Psychological Flexibility as Protective Factor in the Relationships of COVID-19 Worry and Stress with Mental Well-being

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Abstract

The COVID-19 pandemic led to a certain amount of worry for infection, and stress due to the indirect effects of public health policies and restraints. This affected mental well-being. However, to what extent it affected well-being, differs per individual. The degree of reduction of mental well-being in response to negative consequences may have to do with the skill of psychological flexibility (PF). PF consists of six core Acceptance and Commitment Therapy (ACT) processes. The main aim of this study was to find out whether PF moderates the relationships between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being. The *RAND 36-Item Short Form Health Survey* (RAND SF-36) and the *Flexibility Index Test* (FIT-60) were used to measure mental well-being and psychological flexibility, respectively. Levels of worry and stress were measured with single questions. The results showed a significant, but small, protective effect of PF in both the relationships of worry and stress with mental well-being. Ad hoc analyses provided insight into which skills of PF were most protective. For COVID-19 worry this were 'Self as context' and 'Committed action', and for COVID-19 stress this were 'Defusion' and 'Committed action'. This study also conducted additional research on the psychometric qualities of the questionnaire that measures PF, the FIT-60. The current study showed that it's not possible to create a reliable and valid short version of the FIT-60, that can distinguish between the six skills of PF. This implies that no firm conclusions can be drawn from results relating to the six skills of PF. More in-depth research is needed about the six skills of PF, and in which situations PF can be most helpful.

Introduction

By March of 2020, the outbreak of the SARS-CoV-2 virus (COVID-19) is recognized as a global pandemic. Given the rapid spread of the virus, and the lack of preparedness to prevent and treat it, consequences were big for people and society (Horesh & Brown, 2020). During the peak months in the Netherlands, schools, catering and entertainment were closed and people had to work from home. The pandemic led to a certain amount of worry for infection. There is research available that focused on worry or fear of COVID-19 infection (Taylor et al., 2020). For example, Ahorsu et al. (2020) developed the Fear of COVID-19 Scale (FCV-19S), Sinha et al. (2020) emphasized the importance of evidence-based research into COVID-19 infection in children, and several studies focused on the effects of the pandemic for people who were considered 'risk groups', such as people with cancer (Kosir et al., 2020; Younger et al., 2020), inflammatory rheumatic diseases (Koppert, Jacobs, & Geenen, 2020), and an old age (Röhr, Reininghaus, & Riedel-Heller, 2020).

However, the COVID-19 pandemic did not only threaten physical health, but it also affected people's life through the indirect effects of public health policies and containment efforts (Husky, Kovess-Masfety, & Swendsen, 2020; Taylor et al., 2020). People of different ages and in different stages of their life, experienced stress. Stress is a feeling of emotional and physical tension which arises from threats to our homeostasis (Selye, 1956). Regarding families, causes of stress were financial problems, social isolation, and additional parenting burdens, for example home schooling (Brown et al., 2020; Daks, Peltz, & Rogge, 2020). Concerning students, Husky et al. (2020) found in 71.6 % of the students who stayed in their student room during the lockdown, and in 50.5 % of the students who went back to live with their parents, moderate to very severe levels of stress about 'life overall.' The biggest stressors for students were finances and love life (Husky et al., 2020). Lastly, Ellis, Dumas and Forbes (2020) found that adolescents were most stressed about schooling and peer relationships.

Therefore, the consequences of the COVID-19 pandemic may negatively impact mental well-being in the general population. According to Horesh and Brown (2020), worry and stress due to COVID-19, worsened mental disorders and created new ones. In addition, research from Pieh et al. (2020) showed that in the United Kingdom the prevalence of depression, anxiety and insomnia was significantly higher during the pandemic, relative to pre-pandemic epidemiological data. A meta-analysis from Salari et al. (2020) found corresponding results. They showed that, as a result of the pandemic, psychological disorders increased in the general population.

However, to what extent worry and stress due to the COVID-19 pandemic, affects mental well-being, is different per individual. Diathesis-stress models suggest that some people are vulnerable in dealing with stressful situations and are at risk for lower mental well-being (Colodro-Conde et al., 2018). However, a skill that can help in dealing with stressful situations, is psychological flexibility (PF). PF is "*the ability to contact the present moment more fully as a conscious human being, and to*

change or persist in behavior when doing so serves valued ends" (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). PF is an important concept within the Acceptance and Commitment Therapy (ACT). It is formed by six core ACT processes, in other words psychological skills (Hayes et al., 2006). Figure 1 shows a schematic representation at which the six skills are divided in a 'Mindfulness and acceptance' group, and a 'Commitment and behavior change' group. The reason that 'Contact with the present moment' and 'Self as context' are part of both groups, is because all psychological activity of a conscious human being is characterized by this (Hayes et al., 2006).
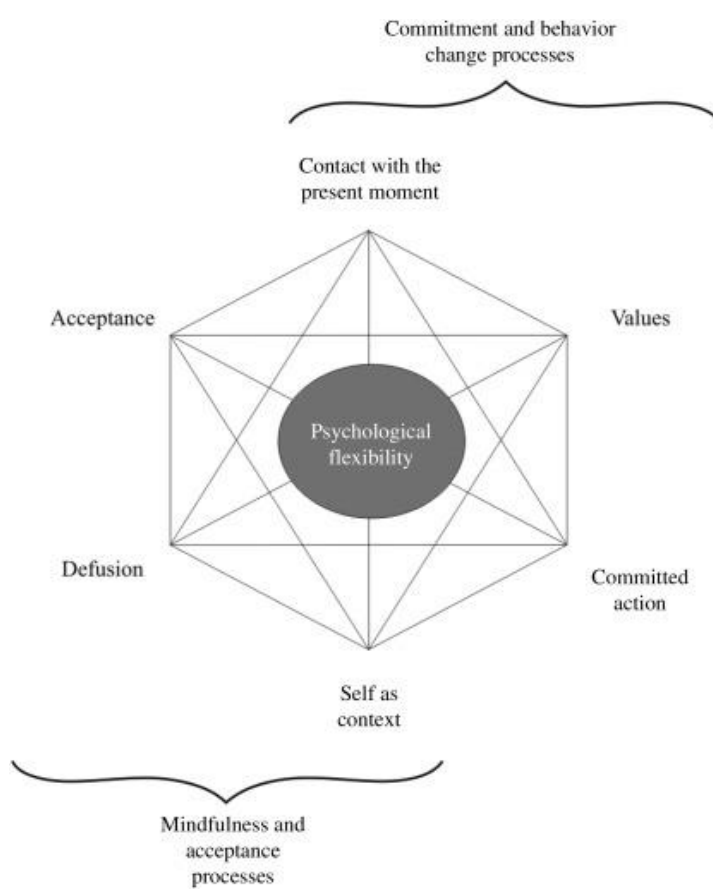

Figure 1. Six core ACT processes of PF (Hayes et al., 2006)

Short explanation of every psychological skill:

1. Acceptance
Paying attention to unpleasant feelings instead of trying to avoid them.

2. Defusion
Realizing that thoughts are not truths you have to react on, but seeing them as cognitions you can distance yourself from.

3. The self as context
Realizing that you are more than your thoughts, emotions and self-image. Seeing yourself as an observer who is having experiences.

4. Contact with the present moment
Be aware of the internal and external environment and focus your attention to the present moment.

5. Values
Refocus on the things that are important to you.

6. Committed action
Start investing in your personal values again.

Important is that PF decreases stress, and promotes mental well-being (Wersebe, Lieb, Meyer, Hofer, & Gloster, 2018), while absence of PF is linked to worry, rumination and difficulty in handling stressful situations (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). This suggests that PF can serve as a buffer. Gloster, Meyer and Lieb (2017) found that PF moderated the relationships between stressful life events and mental well-being, and daily stress and mental well-being, in the way that PF served as protective factor. This suggests that even when people have more stress, if they are psychological flexible, they can still have good mental well-being (Gloster et al., 2017). Pakenham et

al. (2020) found corresponding results. They demonstrated that PF moderated the relationship between COVID-19 lockdown risk factors (e.g. lockdown duration, family infected by COVID-19) and mental health, whereby PF also served as a protective factor. Based on this, PF may as well be an important mechanism in dealing with COVID-19 worry and stress, and maintaining mental well-being. This thought is supported by Dawson and Golijani-Moghaddam (2020), who indicated that PF is a promising candidate for understanding and predicting how an individual may be affected by, and cope with, both the acute and longer-term challenges of the pandemic. To further investigate the applicability of PF, the current study looked at PF as a protective factor in the relationships between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being.

Because of the quality of the current questionnaire that measures PF, the *Flexibility Index Test* (FIT-60; Batink, Jansen, & De Mey, 2012), explorative research is needed. The FIT-60 is the only questionnaire that measures all the six skills of PF. It shows a total score of PF and a separate score of every psychological skill (Batink et al., 2012). The scores can be displayed graphically in a personal flexibility profile, showing strengths and weaknesses, which can be helpful in treatment (Batink et al., 2012). However, the FIT-60 also has some limitations. Participants in earlier studies complained that the questions are sometimes difficult to understand and that the questionnaire is long. Besides this, research showed that the six skills of PF strongly correlate with each other (Batink et al., 2012), which raises the question whether there are really six different skills, or that they all overlap with each other. The mentioned limitations, show the need for further research into the concept of PF and the way that it is measured. The goal of this study that precedes the main study, was to create a shorter version of the FIT-60 and to explore if this shorter version can distinguish between the six factors, and can still be reliable. Thereby the goal was to maintain all six factors, because as mentioned earlier, they can provide helpful information in treatment.

The main aim of this study was to investigate if PF moderates the relationships between COVID-19 worry and mental well-being, and between COVID-19 stress and mental well-being. It was expected that COVID-19 worry and stress, both are negatively related to mental well-being, that PF is positively related to mental well-being, and that PF moderates the relationships between COVID-19 worry and mental well-being, and between COVID-19 stress and well-being, with a lower association between COVID-19 worry/stress and mental well-being when PF is high.

Methods

Participants

The data used in the current study were originally collected by Koppert, Jacobs and Geenen (2020). They examined two samples, one in 2018 and one in 2020. The current study only used data from 2020. This data collection started March 24, one day after the Dutch government introduced strict rules to prevent further spread of the virus, and ended May 2. During this period, the number of

hospitalizations, patients on the intensive care and deaths due to COVID-19 rapidly increased. The sample consisted of people of the general population, but during recruitment extra effort was made to recruit participants with health problems like persistent physical symptoms, osteoarthritis, pulmonary, cardiovascular and obesity (Koppert et al., 2020). The current study has not focused on the different diseases.

Procedure

The procedure was as described in the article of Koppert et al. (2020). It concerned a cross-sectional study. Participants were acquired via e-mail, social media, sites of patients associations, and through sharing the survey with individuals and groups. Participants completed the online survey at a secure university website. Before starting, participants filled out an informed consent and were informed about the study and their voluntary participation. In addition, they self-reported their medical conditions and diseases. Regarding the current study, Geenen gave access to the data and shared it securely. Approval for this study as master's thesis, was given by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University (20-0200).

Materials

Worry level and stress level

Current level of being worried about getting infected by COVID-19 was measured on a 4-point Likert scale (1 = *not worried*, 2 = *a little worried*, 3 = *worried*, 4 = *very worried*). Current stress level compared to normal stress level was measured on a 5-point Likert scale (1 = *less stressed*, 2 = *just a little less stressed*, 3 = *not less nor more stressed*, 4 = *just a little more stressed*, 5 = *more stressed*).

RAND 36-Item Short Form Health Survey (RAND SF-36)

Mental well-being was assessed with the Dutch version of the *RAND 36-Item Short Form Health Survey* (RAND SF-36; Van der Zee, Sanderman, Heyink, & de Haas, 1996). The SF-36 originally measures eight components of health. However, four scales reflect mental well-being: Mental health, Role emotional, Social functioning, and Vitality. These scales together form a total of 14 items. To derive a mental health composite score, the scoring method of Hays et al. (1998) was used. This represents a normalized score with an average of 50 and a standard deviation of 10 in the general population. The theoretical range is from 11 to 60. A higher mental health composite score suggests better mental well-being (Hays et al., 1998). The Dutch translation of the SF-36 shows good psychometric qualities. Krops et al. (2018) found internal consistency from $\alpha = .81$ to $\alpha = .95$. Aaronson et al. (1998) found a mean internal consistency of $\alpha = .84$ and supported the validity of the questionnaire by known-group comparisons. In the current study, the internal consistency for the four scales was $\alpha = .81$.

Flexibility Index Test (FIT-60)

To measure PF, the Dutch *Flexibility Index Test* (FIT-60; Batink, Jansen, & De Mey, 2012) was used. The FIT-60 is based on a literature review of PF and on four existing questionnaires. These are the *Acceptance and Action Questionnaire* (AAQ-II; Bond et al., 2011), the *Cognitive Fusion Questionnaire* (CFQ-13; Gillanders et al., 2014), the *Five Facet Mindfulness Questionnaire* (FFMQ; Baer et al., 2008) and the *Valued Living Questionnaire* (VLQ-2; Wilson, Sandoz, Kitchens, & Roberts, 2010). The FIT-60 measures the six core ACT processes of PF (see Figure 1). Each process is represented by ten items, leading to 60 items total. The sign of 29 items must be reversed. Participants can indicate to what extent an item applies to them on a 7-point Likert scale, ranging from 0 = *totally disagree* to 6 = *totally agree*. The FIT-60 shows a total score of PF and a separate score of every psychological skill. A higher score suggests more PF. Regarding internal consistency, Batink et al. (2012) found Cronbach's alphas ranging from $\alpha = .69$ to $\alpha = .87$ for the six subscales, and $\alpha = .95$ for the total scale. The current study used the total scale with $\alpha = .88$ and the six subscales with $\alpha = .53$ to $\alpha = .90$.

Statistical analyses

To test if it's possible to create a reliable and valid short version of the FIT-60, while keeping the six factors, principal axis factoring (varimax rotation and oblimin rotation) with 6 forced factors was conducted. To decide if an item should be retained or removed, the criterium of Costello and Osborne (2005) was used. This criterium implies that an item may not have a factor loading of >.30 on two or more factors. To further analyze the items, items were examined per scale, using two criteria. First, items that correlated .30 or more with another subscale were removed. Second, when an item decreased the internal consistency of a subscale, measured with 'Cronbach's alpha if item deleted', it was also removed. After this process, reliability analyses were performed to test if the subscales with their remaining items, could still have internal consistency of .70 or higher, which is the criterium for acceptable internal consistency (George & Mallery, 2003).

To test whether higher levels of COVID-19 worry and stress, were related with less mental well-being, and higher levels of PF were related with more mental well-being, three simple linear regression analyses were conducted. To test if PF moderated the relationship between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being, two moderated multiple regression analyses were performed (1000 bootstraps), using PROCESS v3.0 (Hayes, 2018). The covariates age, education and sex were included, because they correlated with the outcome variable mental well-being. After the results, at hoc analyses were performed to find out which factors of PF most clearly moderated the relationships between COVID-19 worry/stress, and mental well-being. This was done by conducting twelve moderated multiple regression analyses using PROCESS v3.0 (Hayes, 2018).

Results

Description of the sample

The characteristics of the participants are shown in Table 1. Research was conducted among 1535 participants aged 18 to 91 years old. The mean age was 49 years and about 80% of the participants were women. Most of the participants were highly educated and identified themselves with a Dutch culture.

Table 1.

Characteristics of the participants (N = 1535)

Variables	Statistics
Age	
Mean (*SD*)	49.17 (14.50)
Range	18 - 91
Gender, n (%)	
Men	324 (21.1)
Women	1211 (78.9)
Education level*, n (%)	
Low	256 (16.7)
High	1271 (82.8)
Missing	8 (0.5)
Culture, n (%)	
Dutch	1500 (97.7)
Other	35 (2.3)
Occupation, n (%)	
Volunteer	124 (8.1)
Paid work	780 (50.8)
Own company	155 (10.1)
Retirement	237 (15.4)
No work	239 (15.6)
Marital status, n (%)	
Single	464 (30.2)
In a relation	1037 (67.6)
Other	34 (2.2)

Note. Education level: low: lower general secondary education or lower; high: higher general secondary education or higher.

Internal consistency short FIT-60 with 6 distinguishable factors

Principal axis factoring with varimax rotation forcing into 6 factors, and a factor loading criterium of >.30 (Costello & Osborne, 2005), resulted in the removal of two items. Principal axis factoring with oblimin rotation forcing into 6 factors, and the same criterium (Costello & Osborne, 2005), resulted in the removal of 6 items. An overview of further examination of items per scale can be found in the supplementary file. It shows that a lot of items correlated more than .30 with multiple subscales. In addition, a few items lowered the internal consistency of their subscale. The 'Acceptance' subscale ended with 2 items with an internal consistency of α = .45, 'Defusion' with 2 items (α = .45), 'Self as context' with 3 items (α = .62), 'Contact with the present moment' with 3 items (α = .68), 'Values' with 5 items (α = .65) and 'Committed action' with 5 items (α = .76). Based on the criterium of >.70 for acceptable internal consistency (George & Mallery, 2003), with a shorter form of the FIT-60 that can distinguish between the six factors, only the subscale 'Committed action' would be reliable.
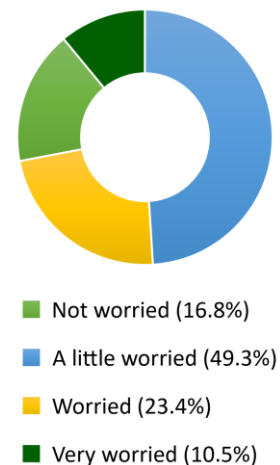
Levels of COVID-19 stress and COVID-19 worry

Figure 1 shows how stressed the participants felt compared to their normal stress level and how worried they were about getting infected by COVID-19. Almost 65% of the participants felt at least a little more stress than normal, or more stress. Just over 30% felt not more or less stress, or a little less stress. Regarding worry about infection, almost 50% of the participants felt a little worried about getting infected. In addition, almost 34% felt worried to very worried.

Stress level compared to normal stress level

- Less stress (4.2%)
- A little less stress (3.8%)
- Not more or less stress (27.6%)
- A little more stress (45.9%)
- More stress (18.6%)
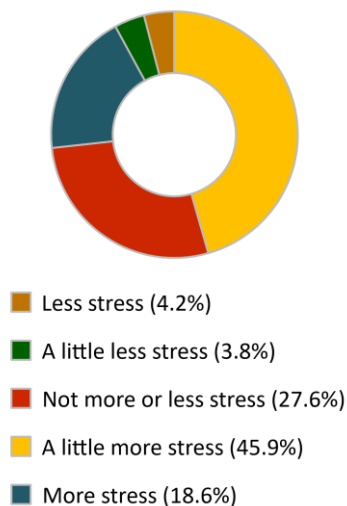
Worry infection COVID-19

- Not worried (16.8%)
- A little worried (49.3%)
- Worried (23.4%)
- Very worried (10.5%)

Figure 1. Percentages of five levels of stress compared to normal (left) and percentages of four levels of worry contracting COVID-19 (right)

Correlations COVID-19 worry, COVID-19 stress and PF, with mental well-being

Negative Pearson correlations were found between COVID-19 worry and mental well-being, r (1534) = -.38, p = <.001, and between COVID-19 stress and mental well-being, r (1534) = -.43, p = <.001. A positive correlation was found between PF and mental well-being, r (1534) = .70, p = <.001.

Moderation PF between COVID-19 worry and mental well-being

Table 2 provides an overview of the regression analysis with mental well-being as dependent variable as associated with the covariates (sex, education, age), the independent variables COVID-19 worry and PF, and the interaction between COVID-19 worry and PF. The model significantly explained 55 percent of the variance in mental well-being, F (6, 1528) = 305.18, p = <.001, R^2 = .55. With regard to the covariables, female sex was associated with lower mental well-being (b = -3.16, p = <.001). More worry was also associated with lower mental well-being (b = -2.70, p = <.001), but more PF was associated with higher mental well-being (b = 0.18, p = <.001). Regarding the main question, the model showed that PF moderated the relationship between COVID-19 worry and mental well-being (b = 0.01 p = .027). Figure 2 shows the interaction graph, demonstrating that the negative relationship between COVID-19 worry and mental well-being was a little less strong when PF was high.

Table 2.

Results of the linear regression analysis with bootstrapping showing the association of mental well-being with covariables, COVID-19 worry, psychological flexibility and the interaction

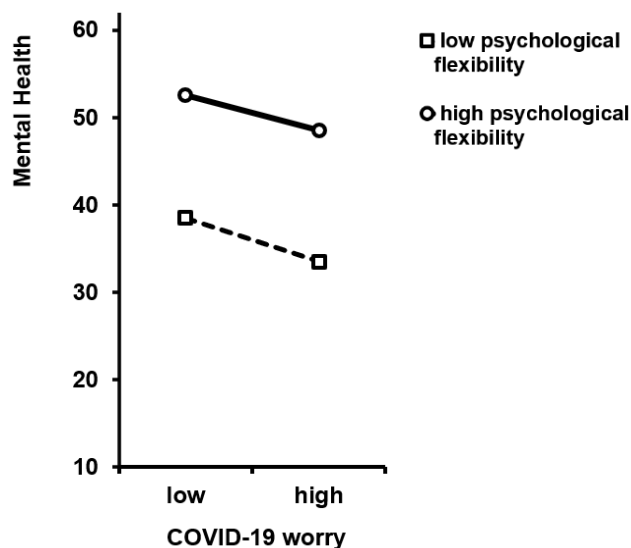|	*B*	*SE*	*t*	*p* value	95% CI
Constant	43.878	(1.093)	40.143	<.001	[41.734,46.022]
Sex	-3.155	(.505)	-6.245	<.001	[-4.146, -2.164]
Education	.619	(.562)	1.102	.270	[-0.483, 1.722]
Age	.028	(.015)	1.888	.059	[-0.001, 0.057]
Worry	-2.696	(.251)	-10.735	<.001	[-3.189, -2.203]
Psy. flex.	.176	(.005)	32.554	<.001	[-0.166, 0.187]
Worry x psy. flex.	.012	(.005)	2.212	.027	[0.001, 0.022]

Figure 2. Interaction graph mental well-being, COVID-19 worry and psychological flexibility

Moderation PF between COVID-19 stress and mental well-being

Table 3 provides an overview of the regression analysis with mental well-being as dependent variable, as associated with the covariates (sex, education, age), the independent variables COVID-19 stress and PF, and the interaction between those two. This model explained 55 percent of the variance in mental well-being, F (6, 1528) = 311.07, $p = <.001$, $R^2 = .55$, which is equal to the model of COVID-19 worry. The other results were also in line with the model of COVID-19 worry. Female sex ($b = -2.94$, $p = <.001$) and more stress ($b = -2.67$, $p = <.001$) were associated with lower mental well-being, but more PF was associated with higher mental well-being ($b = 0.17$, $p = <.001$). In addition, PF moderated the relationship between COVID-19 stress and mental well-being, as well $(b = 0.01$ $p = .018)$. The interaction graph is shown in Figure 3, and shows that the negative relationship between COVID-19 stress and mental well-being, was a little less strong when PF was high.

Table 3.

Results of the linear regression analysis with bootstrapping showing the association of mental well-being with covariables, COVID-19 stress, psychological flexibility and the interaction

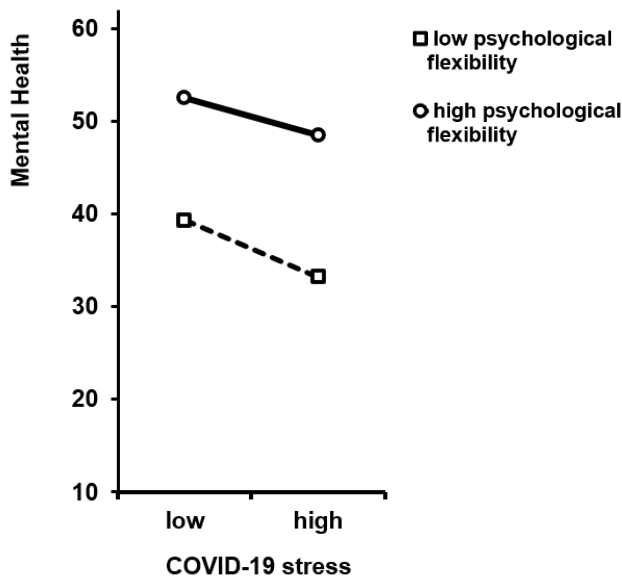|	*B*	*SE*	*t*	*p* value	95% CI
Constant	44.803	(1.076)	41.632	<.001	[42.692, 46.914]
Sex	-2.942	(.504)	-5.840	<.001	[-3.930, -1.954]
Education	1.091	(.559)	1.952	.051	[-0.005, 2.187]
Age	-.001	(.015)	-.088	.930	[-0.030, 0.027]
Stress	-2.667	(.225)	-11.859	<.001	[-3.108, -2.226]
Psy. flex.	.173	(.006)	31.624	<.001	[0.162, 0.184]
Stress x psy. flex.	.013	(.005)	2.370	.018	[0.002, 0.024]

Figure 3. Interaction graph mental well-being, COVID-19 stress and psychological flexibility

Moderation PF looking into the six factors separately (ad hoc analyses)

Ad hoc analyses gave insight into which factor of PF moderated the relationships between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being, the most. Significance levels of all moderations can be found in Table 4. 'Self as context' ($p = .012$) and 'Committed action' ($p = .019$) significantly moderated the relationship between COVID-19 worry and mental well-being. 'Committed action' ($p = .002$) and 'Defusion' ($p = <.001$) significantly moderated the relationship between COVID-19 stress and mental well-being. All these factors had a protective effect.

Table 4.

Moderation of psychological flexibility in the relationships between COVID-19 worry/stress and mental well-being, for each of the six processes of psychological flexibility

	COVID-19 worry	COVID-19 stress
Acceptance	$p = .466$	$p = .255$
Defusion	$p = .088$	$p = <.001$
Self as context	$p = .012$	$p = .081$
Contact with present moment	$p = .374$	$p = .095$
Values	$p = .938$	$p = .184$
Committed action	$p = .019$	$p = .002$

Discussion

The main aim of this study was to investigate whether PF can serve as a protective factor by moderating the relationships of worry and stress due to COVID-19, with mental well-being. As expected, was PF significantly related to higher well-being, and were COVID-19 worry and COVID-19 stress significantly related to lower mental well-being. Also conform the expectation, results showed that PF significantly moderated the negative relationships of COVID-19 worry and stress with mental well-being, in the way that it buffered the negative associations.

Prior to answering the main question, the current study examined whether it is possible to create a reliable and valid short version of the *Flexibility Index Test* (FIT-60; Batink et al., 2012). Results demonstrated that many items correlated with more than one subscale (factor), which resulted in the removal of these items. In addition, a few more items were removed based on the internal consistency within the subscale, resulting in two to five items per subscale. However, this led to unreliability of all the subscales, except 'Committed action'. It can be concluded that it's not possible to create a shorter form of the FIT-60 that can distinguish between the six factors of PF, and is also reliable. The author of the FIT-60 recently responded to the finding that the six factors of the original FIT-60 are insufficiently distinctive, by describing that this can be logically explained by the interconnectedness of the six PF skills (Batink, 2020). However, the fact that the factors don't show divergent validity is something to be critical of, because it can give a false perception of the validity of the questionnaire in terms of distinctiveness of the six skills of PF. The current study agrees with Batink (2020) that the six factors of PF, measured by the FIT-60, may be helpful in clinical practice, but is critical of using the six dimensions of the FIT-60 in research settings. It would be helpful if future research focuses on making the six factors distinguishable, for example by creating new items based on qualitative and quantitative research, because the factors are of added value in understanding PF.

In the main analyses of the study, the total score of the FIT-60 was used. The current study confirmed results of previous studies showing the relevance of PF for mental well-being (Dawson & Golijani-Moghaddam, 2020; Wersebe et al., 2018; Gloster et al., 2017; Nolen-Hoeksema et al., 2008). In line with the literature, a significant and large positive association between PF and mental well-being was found. Something that is less studied, is PF as a protective factor. Although the effect sizes were small, the current study found support for PF as a protective factor in the negative relationships between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being. These findings are in line with Gloster et al. (2017) and Pakenham et al. (2020). All these results suggest the applicability of PF in maintaining or increasing mental well-being. However, the moderations that were found in the current study (Figure 2 and 3) were not strong and showed that even when PF was high, experiencing COVID-19 worry/stress was still negatively associated with mental well-being, but a little less. This calls for caution in interpreting the results.

Different explanations can be given for what was found. First, the weak moderations could

have to do with the limitation of PF. PF is the ability to deal with problems encountered in a flexible and workable manner, while still investing in things that really matter (Hayes et al., 2006). As described earlier, is PF associated with higher mental well-being. However, this does not mean that when PF is high, mental well-being can no longer be negatively affected at all. For example, it is understandable and perhaps even healthy, that worry about COVID-19 infection because of serious consequences for physical health, can negatively influence mental well-being, even when PF is high. This indicates that PF has limits, because it cannot totally protect people from reduced mental well-being due to difficult circumstances. It is important to see the possibilities of PF, but it is also good to be aware of the fact that PF does not eliminate or solve all difficulties.

Second, the light protective effect of PF could possibly be explained by looking at the sample and the topic of the current study. The sample consisted of people of the general population with an overrepresentation of people with somatic symptoms. However, most research on PF is done in clinical samples (Gloster et al., 2017). For example there is substantial evidence for the importance of PF in treating chronic pain (Davey et al., 2020), PF is a point of attention in the treatment of various mental disorders (Twohig, Vilardaga, Levin, & Hayes, 2015), and increasing research emphasizes the employability of PF in cancer patients (Hulbert-Williams, Storey, & Wilson, 2015). In addition to the type of sample, it is notable that in these mentioned studies, PF is used to help in dealing with a disease or a disorder. This can make one wonder if PF is possibly most helpful and beneficial for people who must deal with something that affects them as a person, and is long-term, or forever.

Looking at the topic of the current study, COVID-19 worry and stress, this may not be entirely applicable, for it can be assumed that the COVID-19 pandemic is not lasting forever. From this perspective, it can be thought that not all aspects of PF may be relevant or suitable. The outcomes of the ad hoc analyses are supporting this thought. 'Committed action' and 'Self as context' were indicated to protect against a reduction of mental well-being in response to COVID-19 worry, and 'Committed action' and 'Defusion' protected mental well-being best against the negative impact of COVID-19 stress. These findings are in line with Pakenham et al. (2020), who found that these same skills of PF, were also most protecting in the negative relationship between COVID-19 lockdown risk factors and mental health.

Even in line with Pakenham et al. (2020), the current study found that 'Contact with the present moment' and 'Acceptance', didn't significantly moderate the relationships. Keeping in mind the circumstances during the pandemic, this can be understandable. Pakenham et al. (2020) explained the difficulty of acceptance during a pandemic by: *"Acceptance is likely to be the most challenging in the context of a pandemic and lockdown because it entails embracing potentially intense distress associated with a fear provoking pandemic and restrictive social isolation measures."* However, when people are accepting towards the consequences of a pandemic, it's imaginable that this is not necessarily protecting mental well-being, because accepting may mean more loneliness due to following the rules. Regarding 'Contact with the present moment', it is imaginable that during a

pandemic, being aware of the internal and external environment is not always beneficial, because it can possibly make people aware of the fears they feel due to the pandemic, or make them focus on the difficult things they see happening in the world. For 'Values', Pakenham et al. (2020), did find significant moderating effects. It is unclear why this was not found in the current study.

Taken together, the results indicate that when experiencing worry about COVID-19 infection, viewing yourself from a distance and realizing that you are more than your thoughts, emotions and self-image ('Self as context') is helpful. Regarding stress due to COVID-19, the results indicate that it can be helpful to distance yourself from your thoughts, and to realise that thoughts are not necessarily true ('Defusion'). Lastly, the results are suggesting that focusing on what is important and to keep investing in these things ('Committed action'), is helpful for both COVID-19 worry and stress. However, because of the inability of the FIT-60 to reliable distinguish between the six factors of PF, this is a tentative and cautious conclusion. More research with an improved instrument is needed to confirm or disprove the findings of the current study. It would be interesting if future research would look at the usability of the different skills of PF in different situations, for the general population.

Lastly, two comments are made regarding COVID-19 worry/stress and mental well-being. First of all, it is remarkable that the negative relationships between COVID-19 worry and mental well-being, and COVID-19 stress and mental well-being, were both moderate (Cohen, 1998). Based on the existing literature, about the negative influence of the pandemic on mental well-being (Horesh & Brown, 2020; Pieh et al., 2020; Salari et al., 2020), stronger negative relationships were expected. The fact that these were not found, can possibly be explained by age. The mean age in the current study was forty-nine, while many studies showed the negative impact of the pandemic on mental well-being, for young people (O'Conner et al., 2020; Pieh, Budimir, & Probst, 2020; Salari et al., 2020). More research should clarify the precise impact of the pandemic on mental well-being for the general population.

Second, it's noteworthy that in the current study almost sixty-five percent of the participants felt at least a little more stress than normal, or more stress. In addition, COVID-19 stress was a little stronger negatively related to mental well-being, than worry about COVID-19 infection. This is remarkable, because much research available has mainly focused on worry about infection (Taylor et al., 2020). The findings of the current study, support the idea of Husky et al. (2020) and Taylor et al. (2020). They stated that the COVID-19 pandemic did not only led to worry of infection and consequences for physical health, but that it also affected mental health through the indirect effects of the pandemic, like stress. Attention must be given to the literature that emphasizes stress due to COVID-19 for different groups of society (Brown et al., 2020; Daks et al., 2020; Ellis et al., 2020), and future research should focus on other possible effects of the pandemic.

Two strengths of the current study were the large sample, and the presence of data during the peak period of COVID-19 in the Netherlands. However, the current study also had limitations. First, it was not explicitly measured if the stress that the participants felt, compared to normal, was caused by

COVID-19. I would have been better, if causes for stress were measured. Second, the directions of the relationships that were found are unknown, as this was a cross-sectional study. Another limitation is that the sample consisted of almost eighty percent of women. Since the literature shows that women suffer more, and in a different way, from worry and stress (Zlomke & Hahn, 2010; Matud, 2004) the results may not be representative. Finally, the outcomes of the current study were based on the FIT-60, which psychometric qualities are questionable.

Concluding, more in-depth research is needed about the six skills of PF, to find out if these skills can be reliably distinguished and whether they can also be used separately in research. However, the results for PF as total concept, are promising. Though more research needs to be done in the general population, to discover in which situations PF can be most helpful. The current study indicated that PF has a small protective value against a reduction of mental well-being, in times of COVID-19 worry and stress.

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Supplementary file: Deleting or keeping items FIT-60 per scale

Subscale acceptance

Item	1	10	14	22	26	31	35	45	53	54
Correlation with other scale (more than .30)	S D CP V CA	D CP V CA			S D CP V CA	S D CP V CA	D CP	S D CP V	S D CP V CA	S D CP V
Bad correlation within the scale (Cronbach's alpha if item deleted)			From .43 to .45							

All items: Cronbach's alpha .83

Deleting items that correlate too much with other scales: Cronbach's alpha .43

Deleting item 14 based on Cronbach's alpha if item deleted: Cronbach's alpha .45

Subscale defusion

Item	9	28	29	30	32	39	42	52	57	58
Correlation with other scale (more than .30)	A S CP CA	A S CP V CA	A S CP	A S CP V CA	A S CP V	A S CP	A S CP V	A S CP V	A S CP V	A S CP V
Bad correlation within the scale (Cronbach's alpha if item deleted)										

All items: Cronbach's alpha .90

Deleting items that correlate too much with other scales: Cronbach's alpha .45

Subscale self as context

Item	2	3	17	19	23	24	33	46	51	56
Correlation with other scale (more than .30)	A D CP V CA	Doubt	Doubt		A D CP V CA	D	Doubt	Doubt		A D CP CA
Bad correlation within the scale (Cronbach's alpha if item deleted)		From .23 to .36		From .44 to .52				From .36 to .44	From .52 to .62	

All items: Cronbach's alpha .53

Deleting items that correlate too much with other scales: Cronbach's alpha .23

Cronbach's alpha if item deleted: deleting item 3 = .36, deleting item 46 = .44, deleting item 19 = .52, deleting item 51 = Cronbach's alpha .62

Subscale contact with the present moment

Item	15	16	18	20	36	38	43	44	49	60
Correlation with other scale (more than .30)	A S D V CA	S D CA	A S D V CA	A S D V CA	CA	A S D V	A S D	A S D V CA	CA	A S D V
Bad correlation within the scale (Cronbach's alpha if item deleted)										

All items: Cronbach's alpha .83

Deleting items that correlate too much with other scales: Cronbach's alpha .68

Subscale values

Item	6	8	21	25	27	34	37	41	50	55
Correlation with other scale (more than .30)	A S D CP CA	A S CA	A D CA	CA	CA	Doubt	A S D CP CA	S CA	CA	
Bad correlation within the scale (Cronbach's alpha if item deleted)						From .61 to .65				

All items: Cronbach's alpha .79

Deleting items that correlate too much with other scales: Cronbach's alpha .61

Deleting item 34 based on Cronbach's alpha if item deleted: Cronbach's alpha .65

Subscale committed action

Item	4	5	7	11	12	13	40	47	48	59
Correlation with other scale (more than .30)	V	A S D CP V	A S D CP	A V	A S D CP V	V	V	A S D CP V	A S D CP V	V
Bad correlation within the scale (Cronbach's alpha if item deleted)										

All items: Cronbach's alpha .86

Deleting items that correlate too much with other scales: Cronbach's alpha .76