

Editorial: Roads Less Traveled: New Directions for Novel Outcomes in Youth Irritability Research

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Road metaphors are ubiquitous in youth mental health. Developmental psychopathology research is described in terms of pathways, trajectories, cascades, and transitions. Children's behavioral concerns are discussed as warning signs and rough spots. Although these metaphors have long been useful abstractions, modern quantitative methods and large-scale longitudinal studies have made it possible to empirically investigate the "roads" traveled by individuals across development. One goal here is to chart the paths most often followed by different subgroups of youth. Another goal involves surveying variables that nudge children toward (or away from) psychopathology and other key outcomes. These 2 goals—finding trajectories and predictors thereof—have important implications for research, intervention, and policy; and some of the most important studies, in our view, accomplish both.

Yu and colleagues¹ recently pursued these goals in a large longitudinal study of irritability involving 4,462 children assessed at ages 3, 5, 9, and 15 years. In their aptly named "Roads Diverged..." paper, they first characterized latent class trajectories of irritability from toddlerhood through adolescence, and then identified variables that predicted membership in each trajectory. Irritability was measured via Child Behavior Checklist (CBCL) mean scores on a scale from 0 (Not true) to 2 (Very/often true). Given the brevity and variability of these scales (3–4 items, only 2 common across all occasions), irritability scores should be interpreted with care.

Five trajectories emerged.¹ Most youth (60.8%) showed persistently low irritability (scores <0.5, approaching "not true"), representing the road most traveled. Two other

subgroups followed medium-stable (20.0%) and high-stable (11.3%) irritability trajectories. The remaining 2 subgroups both had high irritability in toddlerhood/kindergarten but subsequently diverged: 6.7% followed a U-shaped reduction in irritability over time, whereas 2.3% followed an arc of consistently high irritability. We focus here on the 3 smallest groups with the greatest severity (the roads *least* traveled): the high-stable, U-shaped, and \cap -shaped classes, showing elevated irritability (scores ≥ 1.0) at multiple waves, differentiating them from the less severe groups (scores ≤ 0.5). Collectively, the high-irritability groups represented 1 in 5 children.

As Yu *et al.*¹ point out, all latent class growth models come with some limitations. Rather than representing "true" groups, the classes are useful approximations of trajectories followed by hidden subgroups of participants. These analyses implicitly ignore between-class uncertainty, within-class variance, and changes in measurement. As more latent classes are specified, class sizes get smaller and eventually less reliable. Accordingly, we caution against concluding that the mirrored curve shapes of these latent classes constitute strong evidence for developmental undulations. Such hypotheses can be tested, however, with more waves, stronger measures, and explicit modeling of the hypothesized effects (eg, for testing seasonality in youth aggression²). To be sure, these caveats are standard, and the authors followed numerous strategies for class specification, enumeration, and model selection based on empirical and theoretical considerations. However, such caveats should be understood before interpreting the trajectories and predictors thereof.

With that in mind, Yu *et al.*¹ justifiably found 5 latent trajectories and put them to good use. Subsequent analyses

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this work, we also actively worked to promote inclusion of historically underrepresented racial and/or ethnic groups in science in our reference list. One or more of the authors of this paper self-identifies as a member of one or more historically underrepresented sexual and/or gender groups in science.

identified predictors of membership in high-severity irritability classes, testing many different variables (eg, family, sociodemographic, attachment, resilience, neighborhood, cognitive, genetic). Of all these variable clusters, 2 emerged as the strongest and most consistent predictors. Harsh parenting (psychological abuse, physical assault) and internalizing symptoms (depression, anxiety) predicted membership in the severe irritability trajectories, relative to the low trajectory. Given the timing of assessments, findings should largely be interpreted as prediction in the correlational rather than longitudinal sense. In addition, these results may overestimate the effects of internalizing symptoms (having 4 observations, measured concurrently with irritability using the same tool) and may underestimate the effects of harsh/neglectful parenting (having 2 datapoints averaged from 4 observations).

These findings¹ add to a compelling body of evidence for irritability's links to anxiety and depression^{3,4} and contribute important novel findings about the role of parenting in developmental pathways of irritability. Strengths include a large and diverse sample, long-term longitudinal data, multimodal assessments, and sophisticated analytic techniques. The study elucidates interesting developmental trajectories of irritability not previously known, including changes in irritability levels and associations with risk factors over time. We applaud Yu *et al.*¹ for this impressive and useful work identifying irritability trajectories and key predictors. It is exceptional to cover so many developmental periods (toddlerhood to adolescence) and variables (genes to neighborhoods). Finally, findings underscore key future directions. To invoke a new variation on the road metaphor: Youth irritability research is at a crossroads—a pivotal point in its own developmental trajectory. Some future directions seem especially promising, whereas others may risk retracing our steps.

One avenue not considered here,¹ but highly relevant to youth irritability, is the role of externalizing psychopathology. Whereas youth irritability is linked to anxiety or depression, it is both linked to *and* a central dimension of oppositional defiant disorder (ODD).^{3,5} Irritability is also common in attention-deficit/hyperactivity disorder (ADHD) and conduct disorder, among other disorders.³ In *DSM-5*, disruptive mood dysregulation disorder (DMDD) was created to be a diagnostic home for chronically irritable youth; however, its formulation effectively relocated these youth out of disruptive behavior disorders and into depressive disorders, meeting criteria for DMDD at the exclusion of ODD. When the World Health Organization later reviewed this evidence for the *International Classification of Diseases, 11th Revision (ICD-11)*, they reached a different conclusion, classifying chronic irritability/anger within ODD, not DMDD.³

Conceptually, irritability has been defined⁴ as an increased proneness to anger that can lead to aggression—ie, externalizing affect and behavior. Research on irritability-related problems from these perspectives can be challenging but highly informative. For instance, one study² found that high-stable reactive aggression trajectories were linked to the poorest affective, social, and school outcomes, whereas trajectories of high proactive aggression showed fluctuations and mixed outcomes. Indeed, in the few studies that have examined ADHD/ODD and internalizing variables in relation to irritability, results have been highly differentiated along clinically relevant lines, such as phasic/tonic irritability, sex/gender, and age.^{6,7} Investigating irritability against the full backdrop of psychopathology may lead to important novel findings, similar to Yu *et al.*'s¹ important findings about parenting variables.

As any body of research progresses, some paths become more trodden than others. What is needed, then, is a fresh look at the way traveled to inform the way forward. Much can be learned from analyzing existing longitudinal datasets.¹ Likewise, there is a growing need for papers that synthesize accumulated findings via integrative,³ systematic, and meta-analytic^{4,8} reviews. For instance, a recent meta-analysis⁸ shows that psychosocial interventions lag far behind pharmacological approaches to irritability, and a systematic review (unpublished data, S.C. Evans *et al.*, 2023) of assessment research underscores the need for multiple informants, methods, and constructs (eg, anger, aggression, irritability). Such attempts to “take stock” often reveal the gaps or roads less taken, which become key directions for future research.

At this juncture in youth irritability research, to avoid spinning our wheels, researchers are encouraged to be circumspect and to travel in directions that seem promising and untouched. This editorial reviewed recent findings¹ as a gateway toward sharing thoughts about such future directions. We conceptualized irritability as a transdiagnostic construct against a full spectrum of psychopathology, emphasizing the connection to externalizing problems. Others will find their different ways forward, which we encourage. Diverging trajectories can make a huge difference in child/adolescent developmental outcomes. Looking ahead to the next decade of youth irritability research, taking roads less traveled could make all the difference.

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