

Defense mechanisms are associated with mental health symptoms across six countries

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ABSTRACT

Defense mechanisms are adaptive processes that are related to mental health and psychological functioning and may play an important role in adaptation to distress, as well as in mental health interventions. The present study aimed to compare the use of defense mechanisms and their relationship to mental health symptoms across six countries. In a large-scale descriptive study, we collected data from community-based individuals ($N=19,860$) in the United States, Australia, Canada, Germany, Italy, and the United Kingdom about the use of defense mechanisms and experienced mental health symptoms during the early phase of the pandemic. We found that the use of defense mechanism categories was similar across countries. Moreover, lower defensive functioning, specifically, neurotic and immature defenses were related to experiencing higher distress across countries, whereas mature defenses were generally inversely related to symptoms. Furthermore, these findings were relatively similar across the six countries. Cross-cultural research on defense mechanisms and mental health has important clinical implications. Our results are consistent with the goal of promoting more adaptive defensive functioning to increase psychological well-being and mitigate the detrimental impact of situational stress.

Key words: defense mechanisms, cross-cultural research, mental health, COVID-19, therapeutic intervention.

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Introduction

The COVID-19 global pandemic and subsequent public health measures related to physical distancing imposed multiple long-lasting stressors on individuals. By now, numerous studies have reported elevated mental distress across the world, compared to pre-pandemic levels, such as increased posttraumatic stress symptoms (PTSS), anxiety, and depression (e.g., Czeisler *et al.*, 2021; Di Giuseppe *et al.*, 2022; Fitzpatrick *et al.*, 2020; Giovannardi *et al.*, 2022; Killgore *et al.*, 2021; Liu *et al.*, 2020; Mazza *et al.*, 2020; Qiu *et al.*, 2020; Prout *et al.*, 2020; Tanzilli *et al.*, 2022; Wang *et al.*, 2020). In order for mental health services to address the increased psychological problems population-wide, it is crucial to understand mechanisms associated with deterioration in psychological functioning, as well as to identify points of therapeutic interventions. The present study aims to focus on cultural differences in the use of defense mechanisms as indicators of mental health and psychological functioning.

Defense mechanisms

Defenses mechanisms are automatic responses to internal and external stress, and emotional conflict, which underlie many adaptational responses in everyday life. Defense use often goes unnoticed by the observer, and even by the person using the defense, although the use of maladaptive defense mechanisms may be more apparent (Cramer, 2008). Defenses vary widely in how generally adaptive they are, as such they can be arranged in a hierarchy of usual adaptiveness (Perry & Bond, 2012). Defenses are a fundamental aspect of mental health, and the adaptiveness of the individual's defenses has a direct impact on the person's

psychological functioning and interpersonal effectiveness (Perry & Bond, 2012; Perry, 2014; Vaillant, 2020).

The defense mechanism hierarchy incorporates three overarching defense categories: Mature defense mechanisms that are the most adaptive, neurotic defenses, which reflect mental inhibition, and Immature defenses, that involve more distortion of inner and outer reality (Perry, 2014). Furthermore, the immature category can be divided into depressive and non-depressive defenses (Perry *et al.*, 2020), and there is some evidence indicating that depressive defenses are especially strongly associated with mental health symptoms and psychopathology (Maffei *et al.*, 1995; Høglend & Perry, 1998; Conversano *et al.*, 2023). See *Supplementary Figure 1* for a review of the DMRS-based defense hierarchy.

Defense mechanisms, as studied in clinical and non-clinical contexts (Carone *et al.*, 2023a; 2023b; Cramer, 2007; Perry & Bond, 2012), offer insights into psychological functioning. Identifying defense mechanisms and defense profiles in clinical settings is helpful for successful treatment outcomes (Perry & Bond, 2012; Cramer, 2007; Perry *et al.*, 2019), and improvement in defensive functioning has been linked to improved psychological functioning in general as well as better treatment outcomes (Kramer *et al.*, 2013; Perry, Knoll, & Tran, 2019).

However, our knowledge of the research relationship between defensive functioning, and specifically, depressive defenses and mental health symptoms, is mostly based on studies conducted in the United States (Perry & Bond, 2012; Perry *et al.*, 2020) and Europe (Babl *et al.*, 2019; Høglend & Perry, 1998; Kramer *et al.*, 2009), and there is no data about the defense use – mental health outcome relationship within the wider Western cultural context. Thus, the question of whether the same associations generalize across the broader Western context, remains unaddressed.

Cultural impact on the use of defense mechanisms

Studies examining cultural differences have typically not focused on defenses *per se*, but on related coping strategies. These studies have generally compared task or problem-focused, and emotional-focused coping between two culturally different, mostly Eastern and Western cultural groups, in a similar context and have identified some culture-related differences. For example, O'Connor & Shimizu (2002) found that Japanese participants employed significantly more emotion-focused coping when faced with stressful encounters compared to a British sample; another study found in the United States and Thailand, that among children who faced commonly experienced school stressors, Thai children used covert forms of coping twice as often or more than American children, whose preferred methods were more overt. To date, we have found only two studies that compared defense mechanisms in Westernized cultural groups (Laconi *et al.*, 2022; Sundbom *et al.*, 1998).

In addition, very little is known about country-based variations in the success of these adaptational strategies, that is, whether they are equally effective at lowering distress and supporting mental well-being across different cultural contexts. Some authors have proposed that the success of any adaptational strategy depends on the strategy's cultural relevance, *i.e.*, whether it fits with the culture's generally preferred adaptation strategy (see Kuo, 2011 for a more detailed discussion). This hypothesis suggests the importance of investigating cultural differences in the use of defense mechanisms to provide appropriate therapeutic intervention for improving individual's

defensive functioning. In line with this hypothesis, some studies have pointed out that the acculturation of foreign students is a process of shifting from their originally preferred adaptation strategies to the new culture's dominant strategies (Aldwin, 2009). Indeed, continuing to use an original adaptational strategy in a new culture that favors another, has been found to be related to experiencing higher distress (Bailey & Dua, 1999), whereas adoption of the new culture's adaptational strategies was associated with experiencing more positive and fewer negative emotions (Sorrentino *et al.*, 2008).

The COVID-19 pandemic, with its global, political, ecological, societal, and individual impacts, represented a momentous, disruptive, population-wide stressor, which mobilized individuals' adaptive processes including defense mechanisms. Previous studies reported that maladaptive coping and defense use, during the initial phase of the pandemic, was associated with poor mental health, whereas adaptive coping and defenses were associated with resilience (*e.g.*, Békés *et al.*, 2022; Di Giuseppe *et al.*, 2022). As such, this context represented an opportunity to examine defenses in a large international sample, facing similar circumstances, at the same time. The overall aim of the current report was to examine adaptational strategies, specifically, the use of defense mechanisms, and their relationship to mental health symptoms in a large-scale international study in six Western countries. Our aims were two-fold:

- i. To delineate similarities and differences and in the use of defense mechanisms across six countries during the early phase of the COVID-19 pandemic,
- ii. To examine whether defensive functioning related to mental health symptoms.

We posited that i) overall use of defense mechanisms would be similar across Western countries, and ii) lower overall defensive functioning, and specifically neurotic and immature (especially depressive) defenses would predict higher levels of depressive, anxiety, and somatization symptoms, as well as COVID-related posttraumatic distress.

Methods

Participants and procedures

The pooled datasets for this study were collected in six different countries: the United States, Australia, Canada, Germany, Italy, and the United Kingdom, by three research teams using an online survey. Data collection took place between March 15 and July 3, 2020, and the study was advertised via social media, email listservs, and market research companies. The surveys were presented in each country with a choice of local language (English, French, German, and Italian). Interested participants were directed to an online platform with additional information about the study. After providing consent, participants completed demographic data and standardized measures. The survey took approximately 30 minutes. Altogether 19,860 participants completed at least the defense mechanism measure, including $n=5,838$ in the United States, $n=483$ in Australia, $n=4,743$ in Canada, $n=1,566$ in Germany, $n=5,655$ in Italy, and $n=1,575$ in the United Kingdom. Among the included participants, $N=208$ only completed the defense mechanisms measure and did not complete any symptom measures. In each country, the same demographic, defense, and mental health measures were completed, except for Italy, where the same defense measure, but

alternative demographic and mental health measures were used (Tables 1 and 2). The study was approved by our Institutional Review Boards.

Measures

Participants completed a battery of measures, including a brief demographic form and multiple scales. Only scales related to the current study are presented below. For an overview of the measures by country, see *Supplementary Table 1*.

Defense mechanisms

The Defense Mechanism Rating Scales-Self-Report-30 (DMRS-SR-30; Di Giuseppe *et al.*, 2020) was used to assess defenses. The 30-item scale reflects the DSM-IV based Defense Mechanisms Rating Scale (DMRS; Perry, 1990). The DMRS-SR-30 items were extracted from the Q-sort version of the DMRS (DMRS-Q; Békés *et al.*, 2021). The scale provides data on 28 individual defenses, which are hierarchically arranged into seven levels, based on their psychological function. Further, the defense levels are arranged into three categories: mature, neurotic, and immature defenses, with the immature category further subdivided into depressive and non-depressive defenses. Finally, Overall Defensive Functioning (ODF) is calculated, with higher scores indicating more adaptive defensive functioning. The scale has shown good internal consistency and predictive validity (Di Giuseppe *et al.*, 2020; Prout *et al.*, 2022), and the Cronbach

alpha in the present study was .94 for USA, .91 for Australia, .92 for Canada, .95 for Germany, .89 for Italy, and .95 for UK.

Depressive, anxiety, and somatization symptoms

The Patient Health Questionnaire (PHQ; Spitzer *et al.*, 1999) was used to assess depressive and anxiety symptoms in each country, except for Italy (see below). To assess depressive symptoms, the PHQ-9 (Kroenke *et al.*, 2001) was administered. The PHQ-9 measures the nine DSM depressive symptoms and has well-established psychometric properties (*e.g.*, Manea *et al.*, 2015). The Cronbach's alpha in the present sample was .91. For anxiety symptoms, the PHQ GAD-7 (Spitzer *et al.*, 2006) was used. The GAD-7 is a sensitive and specific measure of generalized anxiety symptoms (Kroenke *et al.*, 2007). The Cronbach's alpha of the GAD-7 in the present sample was .85 for USA, .82 for Australia, .85 for Canada, .84 for Germany, and .86 for UK. Somatization was measured with the PHQ-15 (Kroenke *et al.*, 2002) which asks about 15 somatic symptoms (*e.g.*, stomach pain, dizziness) that account for 90% of the symptoms reported in outpatient settings (Kroenke, 2003). The PHQ-15 has been reported to have high internal consistency and test-retest reliability (Gierk *et al.*, 2015). Cronbach alpha for the PHQ-15 in the current study was .91 for USA, .92 for Australia, .90 for Canada, .91 for Germany, and .91 for UK.

In the Italian survey, the Symptom Checklist-90 (SCL-90; Derogatis, *et al.*, 1973) was used to assess psychological distress. The SCL-90 is a 90-item, 5-point scale assessing psy-

Table 1. Descriptive characteristics by country.

	Sample size (%)					
	USA	Australia	Canada	Germany	Italy	UK
Age						
18-24	664 (11.7)	32 (6.6)	339 (7.5)	152 (9.7)	273 (4.8)	247 (15.7)
25-34	1175 (20.8)	87 (18.0)	708 (15.7)	325 (20.7)	1662 (29.3)	363 (23.0)
35-44	967 (17.1)	87 (18.0)	881 (19.6)	321 (20.5)	1179 (20.7)	307 (19.5)
45-54	846 (14.9)	92 (19.0)	801 (17.8)	308 (19.7)	1032 (18.2)	261 (16.6)
55-64	1016 (17.9)	75 (15.5)	1064 (23.6)	294 (18.8)	954 (16.8)	218 (13.8)
65-74	813 (14.4)	92 (19.0)	581 (12.9)	147 (9.4)	465 (8.2)	137 (8.7)
75-84	156 (2.8)	16 (3.3)	118 (2.6)	19 (1.2)	117 (2.1)	40 (2.5)
85+	24 (.4)	3 (.6)	10 (.2)	1 (.1)	0 (.0)	2 (.1)
Gender						
Female	4421 (75.7)	361 (74.6)	3658 (77.2)	801 (51.1)	4256 (74.9)	816 (51.8)
Male	1250 (21.4)	113 (23.3)	983 (20.8)	763 (48.7)	1427 (25.1)	752 (47.7)
Non-binary	172 (2.9)	10 (2.1)	96 (2.0)	3 (.2)	0 (.0)	7 (.4)
Education						
< High school	61 (1.0)	23 (4.8)	84 (1.8)	233 (14.9)	–	53 (3.4)
High school	543 (9.3)	68 (14.0)	510 (10.8)	247 (15.8)	–	344 (21.8)
Some college	1124 (19.2)	121 (25.0)	776 (16.4)	76 (4.9)	–	250 (15.9)
College	2234 (38.3)	120 (24.8)	1697 (35.8)	339 (21.6)	–	416 (26.4)
Professional	1388 (23.8)	134 (27.7)	1405 (29.6)	618 (39.4)	–	98 (6.2)
Doctorate	491 (8.4)	18 (3.7)	267 (5.6)	53 (3.4)	–	0 (.0)
Socioeconomic status, %						
Lowest 10	484 (8.3)	55 (11.4)	355 (7.5)	75 (4.8)	–	101 (6.4)
10-30	1389 (23.8)	110 (22.7)	1011 (21.3)	340 (21.7)	–	384 (24.4)
Mid 30-60	2589 (44.3)	265 (54.8)	2237 (47.2)	865 (55.2)	–	800 (50.8)
60-80	1167 (20.0)	46 (9.5)	993 (21.0)	253 (16.1)	–	236 (15.0)
Above 80	214 (3.7)	8 (1.7)	141 (3.0)	34 (2.2)	–	54 (3.4)
Relationship status						
Any	2882 (49.4)	164 (33.9)	2895 (61.1)	892 (56.9)	–	919 (58.3)
None	2938 (50.3)	320 (66.0)	1813 (38.3)	673 (42.9)	–	655 (41.6)

In the Italian sample, no data was collected on education, socioeconomic status, and relationship status.

chopathological and somatic symptoms occurring during the past week. The SCL-90 has various subscales to assess psychiatric symptoms, the subscales for depressive, anxiety, and somatization symptoms were used. Validity and reliability of the scales have been well-documented (Bonicatto *et al.*, 1977; Derogatis & Cleary, 1977). The Cronbach alpha in the Italian sample was .97.

COVID-related posttraumatic distress

The Impact of Events Scale was used to assess COVID-related posttraumatic distress. The Impact of Event Scale – Revised (IES-R; Weiss and Marmar, 2004) was administered in the US, Australia, and Italy, whereas its abbreviated version, the IES-6 (Thorenson *et al.*, 2010) was administered in a subsample in the US, and in Canada, Germany, and the UK. The IES-R is a 22-item self-report measure that assesses subjective distress caused by traumatic events; the IES-6 is a shorter 6-item version (Weiss & Marmar, 1997; Creamer *et al.*, 2003), which has been shown to be a valid and reliable measure of posttraumatic reactions (Thorenson *et al.*, 2010). Following protocols used in numerous studies during pandemics (*e.g.*, Prout *et al.*, 2020), participants were asked to respond to the items with reference to the COVID-19 pandemic as the identified stressor: *For the past week, how much have you been distressed or bothered by the following difficulties related to coronavirus/COVID-19?* Items reflect three aspects of distress

in response to traumatic events: intrusion (*e.g.*, intrusive thoughts, feelings), avoidance (avoidance of thoughts or feelings), and hyperarousal (trouble concentrating, feeling on-guard), and are rated on a 5-point scale from 1 *not at all* to 5 *extremely*. In the current study, Cronbach's alpha for the IES-R total score was .93 for USA, .94 for Italy, and .94 for Australia, and Cronbach's alpha for the IES-6 was .85 for USA, .88 for Canada, .80 for Germany, and .87 for UK.

Data analysis

We cleaned the data and applied Mahalanobis distances to detect and eliminate multivariate outliers. In the analysis, we included participants who completed at least the DMRS-SR-30. Since defense mechanisms were non-normally distributed, we used non-parametric tests. Similar to earlier publications, higher age and female gender were significantly associated with higher defensive functioning in our sample as well, thus we adjusted for age and gender in the analyses. To examine the first research aim, that is, to explore similarities and differences in defense use across the six countries, we calculated means (adjusted for age and gender) for individual defenses, defense levels, and defense categories for each country. Reference scores for ODF are the following: below 5.0 is typically associated with acute distress, from 5.0 to 5.5 with symptom disorders, from 5.5 to 6.0 with average healthy neurotic functioning, and scores above 6.0 with higher healthy-neurotic functioning (Perry & Henry, 2004).

Table 2. Adjusted means and standard deviations of defenses by country.

Defenses	Mean and standard deviations						Total
	USA	Australia	Canada	Germany	Italy	UK	
ODF M	5.44	5.26	5.50	5.05	5.61	5.08	5.44
SD	.73	.64	.78	.73	.72	.76	.76
C1./L7. Mature M	50.03	44.81	51.39	42.49	55.82	42.41	50.67
SD	19.65	17.38	21.01	19.50	19.64	20.00	20.42
C2. Neurotic M	22.05	23.75	22.21	21.19	18.74	21.42	21.04
SD	10.51	9.09	11.35	10.17	10.60	10.57	10.79
C3. Immature M	27.93	31.44	26.40	36.32	25.44	36.16	28.28
SD	15.17	12.77	16.39	15.22	14.87	15.72	15.81
Depressive M	15.94	18.26	14.99	22.44	13.58	21.21	16.04
SD	11.59	10.61	12.64	11.99	11.47	12.40	12.20
Non-dep. M	11.99	13.19	11.41	13.88	11.86	14.95	12.24
SD	8.25	7.26	8.92	9.29	7.93	9.07	8.51
L6. Obsessional M	8.53	9.67	8.44	8.60	8.51	8.29	8.52
SD	6.17	5.08	6.70	6.41	6.90	6.54	6.54
L5. Neurotic M	13.51	14.08	13.77	12.59	10.23	13.13	12.53
SD	7.81	7.35	8.74	7.64	7.01	7.49	7.91
L4. Minor image M	6.60	7.78	6.30	7.52	5.60	8.68	6.51
SD	6.34	6.11	6.82	6.84	5.91	7.25	6.51
L3. Disavowal M	10.17	10.61	9.60	12.26	10.96	12.03	10.60
SD	7.47	6.44	8.12	8.26	7.37	7.74	7.70
L2. Major image M	6.85	7.93	6.48	9.87	3.80	9.34	6.35
SD	6.23	5.39	7.00	7.93	5.09	7.31	6.64
L1. Action M	4.31	5.12	4.01	6.67	5.08	6.11	4.82
SD	4.95	4.79	5.18	5.35	6.06	5.45	5.48

ODF, overall defensive functioning; M, mean; SD, standard deviation; C, category; L, level; Non-dep, non-depressive; Minor image, Minor image distortion; Major image, Major image distortion. All means are adjusted for age and gender.

In addition, we computed effect sizes to denote the magnitude of differences between countries, with partial-eta squared interpretable as $\eta^2 > .14$ indicating a large effect, $\eta^2 = .06-.13$ a medium effect and $\eta^2 < .06$ a small effect (Cohen, Cohen, West, & Aiken, 2013). To examine our second research aim, whether defensive functioning relates to mental health symptoms, we conducted Spearman's correlations (adjusted for age and gender) between defense variables (overall defensive functioning, defense categories, and depressive defenses) and mental health symptoms (depression, anxiety, and COVID-related posttraumatic distress) by country. All analyses were conducted using SPSS 27.

Results

Descriptive characteristics by country are presented in Table 1. Participants were mostly female, and the largest age group was the 25- to 34-year-old, the majority had a college or professional degree, and were in a stable relationship.

Defense mechanism use across the six countries

Table 2 shows the defense mechanism ODF, categories and levels by country, adjusted for age and gender, and Table 3 summarizes the between country analyses.

The adjusted mean ODF scores of four countries fell in the neurotic range, which is generally associated with symptom disorders, and the two others were in the healthy neurotic range, which has been shown to be the average range for fairly well-functioning individuals (Perry, 2014). The effect size for country differences was large ($\eta^2 = .15$), suggesting significant variation. Regarding the defense categories, on average, individuals in each country most often reported using mature defenses (range: 41.41 to 55.82), and the effect size for country differences was moderate ($\eta^2 = .13$). The second largest category was immature defenses (range: 25.44 to 36.32) with a large effect size for country differences ($\eta^2 = .14$). The third category, the neurotic defenses was utilized the least often (range: 18.74 to 23.75) with a small effect size for country variation ($\eta^2 = .05$). Among the immature defenses, depressive defenses (range: 13.58 to 22.44) were utilized more than the non-depressive defenses (range: 11.41 to 14.95) and both effect sizes showed variation across the countries, albeit small for the non-depressive defenses (de-

pressive, $\eta^2 = .11$; non-depressive, $\eta^2 = .04$). Whereas there were some small significant differences in defense level means across countries, the order from highest to lowest was largely similar. In descending order, these were mature, neurotic, disavowal, obsessional, major image-distorting, minor image-distorting, and finally action defenses.

Defense mechanisms and mental health symptoms across the six countries

Table 4 displays the correlations between ODF, defense categories and the psychological symptom scales separately by country. While all of the correlations are highly significant (almost all, $p < .001$), given the varying sample sizes, specific probability-value information is presented separately for each country. In all countries, ODF (median $-.37$; range: $-.28$ to $-.52$) and mature defenses (median $-.37$; range $-.31$ to $-.50$) were negatively associated with all the symptoms scales at similar magnitudes. By contrast in all countries, the neurotic (median $.33$; range $.19$ to $.39$) and immature (median $.27$; range $.16$ to $.46$) categories correlated positively with symptom measures, with the correlations with neurotic defenses higher than those with immature defenses in 68% (17 of 25) of instances. The depressive defenses were more highly correlated with symptoms (median $.27$, range: $.18$ to $.51$) than the non-depressive defenses (median $.10$, range $.00$ to $.28$) for every scale, in all countries. Overall, across all countries, greater reported neurotic and immature (principally depressive) defenses were associated with higher levels of depressive, anxious, and COVID-related post-traumatic stress symptoms.

Several country specific differences in defenses and symptoms were revealed. The Italian sample showed the highest magnitude correlations with depressive and anxiety symptoms, followed by Australia, although different measures were employed. Also, in the Italian sample, immature (especially depressive) defenses were more strongly associated with all symptom measures than neurotic defenses, whereas this pattern was true in the Australian sample only for depressive and somatic symptoms.

Discussion

The present study reports on the adaptational strategies used by a large international sample in the context of the stressful ex-

Table 3. Between-groups effects for overall defensive functioning and defense levels.

Defenses	Sum of squares	df	Mean square	F	p	Partial η^2
ODF	1635.39	7	233.63	469.02	.000	.15
C1./L7.Mature	1068417.45	7	152631.06	421.36	.000	.13
C2. Neurotic	100922.81	7	14417.54	129.63	.000	.05
C3. Immature	65225.97	7	95032.28	440.43	.000	.14
Depressive	30063.50	7	47151.93	357.55	.000	.11
Non-Dep.	62685.86	7	8955.12	129.27	.000	.04
L6. Obsessional	17295.84	7	2470.83	58.95	.000	.02
L5. Neurotic	60162.28	7	8594.61	144.51	.000	.05
L4. Minor I. D.	31779.82	7	4539.98	11.54	.000	.04
L3. Disavowal	57552.72	7	8221.82	145.74	.000	.05
L2. Major I. D.	94405.99	7	13486.57	343.94	.000	.11
L1. Action	43906.88	7	6272.41	226.19	.000	.08

ODF, overall defensive functioning; C, category; L, level; Non-dep, non-depressive; Minor I, Minor image distortion; Major I, Major image distortion.

perience of fear, instability, loss, and strict social restrictions that affected the world population during the early phase of the COVID-19 pandemic. To the best of our knowledge, this is the first study collecting such a large sample analyzed on their defensive functioning. Almost 20,000 international respondents, who reported on their defenses and mental health using the same measure for defense mechanisms (DMRS-SR-30) and similar well-validated measures for psychological distress (IES, IES-R, SCL-90, and PHQ), further had another aspect of uniqueness as they were all living a similar acute stressful experience due to the COVID-19 pandemic.

Our primary study aim was to analyze differences in the use of defense mechanisms in six Western countries, specifically, the United States, Australia, Canada, Germany, Italy, and the United Kingdom. Findings revealed that overall tendencies in the use of defensive strategies were similar across countries. Based on previously established cut-off criteria (see Perry & Henry, 2004), in the present study, the average ODF by country ranged from neurotic (5.1) to healthy-neurotic level (6.0), resulting in a mean ODF of 5.44 for the total sample, which is what would be expected from generally well-functioning individuals. Overall, our results demonstrated that during the initial stage of the COVID-19 pandemic, despite being faced with a considerably stressful situation, the use of adaptive, mature defensive strategies was the most prevalent form of adaptation in

these countries. Next, most used were immature and neurotic defenses. Among the immature defenses, depressive defenses were more frequent than non-depressive defenses in each country. These results reveal that in the face of similar acute stressful events, people living in Western-oriented countries, tend to use similar emotion regulation strategies.

With regards to our second study aim, our results demonstrated that adaptive strategies, in the form of defense mechanisms, were robustly related to mental health across all six countries. Mature defense use was related to less depressive, anxiety, and somatic symptoms, as well as less COVID-related posttraumatic distress. Conversely, neurotic and immature defenses were related to higher levels of mental health symptoms across the six countries. This is in line with previous research conducted on smaller samples and in individual countries (Békés *et al.*, 2022; Prout *et al.*, 2020), and supports evidence for the commonality of defensive processes and their role in both the maintenance and deterioration of mental health in countries with similar Western culture.

While the most robust negative association between mature defenses and lower levels of mental health symptoms and the positive association for neurotic and immature defenses and higher levels of mental health symptoms occurred consistently across the six countries, there was a notable difference between countries in the strength of positive associations between neu-

Table 4. Mean symptoms and Spearman's correlations with defenses by country.

Symptoms	Mean (SD)	ODF	Mature	Neurotic	Immature	Dep.	Non-dep.
USA							
PHQ-Dep.	8.63 (6.77)	-.38**	-.42**	.39**	.27**	.31**	.05*
PHQ-Anx.	6.27 (3.85)	-.28**	-.35**	.39**	.16**	.21**	.00
PHQ-Som.	7.95 (6.16)	-.28**	-.32**	.35**	.17**	.21**	.01*
Posttr. IES-6	9.75 (5.91)	-.31**	-.36**	.35**	.21**	.23**	.07**
Posttr. IES-R22	26.83 (16.70)	-.46**	-.49**	.34**	.40**	.32**	.28**
Australia							
PHQ-Dep.	9.27 (7.21)	-.49**	-.48**	.33**	.43**	.12*	.12**
PHQ-Anx.	8.07 (3.43)	-.41**	-.43**	.39**	.32**	.05	.05**
PHQ-Som.	3.92 (3.41)	-.24**	-.23**	.19**	.32**	.02	.02**
Posttr. IES-R22	23.89 (17.01)	-.42**	-.44**	.35**	.18**	.13*	.13**
Canada							
PHQ-Dep.	8.48 (6.61)	-.43**	-.47**	.37**	.33**	.34**	.11**
PHQ-Anx.	5.96 (3.82)	-.31**	-.38**	.39**	.21**	.23**	.05**
PHQ-Som.	9.28 (5.94)	-.28**	-.34**	.35**	.19**	.21**	.04*
Posttr. IES-6	8.92 (5.70)	-.31**	-.36**	.35**	.22**	.22**	.08**
Germany							
PHQ-Dep.	5.87 (5.91)	-.37**	-.39**	.29**	.31**	.29**	.13**
PHQ-Anx.	3.81 (3.27)	-.33**	-.36**	.31**	.26**	.24**	.10**
PHQ-Som.	7.16 (5.89)	-.33**	-.36**	.28**	.27**	.24**	.12**
Posttr. IES-6	7.71 (4.67)	-.28**	-.32**	.25**	.23**	.18**	.14**
Italy							
SCL-Dep.	.96 (.73)	-.52**	-.50**	.28**	.46**	.51**	.12**
SCL-Anx.	.84 (.68)	-.45**	-.44**	.25**	.40**	.42**	.13**
SCL-Som.	.61 (.59)	-.37**	-.37**	.23**	.32**	.34**	.10**
Posttr. IES-R22	24.72 (16.01)	-.42**	-.43**	.28**	.37**	.35**	.18**
UK							
PHQ-Dep.	7.20 (6.47)	-.37**	-.39**	.31**	.27**	.32**	.02**
PHQ-Anx.	4.56 (3.64)	-.32**	-.36**	.33**	.22**	.27**	.01**
PHQ-Som.	7.54 (6.03)	-.28**	-.31**	.28**	.20**	.23**	.02**
Posttr. IES-6	7.99 (5.55)	-.33**	-.37**	.29**	.26**	.26**	.09**

PHQ, Patient Health Questionnaire – depressive, anxiety and somatic symptom subscales; SCL, Symptom checklist 90 – depressive, anxiety and somatic subscales; Posttr. 6, Impact of Events Scale-6; Posttr. R22, Impact of Events Scale-R22; Dep., Depressive defenses; Non-Dep., Non-Depressive defenses. **p<.001 *p<.01. In all correlations, age and gender were partialled out.

rotic *versus* immature defenses and mental health symptoms. Specifically, whereas in most cases, mental health symptoms were most strongly correlated with neurotic defenses, in a few cases, immature defenses were more strongly associated with symptoms, such as in the US for PTSS, in Australia for depression and somatization, and in Italy for each mental health symptoms. One possible reason for this finding may be driven by the fact that the Italian sample was collected closest to the onset of the pandemic (late March 2020), when very little was known about the SARS-CoV-2 virus, beyond how deadly it was.

Clinical implications

The COVID-19 pandemic led to increased psychological distress and elevated mental health symptoms (Daly *et al.*, 2022; Rajkumar, 2020; Torales *et al.*, 2020). As a practical implication of our study, the findings highlight the importance of addressing defense mechanisms as a part of interventions aimed at supporting individuals in coping with acute stressful life events, including the pandemic and its aftermath. Furthermore, mental health prevention and treatment interventions should focus on identifying and improving less adaptive defense mechanisms, especially those that individuals tend to use frequently when in distress. Furthermore, as our results showed, higher level, mature defenses are associated with better mental health, and these mature defense mechanisms could specifically be consciously promoted by mental health professionals (Di Giuseppe *et al.*, 2021).

Limitations

This study had several limitations. First, different measures were used in the Italian and part of the United States sample, to assess mental health symptoms, which prevented a direct comparison of all countries in our study. However, all the study measures are commonly used and well-validated, with robust psychometric properties, supporting their equivalency, and thus inclusion in a single study. Second, demographic data on completed education, socio-economic status and relationship status were not collected in Italy, therefore, even though the sampling process was similar, and we have no indication of significant demographic differences, it is possible that these variables could be different in Italy, compared to the other countries. In tandem, each country has its own unique history of marginalization with regards to differing racial/ethnic groups, gender, social class, sexual orientation, and other forms of identity. The pandemic differentially impacted the mental health of marginalized groups to a greater degree (Hearne, 2022; Kidd *et al.*, 2021; Lee & Waters, 2021) and we were unable to examine the role of intersectional identity in the use of defenses across the six countries in this study. Third, even though the research teams conducted the data collections during the early phase of the pandemic, inevitably, the intensity of the illness-threat, and the varying governmental responses, differed by country at the time of each assessment, which could have impacted the results. Nonetheless, our results show that, even with differing distress levels, the relationship between defense mechanisms and mental health symptoms is consistent. Fourth, given that this was an online survey study, beyond the known limitations of self-report assessment, an additional limitation of this methodology, is that the survey was therefore only available to participants who had access to an internet connection, and it demanded a certain level of technological ease, as such this may have limited certain individuals from participating, especially when access to free pub-

lic internet and user support may have been limited by social distancing rules. Fifth, our measure of defenses was translated from and back translated to English by native speakers, but we cannot rule out that any phrase had different nuances in a given country, even if literally highly similar, which may have differentially affected their rates of endorsement in that country. Finally, although our findings robustly support similarities in the use of defense mechanisms across these six samples, it is important to note that these countries are culturally predominantly similar, as such, future research examining patterns of defense mechanisms and their relationship with stress and emotion regulation would benefit from the inclusion of more culturally distinct samples.

Conclusions

In conclusion, the current study is the first to investigate concurrent patterns of defense use in such a large sample, in several countries. Findings suggest that in the face of acute stressful events, individuals mobilize both mature and immature defenses, and that these adaptive efforts, simultaneously enhance and hinder psychological well-being. Furthermore, our findings replicated across all countries with few differences, suggesting that the use of defense mechanisms is similar, for individuals in similar cultural contexts, and supported further evidence for the importance of addressing defense mechanism as part of clinical practice and mental health interventions, especially during collective massive traumatic events (*i.e.* wars, natural disasters, etc.) such as the pandemic.

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Online supplementary material:

Supplementary Figure 1. Hierarchical organization of defensive categories, defense levels and individual defenses.

Supplementary Table 1. Measures by country.