Research in Psychotherapy: Psychopathology, Process and Outcome

Clinical applications of the Defense Mechanisms Rating Scale-Self-Report-30: a systematic review of the first five years

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Supplementary Material

Supplementary Table 1. Main characteristics of the included studies.

Authors	**Year**	**Country**	**Sample**	**Main findings**
Aafjes-Van Doorn et al.	2021	United States	441 Therapists Study 1: 105 Study 2: 336	Therapists generally reported high levels of mature defense. Lower levels were related to greater secondary traumatisation and professional doubts. Low levels of vicarious traumatisation corresponded to higher levels of mature defenses.
Békés et al.	2023a	United States, Canada, France, Belgium, other Countries (1.7%)	1,225 above 65 years old	Anxiety, depression and post-traumatic stress were significantly related to adverse childhood experiences, age and overall defensive functioning. Higher distress was related to age and childhood adversity, while adaptive defenses were associated with decreased

				distress. Thus, defenses mediated the relation between distress and childhood trauma.
Békés et al.	2023b	United States, Australia, Canada, Germany, Italy, United Kingdom	19,860 community-based individuals	Defense mechanisms patterns emerged as similar across the six countries. Neurotic and immature defenses were related to increasing distress. Mature defense mechanisms were negatively related to psychopathological symptoms. Cross-cultural research on defenses appeared to have clinical implications.
Carone & Tracchegiani	2025	Italy	348 mothers	Childhood emotional abuse, sexual abuse, and emotional and physical neglect were directly associated with maternal helpless caregiving. Defensive functioning mediated the link between emotional abuse and helplessness: less mature defenses predicted higher maternal helplessness.
Carone et al.	2023a	Italy	401 community-based individuals	Defensive functioning emerged as a key variable for clinicians and therapists. Problematic internet use was significantly associated with helicopter parenting and immature defense functioning.
Carone et al.	2023b	Italy	436 community-based individuals	Mature defenses, mental inhibition and avoidance defense did not contribute to fear of missing out. Immature-depressive defenses highlighted increased probability of experiencing maladjustment, vulnerability, anxiety and frustration.

Ciocca et al.	2023	Italy	521 community-based individuals	Immature defenses mediated the link between reduced capacity to love and hypersexual behaviour. Lower scores in the ability to establish mature affective bonds were associated with dysfunctional defensive functioning and increased psychological distress, which in turn contributed to problematic sexual behaviours.
Cruciani et al.	2025a	Italy	1,565 community-based individuals	Narcissistic profiles were significantly related to defense mechanisms. Specific defensive levels and epistemic stances aligned with narcissistic profiles. Defensive levels appeared as crucial for the analysis of pathological narcissisms.
Cruciani et al.	2025b	Italy	67 cardiological patients 80 healthy individuals	Infarcted patients presented high levels of anxiety and depression symptoms, maladaptive defense mechanisms and decreased affective mentalisation. Psychopathology was significantly related to immature defense mechanisms. Thus, depression and anxiety symptoms affected emotional processing.
Di Giuseppe et al.	2024a	Italy	655 individuals with high anxiety and depression	Self-assertion emerged as the most represented defense. Passive aggression was the most interrelated defense mechanism. Defenses classified within the same category (e.g., mature or immature) exerted a distinct influence on the clustering process, contributing to the allocation of cases.
Di Giuseppe et al.	2021a	Italy	233 healthcare workers	Frontline health workers demonstrated considerable stress, exhaustion and depersonalization. Mature defenses were related to resilience and personal accomplishment. Immature and neurotic defense mechanisms were linked to perceived stress and burnout.

Di Giuseppe et al.	2022	Italy	6385 individuals	Increased scores of mindfulness were significantly associated with higher overall defensive maturity and adaptive defense mechanisms. Mature defenses represented good predictors of psychological health. Emotional regulation assumed a protective role towards distress and maladaptive responses.
Di Giuseppe et al.	2020b	Italy	5683 individuals	Notable levels of defense functioning were associated with lower depression, anxiety and post-traumatic stress symptoms. Immature defenses were associated with affective distress.
Fiorini Bincoletto et al.	2025	Italy	385 individuals	Epistemic disruptions were linked to severe interpersonal problems, immature defenses and appreciable psychopathology scores. Epistemic mistrust and immature defensive functioning significantly predicted higher levels of psychopathology. Epistemic disruptions can be considered as risk factors for psychopathology, affecting mental health and involving immature defensive functioning.
Liotti et al.	2025	Italy	416 Community-based individuals	Defensive profiles associated with epistemic trust, mistrust, and credulity emerged. Mature defenses correlated with epistemic trust, while immature and neurotic defenses were linked to epistemic mistrust and credulity. Specific defense patterns, such as projection, passive aggression, and sublimation, characterized distinct epistemic stances.

Martino et al.	2025	Italy	34 patients with Severe Allergic Asthma and 32 patients with Hymenoptera Venom Anaphylaxis	Mature defensive functioning was significantly and positively associated with mental health, while related to decreased depressive and anxiety symptoms and alexithymia. Severe Allergic Asthma patients showed higher defensive functioning and poorer physical health than those with Hymenoptera Venom Anaphylaxis. Thus, positive defensive functioning predicted psychological health.
Mechler et al.	2024	Sweden	181 patients with social anxiety disorder	Both guided and unguided internet-based psychodynamic therapy reduced social anxiety compared to the waitlist. Guided therapy produced stronger improvements, including broader effects on depressive symptoms, general anxiety, perceived quality of life, emotional regulation, and defensive functioning. Changes in defensive functioning were more pronounced in the guided condition.
Mesce et al.	2025	Italy	1,006 women diagnosed with headache, fibromyalgia, vulvodynia, comorbid conditions, and healthy controls	Defensive functioning showed significant associations with pain-related outcomes across the different clinical groups. Neurotic defense mechanisms were linked to higher distress and symptom severity, in interaction with low emotional processing and alexithymia.
Nimbi et al.	2025	Italy	895 women diagnosed with fibromyalgia, chronic headache, vulvodynia, and comorbid conditions	Cluster analysis identified three psychological profiles, ranging from mild to severe impairment. Higher levels of alexithymia, central sensitization, and less adaptive defensive functioning characterized the more vulnerable groups, which were more frequently associated with fibromyalgia and comorbid conditions.

Nimbi et al.	2024a	Italy	women diagnosed with fibromyalgia Study 1: 510 Study 2: 458	Neurotic and immature defense mechanisms contributed independently to central sensitization in women with fibromyalgia. These defenses, together with mental pain and experiences of bodily threat, were associated with greater symptom severity and reduced quality of life, highlighting their role in the psychological and functional burden of the condition.
Nimbi et al.	2024b	Italy	357 women diagnosed with vulvodynia	Elevated use of neurotic defenses emerged. Higher use of immature and neurotic defenses predicted high levels of mental pain and central sensitisation. Defenses such as intellectualisation, isolation of affect and displacement were significantly associated with central sensitisation.
Perry et al.	2022	Canada, Germany, United Kingdom, United States	6,990 individuals	Defensive style influenced engagement in health-protective behaviors during the early COVID-19 pandemic. Mature defenses were associated with greater adherence to protective measures, whereas immature defenses predicted lower compliance. Immature defenses, together with pandemic-related fears, local regulations, age, domestic stressors, and perceived emotional support, contributed significantly to variability in health-protective behavior, which in turn predicted vaccination uptake eight months later.
Prout et al.	2020	United States, Australia, China, United Kingdom, Canada,	2,787 individuals	Psychopathology emerged among the involved subjects. Somatisation and lower adaptive defense levels were associated with greater distress. Physical experiences, psychological distress, emotional regulation paths and defenses represent key assessment targets.

		Netherlands, Hungary and other countries		
Renzi & Mariani	2025	Italy	562 individuals	Negative associations emerged between mature defenses, maladaptive daydreaming and narcissism, while positive associations regarded neurotic, immature defenses. Greater levels of maladaptive daydreaming and narcissism corresponded to higher use of immature and neurotic defense.
Tanzilli et al.	2022	Italy	367 individuals	Maladaptive reactions to restrictions and stress were associated with immature defense mechanisms. Severe levels of personality pathology were predictive of poor overall defensive functioning.
Tracchegiani et al.	2025	Italy	1,315 community-based individuals	A significant relationship between high exposure to childhood maltreatment and maladaptive defenses was detected. Significant impairments in self and interpersonal personality functioning emerged as associated with defenses.

Supplementary Table 2. Quality assessment of cross-sectional studies (Newcastle-Ottawa Scale).

Author(s), Year	Representativeness of the sample	Sample size	Non-respondents	Assessment of the exposure	Assessment of the outcome	Statistical analysis	Total
Békés et al., 2023a	1	0	0	1	1	1	4
Békés et al., 2023b	1	0	1	1	1	1	5
Carone & Tracchegiani, 2025	1	0	1	1	1	1	5
Carone et al., 2023a	1	0	0	1	1	1	4
Carone et al., 2023b	1	1	0	1	1	1	5
Ciocca et al., 2023	1	0	1	1	1	1	5
Cruciani et al., 2025a	1	0	1	1	1	1	5
Cruciani et al., 2025b	1	0	0	1	1	1	4
Di Giuseppe et al., 2024a	1	0	0	1	1	1	4
Di Giuseppe et al., 2021a	1	0	0	1	1	1	4
Di Giuseppe et al., 2022	1	0	0	1	1	1	4
Di Giuseppe et al., 2020b	1	0	0	1	1	1	4
Fiorini Bincoletto et al., 2025	1	0	0	1	1	1	4
Liotti et al., 2025	1	0	0	1	1	1	4
Martino et al., 2025	1	0	1	1	1	1	5
Mesce et al., 2025	1	1	1	1	1	1	6
Nimbi et al., 2025	1	0	1	1	1	1	5
Nimbi et al., 2024a	1	1	1	1	1	1	6
Nimbi et al., 2024b	1	1	1	1	1	1	6
Perry et al., 2022	1	0	1	1	1	1	5
Prout et al., 2020	1	0	1	1	1	1	5
Renzi & Mariani, 2025	1	0	1	1	1	1	5
Tanzilli et al., 2022	1	0	0	1	1	1	4
Tracchegiani et al., 2025	1	1	1	1	1	1	6

Supplementary Table 3. Quality assessment of longitudinal studies (Newcastle-Ottawa Scale).

Author(s), Year	**Representativeness of the sample**	**Sample size**	**Non-respondents/ loss to follow up**	**Assessment of the exposure**	**Assessment of the outcome**	**Statistical analysis**	**Follow-up**	**Total**
Aafjes-Van Doorn et al., 2021 (Study 2)	1	0	1	1	1	1	1	6

Supplementary Table 4. Quality assessment of the randomised clinical trial (Randomized Controlled Trial of Psychotherapy Quality Rating Scale).

Description of subjects	**Total**
Rate: 0 (poor description); 1 (brief description); 2 (well described)	
1. Diagnostic method and criteria for inclusion and exclusion	2
2. Documentation or demonstration of reliability of diagnostic methodology	2
3. Description of relevant comorbidities	2
Definition and delivery of treatment	
5. Treatment(s) (including control/comparison groups) are sufficiently described or referenced to allow for replication	2
6. Method to demonstrate the treatment being studied is treatment being delivered (only satisfied by supervision if transcripts or tapes are explicitly reviewed)	2
7. Therapist training and level of experience in the treatment(s) under investigation	1
8. Therapist supervision while treatment is being provided	2
9. Description of concurrent treatments (e.g., medication) allowed and administered during course of study (if patients on medication are included, a rating of 2 requires full reporting of what medications were used; if patients on medications are excluded, this alone is sufficient for a rating of 2)	1
Outcome measures	
10. Validated outcome measures(s) (either established or newly standardised)	2
11. Primary outcome measure(s) specified in advance (though does not need to be started explicitly for a rating of 2)	2
12. Outcome assessment by raters blinded to treatment group and with established reliability	0
13. Discussion of safety and adverse events during study treatment(s)	1
14. Assessment of long-term post-termination outcome (should not be penalized for failure to follow comparison group if this is a waitlist or non-treatment group that is subsequently referred for active treatment)	2
Data analysis	
15. Intent-to-treat method for data analysis involving primary outcome measure	2

16. Description of dropouts and withdrawals	1
17. Appropriate statistical tests (e.g., use of Bonferroni correction, longitudinal data analysis, adjustment only for a priori identified confounders	2
18. Adequate sample size	2
19. Appropriate consideration of therapist and site effects	0
Treatment assignment	
20. A priori relevant hypothesis that justify comparison group(s)	2
21. Comparison group(s) from same population and time frame as experimental group	2
Overall quality of study	
23. Balance of allegiance to types of treatment by practitioners	2
24. Conclusions of study justified by sample, measures, and data analysis, as presented (note: useful to look at conclusions as stated in the study abstract)	1
Rate: from 1 (exceptionally poor study) to 7 (exceptionally good study)	
25. Omnibus rating: Please provide an overall rating of the quality of the study taking into account the adequacy of description, the quality of the study design, data analysis and, justification of conclusions	6
-Items 1-24 are rated 0 (poor description, execution, or justification of a design element), 1 (brief description or either a good description or an appropriate method/criterion but not both), or 2 (well described, executed, and, where necessary, justified design element). *-Item 25 is rated from 1 (exceptionally poor study) to 7 (exceptionally good study).*	

Supplementary Table 5. PRISMA 2020 abstract checklist.

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Provided
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Provided
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Provided
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Provided
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Provided
Synthesis of results	6	Specify the methods used to present and synthesise results.	Provided
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Provided
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Provided
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Provided
Interpretation	10	Provide a general interpretation of the results and important implications.	Provided
OTHER			
Funding	11	Specify the primary source of funding for the review.	Not applicable
Registration	12	Provide the register name and registration number.	

Supplementary Table 6. PRISMA 2020 Checklist.

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	p.1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Done
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	1. Introduction
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	1. Introduction
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	2.2 Inclusion and exclusion criteria
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	2.1 Search strategy
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	2.1 Search strategy
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	2.3 Selection process and data collection
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	2.3 Selection process and data collection
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	2.3 Selection process and data collection
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Not applicable
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	2.4 Quality assessment
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Not applicable
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	2.3 Selection process and data collection
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	2.3 Selection

Section and Topic	Item #	Checklist item	Location where item is reported
			process and data collection
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	2.3 Selection process and data collection
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	2.3 Selection process and data collection
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Not applicable
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Not applicable
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	2.4 Quality assessment
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Not applicable
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	3. Results and related paragraphs
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	3. Results and related paragraphs
Study characteristics	17	Cite each included study and present its characteristics.	3. Results and related paragraphs
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Supplementary material
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	3. Results and related paragraphs
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	3. Results and related paragraphs
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	3. Results and related paragraphs
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	3. Results and

Section and Topic	Item #	Checklist item	Location where item is reported
			related paragraphs
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not applicable
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Supplementary material
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Not applicable
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	4. Discussion
	23b	Discuss any limitations of the evidence included in the review.	4. Discussion
	23c	Discuss any limitations of the review processes used.	4. Discussion
	23d	Discuss implications of the results for practice, policy, and future research.	4. Discussion
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Provided
Competing interests	26	Declare any competing interests of review authors.	Provided
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Not applicable