

Involuntary coping mechanisms: a psychodynamic perspective

George E. Vaillant, MD



Coping responses to stress can be divided into three broad categories. The first coping category involves voluntarily mobilizing social supports. The second category involves voluntary coping strategies like rehearsing responses to danger. The third coping category, like fever and leukocytosis, is involuntary. It entails deploying unconscious homeostatic mechanisms that reduce the disorganizing effects of sudden stress. DSM-5 offers a tentative hierarchy of defenses, from psychotic to immature to mature. The 70-year prospective Study of Development at Harvard provides a clinical validation of this hierarchy. Maturity of coping predicted psychosocial adjustment to aging 25 years later, and was associated with not developing symptoms of post-traumatic stress disorder after very severe WWII combat.

© 2011, LLS SAS

Dialogues Clin Neurosci. 2011;13:366-370.

Keywords: ego defense mechanism; resilience; homeostasis; PTSD and involuntary coping

Author affiliations: Professor of Psychiatry, Harvard Medical School; The Study of Adult Development, Massachusetts General Hospital, Boston, Massachusetts, USA

Address for correspondence: George E. Vaillant, MD, Massachusetts General Hospital, 151 Merrimac Street, 2nd floor, Boston, MA 02114, USA (e-mail: gvaillant@partners.org)

What are involuntary coping mechanisms?

Resilience can be defined as the capacity to recover following stress or trauma by adopting healthy strategies for coping with trauma and stress. Psychopathological response to stress may be considered from two perspectives. The first perspective emphasizes pathological consequences of stress, such as impaired brain function, post-traumatic stress disorder (PTSD), hippocampal shrinkage, or elevations in serum cortisol levels.

The second perspective focuses on how an individual's integrated central nervous system alters and copes with the stressor. In this case, the result of stress is seen not as nonspecific depression and anxiety, but as a set of differentiated creative but involuntary behaviors that may range from elaborate delusional systems to Beethoven warding off suicidal depression by inserting Schiller's *Ode to Joy* into his *Ninth Symphony*. This second perspective is the orientation of this report. A fever is a coping response, not a sign of illness.

If response to stress can be viewed from two vantage points—pathological or coping, coping responses to stress can be divided into three broad categories. The first coping category involves voluntarily eliciting help from appropriate others, for example, by mobilizing social supports. The second coping category involves voluntary strategies like information gathering, anticipating danger, and rehearsing responses to danger.¹ The third coping category, like fever and leukocytosis, is involuntary. It entails deploying unconscious homeostatic mechanisms that reduce the disorganizing effects of sudden stress.

Such coping mechanisms (shortened to *defenses* for this paper) have more to do with adaptation to life than with Freud's "psychoanalysis." Despite the emerging dialogue between neuroscience and dynamic psychiatry, the chemical processes and neuronal assemblies underlying involuntary defenses have not been identified.

Not long ago at an amusement park, I watched my grandson ride the loop-the-loop roller coaster with astonishment. As he hung suspended upside down 30 meters above the ground, I saw that for him the experience was one of joy, release, and exhilaration. I imagined that for myself the ride might produce panic. By what alchemy had the chemistry of his brain, hardwired to feel lasting fear at dangerous heights, left him without residual distress? Who is sane and who is crazy—the excited teen or the phobic grandfather?

Choice of defense is involuntary, but so-called "mature defenses" (eg, sublimation and humor) rather than "immature defenses" (eg, projection and hypochondriasis) can make an enormous difference in mental health. But even the most "pathologic" defenses serve to calm. Early 19th-century medical phenomenologists viewed pus, fever, and coughing as evidence of disease; late 19th-century pathophysiologists learned to regard these symptoms as evidence of the body's healthy efforts to cope with infectious insult. Similarly, immature defense mechanisms like imaginary friends (fantasy), temper tantrums (acting out), and self-mutilation (passive aggression) produce behaviors that appear annoying and/or pathological to others but in fact reflect the brain's homeostatic effort to cope with sudden changes in the brain's internal and external environment. In both deafness and traumatic brain injury, the usually maladaptive defense of projection helps to provide subjective order to a disordered brain. The difficulty is that often, as with hypnosis, defenses like my grandson's denial of danger compromise other facets of cognition. Perhaps Freud's most original contribution to human psychology was his inductive postulation in 1894 that unconscious "defense mechanisms" protect the individual from painful emotions, ideas, and realities.² Freud observed that not only could emotion be "dislocated or transposed" from ideas (by the mechanism Freud would later call isolation) but also that emotion could be "reattached" to other ideas (by displacement) and that the idea accompanying the emotion could be "forgotten" by repression. Consider, for example the different responses of different people to the immediate aftermath of 9/11.

Classification of defenses

Defenses have six important properties³:

- They mitigate the distressing effects of both emotion and cognitive dissonance
- They are unconscious (or, otherwise stated, involuntary)
- They are discrete from one another
- Although often the hallmarks of major psychiatric syndromes, they are dynamic and, unlike the brain disease they mimic, are reversible
- They can be adaptive, even creative, as well as pathological
- If to the user defenses are invisible, to the observer defenses appear odd, even annoying.

Clinicians must learn to perceive a patient's often irritating, even disgusting, defenses as lifesaving, as the Viennese hematologist Julius Cohnheim learned to perceive disgusting pus as "laudable." For example, hypochondriacal help-rejecting complaints often seen in inarticulate trauma victims lead to anger and unwitting retaliation on the part of the clinician. Like understanding a foreign language, the discovery of past trauma not in the chart permits the clinician to be empathic towards the patient's unconsciously angry demands.

Although in every effort to produce a comprehensive list of defenses, there will be enormous semantic disagreement,⁴ over the last 30 years several longitudinal studies at Berkeley⁵ and at Harvard⁶ have clarified our understanding. Empirical studies reviewed by Cramer⁷ and Skodol and Perry⁸ finally organized defenses into a consensual hierarchy of relative psychopathology. By offering a tentative hierarchy and glossary of consensually validated definitions, the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*),⁹ hardly a psychoanalytic document, has included a Defensive Functioning Scale (pp 751-753) adapted from Vaillant, 1971,¹⁰ as a proposed diagnostic axis.

The hierarchy has four levels. At the first level are *psychotic defenses* (common in PTSD): *delusional projection*, *psychotic denial*, and *psychotic distortion*. These mechanisms are common in young children, in our dreams, and in psychosis. To breach them requires altering the brain by neuroleptics or waking the dreamer.

At the second level are *immature defenses* (also common in PTSD): *acting out* (eg, My Lai Massacre); *passive aggression* (cutting oneself); *autistic fantasy*; *dissociation* (out-of-body experience during torture, multiple per-

Brief report

sonalities common after childhood abuse); and *projection* (paranoia). The relatively maladaptive defenses found in the second level are common in adolescents, in substance abusers, in personality disorders, and in brain injury. Defenses in this category rarely respond to verbal interpretation alone.

The third level are *intermediate (neurotic) defenses*. Defensive functioning at this level keeps potentially threatening ideas, feelings, memories, wishes, or fears out of awareness. Examples are: *displacement* (kicking the dog instead of the boss), *isolation* (a surgeon thinking the Whipple operation for pancreatic cancer is interesting) *repression*, the opposite of isolation—*feeling without thinking*. These intermediate defenses are manifested clinically by phobias, compulsions, somatizations, and amnesias. In contrast to the immature defenses, intermediate defenses usually make the user more uncomfortable than the observer. They can often be breached with psychotherapy.

At the fourth level are *mature defenses*. If immature defenses are most common in adolescents, mature defenses increase with age¹¹ just as PTSD decreases with age. These defenses usually maximize gratification and allow relatively more conscious awareness of feelings, ideas, and their consequences. Examples of defenses at this level are: *altruism, sublimation, suppression, and humor*.

For example, although humor appears to reflect denial and dissociation, humor, like meditation, helps shift the body's autonomic sympathetic agitation to parasympathetic calm. Black humor on the battlefield and in the operating theater reflect such examples of transformation of terror into relaxation. Thus, not only do defenses lie along a continuum of relative psychopathology; they also lie along a continuum of personality maturation.¹¹ With the passage of decades and the continuing myelination of frontal lobe connections to the limbic system,¹² the defense of adolescent acting out (eg, temporarily comforting shoplifting) could evolve into reaction formation (becoming a strict policeman) and finally into the altruism of a parole officer.

Immature defenses can be breached in three ways. First, by confrontation—often by a group of supportive peers—or by videotaped empathic but focused psychotherapy.¹³ Second, immature defenses can be breached by improving intrapsychic competence by rendering the individual less anxious and lonely through empathy, or less tired and hungry through food and rest. Third, improving brain function, (for example, sobriety

or relieving normal-pressure hydrocephalus). At present few evidence-based treatment results are available, except for a small body of literature on change in defenses over treatment and time.^{3,14}

At present we have only clinical evidence to support the importance and the clinical utility of the concept of a hierarchy of defenses. The Study of Adult Development at Harvard University offers one such experimental clinical setting. The Study consists of three cohorts of adolescents followed for a lifetime: The College cohort (Harvard sophomores selected for mental health in 1940),⁶ The Core City cohort, (socioeconomically deprived, but nondelinquent, inner city adolescents selected in 1940)¹⁶ and the Terman cohort, (California grammar school girls with high IQs selected for longitudinal study in 1922).^{16,17} Evidence of involuntary coping was obtained by 2-hour interviews with the subjects between 45 and 80. Independent raters, blind to the future, using the rating of theoretical “maturity” and adaptiveness outlined earlier, achieved labeling of coping mechanisms. Rater reliability was adequate.¹⁸

For all three samples the maturity of each subject's coping choice was assessed along a 9-point scale: 1 equaled men and women only using mature defenses, and 9 equaled individuals only using immature defenses. *Table I* illustrates that, analogous to blood clotting mechanisms, defense choice is relatively unaffected by parental social class, IQ, and education.¹¹ *Table II* illustrates that maturity of defense mechanism predicts successful aging and income for the College sample and Core City sample.¹⁹ (Only objective physical deterioration after age 50 seemed independent of mature coping).⁶

In order to assess the relevance of maturity of defenses to symptoms of PTSD, the Study took advantage of the fact that most of the College sample (studied prospectively from 1938 to 2011) served in World War II.^{20,21} and

Antecedent	“Maturity” of defenses		
	College n = 154 ^a	Core City n = 189 ^a	Terman n = 40
Years of education	.13	.10	.33*
IQ	.04	.14	.07
Parental social class	.11	.00	.13

Table I. Correlation of social antecedents with adaptiveness of defenses. a. Sample size is reduced. In order to control confounders, men with IQ<86, depression, alcohol dependence, and schizophrenia have been excluded. * $P < .05$, Spearman correlation coefficient was the statistic used.

had been extensively studied in college before the war. Immediately after serving overseas in World War II, they were extensively debriefed on their combat experiences, their physical symptoms during combat, and their persisting symptoms of stress. Forty years later, 107 surviving men filled out questionnaires reflecting persisting symptoms of PTSD. Men with high combat exposure continued to report increased symptoms of PTSD. Combat exposure and number of physiological symptoms during combat—but not during civilian stress—predicted symptoms of PTSD in 1946 and 1988. Men with high combat exposure reported 20 times as many symptoms of PTSD as those with low exposure. Sixteen men had very high combat exposure but no reported PTSD symptoms either in 1946 or 40 years later. When contrasted with men who experienced PTSD

symptoms after similar combat exposure, these 16 resilient men did not manifest less neuroticism or less severe combat; but they did as young adults manifest more “mature” defenses. The 16 men with high combat exposure and mature defenses (age 20 to 47) reported only an eighth as many PTSD symptoms as the 18 men with similarly high combat exposure and less mature defenses ($F 9.5, P=.000$ two-tailed, $df=33$). However this example does not exclude the possibility that brains altered by PTSD, like brains altered by traumatic brain injury (eg, Phineas Gage) or alcohol, subsequently manifest less mature mechanisms.

At present many imaging studies have illuminated the brain circuits underlying PTSD,^{22,23} social anxiety, and phobia.²⁴ Only a few²⁵⁻²⁷ have begun tentatively to understand how the brain adapts (downregulates) the effects of conflict. A study by Westen et al²⁸ helped clarify the brain pathways by which partisan voters altered unwelcome facts. The brain “reward” neurons in the striatum and nucleus accumbens appeared to be involved, providing a basis for reinforcing specific mechanism choices for downregulation. A recent study by Nili and colleagues²⁹ illuminates a putative pathway leading to downregulation of (or dissociation from) fear. Hopefully, the next 10 years of neuroimaging will bring increasing clarity to the field.

Conclusion

The concept of involuntary coping mechanisms, (the “politically correct” renaming of the now outmoded (?) term, “ego mechanisms of defense”), is too valuable to be discarded by neuroscience because of its association with Sigmund Freud and psychoanalysis. The diagnostic and prognostic validity of such “mechanisms” in longitudinal studies more than make up for their unreliability and difficulty in rating. The task of neuroscience is to continue to use neuroimaging to identify and to understand the neural connections of such mechanisms. □

	Core City n = 137 ^a “Mature” coping (1-9)	College n = 154 ^a “Mature” coping (1-9)
I. Objective evidence		
Income (midlife)	.25**	.28***
Psychosocial adjustment (50-65) ³	.51***	.34***
Social supports ^{b 36}	.44***	.34***
II. Subjective evidence		
Joy in living ^b	.37***	.35***
Marital satisfaction (midlife)	.30***	.18*
Subjective physical functioning ^b	.32***	.23*
III. Objective physical health obtained from internist blinded to other data^c		
Physical health decline ^c	.14	.04

Table II. Late-life consequences of adaptive defenses at age 20 to 47. Spearman correlation coefficient (rho) was the statistic used. * $P<.05$ ** $P<.01$ *** $P<.001$ a. Sample size is reduced because men who died before age 65 are excluded. b. Measured at age 65 for the Core City men and measured at age 75 for the College men. c. 1 = well, 2 = minor irreversible illness, 3 = chronic illness, 4 = disabling illness, 5 = dead.³⁴ Measured at age 60 for Core City men and at age 70 for College men.

REFERENCES

- Lazarus R, Folkman S. *Stress, Appraisal and Coping*. New York, NY: Springer; 1984.
- Freud S. (1894) The neuro-psychoses of defense. In: *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. Volume 3. London, UK: Hogarth Press; 1964:45-61.
- Vaillant GE. *Adaptation to Life*. Boston, MA: Little Brown; 1977.
- Vaillant GE. *Ego Mechanisms of Defense: a Guide for Clinicians and Researchers*. Washington, DC: American Psychiatric Press; 1992.
- Haan NA. *Coping and Defending*. San Francisco, CA: Jossey Bass; 1977.
- Vaillant GE. *Aging Well*. New York, NY: Little Brown; 2002.
- Cramer P. *The Development of Defense Mechanisms*. New York, NY: Springer Verlag; 1991.
- Skodol AE, Perry JC Should an axis for defense mechanisms be included in DSM-IV? *Comp Psychiatry*. 1993;34:108-119.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994:751-753.
- Vaillant GE. Theoretical hierarchy of adaptive ego mechanisms. *Arch Gen Psychiatry*. 1971;24:107-118.

Brief report

Mecanismos de adaptación involuntarios: una perspectiva psicodinámica

Las respuestas de adaptación al estrés se pueden dividir en tres grandes categorías. La primera de ellas incluye la movilización voluntaria de los apoyos sociales. En la segunda categoría están las estrategias de adaptación voluntaria como las respuestas de entrenamiento ante el peligro. La tercera categoría de adaptación es involuntaria, como la fiebre y la leucocitosis. Esto implica desplegar los mecanismos homeostáticos inconscientes que reducen los efectos desorganizadores del estrés agudo. El DSM-V ofrece una jerarquía provisional de defensas que van desde lo psicótico a lo inmaduro y lo maduro. El Estudio sobre el Desarrollo, de tipo prospectivo por 70 años realizado en Harvard proporciona una validación clínica de esta jerarquía. La madurez en la adaptación predijo el ajuste psicosocial a los efectos de la edad 25 años más tarde y se asoció con la ausencia de la aparición de síntomas del trastorno por estrés postraumático luego de combates muy graves de la Segunda Guerra Mundial.

Mécanismes involontaires d'adaptation: une perspective psychodynamique

Les stratégies d'adaptation au stress peuvent être divisées en trois grandes catégories. La première comprend des supports sociaux à mobilisation volontaire. La deuxième comprend des stratégies d'adaptation volontaires comme la préparation des réponses au danger. La troisième catégorie, comme la fièvre et la leucocytose, est involontaire. Elle suppose le déploiement de mécanismes homéostatiques inconscients qui réduisent les effets désorganisateur d'un stress soudain. Le DSM-V présente une hiérarchie de la tentative des défenses allant de psychotique à immature à mature. L'étude prospective de 70 ans du Développement conduite à Harvard apporte une validation clinique de cette hiérarchie. Ainsi, la maturité de la stratégie d'adaptation a permis de prédire l'ajustement aux effets de l'âge 25 ans plus tard, et était associée à une absence de développement de l'état de stress post-traumatique après des combats très sévères durant la seconde guerre mondiale.

11. Vaillant GE. *The Wisdom of Ego*. Cambridge, MA: Harvard University Press; 1993.
12. Benes FM, Turtle M, Khan Y, Farol P. Myelination of a key relay in the hippocampal formation occurs in the human brain during childhood, adolescence and adulthood. *Arch Gen Psychiatry*. 1994;51:477-484.
13. McCullough Vaillant L. *Changing Character*. New York, NY: Basic Books; 1997.
14. Perry JA, Beck SM, Constantinides P, Foley JE. Chapter 6: Studying change in defensive functioning in psychotherapy, using defense mechanism rating scales four hypotheses, four cases. In: Levy RA, Ablon JS, eds. *Handbook of Evidence-Based Psychodynamic Psychotherapy*. New York, NY: Humana Press; 2008:121-153.
15. Glueck S, Glueck E. *Delinquents and Nondelinquents in Perspective*. Cambridge, MA: Harvard University Press; 1968.
16. Terman LM, Oden M. The gifted group at midlife. In: *Genetic Studies of Genius*. Vol 5. Stanford, NY: Stanford University Press; 1959.
17. Sears RR. The Terman gifted children study. In: Mednick SA, Harway M, Finells KM, eds. *Handbook of Longitudinal Research*. New York, NY: Praeger; 1984:398-414.
18. Vaillant GE. Natural history of psychological health V: the relation of choice of ego mechanisms of defenses to adult adjustment. *Arch Gen Psychiatry*. 1976;33:535-545.
19. Vaillant GE. Adaptive mental mechanisms: their role in a positive psychology. *Am Psychol*. 2000;55:89-98.
20. Lee KA, Vaillant GE, Torrey WC, Elder GH. A 50-year prospective study of the psychological sequelae of World War II combat. *Am J Psychiatry*. 1995;152:516-522.

21. Monks JP. *College Men at War*. Boston, MA: American Academy of Arts and Science; 1951.
22. Rauch SL, Shin LM, Phelps EA. Neurocircuitry models of post-traumatic stress disorder and extinction: human neuroimaging research—past, present, and future. *Biol Psychiatry*. 2006;60:376-382.
23. Hennig-Fast K, Werner NS, Lerner R, et al. After facing traumatic stress: brain activation, cognition and stress coping in policemen. *J Psych Res*. 2009;43:1146-1155.
24. Etkin A, Wager TD. Function of neuroimaging of anxiety: A meta-analysis of emotional processing in PTSD, social anxiety disorder and specific phobia. *Am J Psychiatry*. 2007;164:1476-1488.
25. Kalish R, Wiech K, Critchley HD, et al. Anxiety reduction through detachment: subjective, physiological, and neural effects. *J Cogn Neurosci*. 2005;17:874-883.
26. Ochsner KN, Ray RD, Cooper JC, et al. For better or for worse: neural systems supporting the cognitive down-and-up regulation of negative emotion. *Neuroimage*. 2004;23:483-499.
27. Etkin A, Egner T, Peraza DM, Kandel ER, Hirsch J. Resolving emotional conflict: a role for the rostral anterior cingulate cortex in modulating activity in the amygdala. *Neuron*. 2006;51:871-882.
28. Westen D, Blagou PS, Harenski K, Kilts C, Hamann S. Neural bases of motivated reasoning: An fMRI study of emotional constraints on partisan political judgments in the 2004 U.S. Presidential Election. *J Cogn Neurosci*. 2006;18:1947-1958.
29. Nili L, Goldberg H, Weizman A, Dudai Y. Fear thou not: activity of frontal and temporal circuits in moments of real-life courage. *Neuron*. 2010;66:949-962.