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The Multidimensional Psychological Flexibility Inventory (MPFI): Discriminant validity of psychological flexibility with distress

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**The Multidimensional Psychological Flexibility Inventory (MPFI): Discriminant Validity of Psychological Flexibility with Distress**

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### **Highlights**

- Discriminant validity of the 30 psychological flexibility items of the MPFI.
- The MPFI is effective in distinguishing psychological flexibility from distress.
- Psychological flexibility assessed with the AAQ-II measures distress.
- The MPFI is a robust measure of psychological flexibility and empirically distinct from distress.

### **Abstract**

The psychological flexibility model of behavior change underpins acceptance and commitment therapy (ACT). However, the measurement of psychological flexibility over the past 20 years has mostly hinged on the use of measures with poor discriminant validity and fuzzy boundaries with distress and negative emotionality. The current study analyzed the structure of psychological flexibility as assessed with the recently developed Multidimensional Psychological Flexibility Inventory (MPFI) and examined its link with distress. We used data from an online cross-sectional survey ( $N = 1,542$ ) which assessed psychological flexibility with the MPFI and the Acceptance and Action Questionnaire-II (AAQ-II), as well as anxiety, and depression. Exploratory and confirmatory factor analyses highlighted that the six psychological flexibility processes of the MPFI loaded on a psychological flexibility factor, while anxiety, depression and the AAQ-II loaded on a distress factor, supporting the discriminant validity of the MPFI in assessing psychological flexibility. Findings were consistent with those from prior studies which suggest that the AAQ-II is more of a measure of global distress than psychological inflexibility or by proxy, psychological flexibility. The 30-item MPFI psychological flexibility scale demonstrated good construct and discriminant validity. Overall, findings support psychological flexibility as a construct that is empirically distinct from distress.

*Keywords:* MPFI, psychological flexibility, discriminant validity, distress, Acceptance and Commitment Therapy

## **The Multidimensional Psychological Flexibility Inventory (MPFI): Discriminant Validity of the Psychological Flexibility with Distress**

Psychological flexibility is a transdiagnostic concept that entails a range of inter- and intra-personal skills and is considered the cornerstone of mental health as it is closely related to resiliency (Kashdan & Rottenberg, 2010). According to the psychological flexibility model that underpins acceptance and commitment therapy (ACT), psychological flexibility involves being open to inner experiencing in the present and adjusting behaviors in response to changing situational demands that are also aligned with personal values (Hayes et al., 2006). As such, psychological flexibility enables an individual to shift behavioral repertoires when they compromise pursuit of personal values, while also adapting to changing circumstances (Kashdan & Rottenberg, 2010). ACT uses six interrelated core processes to increase psychological flexibility: (1) acceptance – openness to inner experiencing, (2) defusion – observing feelings and thoughts without attachment, (3) present moment awareness – mindful awareness of the present, (4) self-as-context – flexible self-awareness and perspective taking, (5) values – connection to personal values, (6) committed action – values-guided effective action (Hayes et al., 2012). In contrast, higher levels of the inverse of these processes foster psychological inflexibility which entails rigid and reactionary behavioral responses to uncomfortable and unwanted stimuli. The six psychological inflexibility processes involve: (1) experiential avoidance – avoidance of unwanted inner experiencing, (2) lack of present moment awareness, (3) self-as-content – rigid attachment to concepts of self, (4) fusion – absorption in unwanted thoughts and feelings rather than observing them and allowing them to flow freely, (5) lack of contact with values, (6) inaction and impulsiveness – derailment of functional behavior in response to unwanted inner experiencing (Hayes et al., 2012).

ACT aims to increase psychological flexibility and reduce psychological inflexibility. It is an empirically supported treatment for a range of mental health problems including anxiety, depression, substance use, pain, and transdiagnostic groups (see reviews of meta-analyses, Gloster et al., 2020). Twenty meta-analyses indicate that, across 133 studies and 12,477 participants, ACT

is more effective than waitlist and placebo conditions and at least as effective as the traditional cognitive behavioral therapies (Gloster et al., 2020). Higher psychological flexibility is associated with optimal responses to distress in the context of meaningful goal pursuit and better mental health outcomes across a wide range of contexts (Gloster et al., 2017; Hayes et al., 2006; Kashdan & Rottenberg, 2010; Stabbe et al., 2019; Yadavaia et al., 2014). For example, higher psychological flexibility has been associated with increased self-compassion and well-being (e.g., Hayes et al., 2012; Kashdan & Rottenberg, 2010; Marshall & Brockman, 2016). Other studies in the general population showed psychological flexibility to be a moderator in the relationship between daily stress, physical and mental health, and wellbeing (Gloster et al., 2017). Psychological flexibility was also reported as a moderator of the adverse effects of major life events and learned helplessness on depressive symptoms (Fonseca et al., 2020; Trindade et al., 2020). Most importantly, research indicates that ACT interventions produce therapeutic effects through improvements in psychological flexibility, which is the theoretically proposed change mechanism (Levin et al., 2012).

### **Discriminant Validity of Psychological Flexibility Measures**

Although according to the ACT framework psychological flexibility is the core mechanism of change, almost all of the work on psychological flexibility over the past 20 years has hinged on studies that have explored its opposite: psychological inflexibility and in particular its sub-process experiential avoidance (Doorley et al., 2020), defined as unwillingness to remain in contact with aversive internal experiencing (e.g., thoughts, memories, bodily sensations), which in turn is related to inflexible responses to difficult thoughts, feelings, and experiences (Hayes et al., 2012). Most of the research on the effectiveness of ACT interventions and the causes and consequences of psychological flexibility is based on the use of two self-report measures of psychological inflexibility, the Acceptance and Action Questionnaire (AAQ-I and AAQ-II; Bond et al., 2011; Hayes et al., 2004) and the Brief Experiential Avoidance Questionnaire (BEAQ; Gámez et al., 2014), which are used as a proxy for psychological flexibility (e.g., Kashdan et al., 2020; Rochefort

et al., 2018; Tyndall et al., 2019; Wolgast, 2014). Nevertheless, these instruments suffer from poor discriminant validity as they overlap highly with several measures of psychopathology including, depression, anxiety, stress and substance abuse (Bond et al., 2011; Doorley et al., 2020). In fact, a small but growing body of research evidence shows that the AAQ-II and the BEAQ assess distress and negative emotionality rather than psychological inflexibility or psychological flexibility by proxy (Kashdan et al., 2020; Rochefort et al., 2018; Tyndall et al., 2019; Wolgast, 2014). Based on these findings, it has been proposed that rather than measuring the ability to respond effectively to unwanted inner experiencing, the AAQ-II and the BEAQ instead assess the inner experiences to which participants are responding (e.g., Kashdan et al., 2020; Ong et al., 2020; Tyndal et al., 2019; Wolgast, 2014). This differentiation is crucial, especially in clinical settings where ACT researchers and practitioners are primarily interested in how a person responds to their difficult thoughts and feelings rather than the distress the person is experiencing.

In contrast to the abovementioned research on the AAQ-II and the BEAQ, the discriminant validity findings of two recently developed psychological flexibility measures show promise (Kashdan et al., 2020; Ong et al., 2020). Results of these studies indicate that the Personalized Psychological Flexibility Index (PPFI; Kashdan et al., 2020) and the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT; Francis et al., 2016) evinced good discriminant validity with negative emotionality and distress, although the CompACT had weak structural validity (Kashdan et al., 2020; Ong et al., 2020). However, there is no published data on the discriminant validity of the recently developed Multidimensional Psychological Flexibility Inventory (MPFI; Rolffs et al., 2016). Hence, we investigated whether this measure of psychological flexibility is confounded with distress.

### **The Multidimensional Psychological Flexibility Inventory (MPFI) as a Measure of Psychological Flexibility**

The most widely used measures of psychological inflexibility or psychological flexibility by proxy, the AAQ-II and the BEAQ, assess this construct at the global level rather than at the level of



the six interrelated core processes that foster this overarching dimension (Rolffs et al., 2016). The MPFI was developed to assess global psychological flexibility and inflexibility and each of their respective six sub-processes. It was created from a pool of 554 items which were derived from 22 of the most widely used scales in the ACT and mindfulness literature as well as 84 items that were developed by the authors (Rolffs et al., 2016) based on published conceptual definitions of the psychological flexibility and inflexibility dimensions in the ACT literature. Over three studies and a combined sample of 3,040 participants, exploratory and confirmatory factor analyses were used in combination with item response theory to generate, refine and isolate the structure of the instrument. The final MPFI is composed of 60 items, of which 30 assess psychological flexibility and 30 assess inflexibility, and their respective core processes. Studies have provided supportive evidence for the validity of the instrument (Cherry et al., 2021), including factorial stability (Grégoire et al., 2020; Lin et al., 2020; Rolffs et al., 2016; Seidler et al., 2020), responsiveness to change over time (Rolffs et al., 2016), identification of individuals currently in counseling (Stabbe et al., 2019), and the prediction of distress and wellbeing (Rolffs et al., 2016; Stabbe et al., 2019).

### **The Present Study**

The present study examined whether the MPFI as a measure of psychological flexibility is confounded with distress. Only data on the psychological flexibility dimension is presented for several reasons. First, consistent with the primary aim of prior studies which have assessed the discriminant validity of two other psychological flexibility measures, the PPF (Kashdan et al., 2020) and the CompACT (Ong et al., 2020), the primary aim of the present study was to extend and evaluate the discriminant validity of the 30 psychological flexibility items of the MPFI. Second, given the lack of research into psychological flexibility scales relative to the volume of studies examining psychological inflexibility scales, and often as a proxy for psychological flexibility (Kashdan et al., 2020; Rochefort et al., 2018; Tyndall et al., 2019; Wolgast, 2014), the sole focus on psychological flexibility in the present study is warranted. Third, we have used the Italian version of the MPFI which is still under review, and preliminary data on the structure of the Italian MPFI has

been published for only the psychological flexibility dimension (confirmatory factor analysis of the 30 items of the Italian MPFI, “citation removed for masked review”). We investigated the discriminant validity of the 30 psychological flexibility items of the MPFI (Rolffs et al., 2016) with standardized measures of distress and a widely used measure of psychological inflexibility or by proxy psychological flexibility, the AAQ-II. We expected the MPFI psychological flexibility items to load on an independent factor, whereas based on previous research, we expected the AAQ-II items to load on a distress factor together with items from anxiety and depression measures.

## Methods

### Participants and Recruitment Procedure

Data were collected from a total of 1,587 participants. After removal of responders who finished the online survey in less than nine minutes<sup>1</sup> ( $n = 45$ ), the analyses were conducted on a sample of 1,542 participants who completed the survey between May and August 2020 in Italy. People  $\geq 18$  years of age were eligible. Exclusion criteria were  $< 18$  years of age and not being fluent in Italian. Recruitment was conducted through social networking platforms (e.g. WhatsApp and Facebook) and a snowballing procedure, whereby participants invited friends and acquaintances to participate in the study. The recruitment materials presented the study as “The Psychological Resources Project” and informed potential respondents that participation was voluntary. The survey was developed using Qualtrics software and took approximately 20-25 minutes to complete. An accurate response rate was not possible to obtain, as recruitment was primarily conducted through social networks. The study received ethical clearance by an institutional human research ethics committee.

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<sup>1</sup> The nine-minute survey completion cut-off was based on pilot testing. Five participants were instructed to complete the online survey as quickly as possible while ensuring they read and comprehended all written material. None of the five participants could complete the questionnaire in less than 9 minutes, therefore we selected this criterion as the cut-off for inclusion in the study.

A total of 70.6% of the sample were female. The age range was 18 to 83 ( $M=38.6$ ,  $SD=15.0$ ). Almost all (98.4%) responders were of Italian nationality. Regarding highest education levels, 43.0% of the sample had a bachelor's degree, 42.2% completed high school and 8.3% postgraduate courses. Almost half (45.2%) of the sample were either married or living with a partner, 47.4% were single, while 7.4% were widowed or divorced. Most (75.0%) participants were employed, 21.3% were students, 5.2% unemployed, and 4.7% were retired. Regarding SES, 11.5% endorsed a mean income below average, 79.7% reported being in the middle socioeconomic class, and 8.8% wealthier than the average.

## Measures

### *Multidimensional Psychological Flexibility Inventory (MPFI)*

The MPFI (Rolffs et al., 2016) was used to assess global psychological flexibility and its constituent six core processes (acceptance, present moment awareness, self-as-context, defusion, values, committed action). Participants were asked to refer to the past two weeks and responded on a 6-point Likert scale from 1 “*never true*” to 6 “*always true*.” Scores were averaged and higher scores on the global dimension and the respective sub-processes indicate greater psychological flexibility. The Italian version of this scale is currently under validation. In order to translate the scale into Italian, a multistep strategy was used in which two independent forward translations of the original version of the MPFI were produced first (one by the authors of the Italian validation and one by a bilingual translator whose mother tongue is Italian and who is fluent with US English). Secondly, these forward translations were reviewed by a translation panel consisting of the authors, the translator, two ACT researchers and a lay person. After identifying ambiguities amongst these two versions, a reconciled forward version was produced. In order to examine the extent to which this preliminary Italian version of the MPFI was clear and understandable, it was administered to a group of 30 respondents from the general population. Further modifications were applied based on this pilot testing, and the preliminary version was then back-translated by a bilingual translator whose mother tongue was US English with fluency in Italian. A preliminary confirmatory factor

analysis was conducted highlighting excellent fit indices for the original six-factor model of psychological flexibility (“citation removed for masked review”). The MPFI has demonstrated good reliability and validity in clinical and nonclinical samples (Lin et al., 2019; Rogge et al., 2019; Seidler et al., 2020; Stabbe et al., 2019). The observed Cronbach’s alphas range (.85 – .94) was similar to that obtained in the derivation study (.87 – .97).

### ***General Anxiety Disorder Scale (GAD-7)***

The GAD-7 questionnaire (Spitzer et al., 2006) measures anxiety symptoms over the past two weeks. Items are rated on a 4-point Likert scale from 0 “*not at all*” to 3 “*nearly every day*.” Item scores were summed, with higher scores reflecting higher anxiety. We used the Italian version of the GAD-7 (Kroenke & Spitzer, 2010). The instrument has been shown to be psychometrically sound (Löwe et al., 2008; Plummer et al., 2016). The observed Cronbach’s alpha was .88.

### ***Patient Health Questionnaire-9***

The Patient Health Questionnaire (PHQ-9; Spitzer et al., 1999) was used to measure depressive symptomatology over the past two weeks. Items are rated on a 4-point Likert scale from 0 “*not at all*” to 3 “*nearly every day*.” All item scores were summed, with higher scores indicating higher depression. We used the Italian validated version of the PHQ-9 (Kroenke & Spitzer, 2010). The measure has demonstrated sound psychometric properties (Kroenke et al., 2001). The observed Cronbach’s alpha was .83.

### ***Acceptance and Action Questionnaire-II (AAQ-II)***

The AAQ-II (Bond et al., 2011) is a self-report questionnaire composed of 7-items measuring psychological inflexibility, defined as “rigid dominance of psychological reactions over chosen values and contingencies in guiding actions.” Items are rated on a 7-point Likert from 1 “*not at all true*” to 7 “*completely true*.” All item scores were summed, with higher scoring indicating higher psychological inflexibility. The AAQ-II has showed good internal consistency and test-retest reliability in community samples (Bond et al., 2011). The observed Cronbach’s alpha was .90.

### **Data Analysis**

Preliminary analyses (i.e., descriptive statistics, reliabilities, and correlations among study variables) were performed in IBM SPSS 24. Exploratory Structural Equation Modeling (ESEM) and Confirmatory Factor Analysis (CFA) were conducted in *Mplus* 8.3 with the robust maximum likelihood estimator (MLR; Muthén, & Muthén, 1998-2018). Because the percentage of missing data across all study items was 0.33%, we used the Full Information Maximum Likelihood estimator in *Mplus* to address missing data. We first ran an ESEM with an oblique Geomin rotation examining a two-factor solution with all psychological flexibility subscales (acceptance, present moment awareness, self-as-context, defusion, values, committed action) as well as anxiety, depression, and AAQ-II scores as observed variables. ESEM has been developed in order to overcome CFA and exploratory factor analysis (EFA) limitations by integrating benefits of both. Like EFA, ESEM allows items with cross-loadings to load on other factors and like CFA, ESEM examines goodness-of-fit statistics, offering a more accurate representation of the data (Marsh et al., 2009; Marsh et al., 2014). The loading cut-off on the main factor was  $\geq .40$  with a  $p$  value  $\leq .05$  (Hair et al., 2010). If our hypothesis was supported, we planned to confirm the differentiation of the psychological flexibility and distress factors by conducting a CFA testing a second order two-factor model in which all psychological flexibility processes (acceptance, present moment awareness, self-as-context, defusion, values and committed action) and all distress scales (anxiety, depression and AAQ-II) were considered as latent variables. Specifically, psychological flexibility was included as a second-order latent variable composed of acceptance, present moment awareness, self-as-context, defusion, values and committed action as first-order latent variables, while distress was included as a second-order latent variable composed of GAD-7, PHQ-9 and AAQ-II as first-order latent variables. The model fit in ESEM and CFA analyses was evaluated with the following goodness of fit indices: Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and its 90% Confidence Interval (CI), and the Standardized Root Mean Square Residual (SRMR). CFI values  $> .90$ , RMSEA values  $\leq .08$ , and SRMR values  $\leq .09$  as well as the upper bound of the 90% CI of RMSEA lower than  $.10$  were considered indices of a good model fit (Marsh et al., 2005).

In both ESEM and CFA analyses, we also compared whether our hypothesized two-factor model was superior to an alternative one-factor model (in which all psychological flexibility processes and all distress scales loaded together onto a single factor). To identify the best fitting solution, the Akaike's Information Criterion (AIC) and Bayes Information Criterion (BIC) indices were also inspected (i.e., the model with the smallest AIC and BIC values is the best fitting one). Statistical scripts for all analyses and relevant outputs are presented in Supplementary Materials A.

## Results

### Preliminary Analyses

Means, standard deviations, Cronbach's alphas and correlations among all variables are presented in Table 1. Global psychological flexibility and all psychological flexibility processes were related to reduced anxiety, depression, and AAQ-II scores. The six psychological flexibility processes were significantly positively and strongly associated with global psychological flexibility. The six psychological flexibility processes were also positively and significantly related with each other and most were of a moderate to large magnitude. Anxiety, depression and AAQ-II scores were positively and strongly correlated with each other.

### Exploratory Structural Equation Modeling (ESEM): Differentiating Psychological Flexibility from Distress

The primary aim of this study was to examine the discriminant validity of the psychological flexibility items of the MPFI with measures of anxiety and depression, and the AAQ-II. We first conducted an ESEM with an oblique Geomin rotation examining a two-factor solution with all psychological flexibility subscales (acceptance, present moment awareness, self-as-context, defusion, values, committed action) as well as the GAD-7, PHQ-9, and AAQ-II scores as observed variables. As predicted, results of this analysis indicated a two-factor model with very good model fit:  $\chi^2(17) = 163.468, p < .001$ ; CFI = .971; TLI = .939; RMSEA = .075; RMSEA CI = [.065, .085]; SRMR = .026 (standardized factor loadings and 95% confidence intervals for the two-factor

solution are reported in Table 2). The results are summarized in Figure 1. The MPFI psychological flexibility sub-processes loaded on one factor, whereas anxiety, depression and the AAQ-II all strongly loaded together on a second factor. The two extracted factors were inversely related (standardized correlation =  $-.446$ ; 95% CI =  $-.497, -.394$ ).

As reported in Table 2, the psychological flexibility sub-processes of acceptance and present moment awareness displayed some positive cross-loadings with the latent distress factor, while defusion and committed action evidenced some negative cross-loadings with the latent distress factor; however, they had substantially larger primary loadings on the psychological flexibility factor (composed of only MFPI items). The AAQ-II also showed a negative cross-loading with the latent psychological flexibility factor but had substantially larger primary loadings on the distress factor (standardized factor loading of  $-.196^{**}$  and  $.680^{**}$ , respectively). Therefore, as expected, the AAQ-II loaded on the distress factor together with the measures of anxiety and depression.

As displayed in Table 3, fit indices clearly indicated that our hypothesized two-factor model was superior to the alternative one-factor model in which all psychological flexibility sub-processes and all distress scales loaded together as observed variables onto a single factor. In fact, the two-factor model in which psychological flexibility and distress are considered as two distinct factors resulted in a substantial improvement in fit ( $\Delta CFI=.306$ ,  $\Delta TLI=.421$ ,  $\Delta RMSEA= -.135$ ,  $\Delta SRMR= -.099$ ,  $\Delta AIC= -1,425.561$ ,  $\Delta BIC = -1.337,834$ ).

### **Second-Order Confirmatory Factor Analysis (CFA): Confirming the Differentiation of the Psychological Flexibility and Distress Factors**

As our hypothesis was supported, we confirmed the differentiation of psychological flexibility and distress factors by conducting a CFA testing a second order two-factor model in which all psychological flexibility sub-processes (acceptance, present moment awareness, self-as-context, defusion, values, committed action) and all distress scales (anxiety, depression, and AAQ-II) were considered as latent variables. Specifically, psychological flexibility was included as a second-order latent variable composed of acceptance, present moment awareness, self-as-context, defusion,

values and committed action as first-order latent variables, while distress was included as a second-order latent variable composed of GAD-7, PHQ-9, and AAQ-II as first-order latent variables. Descriptive statistics and the correlation matrix of all items of each questionnaire used in this analysis are presented in Supplementary Materials B. Fit indices for the second-order CFA were excellent:  $\chi^2(1,309) = 4,204.809$ ,  $p < .001$ ; CFI = .924; TLI = .920; RMSEA = .038; RMSEA CI = [.037, .039]; SRMR = .064. Standardized factor loadings are reported in Figure 2 and show that the psychological flexibility and distress factors were inversely related (standardized correlation =  $-.568$ ; 95% CI =  $-.616, -.519$ ).

As reported in Table 3, compared to an alternative model in which all psychological flexibility sub-processes and all distress scales loaded together into one overarching second-order factor, fit indices showed that our hypothesized model in which psychological flexibility and distress were considered as two distinct second-order factors resulted in an improvement in fit ( $\Delta\text{CFI}=.026$ ,  $\Delta\text{TLI}=.027$ ,  $\Delta\text{RMSEA} = -.006$ ,  $\Delta\text{SRMR} = -.031$ ,  $\Delta\text{AIC} = -1,115.894$ ,  $\Delta\text{BIC} = -1,110.553$ ). In sum, results clearly indicate psychological flexibility as an independent factor and empirically distinct in relation to distress.

## Discussion

The aim of the present study was to examine the discriminant validity of psychological flexibility assessed with the MPFI. We used ESEM and second-order CFA to evaluate if the MPFI was effective in distinguishing psychological flexible responding from the experience of distress. Results revealed psychological flexibility to be an independent factor and separate from distress. Hence, the psychological flexibility items of the MPFI measure a distinct latent construct relative to anxiety, depression, and AAQ-II psychological inflexibility items in our sample. Results of this study showed the 30 MPFI psychological flexibility items are effective in distinguishing psychological flexibility from distress. Findings are noteworthy as they are the first published data showing that all six psychological flexibility processes as well as global flexibility, measured by the



MPFI, are not confounded with distress and can therefore be used as valid indicators of psychological flexibility.

Results of this study also revealed that some psychological flexibility processes loaded on the distress factor even though they had substantially larger primary loadings on the psychological flexibility factor. In particular, defusion and committed action evidenced negative cross-loadings with distress. Unexpectedly, acceptance and present moment awareness displayed positive cross-loadings with distress. These positive cross-loading might be explained by the fact that data were collected in the midst of the COVID-19 pandemic and during the aftermath of a government imposed lockdown. The stress and fear associated with the pandemic itself, accompanied by the lockdown effects of social isolation and activity restrictions as well as anxiety about future health and economic uncertainties are associated with detrimental mental health impacts (Brooks et al., 2020; Xiong et al., 2020). Acceptance and present moment awareness involve being open to difficult thoughts and feelings and allowing them to organically unfold and pass. Therefore, of the six psychological flexibility processes, they are likely to be the most challenging in the context of a pandemic because they entail embracing potentially intense psychological discomfort related to pandemic induced fear, uncertainty, and social isolation and, hence, their positive cross-loadings on the distress factor. Consistent with this proposal, research on the psychological impacts of COVID-19 has shown that greater acceptance is related to higher distress (Landi et al., 2020; Pakenham et al., 2020). In addition, a non-COVID context study found that acceptance cross-loaded with negative emotionality (Kashdan et al., 2020) and highlighted the difficulties in measuring constructs like psychological flexibility, which require evaluation with reference to a specific context (Hayes et al., 2012; Kashdan et al., 2020).

Findings of the present study are consistent with the growing body of evidence which suggests the AAQ-II assesses distress and negative emotionality rather than psychological inflexibility or psychological flexibility by proxy (Doorley et al., 2020; Kashdan et al., 2020; Ong et al., 2020; Rochefort et al., 2018; Tyndall et al., 2019; Wolgast, 2014). Results of the present study

showed that the AAQ-II had poor discriminant validity in relation to distress and risks circularity of measurement and an overestimation of the association between psychological inflexibility (or its sub-process experiential avoidance) and measures of psychopathology (Kashdan et al., 2020; Wolgast, 2014). Evidence from this and other studies suggests that the AAQ-II does not adequately discriminate between psychological inflexibility as a behavioral pattern of responding (e.g., the independent variable, context-insensitive avoidance of distressing stimuli) and the experience of emotional distress (e.g., the dependent variables, anxiety, depression and other measures of psychopathology) (Kashdan et al., 2020; Ong et al., 2020; Rochefort et al. 2018; Tyndall et al. 2019; Wolgast, 2014).

This study has several methodological limitations. First, all data were collected via an online survey and self-report measures, which increases the risk of common method variance. Second, convenience sampling and the bias towards female participants limits the generalizability of findings. Future studies should replicate these results in other community as well as clinical samples. Third, this study did not use the 30-item MPFI psychological inflexibility scale for the reasons mentioned earlier. However, future research should investigate the discriminant validity of both the psychological flexibility and the inflexibility scales of the MFPI. Investigation of whether psychological flexibility and inflexibility should be considered separately and examination of their discriminant validity in relation to distress and negative emotionality will have important theoretical and practice implications. In particular, future studies should clarify the structure of the psychological inflexibility/flexibility model and shed light on whether the MPFI or other measures could validly identify distinct subgroups among psychologically flexible or inflexible individuals based on their profiles of psychological flexibility and inflexibility (e.g., Cherry et al., 2021; Christodoulou et al., 2019; Rogge et al., 2019; Tyndal et al., 2020). Notwithstanding the above limitations, this study is the first to provide empirical support for the discriminant validity of psychological flexibility assessed with the MPFI with respect to distress.

## **Conclusion**

The 30-item MPFI psychological flexibility scale showed good discriminant validity in relation to distress. However, results revealed some overlap between distress and two psychological flexibility processes, present moment awareness and acceptance, which may have emerged due to their sensitivity to the context specific challenges of the COVID-19 pandemic. Consistent with prior research, findings showed that the AAQ-II assesses distress rather than psychological inflexibility or by proxy, psychological flexibility. Overall, findings support psychological flexibility as a construct that is empirically distinct from distress.

### References

- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., ... & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42*(4), 676–688. <https://doi.org/10.1016/j.beth.2011.03.007>.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet, 395*, 912–920. [https://doi.org/10.1016/s0140-6736\(20\)30460-8](https://doi.org/10.1016/s0140-6736(20)30460-8).
- Cherry, K. M., Vander Hoeven, E., Patterson, T. S., & Lumley, M. N. (2021). Defining and measuring “psychological flexibility”: A narrative scoping review of diverse flexibility and rigidity constructs and perspectives. *Clinical Psychology Review, 101973*. <https://doi.org/10.1016/j.cpr.2021.101973>
- Christodoulou, A., Michaelides, M., & Karekla, M. (2019). Network analysis: A new psychometric approach to examine the underlying ACT model components. *Journal of Contextual Behavioral Science, 12*, 285–289. <https://doi.org/10.1016/j.jcbs.2018.10.002>.
- Doorley, J. D., Goodman, F. R., Kelso, K. C., & Kashdan, T. B. (2020). Psychological flexibility: What we know, what we do not know, and what we think we know. *Social and Personality Psychology Compass, e12566*. <https://doi.org/10.1111/spc3.12566>.

- Fonseca, S., Trindade, I. A., Mendes, A. L., & Ferreira, C. (2020). The buffer role of psychological flexibility against the impact of major life events on depression symptoms. *Clinical Psychologist, 24*(1), 82–90. <https://doi.org/10.1111/cp.12194>.
- Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT). *Journal of Contextual Behavioral Science, 5*(3), 134–145. <https://doi.org/10.1016/j.jcbs.2016.05.003>.
- Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., Suzuki, N., & Watson, D. (2014). The Brief Experiential Avoidance Questionnaire: Development and initial validation. *Psychological Assessment, 26*(1), 35–45. <https://doi.org/10.1037/a0034473>.
- Gloster, A. T., Meyer, A. H., & Lieb, R. (2017). Psychological flexibility as a malleable public health target: Evidence from a representative sample. *Journal of Contextual Behavioral Science, 6*(2), 166–171. <https://doi.org/10.1016/j.jcbs.2017.02.003>.
- Gloster, A. T., Walder, N., Levin, M., Twohig, M., & Karekla, M. (2020). The empirical status of acceptance and commitment therapy: A review of meta-analyses. *Journal of Contextual Behavioral Science*. <https://doi.org/10.1016/j.jcbs.2020.09.009>.
- Grégoire, S., Gagnon, J., Lachance, L., Shankland, R., Dionne, F., Kotsou, I., ... & Rogge, R. D. (2020). Validation of the English and French versions of the multidimensional psychological flexibility inventory short form (MPFI-24). *Journal of Contextual Behavioral Science, 18*, 99–110. <https://doi.org/10.1016/j.jcbs.2020.06.004>.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44*(1), 1–25. <https://doi.org/10.1016/j.brat.2005.06.006>.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy. An experiential approach to behavior change* (2<sup>nd</sup> ed.). The Guildford Press.

- Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., Polusny, M. A., et al. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record, 54*, 553–578.
- Kashdan, T. B., Disabato, D. J., Goodman, F. R., Doorley, J. D., & McKnight, P. E. (2020). Understanding psychological flexibility: A multimethod exploration of pursuing valued goals despite the presence of distress. *Psychological Assessment, 32*(9), 829–850. <https://doi.org/10.1037/pas0000834>.
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30*(7), 865–878. <https://doi.org/10.1016/j.cpr.2010.03.001>.
- Kroenke, K., & Spitzer, R. L. (2010). Instruction manual: Instructions for patient health questionnaire (PHQ) and GAD-7 measures. Retrived from [www.phqscreeners.com](http://www.phqscreeners.com).
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of general internal medicine, 16*(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>.
- Landi, G., Pakenham, K. I., Bocolini, G., Grandi, S., & Tossani, E. (2020). Health anxiety and mental health outcome during COVID-19 lockdown in Italy: The mediating and moderating roles of psychological flexibility. *Frontiers in Psychology, 11*, 2195. <https://doi.org/10.3389/fpsyg.2020.02195>.
- Levin, M. E., Hildebrandt, M. J., Lillis, J., & Hayes, S. C. (2012). The impact of treatment components suggested by the psychological flexibility model: A meta-analysis of laboratory-based component studies. *Behavior Therapy, 43*(4), 741–756. <https://doi.org/10.1016/j.beth.2012.05.003>.
- Lin, Y. Y., Rogge, R. D., & Swanson, D. P. (2020). Cross-cultural flexibility: Validation of the traditional Mandarin, simplified Mandarin, and Japanese translations of the Multidimensional Psychological Flexibility Inventory. *Journal of Contextual Behavioral Science, 15*, 73–84. <https://doi.org/10.1016/j.jcbs.2019.11.008>.

- Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266–274.
- Marsh, H. W., Hau, K. T., & Grayson, D. (2005). Goodness of fit evaluation in structural equation modeling. In A. Maydeu-Olivares & J. McArdle (Eds.), *Contemporary psychometrics. A Festschrift for Roderick P. McDonald* (pp. 275–340). Erlbaum.
- Marshall, E. J., & Brockman, R.N. (2016). The relationships between psychological flexibility, self-compassion, and emotional well-being. *Journal of Cognitive Psychotherapy, 30*(1), 60–72.  
<https://doi.org/10.1891/0889-8391.30.1.60>.
- Muthén, L. K., & Muthén, B. O. (1998-2018). *Mplus user's guide*. (7<sup>th</sup> ed.). Muthén & Muthén.
- Ong, C. W., Pierce, B. G., Petersen, J. M., Barney, J. L., Fruge, J. E., Levin, M. E., & Twohig, M. P. (2020). A psychometric comparison of psychological inflexibility measures: Discriminant validity and item performance. *Journal of Contextual Behavioral Science, 18*, 34–47.  
<https://doi.org/10.1016/j.jcbs.2020.08.007>.
- Pakenham, K. I., Landi, G., Boccolini, G., Furlani, A., Grandi, S., & Tossani, E. (2020). The moderating roles of psychological flexibility and inflexibility on the mental health impacts of COVID-19 pandemic and lockdown in Italy. *Journal of Contextual Behavioral Science, 17*, 109–118. <https://doi.org/10.1016/j.jcbs.2020.07.003>.
- Plummer, F., Manea, L., Trepel, D., & McMillan, D. (2016). Screening for anxiety disorders with the GAD-7 and GAD-2: A systematic review and diagnostic metaanalysis. *General Hospital Psychiatry, 39*, 24–31. <https://doi.org/10.1016/j.genhosppsy.2015.11.005>.
- Rochefort, C., Baldwin, A. S., & Chmielewski, M. (2018). Experiential avoidance: An examination of the construct validity of the AAQ-II and MEAQ. *Behavior Therapy, 49*(3), 435–449.  
<https://doi.org/10.1016/j.beth.2017.08.008>.
- Rogge, R. D., Daks, J. S., Dubler, B. A., & Saint, K. J. (2019). It's all about the process: Examining the convergent validity, conceptual coverage, unique predictive validity, and clinical utility of

ACT process measures. *Journal of Contextual Behavioral Science*, *14*, 90–102.

<https://doi.org/10.1016/j.jcbs.2019.10.001>.

Rolffs, J. L., Rogge, R. D., & Wilson, K. G. (2016). Disentangling components of flexibility via the hexaflex model: Development and validation of the Multidimensional Psychological Flexibility Inventory (MPFI). *Assessment*, *25*(4), 458–482. <https://doi.org/10.1177/1073191116645905>.

Seidler, D., Stone, B., Clark, B. E., Koran, J., & Drake, C. E. (2020). Evaluating the factor structure of the Multidimensional Psychological Flexibility Inventory: An independent replication and extension. *Journal of Contextual Behavioral Science*, *17*, 23–31.

<https://doi.org/10.1016/j.jcbs.2020.04.007>.

Spitzer, R. L., Kroenke, K., Williams, J. B. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Jama*, *282*(18), 1737–1744.

<https://doi.org/10.1001/jama.282.18.1737>.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097.

<https://doi.org/10.1001/archinte.166.10.1092>.

Stabbe, O. K., Rolffs, J. L., & Rogge, R. D. (2019). Flexibly and/or inflexibly embracing life: Identifying fundamental approaches to life with latent profile analyses on the dimensions of the Hexaflex model. *Journal of Contextual Behavioral Science*, *12*, 106–118.

<https://doi.org/10.1016/j.jcbs.2019.03.003>.

Trindade, I. A., Mendes, A. L., & Ferreira, N. B. (2020). The moderating effect of psychological flexibility on the link between learned helplessness and depression symptomatology: A preliminary study. *Journal of Contextual Behavioral Science*, *15*, 68–72.

<https://doi.org/10.1016/j.jcbs.2019.12.001>.

Tyndall, I., Waldeck, D., Pancani, L., Whelan, R., Roche, B., & Dawson, D. L. (2019). The Acceptance and Action Questionnaire-II (AAQ-II) as a measure of experiential avoidance:

Concerns over discriminant validity. *Journal of Contextual Behavioral Science*, *12*, 278–284.

<https://doi.org/10.1016/j.jcbs.2018.09.005>.

Tyndall, I., Waldeck, D., Pancani, L., Whelan, R., Roche, B., & Pereira, A. (2020). Profiles of Psychological Flexibility: A latent class analysis of the Acceptance and Commitment Therapy model. *Behavior Modification*, *44*(3), 365–393. <https://doi.org/10.1177/0145445518820036>.

Wolgast, M. (2014). What does the Acceptance and Action Questionnaire (AAQ-II) really measure?. *Behavior Therapy*, *45*(6), 831–839. <https://doi.org/10.1016/j.beth.2014.07.002>.

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M., Gill, H., Phan, L., ... & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, *277*(1), 55–64.

<https://doi.org/10.1016/j.jad.2020.08.001>.

Yadavaia, J. E., Hayes, S. C., & Vilardaga, R. (2014). Using acceptance and commitment therapy to increase self-compassion: A randomized controlled trial. *Journal of Contextual Behavioral Science*, *3*(4), 248–257. <https://doi.org/10.1016/j.jcbs.2014.09.002>.



**Table 1***Descriptive Data and Person's Correlations among Study Variables (N = 1,542).*

	<i>M (SD)</i>	Range	$\alpha$	1	1a	1b	1c	1d	1e	1f	2	3
1. Global Psychological Flexibility	3.89 (0.69)	1.60-6	.94	-								
1a. Acceptance	3.44 (0.86)	1-6	.85	.59**	-							
1b. Present Moment Awareness	3.96 (0.99)	1-6	.89	.70**	.52**	-						
1c. Self-as-context	3.92 (0.99)	1-6	.89	.80**	.33**	.41**	-					
1d. Defusion	3.46 (0.96)	1-6	.88	.75**	.29**	.31**	.67**	-				
1e. Values	4.38 (0.93)	1.40-6	.87	.76**	.28**	.45**	.49**	.45**	-			
1f. Committed Action	4.16 (0.95)	1-6	.88	.78**	.25**	.38**	.58**	.53**	.66**	-		
2. GAD-7	6.52 (4.48)	0-21	.88	-.30**	-.06*	-.01	-.31**	-.45**	-.21**	-.27**	-	
3. PHQ-9	7.27 (4.67)	0-27	.83	-.35**	-.07**	-.06*	-.33**	-.43**	-.28**	-.35**	.75**	-
4. AAQ-II	19.81 (8.61)	7-49	.90	-.42**	-.08**	-.09**	-.41**	-.50**	-.34**	-.41**	.65**	.67**

*Note.* \* $p < .05$ , \*\* $p < .01$ .  $\alpha$  = Cronbach's Alpha. GAD-7 = Generalized Anxiety Disorder-7; PHQ-9 = Patient Health Questionnaire-9; AAQ-II = Acceptance and Action Questionnaire- II.

**Table 2**

*Factor Loadings and 95% Confidence Intervals for Exploratory Structural Equation Modeling (ESEM) Differentiating Psychological Flexibility From Distress.*

Factors	Factor 1	95% CI	Factor 2	95% CI
Acceptance	<b>.447**</b>	.393, .502	.127**	.076, .179
Present Moment Awareness	<b>.619**</b>	.569, .669	.248**	.198, .297
Self-as-Context	<b>.837**</b>	.808, .866	.002	-.020, .025
Defusion	<b>.674**</b>	.634, .715	-.210**	-.254, -.167
Values	<b>.623**</b>	.576, .670	-.002	-.042, .038
Committed Actions	<b>.664**</b>	.625, .703	-.074*	-.120, -.027
GAD-7	.036	-.001, .073	<b>.887**</b>	.855, .918
PHQ-9	-.013*	-.023, -.003	<b>.856**</b>	.832, .880
AAQ-II	-.196**	-.239, -.152	<b>.680**</b>	.641, .718

*Note.* Factor 1 = psychological flexibility; Factor 2 = distress; Bold indicates the highest factor loading. 95% CI = 95% confidence interval. GAD-7 = Generalized Anxiety Disorder-7; PHQ-9 = Patient Health Questionnaire-9; AAQ-II = Acceptance and Action Questionnaire- II. \*  $p < .05$ , \*\*  $p < .01$ .

**Table 3**

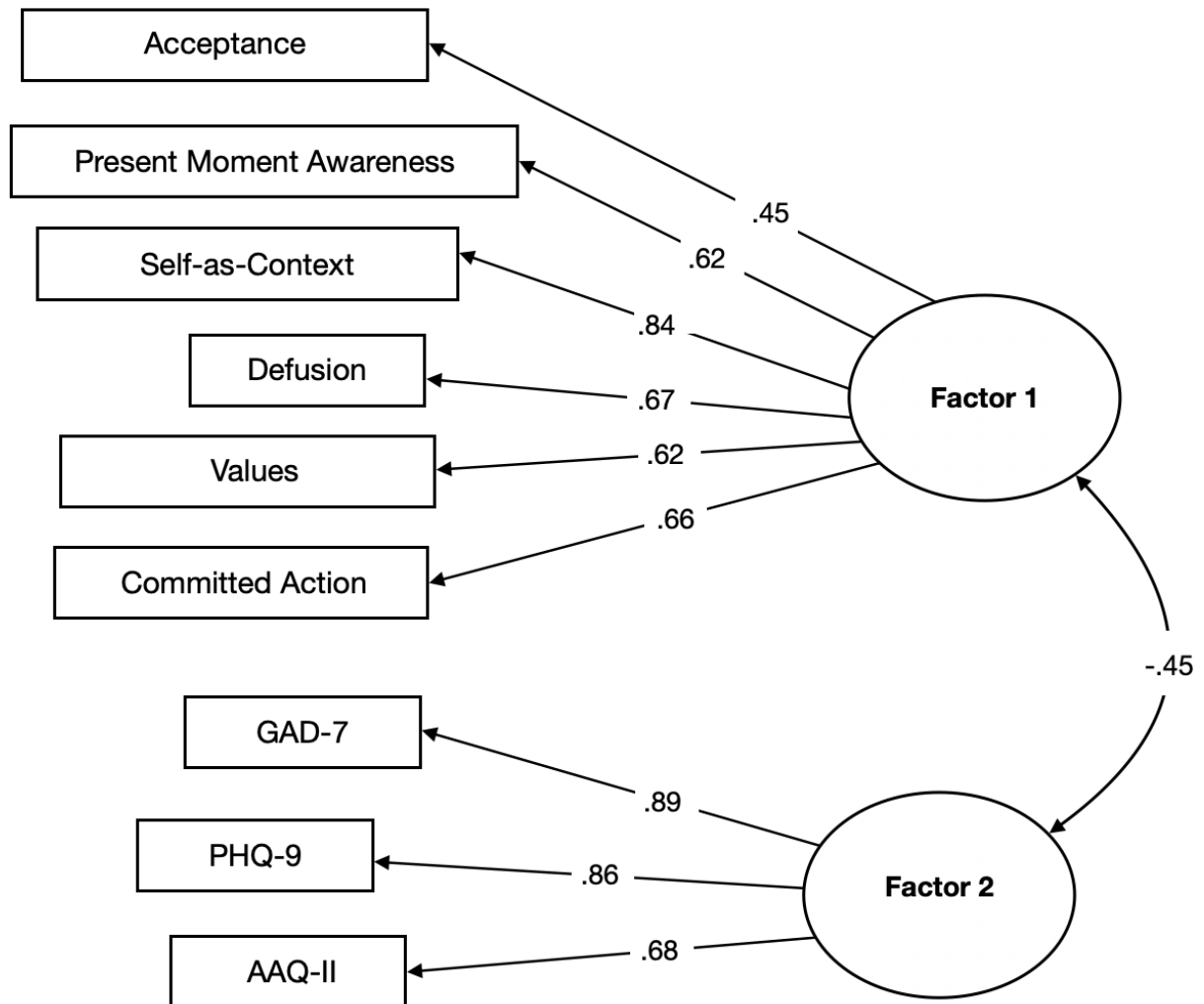
*Fit Indices for Exploratory Structural Equation Modeling (ESEM) and Confirmatory Factor Analysis (CFA) of Two-Factor and One-Factor Models of Psychological Flexibility and Distress.*

	$\chi^2$	<i>df</i>	CFI	TLI	SRMR	RMSEA [90% CI]	AIC	BIC
ESEM Models								
Two-factors	<b>163.468**</b>	<b>17</b>	<b>.971</b>	<b>.939</b>	<b>.026</b>	<b>.075 [.065, .085]</b>	<b>46,791.867</b>	<b>46,989.478</b>
One-factor	1,719.833**	25	.665	.518	.125	.210 [.201, .218]	48,217.428	48,327.312
Second-order CFA Models								
Two-factors	<b>4,204.810**</b>	<b>1,309</b>	<b>.924</b>	<b>.920</b>	<b>.064</b>	<b>.038 [.037, .039]</b>	<b>198,048.672</b>	<b>198,983.318</b>
One-factor	5,158.591**	1,310	.898	.893	.095	.044 [.042, .045]	199,164.566	200,093.871

*Note.* \*\* $p < .01$ ;  $\chi^2$  = Chi-square; *df* = degrees of freedom; CFI = Comparative Fit Index; TLI = ; RMSEA [90% CI] = Root Mean Square Error of Approximation and 90% confidence interval; SRMR = Standardized Root Mean Square Residual; AIC = Akaike's Information Criterion; BIC = Bayes Information Criterion. Bold indicates the best fitting factor solution.

**Figure 1**

*Exploratory Structural Equation Modeling Differentiating Psychological Flexibility from Distress. Factor 1 = Psychological Flexibility; Factor 2 = Distress. GAD-7 = Generalized Anxiety Disorder-7; PHQ-9 = Patient Health Questionnaire-9; AAQ-II = Acceptance and Action Questionnaire- II.*



**Figure 2**

*Standardized Solution of the Second-Order Factor Structure Depicting the Independence of the Psychological Flexibility Factor from Distress. GAD-7 = Generalized Anxiety Disorder-7; PHQ-9 = Patient Health Questionnaire-9; AAQ-II = Acceptance and Action Questionnaire- II.*

