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EDITORIAL

Anger, Irritability, Aggression and Violence: States in search of a diagnostic and treatment ‘home’ Part I – Evolution

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Abstract

This paper is the first in a two-part editorial that reviews the current descriptions, relationships between, and etiologies informing, clinical terms such as ‘anger’, ‘irritability’, ‘aggression’ and ‘violence’ (AIAV), as well as the importance of their being properly conceptualized and treated. It draws from seminal academic papers across a range of disciplines including: psychiatry, psychology, sociology, neurobiology, neuroscience, medicine, anthropology, philosophy and politics. Given AIAV’s pervasiveness, as well as its concerning fiscal and psychosocial ramifications worldwide, this editorial highlights the importance to clinicians, researchers and governmental entities of properly understanding, classifying and treating this dire public health issue. While mental disorders may include AIAV, existing diagnostic categories remain unable to capture its pertinent contextual, neurobiological and cognitive components. This leaves clinicians bereft of a knowledge-base that is crucial to treatment. By striving for an overarching, interdisciplinary and ‘transdiagnostic’ paradigm that captures actual scenarios leading to AIAV, it advocates that ‘real-world’ issues (e.g. mass shootings, ‘road rage’, domestic, sexual, and workplace violence) be properly addressed with targeted interventions that have proven clinical utility, It also critiques the applicability of the current DSM ‘mental disorder’ model that dominates clinical practice, and upon which clinicians remain unduly reliant.

The importance of studying anger, irritability, aggression, and violence

Anger, aggression, irritability, and violence (which will be referred to by the acronym 'AIAV' in this editorial) are terms that have been used repeatedly to describe one of the most vexing of human struggles, with writings on it dating back to antiquity.¹ Yet, it has continued to receive short shrift by psychiatry, particularly with respect to other symptomatology (e.g., anxiety, mania, depressed mood or psychosis). Psychology has attempted to address AIAV both diagnostically and therapeutically, but AIAV's inclusion as a mainstream *diagnostic focus* remains elusive. Even with the fiscal costs to society of this enormous public health issue, healthcare professionals still grapple to properly understand it. The importance of doing so cannot be overstated.

For example, in the United States alone, the costs of intimate partner rape, physical assault, and stalking exceed \$5.8 billion each year, nearly \$4.1 billion of which was for direct medical and mental health care services.² Internationally, the WHO's 2014 status report on violence prevention highlighted that 1.3 million people worldwide die each year as a result of violence in all its forms (self-directed, interpersonal and collective), accounting for 2.5% of global mortality.³

For victims of AIAV, it has also been shown that exposure to violence increases vulnerability to a broad range of mental and physical health problems over the life course.⁴ Lastly, with the recent rise of mass shootings

in the United States, there has been a renewed (but distorted) focus on the relationship of gun violence to "mental illness", and not AIAV in its broader context.⁵

Shortcomings of the Diagnostic and Statistical Manual of Mental Disorders (DSM)

Mental health professionals have increasingly been asked to diagnose, treat and account for AIAV. Yet, the nomenclature, models, and etiology of phenomena such as anger and aggression remain confusing for most clinicians. At the center of this is the DSM-5⁶, with its criteria being ubiquitously splashed across the internet, but with no actual 'home' to 'house' the all-too-common clinical issues of AIAV.

The unintended consequences have included the overdiagnosis of Bipolar Disorders in adolescents, as public discourse has veered towards equating youth violence and 'mood swings' with this disorder.⁷ Moreover, despite its revisions, and mental health professionals' primary reliance upon it, the DSM has continued to prove unhelpful to clinicians in formulating (and ultimately treating) 'anger problems and aggression.

Of course, this is a problem intrinsic to the design of the DSM itself, with its consensus-driven, criteria-based/time-centric diagnostic approach, which doesn't lend itself well to application in clinical practice. This is because its design is inherently antithetical to the way physicians are trained: to recognize syndromes (not just clear-cut categories), as

well as predispositions and precipitants to pathology, and associated etiologies that tend to present in predictable ways⁸. In addition, as has been amply demonstrated in the case of personality pathology⁹ ¹⁰ expressions of anger lie on a spectrum, ranging from mild irritability to overt physical aggression. Even the DSM-5 (in its Alternative Model for Personality Disorders section) now acknowledges that certain pathologies can indeed lie on a dimensional spectrum.⁶

Most observers would agree as to *when* anger (as a state) and aggression (as a behavior) become 'dysfunctional' (whether the criteria are socio-cultural, legal, or scientific). However, the question whether anger or aggression should be 'subclassified' (like, for example, anxiety disorders are in the DSM) remains vigorously debated. Like anxiety at lower levels, it has been argued that anger has evolved to protect and defend human beings against perceived threats, signaling to the individual and others of a boundary having been crossed (which confers 'survival').¹¹ However, unlike anxiety (which would encourage retreat), anger has always been viewed as an 'approach-state', that may or may not result in escalation to aggression.¹²

This speaks to *when* a continuous (Gaussian) variable is classified as 'abnormal' (i.e., a disorder)¹³ ¹⁴ especially so with children, where age-related developmental processes would also be pertinent.¹⁵ Hence (as with anxiety) the same applies: When does anger become 'pathological' or 'a disorder'? For all its shortcomings, the DSM's "subjective distress or impairment in psychosocial functioning"

is arguably a helpful *qualitative/clinical benchmark* here (at least in the decision to treat), irrespective of continuing debates over anger/aggression being 'a disorder' that 'needs classification'. Indeed, this is precisely where and why situational/contextual criteria are more helpful than the (existing) time-centric ones.

There has been a distinct categorical shift over successive iterations of the DSM when it comes to aggression (though curiously anger has never been discussed). The construct of *impulsive aggression* has been reified in this time, starting out as 'passive-aggressive personality - aggressive type' in DSM-I, then as 'explosive personality' in DSM-II followed by the newly-minted 'Intermittent Explosive Disorder' (IED), which first appeared in DSM-III as an Axis I Disorder.¹⁶ IED was then moved to the newly created 'Impulse control disorders' section in the DSM-IV (1994), and has remained there in DSM-5 (2013).¹⁷ ¹⁸

The inclusion/exclusion criteria permitted comorbid diagnoses, and frequency of aggressive outbursts have also changed over successive iterations¹⁷ ¹⁸ In particular, there are arbitrary cut-off criteria for how frequently and what type of aggression needs to occur in order to diagnose IED (at least several times a week of 'low intensity' aggression, for example). Of greatest concern is the confounding variable of comorbid diagnoses, with similar clinical as well as neurobiological findings;¹⁹ There is also still a paucity of research on subtypes of aggression *within* disorders such as intermittent explosive disorder (IED)²⁰ Hence, IED's validity and

reliability as a bona fide diagnosis has been questioned.^{8 21 22}

Otherwise, aggression is only mentioned cursorily across a range of DSM-5 disorders, with there never being any formal 'DSM' definitions of it, anger or irritability.⁶ Irritability has been recognized as a primary presenting feature of depressive episodes in children and adolescents, and of bipolar disorders in adulthood. DSM-5 diagnoses that also encompass AIAV include: Disruptive Mood Dysregulation Disorder (DMDD), Conduct Disorder, Oppositional defiant disorder (ODD), Borderline Personality Disorder, Antisocial Personality Disorder, Major Depressive Disorder, and Post Traumatic Stress Disorder. An endophenotype that underpins these disorders has also been suggested by several authors.^{23 24 25}

DSM-5 has attempted to address 'symptom complexes' (such as non-suicidal self-injury and impaired impulse control, which are arguably epiphenomena of uncertain etiology rather than diagnoses in their own right). If so, why not then at least address anger and aggression? This would (true to its atheoretical paradigm) not have to etiologically 'explain' AIAV. However, it would promote greater awareness of the public health implications of AIAV, while helping to consolidate clinical understanding of it as an epiphenomenon.

It would also draw rightful attention to established research-based findings that have occurred over the last four decades in the fields of psychology and neurobiology (which

includes descriptions, imaging studies and rating scales).^{26 27 28} It is also long overdue, as a credible answer to the 'causes' of "dysfunctional' anger. This would better inform public discourse and be an effective counter-narrative to the popular media – who tend to reflexively sensationalize violence/aggression, equating these all too easily with "mental illness".⁵

Inadequate agreement on terminology:

Review of the academic literature indicates first the need to better define, and then harmonize, nosology such as: anger, aggression, violence, hostility, irritability and explosivity. Definitions of irritability, for example, vary from the Oxford English Dictionary to a multitude of arbitrary definitions..^{29 30}

Examples would include: 'interindividual differences in susceptibility to anger that may reach a pathological extent'³¹, an aberrant response responding to threat,⁴⁹ self-directed hostility³¹ a 'defining feature of anger'³¹ a proneness to anger³² or the Research Domain Criteria (RdoC) domain (stemming from the original concept described in 1958³³) of Negative Valence Systems: 'an expression of frustrative non-reward', which is the reaction to 'blocked goal attainment as well as impairments in 'reward prediction'.³⁴ Some associate it with physiological arousal, while some do not.^{35 36} Irritability has also been conflated with trait hostility, verbal aggression, the enactment of physical aggression and has even been referred to as "a trait" in its own right.^{31 35 36 37}

Subtypes of, and relationship between, existing terms

The *relationship* between irritability and its proxy 'manifestations' e.g., argumentativeness and 'temper outbursts' or 'rage/anger attacks' has also received scrutiny^{38 39 40}. At present, these 'links in the chain' are yet to be properly understood. This is again where definitions and delineations of interrelated psychopathologies (e.g., anger, impulse control, comorbid mood disturbance, response-inhibition) need to be more consistent, if research in this area is to yield *valid* statistical and etiological inferences.

Others have suggested *subcomponents* to irritability, such as poor frustration tolerance, that are "necessary but not sufficient" for its expression.⁴¹ Anger also tends to be admixed by some, specifically when they refer to irritability as 'an emotional ('feeling') state, which varies in intensity from mild annoyance to intense fury and rage'.⁵⁹

Much confusion therefore lies over whether irritability is exclusively a *subjective* experience or whether it should be more objectively defined and quantified.^{42 43} As a subjective state, irritability has been shown to vary considerably, according to the type of mood state and by age: i.e., with depressed mood more than manic mood states in children and adolescents, and with manic mood more than depressed mood states in adults.⁴⁴

As defined by *objective* measures, irritability does not appear to correlate with age⁴⁵ However, if viewed as a *subjectively*

articulated experience, an older individual may be more likely cognizant of their own threshold for aggressive enactment, even though they may still behave in a verbally 'hostile' (argumentative) manner.⁴⁶

The introduction of the DMDD diagnosis, with persistent, rather than episodic irritability⁶ (however ill-defined) also exemplifies the importance of considering its *duration*. Then there are the *frequency* of such outbursts if clinicians are to successfully delineate age-appropriate developmental processes from trauma-based psychopathology and emergent mood disorders⁴⁷ Some have even advanced the notion of parameters such "tonic" and "phasic" irritability, to better delineate DMDD from these other etiologies¹³ Lastly, there is the link between description and actual experience, with the startling omission of subjectively experienced anger in the DMDD definition even.

Delineation of childhood from adult anger and aggression

Child and adolescent studies have been leading the way in understanding and refining criteria for pathological irritability, but applicability of such findings to adults remains sparse.⁴⁸ Questions remain as to whether irritability should be *distinguished* as an accompanying 'epiphenomenon', an intrinsic *part* of a mood disorder, or an intrinsic *part* of ADHD, ODD or developmental attentional deficits⁴⁹. These two 'types' of irritability can have very different prognostic implications for the onset of later disruptive versus affective disorders.⁵⁰

With respect to defining anger versus irritability, there still appears to be some descriptive overlap, but with irritability appearing to be more of a 'predisposition' ("proneness") not only to anger but also other affectively charged states e.g., anxiety or motor agitation.^{51 52} The overlap with irritability appears when the construct of anger is elaborated upon. This would include description of its sympathetic hyperarousal, verbal and behavioral expressions, 'inflammatory' cognitive components, and subjective 'angry' feelings.^{53 54}

Anger: is it a phenomenon in its own right?

In an attempt to distinguish anger from irritability, there has been the conceptualization of the 'anger attack'.⁵⁵ This has been defined as, "a rapid onset of intense anger and a crescendo of autonomic arousal that occurs upon provocation described as trivial by the individual". This description appears to resemble some definitions of extreme irritability or IED (which oddly makes *no* mention of accompanying affective states, such as anger). It has also been described as a recognized feature of major depressive disorder.⁵⁶

Thus, though terminology in this area appears to have amassed (explosivity, hostility, irritability, anger, aggression) researchers have yet to properly *connect* these phenomena *with* each other as necessary *elements* of the psychophysiological state of anger.

Anger itself as an invariable component of hostility (that also causes "subjective distress"

but is historically associated with malevolent intentions) has also continued to receive inadequate attention as a multivariate phenomenon in its own right.¹ This is because, it too is determined by context, and can be comprised of varied motivations that have historically (but not contemporaneously) been discussed. The latter may reflect the 'about turn' in research away from psychodynamic understandings of anger towards purely psychometric approaches.⁵⁷ Review of the existing literature therefore indicates a focus on varying definitions rather than on deeper motivations for anger.⁵⁴

Anger has been successfully categorized as both a "state" and a stable "trait."⁵⁸ State anger is defined as, "a transient subjective emotional feeling of intense fury and rage."⁵⁹ Of note, the oldest definition adds: "physiologically, state anger varies from little or no change in physiological arousal to marked sympathetic arousal, increased tension in facial and skeletal muscles, and release of adrenal hormones"⁶⁰ Trait anger has been defined as, "a stable personality dimension of *anger proneness* or *tendency* to experience state anger"⁵⁸ State anger is evoked by "very extreme external factors"⁵⁸ Trait anger, by contrast, is most strongly linked to aggression because of perceived hostility in interpersonal situations i.e., 'hostile attribution bias (HAB), an offshoot of social learning theory'^{61 62}.

Within this paradigm, hostile attribution biases and ruminative (and selective) attention⁶³ would be crucial *components* of trait anger, as well as its being a predisposing

factor for reactive (impulsive) aggression to “ambiguous environmental cues” that could be misinterpreted and thereby transform this trait into a state.⁶⁴ Interestingly, recent research has identified ‘emotional information processing’ as being as just as pertinent as HAB in misinterpretation of ambiguous events as ‘hostile’ (though there were methodological limitations to this particular study)⁶⁵

Apparently, the key difference between an ‘anger attack’ and irritability is that the experience of irritability ‘is not necessarily rapid’⁶⁶ However, it is all too easy to see how an ‘anger attack’ might blend into *psychiatrically-defined* concepts (such as explosivity and aggression). However, anger as a term appears to have increasingly been eclipsed by ‘hostility’ over the last decade.

And then there is Hostility..

‘Hostility’ is similarly described as a trait⁶⁷, but it too appears inadequately parsed out from trait anger. Some authors have tried to delineate it as a cluster of core beliefs informing an ‘antagonistic ‘attitude’.⁶⁸ Hostility would therefore comprise both *feelings* (of disgust, resentment, indignation and recrimination)⁶⁹ ⁷⁰ as well cognitions (cynicism and suspicion)⁶⁸. Yet, as in the case of irritability, the hyperarousal component that may underlie trait hostility may be underappreciated, particularly when it evolves into an irritable state.⁷¹ Then there is the subclassification of *covert* hostility (associated with irritability) and *overt* hostility (associated with aggression).⁷²

Anger and hostility are also believed to have “a close relationship with irritability and aggression” but again this has not been clearly elucidated.⁷³ The role of *affect* in *generating* a hostile ‘attitude’ similarly tends to be implied but not properly explained.⁶⁸ Nor is the confounding variable of impulsivity included in descriptions of hostility.⁷⁴ ⁷⁵ Hostility and anger (if indeed they are separate entities) have also been shown to have diametrically opposite associations with suicide⁷⁶

Could Amok be the ‘actual cause’ of Mass Shootings?

With the prevalence of mass shootings in the United States, an older, (since debunked) ‘culture-bound’ syndrome called *Amok* appears to capture this form of abrupt explosive anger and indiscriminate mass violence more aptly than any of the above current descriptors.⁷⁷ It has since been asserted that *Amok* is: a) *not* a culture-bound syndrome b) an *epiphenomenon*, having several contributory factors, including (but not limited to): personality pathology, temperament, several different mental disorders, as well as coping abilities and cognitive distortions, all of which affect each other in how it actually manifests, and *irrespective of which culture it occurs in*. Culture-bound syndromes have since been eliminated altogether in DSM-5, in favor of its updated “Cultural Formulation” and “Glossary of Cultural Concepts of Distress” sections. Yet *Amok* (or a more contemporaneous, culturally-informed phenomenological description of it) is nowhere to be found in DSM-5.¹

Aggression is more robustly defined

Aggression is most commonly subcategorized into two different types: impulsive (or reactive) and instrumental (premeditated).⁷⁸ However, other descriptions have included: indirect versus direct aggression, verbal aggression, non-verbal aggression (intimidation) and physical aggression.¹ Evolutionary psychologists have argued that these types of aggression 'evolved' in order to maintain social/political order, or like instrumental aggression, to achieve a predetermined "reward" or goal (like winning a well-planned war)⁷⁹

'Explosivity' refers to rapid and extremely destructive aggression that would be considered grossly disproportionate to the provoking stimulus⁶ Interestingly, there has not been much controversy over this term. In fact, the (now established) transdiagnostic dimension of *impulsive aggression* has seen several pharmacological studies claiming promising treatments for it specifically⁸⁰⁻⁸¹. What appears less well emphasized in the *psychiatric* (not *psychological*) literature are *environmental triggers* and cognitive/affective predispositions to impulsive aggression.

Instrumental/ predatory aggression has long been associated with psychopathy and antisocial personality disorder, with it now understood that empathy deficits play a salient role, and little, if any, role for pharmacological treatments.⁸²

What then is violence?

Then there is violence, which, according to the oldest definition used in risk assessment,

indicates *actual* bodily harm to persons and/or property, resulting from physical aggression.⁸³ Even here, scholars have tried to delineate harms such as intimate partner violence, rape, robbery and even bullying.⁸⁴ Moreover, different academic disciplines have cast their own lenses on it, with some focused on violence's sheer egregiousness, others on its hidden intent, its being entirely unnecessary, and its long-term traumatizing impact.⁸⁴

Time to 'de-rely' on the DSM

That is why the decision by the NIMH to no longer rely on DSM-5 categories to further research into 'brain circuitry' is so pertinent to this transdiagnostic issue. Variation of symptoms, comorbidity, and limitation of sample sizes in research (to reduce heterogeneity as a confounding variable) in mental disorder field trials "challenges the proper understanding of the full spectrum of mental health conditions and their symptom trajectories."⁸⁵ Authors have also suggested that, with the burgeoning number of comorbid diagnoses in children, they are the best population to which to apply RDoC constructs (i.e. brain networks), in order to glean greater clarity about neurobiological circuitry (including neurodevelopmental processes).⁸⁶

Subsequent research into brain circuitry has been both vigorous and illuminating in helping to advance a much more integrated understanding of the complex phenomenology behind the terms: Anger, Irritability, Aggression and Violence. This will be discussed in part two of this two-part article.

Conclusion (Part I: Evolution)

It is disappointing that an issue as important as AIAV remains so poorly conceptualized. DSM-5's categorical approach has proved to be entirely unhelpful in even defining it. Instead, AIAV is 'smattered' across a range of different disorders. In addition, by marginalizing 'syndromes' (such as Amok), the DSM has done a disservice to clinicians who have to address real world scenarios, (such as mass shootings). Unintended consequences of its approach have included the overdiagnosis of Bipolar Disorder, poor understanding of developmental considerations, and defining 'abnormality' if there is also an evolutionary basis for AIAV. IED as the only AIAV 'disorder' has also continued to fall woefully short in capturing the real-world spectrum of pathological anger and aggression by being too narrowly time-centric. Fortunately, the evolving transdiagnostic construct of impulsive aggression has allowed clinicians to formulate more evidenced-based treatment strategies. However, there remain crucial, but poorly understood, components of AIAV, specifically: situational, temperamental, cognitive and even sociocultural factors in its expression and enactment/inhibition.

In highlighting the poor agreement on terms as basic as 'anger', 'irritability', 'aggression' and 'violence', this editorial hopes to promote more exacting standards for understanding how they are related. Moreover, though it behooves the DSM to at least include definitions of these terms in its glossary section, it is increasingly evident that its overly categorical approach has proven inferior to

the transdiagnostic approach of the NIMH RdoC. The latter focuses on relevant brain circuitry that leads to enactment of AIAV. Could this prove to be more clinically pragmatic, and less 'academic', than the DSM-5? Perhaps the time has indeed come to 'de-rely on the DSM' with particular respect to understanding AIAV.

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References

1. DiGiuseppe R, Tafrate RC. Anger: The Forgotten Emotion. In: DiGiuseppe R, Tafrate RC, eds. *Understanding Anger Disorders*. Oxford University Press; 2006
2. National Center for Injury Prevention and Control. Costs of Intimate Partner Violence Against Women in the United States. Atlanta (GA): Centers for Disease Control and Prevention; 2003
3. Mikton CR, Butchart A, Dahlberg LL, Krug EG. Global Status Report on Violence Prevention 2014. *Am J Prev Med*. 2016;50(5): 652-659. doi:10.1016/j.amepre.2015.10.007
4. Sumner SA, Mercy JA, Dahlberg LL, Hillis SD, Kleven J, Houry D. Violence in the United States. *JAMA*. 2015;314(5):478-488. doi:10.1001/jama.2015.8371
5. Hirschtritt ME, Binder RL. A Reassessment of Blaming Mass Shootings on Mental Illness. *JAMA Psychiatry*. 2018;75(4):311-312. doi:10.1001/jamapsychiatry.2018.0010
6. American Psychiatric Association. (2013) Diagnostic and Statistical Manual of Mental Disorders (5th edition). Washington DC American Psychiatric Press.
7. Mitchell PB. Bipolar Disorder: The Shift to Overdiagnosis. *Can J Psychiatry*. 2012; 57(11):659-665.
8. Anand S. Has the DSM Failed? *Curr Pract Med Sci Vol 9*. Published online August 16, 2022:187-196
9. Lynam DR. Using the five-factor model to assess disordered personality. In: *Personality Disorders and the Five-Factor Model of Personality, 3rd Ed*. American Psychological Association; 2013:
10. Gore WL, Widiger TA. The DSM-5 dimensional trait model and five-factor models of general personality. *J Abnorm Psychol*. 2013
11. Williams R. Anger as a Basic Emotion and Its Role in Personality Building and Pathological Growth: The Neuroscientific, Developmental and Clinical Perspectives. *Front Psychol*. 2017;8
12. Carver CS, Harmon-Jones E. Anger is an approach-related affect: Evidence and implications. *Psychol Bull*. 2009;135:183-204
13. Copeland WE, Brotman MA, Costello EJ. Normative Irritability in Youth: Developmental Findings From the Great Smoky Mountains Study. *J Am Acad Child Adolesc Psychiatry*. 2015;54(8):635-642
14. Altman DG, Royston P. The cost of dichotomising continuous variables. *BMJ*. 2006;332(7549):1080
15. Wakschlag LS, Choi SW, Carter AS, et al.: Defining the developmental parameters of temper loss in early childhood: implications for developmental psychopathology. *J Child Psychol Psychiatry* 2012; 53:1099–1108
16. Coccaro EF. Intermittent Explosive Disorder as a Disorder of Impulsive Aggression for DSM-5. *Am J Psychiatry*. 2012;169(6):577-588

17. American Psychiatric Association. (1994) Diagnostic and Statistical Manual of Mental Disorders (4th edition). Washington DC American Psychiatric Press.
18. American Psychiatric Association. (2013) Diagnostic and Statistical Manual of Mental Disorders (5th edition). Washington DC American Psychiatric Press.
19. McLaughlin KA, Green JG, Hwang I, Sampson NA, Zaslavsky AM, Kessler RC. Intermittent Explosive Disorder in the National Comorbidity Survey Replication Adolescent Supplement. *Arch Gen Psychiatry*. 2012;69(11):1131-1139
20. Fanning, J. R., Coleman, M., Lee, R., & Coccaro, E. F. (2019). Subtypes of aggression in intermittent explosive disorder. *Journal of Psychiatric Research*, 109, 164–172.
21. Anand S. Intermittent explosive disorder and DSM-5: a flawed conceptualization of pathological anger. *Aust N Z J Psychiatry*. 2013;47(6):578-579
22. Zapata JP, Palacio JD. Trastorno explosivo intermitente: un diagnóstico controversial. *Rev Colomb Psiquiatr*. 2016;45(3):214-223
23. Gould TD, Gottesman II. Psychiatric endophenotypes and the development of valid animal models. *Genes Brain Behav*. 2006;5(2):113-119
24. Van den Berg H. Evaluating the validity of animal models of mental disorder: from modeling syndromes to modeling endophenotypes. *Hist Philos Life Sci*. 2022;44(4):59.
25. Miller GA, Rockstroh B. Endophenotypes in Psychopathology Research: Where Do We Stand? *Annu Rev Clin Psychol*. 2013;9(1):177-213
26. Richard Y, Tazi N, Frydecka D, Hamid MS, Moustafa AA. A systematic review of neural, cognitive, and clinical studies of anger and aggression. *Curr Psychol*. Published online June 8, 2022
27. Puiu AA, Wudarczyk O, Kohls G, Bzdok D, Herpertz-Dahlmann B, Konrad K. Meta-analytic evidence for a joint neural mechanism underlying response inhibition and state anger. *Hum Brain Mapp*. 2020;41(11):3147-3160
28. Rohrmann S, Hodapp V, Schnell K, et al. *Das State-Trait-Ärgerausdrucks-Inventar—2 Deutschsprachige Adaptation des State-Trait Anger Expression Inventory-2 (STAXI-2) von Charles D. Verlang* Hans Huber: Spielberger; 2013.
29. Toohey MJ, DiGiuseppe R. Defining and measuring irritability: Construct clarification and differentiation. *Clin Psychol Rev*. 2017; 53:93-108
30. Deveney CM, Stoddard J, Evans RL, Chavez G, Harney M, Wulff RA. On defining irritability and its relationship to affective traits and social interpretations. *Personal Individ Differ*. 2019;144:61-67
31. Vidal-Ribas, P., Brotman, M. A., Valdivieso, I., Leibenluft, E., & Stringaris, A. (2016). The Status of Irritability in Psychiatry: A Conceptual and Quantitative Review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 55(7), 556–570
32. Leibenluft E, Stoddard J: The developmental psychopathology of irritability. *Dev Psychopathol* 2013; 25:1473–1487

33. Amsel A. The role of frustrative nonreward in noncontinuous reward situations. *Psychol Bull.* 1958;55:102-119
34. Pacheco J, Garvey MA, Sarampote CS, Cohen ED, Murphy ER, Friedman-Hill SR. Annual Research Review: The contributions of the RDoC research framework on understanding the neurodevelopmental origins, progression, and treatment of mental illnesses. *J Child Psychol Psychiatry.* 2022; 63(4):360-376.
35. Berkowitz L. A Different View of Anger: The Cognitive-Neoassociation Conception of the Relation of Anger to Aggression. *Aggress Behav.* 2012;38(4):322-333.
36. Ramírez JM, Andreu JM. Aggression, and some related psychological constructs (anger, hostility, and impulsivity) Some comments from a research project. *Neurosci Biobehav Rev.* 2006;30(3):276-291
37. Wiggins JL, Brotman MA, Adleman NE, et al.: Neural correlates of irritability in disruptive mood dysregulation and bipolar disorders. *Am J Psychiatry* 2016; 173:722–730
38. Connor DF, Newcorn JH, Saylor KE, et al. Maladaptive Aggression: With a Focus on Impulsive Aggression in Children and Adolescents. *J Child Adolesc Psychopharmacol.* 2019;29(8):576-591.
39. Brotman MA, Kircanski K, Stringaris A, Pine DS, Leibenluft E. Irritability in Youths: A Translational Model. *Am J Psychiatry.* 2017;174(6):520-532
40. Snaith RP, Taylor CM. Irritability: Definition, Assessment and Associated Factors. *Br J Psychiatry.* 1985;147(2):127-136
41. Wiggins JL, Briggs-Gowan MJ, Brotman MA, Leibenluft E, Wakschlag LS. Toward a Developmental Nosology for Disruptive Mood Dysregulation Disorder in Early Childhood. *J Am Acad Child Adolesc Psychiatry.* 2021;60(3):
42. DiGiuseppe R, Tafrate RC. Anger: Ubiquitous and Intangible. In: DiGiuseppe R, Tafrate RC, eds. *Understanding Anger Disorders.* Oxford University Press; 2006
43. Toohey MJ, DiGiuseppe R. Defining and measuring irritability: Construct clarification and differentiation. *Clin Psychol Rev.* 2017; 53:93-108. doi:10.1016/j.cpr.2017.01.009
44. Malhi G, Bell E, Outhred T. Getting irritable about irritability? *BMJ Ment Health.* 2019;22(3):93-94
45. Bell E, Malhi GS, Mannie Z, et al. Novel insights into irritability: the relationship between subjective experience, age and mood. *BJPsych Open.* 2021;7(6):e198. doi:10.1192/bjo.2021.1033
46. Ngo N, Isaacowitz DM. Use of context in emotion perception: The role of top-down control, cue type, and perceiver's age. *Emotion.* 2015;15:292-302.
47. Havens JF, Marr MC, Hirsch E. Editorial: From Bipolar Disorder to Disruptive Mood Dysregulation Disorder: Challenges to Diagnostic and Treatment Specificity in Traumatized Youths. *J Am Acad Child Adolesc Psychiatry.* 2022 Mar;61(3):364-365
48. Stringaris A. Irritability in children and adolescents: a challenge for DSM-5. *Eur Child Adolesc Psychiatry.* 2011;20(2):61-66
- Sukhodolsky DG, Smith SD, McCauley SA,

- Ibrahim K, Piasecka JB. Behavioral Interventions for Anger, Irritability, and Aggression in Children and Adolescents. *J Child Adolesc Psychopharmacology*
49. Stringaris A, Goodman R (2009) Mood lability and psychopathology in youth. *Psychol Med* 11:1–9
50. Stringaris A, Goodman R. Longitudinal Outcome of Youth Oppositionality: Irritable, Headstrong, and Hurtful Behaviors Have Distinctive Predictions. *J Am Acad Child Adolesc Psychiatry*. 2009;48(4):404-412.
51. ;Brotman MA, Kircanski K, Stringaris A, Pine DS, Leibenluft E. Irritability in Youths: A Translational Model. *Am J Psychiatry*. 2017;174(6):520-532
52. Toohey MJ, DiGiuseppe R. Defining and measuring irritability: Construct clarification and differentiation. *Clin Psychol Rev*. 2017; 53:93-108.
53. Richard Y, Tazi N, Frydecka D, Hamid MS, Moustafa AA. A systematic review of neural, cognitive, and clinical studies of anger and aggression. *Curr Psychol*
54. Berkowitz L, Harmon-Jones E. Toward an Understanding of the Determinants of Anger. *Emot Wash DC*. 2004;4:107-130
55. Fava M. Depression with anger attacks. *J Clin Psychiatry*. 1998;59 Suppl 18:18-22
56. Mammen OK, Shear MK, Pilkonis PA, Kolko DJ, Thase ME, Greeno CG. Anger attacks: correlates and significance of an underrecognized symptom. *J Clin Psychiatry*. 1999;60(9)
57. Manfredi P, Taglietti C. A psychodynamic contribution to the understanding of anger - The importance of diagnosis before treatment. *Res Psychother Psychopathol Process Outcome*. 2022;25(2)
58. Spielberger CD. State-Trait Anger Expression Inventory. In: *The Corsini Encyclopedia of Psychology*. John Wiley & Sons, Ltd; 2010:1-1.
59. Deffenbacher JL, Oetting ER, Thwaites GA, et al. State–Trait Anger Theory and the utility of the Trait Anger Scale. *J Couns Psychol*. 1996
60. Ekman P, Levenson RW, Friesen WV. Autonomic Nervous System Activity Distinguishes Among Emotions. *Science*. 1983;221(4616):1208-1210
61. Crick NR, Dodge KA. A review and reformulation of social information-processing mechanisms in children’s social adjustment. *Psychol Bull*. 1994;115:74-101.
62. Bandura A, Ross D, Ross SA. Transmission of aggression through imitation of aggressive models. *J Abnorm Soc Psychol*. 1961;63:575-582.
63. Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53, 27–51.
64. Deveney CM, Stoddard J, Evans RL, Chavez G, Harney M, Wulff RA. On defining irritability and its relationship to affective traits and social interpretations. *Personal Individ Differ*. 2019;144:61-67
65. Coccaro EF, Fanning JR, Keedy SK, Lee RJ. Social cognition in Intermittent Explosive Disorder and aggression. *J Psychiatr Res*. 2016;83:140-150

66. Barata PC, Holtzman S, Cunningham S, O'Connor BP, Stewart DE. Building a Definition of Irritability From Academic Definitions and Lay Descriptions. *Emot Rev.* 2016;8(2):164-172.
67. Geen RG. 2001. Human Aggression. Taylor & Francis. 2nd ed
68. Ramírez JM, Andreu JM. Aggression, and some related psychological constructs (anger, hostility, and impulsivity) Some comments from a research project. *Neurosci Biobehav Rev.* 2006;30(3):276-291
69. DiGiuseppe R, Tafrate RC. Anger: Ubiquitous and Intangible. In: DiGiuseppe R, Tafrate RC, eds. *Understanding Anger Disorders.* Oxford University Press; 2006
70. Berkowitz, L., 2000. Causes and Consequences of Feelings, Studies in Emotion and Social interaction. Cambridge University Press, New York
71. Miller, T., Smith, T., Turner, C.W., 1996. A meta-analytic review of research on hostility and physical health. *Psychological Bulletin* 119 (2), 322–348
72. Bendig, A.W., 1962. Factor analytic scales of covert and overt hostility. *Journal of Consulting Psychology* 26, 200.
73. Teten AL, Miller LA, Stanford MS, et al. Characterizing Aggression and Its Association to Anger and Hostility Among Male Veterans With Post-Traumatic Stress Disorder. *Mil Med.* 2010;175(6):405-410
74. Mohseni M, Lindekilde N, Forget G, et al. Trait Anger, Hostility, and the Risk of Type I Diabetes and Diabetes- Related Complications: A Systematic Review of Longitudinal Studies. *Curr Diabetes Rev.* 19(4):73-82
75. Richard Y, Tazi N, Frydecka D, Hamid MS, Moustafa AA. A systematic review of neural, cognitive, and clinical studies of anger and aggression. *Curr Psychol*
76. Zhang P, Roberts RE, Liu Z, et al. Hostility, Physical Aggression and Trait Anger as Predictors for Suicidal Behavior in Chinese Adolescents: A School-Based Study. *PLoS ONE.* 2012
77. Hagan CR, Podlogar MC, Joiner TE. Murder-suicide: bridging the gap between mass murder, amok, and suicide. Robert J. Cramer Dr, ed. *J Aggress Confl Peace Res.* 2015;7(3):179-186.
78. Wrangham RW. Two types of aggression in human evolution. *Proc Natl Acad Sci.* 2018;115(2):245-253
79. Chen Zeng T, Cheng JT, Henrich J. Dominance in humans. *Philos Trans R Soc B Biol Sci.* 377(1845)
80. Coccaro EF, Kavoussi RJ. Fluoxetine and Impulsive Aggressive Behavior in Personality-Disordered Subjects. *Arch Gen Psychiatry.* 1997;54(12):1081-1088.
81. Stanford MS, Helfritz LE, Conklin SM, et al. A Comparison of Anticonvulsants in the Treatment of Impulsive Aggression. *Exp Clin Psychopharmacol.* 2005;13:72-77.
82. de Haan W. Violence as an Essentially Contested Concept. In: Body-Gendrot S, Spierenburg P, eds. *Violence in Europe: Historical and Contemporary Perspectives.* Springer New York; 2009:27-40.

83. Gold LH, Frierson RL. Eds. *American Psychiatric Association Textbook of Forensic Psychiatry* Ed. American Psychiatric Publishing Arlington 2018.

84. Hamby S. On defining violence, and why it matters. *Psychol Violence*. 2017;7:167-180

85. *About RDoC*. (n.d.). National Institute of Mental Health (NIMH). Retrieved December 16, 2022, from

<https://www.nimh.nih.gov/research/research-funded-by-nimh/rdoc/about-rdoc>

86. Pacheco J, Garvey MA, Sarampote CS, Cohen ED, Murphy ER, Friedman-Hill SR. Annual Research Review: The contributions of the RDoC research framework on understanding the neurodevelopmental origins, progression and treatment of mental illnesses. *J Child Psychol Psychiatry*. 2022;63(4):360-376. doi:10.1111/jcpp.13543