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Bullying Perpetration and Victimization in Youth: Associations with Irritability and Anxiety

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Abstract

Prior work on has demonstrated that irritability and anxiety are associated with bullying perpetration and victimization, respectively. Even though symptoms of irritability and anxiety often occur concurrently, few studies have tested their interactive effects on perpetration or victimization. The current study recruited 131 youths from a broader program of research that examines the pathophysiology and treatment of pediatric irritability and anxiety. Two moderation tests were performed to examine concurrent irritability and anxiety symptoms and their relation to perpetration and victimization of bullying. More severe anxiety was associated with greater victimization. However, more severe irritability was associated with, not just greater perpetration, but also greater victimization. An irritability-by-anxiety interaction demonstrated that youths with more severe irritability and lower levels of anxiety engaged in more perpetration. Our findings suggest a more nuanced approach to understanding how the commonly comorbid symptoms of irritability and anxiety interact in relation to peer-directed behavior in youths.

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Ethical Approval. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent. Informed consent was obtained from all individual participants included in the study.

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Keywords

irritability; anxiety; bullying perpetration; peer victimization

Introduction

Peer victimization and bullying perpetration are major public health concerns because they are ubiquitous and increase risk for poor current and long-term mental and physical health outcomes [1]. Victimized youths are the target of intentional and persistent aggressive behavior that is often coupled with an imbalance of power with perpetrators [2]. Rates of victimization and perpetration increase dramatically in late childhood and adolescence as peer relationships become more important and complex [3]. This developmental transition coincides with the onset of many internalizing and externalizing disorders that are also linked to peer victimization and perpetration [1]. For example, anxiety is a common internalizing symptom that has been associated with greater victimization [1]. Irritability is a common transdiagnostic symptom of several internalizing and externalizing disorders that is often associated with higher rates of perpetration [4]. However, symptoms of irritability and anxiety are often comorbid [5, 6] and may differentially interact to influence perpetration and victimization. Yet, no study has tested how concurrent irritability and anxiety symptoms relate to bullying perpetration and victimization. The present study addresses this gap.

Irritability

Irritability is a developmentally inappropriate proneness to anger and temper outbursts [7]. It is defined as a propensity for negative affects, which is similar to the characterization of trait anger and reactive aggression [8]. However, there are significant conceptual differences between these constructs. When comparing irritability to trait anger, both constructs capture the proneness to the experience of anger; irritability further describes the angry outbursts or reactivity. Although both irritability and reactive aggression are characterized by the disproportionate responses to provocations, irritability is not defined as a propensity for aggression or a premeditated intent to harm [9]. Contextually, youths with clinically significant irritability show increased orientation, interpretation, and labeling of potential threats [10]. The induced sense of imminent threat often elicits negative affect (e.g., anger) associated with approach behaviors (e.g., angry outbursts) in an attempt to neutralize the threatening stimulus. This low threshold for threat detection in a social setting may produce an increased perception of rejection, a powerful punishment for adolescents during a time when social acceptance is increasingly salient. Moreover, prior research has demonstrated that youths with irritability have a greater proclivity to perceive ambiguous facial expressions as being hostile [8]. While it is true that prior evidence has largely converged on the way in which irritability symptoms may influence bullying perpetration through the engagement in angry outbursts, irritability-induced aggressive behaviors may influence peer victimization [11].

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Anxiety

Anxiety is characterized by excessive worry and fear of uncertainty that often promotes avoidance responses, particularly social avoidance in adolescence [1, 12, 13]. Symptoms of anxiety can also be characterized as the anticipation of a future threat (e.g., punishment, rejection) in the form of extensive rumination [14]. Our prior work has demonstrated that anxious youths may be influenced by negative prediction biases in anticipation to social feedback [15], suggesting that youths with anxiety anticipate rejection even before receiving feedback. Moreover, like youths with irritability, youths with anxiety have threat detection biases [8], such that they interpret ambiguous facial cues as hostile. Behaviorally, individuals with anxiety often engage in pervasive patterns of avoidance to reduce their fear of uncertainty [1, 13]. Particularly in adolescence, avoidance responses predominately manifest in the social context [13]. Unfortunately, social withdrawal and isolation can increase vulnerability to peer victimization. In this way, anxiety symptoms may contribute to a particularly vicious circle in the context of peer victimization [1]. Indeed, a great deal of work supports the idea that symptoms of anxiety increase experiences of peer victimization, and vice versa (e.g., [1, 13]).

Comorbid Irritability and Anxiety

Irritability and anxiety are both associated with heightened arousal to perceived social threat [8, 10, 16]. However, threat elicits an approach response in irritable youths [7, 8] and an avoidant response in anxious youths [1, 13]. Yet, symptoms of irritability and anxiety often co-occur [5, 6]. Indeed, some data suggest that the majority of treatment-seeking anxious youths report concurrent persistent symptoms of irritability [17]. Despite high levels of comorbitiy, few studies have tested the interactive effects of irritability and anxiety symptoms in the context of perpetration and victimization. However, prior work demonstrates interactive effects of irritbaility and anxiety symptoms on neural response to social stimuli [18]. When adolescent participants were presented different pairs of emotional faces (e.g., angry-neutral, happy-neutral) and asked to engage in attentional shifting while undergoing fMRI, youths with higher levels of irritability coupled with lower levels of anxiety showed more pronounced fluctuations in neural reactivity. Moreover, while both symptoms of irritability and anxiety are associated with the tendency to interpret ambiguous social cues as hostile, a recent study [8] showed that anxiety blunts the relation between irritability and hostile attribution bias when participants were asked to judge a series of facial expressions as angry or happy. These findings suggest that interactive effects of high irritability and low anxiety symptoms may lead to greater threat detection and hostile attribution biases. When applyed to a peer context, youths with the profile of higher levels of irritability and lower levels of anxiety may engage in a greater degree of bullying perpetration. However, this assumption has yet to be tested. Likewise, it is unclear how irritability and anxiety may interact to influence peer victization. Thus, there is a critical need to test these relations.

Current Study

Taken together with evididence that social threat often generates opposing behavioral responses in irritable (approach) and anxious (avoidance) youths, we hypothesize that: (i)

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In youths, greater bullying perpetration will be associated with higher levels of irritability and lower levels of anxiety. The rationale is that, in the absence of avoidance-promoting anxiety symptoms, severe irritability is more likely to result in approach-related aggressive behavior. (ii) Lower levels of irritability among youths with higher levels of anxiety will be associated with greater victimization. The presence of anxiety symptoms (which promote avoidance) in conjunction with the absence of irritability symptoms (which promote approach), may increase vulnerability for victimization among youths who fail to retaliate against perpetrators.

Method

Participants

The study was part of a broader program of research at the National Institute of Mental Health (NIMH) that examines the pathophysiology and treatment of pediatric irritability and anxiety. Youths (N=131, Female=60.1%) 8–18 years of age (M=13.00, SD=2.79) were recruited from the greater Washington, D.C. metropolitan area. The sample had a high-average IQ (M=112.44, SD=13.07; Wechsler Abbreviated Scale of Intelligence-Second edition, WASI-II). Overall, the sample was diverse in terms of race/ethnicity, socioeconomic status, and educational history (see Table 1). Although about half of the sample was diagnosed with anxiety disorders (n=67), the present study treated symptoms of irritability and anxiety as dimensional to fully capture symptom variations. Consent and assent were obtained from parents and youths, respectively. Procedures were approved by the NIMH Institutional Review Board.

Measures

The Kids in My Class Questionnaire (KIMC).—The KIMC [19, 20] is a 26-item self-report inventory that quantifies the frequency of bullying victimization and perpetration over the last six months on a 5-point Likert-type scale (1=never to 5=always). The KIMC includes 3 subscales: peer victimization (4 items); perpetration (4 items); perceived peer support (10 items). We focused on the 8-item peer victimization and perpetration subscales. The 4-item peer victimization subscale measures how frequently the participant experiences victimization (e.g., how often do classmates: pick on you, say mean things to you, say bad things about you to other kids, or hit you). The 4-item perpetration subscale measures how frequently the participant perpetrates victimization (e.g., how often do you: pick on peers, say mean things to peers, say bad things about peers to other kids, or hit peers). The peer victimization and perpetration subscales were calculated by taking the average of the respective items. The possible total scores of both subscales are 5–20. Higher averaged scores indicate more victimization or perpetration. There are no clinical thresholds for this measure. The reliability for the peer victimization and perpetration subscales were moderate (α=.76 and α=.77, respectively).

The Affective Reactivity Index (ARI).—The ARI [21] is a 7-item self-report inventory quantifies severity of irritability over the last six months on a 3-point Likert-type scale (0=not true, 1=somewhat true, 2=certainly true). The scale was designed to examine three main aspects of irritability-related problems: threshold for an angry reaction; frequency of

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angry feelings/behaviors; duration of such feelings/behaviors. The 7-item scale measures how often participants feel irritated (e.g., easily annoyed by others, often lose temper, stay angry for a long time, be angry for most of the time, get angry frequently, or lose temper easily). The 7th question on the scale is an overall assessment of the level of irritability-induced functional impairment. As recommended by the authors, the ARI score reflects the sum of the first 6 items (the 7th is primarily used in clinical settings), resulting the possible total score of 0–12. A total summed score that is greater than 2 indicates a likely presence of a disruptive mood dysregulation disorder. In this sample, 33 participants had a score greater than 2. Higher averaged scores indicate more irritability. The reliability for the scale was excellent (α=.91).

The Screen for Child Anxiety Related Disorders (SCARED).—The SCARED [12] is a 41-item self-report inventory that quantifies anxiety symptoms in children over the last six months on a 3-point Likert-type scale (0=not true or hardly ever true, 1=somewhat true or sometimes true, 2=very true or often true). The SCARED is divided into five factors: panic/somatic (13 items); generalized anxiety (9 items); separation anxiety (8 items); social phobia (7 items), and school phobia (4 items). The scale measures how often participants feel anxious (e.g., worry about being liked by others, or feeling difficult to communicate to strangers). A total summed score that is greater or equal to 25 indicates a likely presence of an anxiety disorder. In this sample, 44 participants had a score greater or equal to 25. Higher scores (<30) may indicate specific disorder. The possible total score is 0–82. Higher summed scores indicate more severe anxiety symptoms. Given that prior studies quantified the symptoms of anxiety using the total summed score when examining anxiety in the contexts of peer victimization (e.g., [1, 22]) and the interactive effects with irritability (e.g., [5, 6, 18]), the present study utilized the total summed score as the indicator of overall levels of anxiety. The reliability for the scale was excellent (α=.94).

Analytic Approach

Data analysis was conducted using the SPSS (version 26.0; IBM SPSS, Chicago, IL). Two separate moderation analyses (PROCESS macro; [23]), were performed to test the Irritability × Anxiety interaction with perpetration and victimization. In the model with perpetration as the outcome, irritability was entered as the predictor while anxiety was entered as the moderator. This analytic strategy is consistent with the proposed hypothesis [24]. Specifically, we aimed to determine the point at which anxiety significantly influenced the relationship between irritability and perpetration. The analytic strategy for the victimization model followed the same logic, such that irritability was entered as the moderator to determine the point at which irritability significantly influenced the relationship between anxiety and victimization. An outlier who reported bullying perpetration three standard deviations above the mean was excluded from the bullying perpetration analysis. Significant interactions were probed in R using the Johnson-Neyman technique [25]. The Johnson-Neyman technique is a robust method for determining regions of significance within an interaction [26]. In the context of a two-way interaction, it outputs the slopes of the predictor at different values of the moderator, from statistically significant to non-significant. Thus, instead of artificially grouping individuals into different categories to interpret results, one can identify the specific point at which an interaction becomes

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significant. We controlled for gender and age in both analyses given that clinically relevant irritability is more prevalent in boys, whereas anxiety is more prevalent in girls [3] and because prevalence rates of perpetration and victimization vary across adolescence [3]. The goodness-of-fit of the linear regression models was determined by the R-squared-change value from a model that only included covariates of no interest (i.e., age and sex) to a model that also included covariates of interest (i.e., irritability, anxiety, and the interaction term).

Results

Means, standard deviations, and correlations among variables are described in Table 2.

Perpetration

Perpetration was correlated with more severe symptoms of irritability but had no relation with symptoms of anxiety. Further, in the regression-based moderation analysis, controlling for age and gender, more severe symptoms of irritability were associated with higher levels of perpetration ($t(85)=3.585$, $b=.110$, $p=.001$). Despite no relation with perpetration in the correlation-based analysis, after controlling for age and gender, more severe symptoms of anxiety were associated with higher levels of perpetration ($t(85)=2.038$, $b=.007$, $p=.045$). Importantly, an irritability × anxiety interaction emerged ($R^2=.092$, $F(1, 85)=9.254$, $b=-.003$, $p=.003$; Figure 1). Such that irritability was associated with higher levels of perpetration at mean levels of anxiety ($M=22.293$, CI[.018,.087], $p=.003$) and at levels of anxiety below the mean ($M=6.070$; CI[.041,.145], $p=.0006$). This relation was not observed at higher levels of anxiety ($M=37.887$; CI[−.020,.045], $p=.452$). More specifically, a Johnsen-Neyman analysis demonstrated that irritability was associated with higher levels of perpetration at levels of anxiety below 30.805 (CI[.000,.061], $p=.050$). Additionally, an analysis of the goodness-of-fit revealed that the model that included covariates of interest (i.e., irritability, anxiety, and the interaction term) in addition to the inclusion of covariates of no interest (i.e., age and sex) was significantly a better fit than the model without covariates of interest ($R^2=.143$, $F(3, 85)=4.815$, $p=.004$).

Victimization

Victimization was correlated with more severe symptoms of irritability and anxiety. Similarly, in the regression-based moderation analysis, controlling for age and gender, more severe symptoms of irritability ($t(85)=2.683$, $b=.133$, $p=.009$) and anxiety ($t(85)=2.776$, $b=.014$, $p=.007$) were associated with higher levels of victimization. However, there was no irritability × anxiety interaction. Despite that, an analysis of the goodness-of-fit showed that the model that included covariates of interest in addition to the inclusion of covariates of no interest, was significantly a better fit than the model without covariates of interest ($R^2=.253$, $F(3, 85)=9.722$, $p<.001$).

Discussion

This study examined the interactive effects of irritability and anxiety symptoms in the context of bullying perpetration and victimization in a racially and ethnically diverse youth sample. Concurrent symptoms of irritability and anxiety interacted in relation to

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perpetration. Youths with more severe symptoms of irritability exhibited higher levels of perpetration when concurrent symptoms of anxiety were low or moderate. However, irritability was not associated with perpetration when concurrent symptoms of anxiety were severe. This work suggests an interplay between symptoms of irritability and anxiety for those who perpetrate bullying.

Our findings provide evidence that competing behavioral tendencies for concurrent irritability and anxiety may interfere with patterns of approach (typically associated with irritability) and avoidance (typically associated with anxiety) to social threat. Specifically, the expected positive relation between irritability and perpetration was observed at low to moderate levels of anxiety, but was eliminated when anxiety levels were more severe. We speculate that the anxiety-based drive to avoid engaging with social threat may compete with and/or over-ride the irritability-based drive to approach social threat that might otherwise result in bullying perpetration. Our prior work demonstrated that symptoms of irritability and anxiety in youths were associated with engagement of distinct neural circuits during threat-processing [5, 6, 16, 18]. The present findings further contextualize the interaction between the two circuits that is important for real-world social threat, namely bullying perpetration.

Consistent with prior studies [27], our correlation-based analyses did not detect a main effect of anxiety in relation to perpetration. Instead, we detected a main effect of anxiety when effects of irritability, sex, and age were accounted for. While a few prior studies show a similar relation, most of this work involved large samples of youths (N> 20,000) or meta-analytic techniques (e.g., [28]), which provided sufficient power to categorize participants as victims, perpetrators, or perpetrators who are also victims (bully-victims). Those studies show a significant association between anxiety and perpetration among bully-victims, but did not test for effects of irritability. While sample size was insufficient to perform bully-victim analyses in this study, the interactive relation between irritability and anxiety should be considered in future large-scale studies of victimization and perpetration.

Given that irritability is largely defined by increased proneness to anger, less work has been done to test specific links with victimization (although see work on ADHD and oppositional defiance disorder, where irritability is a key symptom for victimization [29]). We found that more severe symptoms of irritability were robustly related to greater peer victimization. This is consistent with research showing that irritability is associated with social problems [7, 10, 11]. However, one of the few studies to measure the specific relation between concurrent irritability and victimization in 2nd graders failed to find effects [30]. Yet, longitudinal data has demonstrated that irritability may be both an antecedent to and consequence of victimization [3]. Given the dearth of research testing the interplay between irritability and victimization, further work is needed in this domain. For example, social problems in youth are often measured via the Child Behavior Checklist (CBCL), which includes items such as getting teased, being clumsy, and being out to get others. Although it is not optimized to quantify victimization, pre-existing datasets where the CBCL was collected in youths with a range of irritability symptoms may begin to shed light on these relations.

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Limitations

In addition to its strengths, this study has limitations. Because of the modest sample size, there was insufficient statistical power to examine the interplay between symptoms of irritability and anxiety in bully-victims. Mounting evidence suggests that bully-victims have worse psychosocial outcomes than victims or perpetrators [1]. Given that bully-victims may benefit most from psychosocial interventions, large scale studies are needed to better characterize the interactive effects of irritability and anxiety in this group. Moreover, given the cross-sectional design of the present study, we cannot speak to the causality between the examined constructs. Longitudinal research is needed to determine whether symptoms of anxiety and irritability are a cause or consequence of bullying perpetration and victimization. Finally, while this study demonstrates that in the context of perpetration, irritability and anxiety interact in a complex way, it does not pinpoint the neurocognitive mechanisms that support this interaction. Given that aberrant neural responses to threat are differentially related to irritability and anxiety symptoms [18], a critical next step is to determine if these neural responses vary depending on real world perpetration and victimization.

Summary

Peer victimization is a major public health concern because it is ubiquitous and increases risk for poor current and long-term mental and physical health. Prior work has demonstrated that irritability and anxiety are associated with bullying perpetration and victimization, respectively. Despite the fact that symptoms of irritability and anxiety often occur concurrently, few studies have tested their interactive effects on perpetration or victimization. The current study recruited 131 youths (60.1% female; M age = 13.00 years, range = 8–18; 58% White; 13% Latinx/Hispanic) from a broader program of research that examines the pathophysiology and treatment of pediatric irritability and anxiety. Two moderation tests were performed to examine concurrent irritability and anxiety symptoms and their relation to perpetration and victimization of bullying. More severe anxiety was associated with greater victimization. However, more severe irritability was associated with, not just greater perpetration, but also greater victimization. An irritability-by-anxiety interaction demonstrated that youths with more severe irritability and lower levels of anxiety engaged in more perpetration. This study highlights the need to consider comorbid symptoms of irritability and anxiety on bullying perpetration and victimization. Mapping these relations more clearly may help inform the design of bullying prevention programs. For example, while many prevention programs focus on mitigating externalizing symptoms, the role of anxiety in victimization and perpetration has been given less attention. Our data suggest it is critical for mental healthcare professionals to appreciate that treating anxiety in irritable youths may have the paradoxical effect of increasing risk for perpetration. Taken together, our work highlights the need to take a more nuanced approach to understanding how commonly comorbid symptoms of irritability and anxiety interact to influence peer-based relations in youths.

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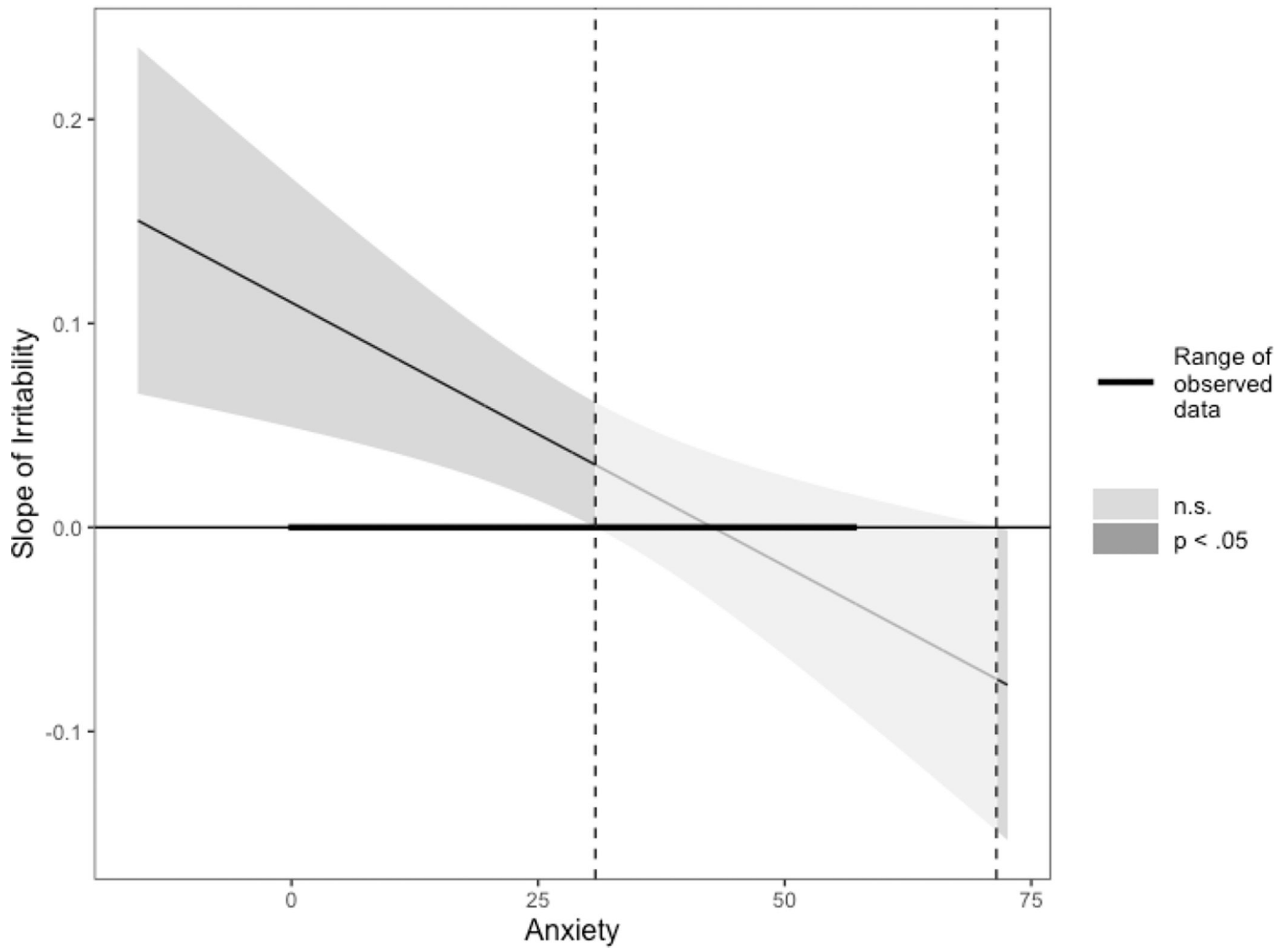

Figure 1. Johnson-Neyman plot for the simple slope of irritability predicting perpetration.
The Johnson-Neyman technique showed that the relationship between irritability and perpetration was significant when anxiety was less than or equal to 30.805 (CI: [.000, .061]) but not significant with higher scores of anxiety. The clinical threshold used in the Screen for Child Anxiety Related Disorders (SCARED) is 25.

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Table1

Demographic Information (N=131)

Gender [*n* (%)]	
Male	52 (39.7)
Female	79 (60.3)
Age [*M* (*SD*)]	13.00 (2.79)
IQ [*M* (*SD*)]	112.44 (13.07)
Ethnicity [*n* (%)]	
Hispanic/Latinx	17 (13.00)
Non-Hispanic/Latinx	112 (85.5)
Unknown	2 (1.5)
Race [*n* (%)]	
White	76 (58.0)
Black / African American	26 (19.8)
Asian / Asian American	8 (6.1)
Native Hawaiian and Other Pacific Islander	1 (.8)
More than one race	17 (13.0)
Unknown	2 (2.3)
Annual Household Income [*n* (%)]	
Over $180,000	28 (29.9)
$90,000 – $179,999	56 (44.1)
$60,000 – $89,999	11 (8.7)
$40,000 – $59,999	8 (6.3)
$25,000 – $39,999	3 (2.4)
$15,000 – $24,999	1 (.8)
$5,000 – $9,000	4 (3.1)
Under $5,000	1 (8)
Unknown	5 (3.9)
Education [n (%)]	
Graduate professional degree (Masters or above)	74 (58.3)
Standard college graduation	31 (24.4)
Partial college (1 year or more)	15 (11.8)
High school graduation	3 (2.4)
Partial high school (grade 10 or 11)	1 (.8)
Junior high school (grade 7–9)	2 (1.6)
Less than 7 years of school	1 (.8)
Household size [*M* (*SD*)]	4.59 (1.18)

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Table 2

Correlations & Descriptive Statistics

Variables	1	2	3	4	*M*	*SD*
1	-				1.265	.469
2	.341***	-			1.534	.603
3	.205*	.279**	-		20.066	14.848
4	−.034	.310***	.456***	-	2.30	2.635

Note: 1. KIMC Bullying Perpetration (n=126). 2. KIMC Peer Victimization (n=125). 3. ARI Child Self-Report (n=97). 4. SCARED Child Self-Report (n=130).

* $p < .05$,

** $p < .01$.,

*** $p < .001$