Accumulated Anger as a Linking Component in the Structure of Aggression Among Adolescents in Kazakhstan

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Abstract

Background: Adolescent aggression is a complex combination of emotional reactions, hostile cognitions, and behavioral manifestations. Traditional assessments of aggression are mainly based on total scores for physical aggression, verbal aggression, anger, and hostility. However, this approach may not identify the specific psychological components that connect perceived injustice, emotional arousal, and aggressive behavior. Network analysis makes it possible to examine aggression as a system of interconnected components and identify its most influential elements.

Objective: To identify the central and bridging components of adolescent aggression, assess the reproducibility of the resulting structure in two independent samples, and examine the characteristics of aggression that adolescents attribute to academic stress.

Materials and Methods. A cross-sectional study was conducted among adolescents attending secondary schools and technical and vocational education and training institutions in Almaty, Kazakhstan. The analysis included two independent samples. The discovery sample consisted of 491 participants, of whom 61.1% were girls; the mean age was 15.7 ± 0.7 years. The replication sample included 294 participants, of whom 65.3% were girls; the mean age was 16.6 ± 1.1 years. The total sample comprised 785 adolescents.

Aggression was assessed using the 29-item Buss-Perry Aggression Questionnaire, which includes four theoretical domains: Physical Aggression, Verbal Aggression, Anger, and Hostility. Participants were also asked whether they believed that aggression in their behavior arose from academic stress associated with excessive workload, examinations, or pressure to achieve high academic results.

Regularized partial-correlation networks were estimated at the item level. Expected influence and bridge expected influence were calculated for each component. Exploratory graph analysis was used to identify empirical communities of aggression symptoms. The stability of the findings was evaluated using bootstrap procedures, while differences between samples and subgroups were examined using permutation-based network comparison tests.

Results: A total of 173 connections between aggression components were retained in the discovery sample and 167 in the replication sample. Most connections crossed the boundaries of the original questionnaire domains, indicating substantial interaction between the emotional, cognitive, and behavioral manifestations of aggression.

The item describing feeling “like a powder keg ready to explode” was the most influential component in both samples. It had the highest expected influence in the discovery sample and the second-highest expected influence in the replication sample. It was also among the three strongest bridge components in both networks. Accumulated anger connected perceptions of unfair treatment by others with destructive behavior, including breaking things when angry.

Verbal Aggression did not form a distinct and stable community in either sample. Its individual manifestations were distributed across reactive anger, retaliatory confrontation, and hostility. This finding suggests that verbal confrontation may serve different psychological functions rather than represent a single, coherent dimension of aggression.

Academic-stress-related aggression was reported by 28.9% of participants in the discovery sample and 23.5% in the replication sample. It was primarily associated with arguing when others disagreed, retaliating when physically provoked, threatening others, and openly expressing irritation. Associations with suspiciousness and persistent hostile beliefs were weak. No statistically significant differences in overall network structure were found between the discovery and replication samples or between boys and girls.

Conclusion: Accumulated and poorly regulated anger appears to be a stable linking component in the structure of adolescent aggression. It occupies an intermediate position between perceptions of unfair treatment and confrontational or physically aggressive behavior. These findings support the inclusion of early recognition of emotional escalation, anger-regulation skills, interruption of

hostile rumination, and conflict de-escalation strategies in adolescent aggression-prevention programs. Interventions addressing aggression attributed to academic pressure should focus not only on stress reduction but also on preventing arguments, retaliatory behavior, and impulsive reactions. Because of the cross-sectional study design, the identified associations should not be interpreted as causal relationships.

Keywords

Adolescents, aggression, accumulated anger, academic stress, network analysis, emotion regulation, Kazakhstan.