psychological resilience factors including PF and grit – the outcome variables: mental health variables, including symptoms of depression, anxiety, and insomnia - and the control variables, including demographic characteristics, were analyzed using Pearson product-moment correlations and Pearsons Chi-Squared tests for categorical variables with two levels. To examine the independent contribution of PF and grit to the explained variance in the mental health variables we conducted a series of hierarchical regression models. The demographic variables were entered in the first step. The grit variables were entered in the second step and the PF variables in the third step. To account for possible order of entry effects in the models, further regression analyses were performed entering the PF variables in the second step and grit variables in the third step. The exact same regression procedure was conducted for each outcome variable, symptoms of depression, anxiety, and insomnia, respectively.

Results

Sample Characteristics

This study involved 1102 individuals with an average age of 36.9 years ($SD = 15.41$, ranges 18-88). The mean age of the female participants was 37.1 years ($SD = 15.4$) and the males 35.9 ($SD = 15.2$). The majority of the sample was female (75.2%), married or in a relationship, (56.3%) and had a university degree (70.1%). Table 1 presents the means, standard deviations, minimum and maximum of the mental health and psychological resilience scales.

Correlational Analyses

Correlations between all study variables are presented in Table 2. As expected, the results showed strong positive associations between symptoms of depression, anxiety, and insomnia. The two PF variables, committed action and inflexibility, and grit variables, perseverance of effort and consistency of interest, were negatively associated with all mental health variables. Further, age, marital status, and education were all negatively correlated with symptoms of depression, anxiety, and insomnia, whereas they were all positively correlated with committed action and grit variables, and negatively with inflexibility.

Hierarchical regression analyses

The hierarchical regression analyses showed a very similar pattern of results for all of the outcome variables, symptoms of depression, anxiety, and insomnia (see Table 3). In the first model, the three sets of predictors are entered in the predetermined order, demographics in step 1, grit in step 2 and PF in step 3. All steps contributed significant and unique variance for each of the outcome variables. Older age and higher levels of education predicted slightly lower levels of symptoms of depression (β (age) = $-.06$, β (education) = $-.07$) and anxiety (β (age) = $-.08$, β (education) = $-.09$), and higher education predicted slightly lower levels of insomnia (β = $-.05$). After controlling for these demographic effects, higher levels of perseverance of effort predicted slightly higher levels of symptoms of depression (β = $.06$), anxiety (β = $.12$) and insomnia (β = $.06$) whereas consistency of interest did not significantly predict outcomes. Finally, controlling for both demographic and grit variables, committed action predicted lower symptoms of depression (β = $-.29$), anxiety (β = $-.24$), and insomnia (β = $-.16$) whereas inflexibility predicted higher levels of symptoms of depression (β = $.43$), anxiety (β = $.50$), and insomnia (β = $.42$). PF accounted for the largest part of the variance explained, with ΔR^2 accounting for 27.5%, 30.1%, and 19.5% of the variance in symptoms of

depression, anxiety, and insomnia, respectively. Out of the two PF variables, inflexibility emerged as the more important predictor for each of the mental health variables.

In the second model, when switching the order of the PF and grit variables, the overall pattern of result remained. After controlling for the demographic variables, greater committed action predicted less symptoms of depression ($\beta = -.29$), anxiety ($\beta = -.24$), and insomnia ($\beta = -.16$) whereas greater inflexibility predicted more symptoms of depression ($\beta = .43$), anxiety ($\beta = .50$), and insomnia ($\beta = .42$). Finally, controlling for all of the other predictors in the model 2, greater perseverance of effort predicted slightly higher levels of symptoms of depression ($\beta = .06$), anxiety ($\beta = .12$) and insomnia ($\beta = .06$) whereas consistency of interest did not significantly predict outcomes. Again, in model 2, PF accounted for the largest part of variance 36.9%, 35.6%, and 24.4% in symptoms of depression, anxiety, and insomnia, respectively.

Discussion

The impacts of the COVID-19 pandemic on people around the world are becoming increasingly clear. This includes impacts on mental health and wellbeing. What is less clear is how to mitigate these impacts and how to plan for future events of this type. The purpose of this study was to shed light on these questions by studying associations between mental health and individual differences in two sets of psychological resilience factors, PF and grit. We found that PF and grit both correlated with symptoms of depression, anxiety, and insomnia appearing in the wake of COVID-19 in data from people in Sweden. Two assessed components of PF, committed action and inflexibility, showed mostly large correlations with symptoms of depression, anxiety and insomnia. Two assessed components of grit, perseverance of effort and consistency of interest, showed a mix of small to moderate correlations with these same outcomes. In regression equations including relevant background

variables and both sets of resilience factors, total variance accounted for in symptoms of depression symptoms, anxiety, and insomnia was substantial, 50.5%, 49.5%, and 28.8%, respectively. The largest increment in explained variance was accounted for by the PF components, even after accounting for variance in grit.

In terms of comparative roles of PF and grit in mental health, PF accounted for the largest part of the explained variance in symptoms of depression, anxiety and insomnia. Variance accounted for by grit was between a quarter and a third of that accounted for by PF even when grit was given priority and entered before PF in the regression models. And, when grit was entered last in the models to see whether it could account for unique variance over and above PF, the contribution remained significant in symptoms of depression and anxiety (but not insomnia), however it was less than 1% for each outcome, and therefore probably not practically significant.

In terms of individual components within PF, the score from the AAQ-II, what we are here calling inflexibility, stood for the strongest correlations and the highest regression coefficients in relation to the outcomes studied. We note, however, that in all cases committed action also showed generally large relations. The exception here was in relation to insomnia where the correlation was moderate in size and the regression coefficient likewise was relatively small. In correlation analyses of the grit components consistency of interest, compared with perseverance of effort, appeared like the stronger half of grit while in the multivariate analyses, with the inclusion of PF, it was perseverance of effort that was the only one of the two parts that obtained significant, but very small, regression coefficients for symptoms of depression and anxiety.

We are not aware that PF and grit have ever been studied in relation to each other before. We therefore note that committed action, inflexibility, perseverance of effort, and consistency of interest were each significantly correlated with the other, which seems

theoretically consistent. Among the correlations the strongest overlap appeared between committed action and perseverance. Again, this is predictable, and perhaps provides evidence for construct validity. Committed action includes behavior patterns that are connected to ongoing values on the one hand and to building a persistent growing pattern of behavior on the other (Hayes et al., 2012). These aspects appear to be picked up in grit, in the consistency of interest part, reflecting a similar quality to values, and perseverance of effort part, including behavior patterns like completing what one begins and carrying on when setbacks occur, (Duckworth & Quinn, 2009) features naturally associated with the persistent and building quality of committed action. On the other hand, items in the grit measure that include “I am diligent,” and “I am a hard worker,” reflect an approach to behavior, at a level of traits and conceptual self, that is not particularly consistent with the contextual behavioral science approach underlying PF. Hence, while comparing these concepts empirically can be justified, combining them into an integrated understanding of resilience may require some further refinement of the underlying processes or the measures of them.

A note of clarity about the AAQ-II is needed. It was chosen, along with the CAQ, because these were the only measures we could identify, related to PF, and validated in Swedish, however the AQ-II has known limitations that should be acknowledged. This instrument has been variously called a measure of psychological flexibility, psychological inflexibility, acceptance, and experiential avoidance (Bond et al., 2011). To cut through some of this confusion, and based on recent studies, we elected here to refer to it as a measure of inflexibility. **Clearly the item content is not positively worded nor broad enough to include all facets of psychological flexibility, so there is no basis to refer to it as such. In fact, most of the content reflects experiential avoidance** (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). In addition, studies of available methods of assessing PF and psychological inflexibility show that the AAQ-II is limited in what it reflects from the perspective of PF, and that more

recently developed multidimensional measures appear to perform better, more comprehensively capturing a full range of relevant processes (Ong et al., 2020; Rogge, Daks, Dubler, & Saint, 2019). These multidimensional measures include the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT; Francis, Dawson, & Golijani, 2016), and the Multidimensional Psychological Flexibility Inventory (MPFI; Rolffs, Rogge, & Wilson, 2018). Finally, the AAQ-II has been criticized as having item content that is not adequately differentiated from emotional distress, leading to intercorrelations between the two that are misleadingly high (Wolgast, 2014). Future studies in Sweden will be greatly improved if work can be done in translating and validating such measures as the CompACT or MPFI.

Importantly, our findings on a potential “protecting” role of PF, or a detrimental effect of inflexibility, in mental health during the pandemic converge with recent findings from studies that have appeared since the time ours was planned and completed. Results here are general consistent with these (Arslan et al., 2020; Crasta et al., 2020; Daks et al., 2020; Dawson & Golijani-Moghaddam, 2020; Kroska et al., 2020; Smith et al., 2020). The similarity in findings despite differences in measures, methods, and countries, with different pandemic situations and different intervention strategies, certainly implicate PF as a robust psychological resilience factor against mental health problems in the context of COVID-19. However, it should be noted that our findings also extend previous results by demonstrating grit as a resilience factor, albeit not as strong as PF in this pandemic context. This in turn indicate that psychological resistance against pandemic impact on mental health may involve additional psychological processes relating to goal-directedness as defined within other conceptual frameworks.

Potential practical implications of the results seem clear. It is the case around the world that mental health and wellbeing are already being promoted in training, treatments,

and self-help, focused on PF. Perhaps it is now time to consider further ways to do that, including some ways that might include grit. This could mean including these as a focus within mental health services, perhaps particularly at a primary care level. Services at this level ought to already have the pathways and the capability to address relatively straightforward problems of depression, anxiety, and insomnia, as these are common or routine primary care level problems. Some proportion of those adversely affected in their mental health and wellbeing will seek such services and will be appropriately treated. Many others will not seek formal treatment and will recover regardless, and others still may need higher intensity services, or application of treatments specifically suited to multi-problem presentations. In fact, our previous results show that of those who have any of the problems of depression, anxiety, or insomnia, people are just as likely to have all three as they are to have any single one (*reference blinded*).

An important question is how to apply what is learned here, not on a health service basis but on a *population* public health basis. How might we design and implement more widely available skills training material perhaps through social media or the internet, perhaps targeting especially people who are screened as relatively low in PF (Gloster et al., 2017). Perhaps this could be done in education settings, in organizations or worksites, or more broadly. **We know that relatively brief training methods are available and can be effective in enhancing PF, including via self-help workbooks, the internet, by other means of remote delivery, or in groups (e.g., Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012; French, Golijani-Moghaddam, & Schröder, 2017; see also A-Tjak, et al., 2015).** Naturally, other methods and modes of delivery can be designed and tested. Clearly some of the problems presented by COVID-19 will require new, innovative, and collaborative methods within psychological science, not just for health service patients but for the wider public (O'Connor

et al., 2020). What we have so far is preliminary support for the relevance of a model of health and wellbeing, and potential resilience factors to target.

This study is limited in a number of ways that should be appreciated in interpreting and applying the findings. This was a survey conducted online focused on the population of just one country. While we know that all regions of Sweden were represented in the data, we do not know for certain that it is an entirely representative sample. There will be people to whom these results do not apply. Whether similar results would obtain in other countries will require further research. For practical purposes of participant burden we included only two measures related to PF. It would be important to further investigate the full model. Although we consider it a strength that we included an alternative model for comparison, as we included grit, this certainly does not exhaust the possibilities and we cannot know whether PF is the best guiding model to take forward. Finally, results here are correlational only and derived from a cross-sectional design. In the future longitudinal study designs that can determine the direction of effects will be needed, as will experimental designs to verify that intervening to enhance PF can improve results for the outcomes examined.

In summary, the world has been caught off guard and people have clearly suffered the effects of a pandemic, including widespread infection, symptoms, loss of lives, losses of livelihood, lockdowns, isolation – in three words: loss, threats, and uncertainty. From this situation, it seems, entirely understandable impacts on mood, emotional wellbeing, and sleep have emerged. In an attempt to find how to mitigate the effects experienced, hasten recovery, and perhaps prevent some of these impacts in future, we investigate and find that people who report higher PF, and to a lesser extent higher grit, also report fewer symptoms of depression, anxiety, and insomnia. The role of PF appears substantial, potentially practically important, and therefore could be a basis for applications within health services but perhaps more usefully for wider implementation, for all of those who might be at risk at a population level.

Based on our earlier study this includes 45.6% of the Swedish population suffering from problems of depression, anxiety, or insomnia in the wake of COVID-19 and perhaps among these people, those with a relatively lower level of PF.

Declaration of competing interest: The authors declare that they have no conflict of interest.

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Table 1*Descriptive Statistics of Mental Health and Psychological Resilience*

Study Variables	Min	Max	Mean	SD
<i>Mental Health</i>				
Patient Health Questionnaire-9	0	27	7.05	6.1
General Anxiety Disorder-7	0	21	5.88	5.4
Insomnia Severity Index	0	28	8.1	6.2
<i>Psychological Resilience</i>				
Psychological Flexibility				
Committed Action Questionnaire	0	48	29.34	7.9
Acceptance & Action Questionnaire-	-7	-49	-36.03	10.54
II				
Grit				
Perseverance of effort	1	5	3.59	0.79
Consistency of interest	1	5	3.25	0.89

Table 2

Correlations between Mental Health Variables, Psychological Resilience Variables, and Demographic Variables

Variables	1	2	3	4	5	6	7	8	9	10	11
1. PHQ	–										
2. GAD-7	.84**	–									
3. ISI	.68**	.67**	–								
4. CAQ	-.59**	-.54**	-.42**	–							
5. AAQ-II	.65**	.66**	.52**	-.65**	–						
6. Perseverance of effort	-.30**	-.24**	-.20**	.55**	-.38**	–					
7. Consistency of interest	-.36**	-.33**	-.24**	.53**	-.38**	.43**	–				
8. Age	-.29**	-.29**	-.14**	.22**	-.30**	.19**	.29**	–			
9. Gender ^a	-.05	-.04	-.02	.02	-.03	-.05	-.06*	-.03	–		
10. Marital status ^b	-.18**	-.14**	-.12**	.11**	-.19**	.08**	.10**	.21**	.04†	–	
11. Education ^c	-.24**	-.25**	-.16**	.21**	-.19**	.15**	.19**	.35**	.06*†	.23**†	–

Note. PHQ-9 = Patient Health Questionnaire; GAD-7 = General Anxiety Disorder; ISI = Insomnia Severity Index; CAQ= Committed Action Questionnaire; AAQ= Acceptance and Action Questionnaire.

^a Gender was coded as 1 = female, 0 = male; ^b Marital status was coded as 0 = single (single, divorced, separated, and widowed), 1 = in a relationship (married and in relationship); ^c Education was coded as 0 = lower education (pre-secondary and secondary educational level), 1 = higher education (post-secondary and graduated level).

† Phi

* P < .05; **P < .01.

Table 3

Hierarchical Multiple Regression Analyses of the Outcome Variables and Potential Predictors

Independent variables	Dependent variables								
	Depression			Anxiety			Insomnia		
	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β
<i>Model 1</i>									
Step 1	.13	.13***		.12	.12***		.04	.04***	
Age			-.22***			-.24***			-.09**
Gender			-.08**			-.07**			-.04
Marital status			-.10***			-.05			-.07*
Education			-.15***			-.16***			-.11**
Step 2	.23	.09***		.19	.06***		.09	.05***	
Age			-.14***			-.17***			-.03
Gender			.09***			-.08**			-.05*
Marital status			-.09***			-.04			-.07*
Education			-.11***			-.13***			-.08**
Perseverance of effort			-.15***			-.09**			-.10**
Consistency of interest			-.22***			-.21***			-.17***
Step 3	.50	.27***		.49	.30***		.28	.19***	
Age			-.06*			-.08**			.04
Gender			-.04			-.03			-.01
Marital status			-.04			-.02			-.02
Education			-.07**			-.09***			-.05*
Perseverance of effort			.06*			.12***			.06*
Consistency of interest			-.03			-.02			-.02

Note. R²=R square; ΔR²=R square change; β = Standardized regression coefficient.
*p < .05. **p < .01. ***p < .001.

*p < .05. **p < .01. ***p < .001.

Highlights

- The detrimental impact of the COVID-19 pandemic on mental health is now a fact.
- We explore Psychological flexibility and grit as potential resilience factors.
- Both factors were negatively associated with depression, anxiety and insomnia.
- Psychological flexibility accounted for most variance explained in all outcomes.
- Psychological flexibility is a resilience factor mitigating the COVID-19 impacts.

Conflict of Interest

Declaration of competing interest: The authors declare that they have no conflict of interest. Lance McCracken, Farzaneh Badinlou, Monica Buhrman & Karin Brocki, Uppsala University, Sweden.

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