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Brief report

Brief report: A network analysis of self-cutting risk among late adolescent girls exposed to dating violence

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ABSTRACT

Adolescent self-directed violence (SDV) is a major public health concern. Adolescent girls exposed to dating violence (DV) are a particularly vulnerable group. Numerous studies have examined the number and type of SDV risk factors, but few examined global patterns of relationships among them. Exploring global patterns of risk is crucial to developing targeted prevention efforts. In this study we applied a network model to identify risk patterns for a common form of SDV, self-cutting, among American adolescent girls ($N = 109$) with history of DV. Risk factor networks were compared among girls who did/did not endorse lifetime self-cutting. Girls with a history of self-cutting (19%) had a risk factor network characterized by a higher number of associations than girls who did not (*test statistic* = 0.142; 95% *CI* = 02-.03). For these girls, the experience of one risk factor is more likely to co-occur with multiple others, thereby potentially compounding effects and unwanted consequences.

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Adolescent self-directed violence (SDV) is a major public health concern. Among female adolescents in particular, both the frequency of self-cutting behaviors and the rate of increase in suicide attempts surpasses those of their male counterparts (Bakken & Gunter, 2012; Curtin, Warner, & Hedegaard, 2016), suggesting that gender-specific risk patterns may exist. Notably, adolescent girls exposed to dating violence (DV) report high rates of SDV risk factors including childhood trauma, interpersonal conflict, substance use, and emotional dysregulation (Baker, Helm, Bifulco, & Chung-Do, 2015; Crosby, Ortega, & Melanson, 2011; Jacobson & Gould, 2007). Adolescent girls exposed to DV also report high rates of SDV over their lifetime (Buttar, Clements-Nolle, Haas, & Reese, 2013; Rizzo et al., 2014; Silverman, Raj, Mucci, & Hathaway, 2001). Despite the potential importance of exploring the relationships between SDV risk factors among DV-exposed girls, studies in this area are scarce.

Network analysis (NA) is a methodology based in graph theory, which is particularly useful for analyzing and visualizing complex relationships among psychopathology symptoms and risk factors that would otherwise be difficult to disentangle using traditional approaches (Borsboom & Cramer, 2013). It has recently been identified as a novel method of examining risk

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factors associated with SDV (de Beurs, 2017), and has been used in the study of posttraumatic stress disorder, depression, and other psychosocial phenomena (DuBois, Rodgers, Franko, Eddy, & Thomas, 2017; Hoorelbeke, Marchetti, De Schryver, & Koster, 2016; Sullivan, Smith, Lewis, & Jones, 2016). Few studies have examined the relationship between DV and self-cutting behavior (Baker et al., 2015; Murray, Wester, & Paladino, 2008; Rizzo et al., 2014). To date, no studies have been conducted using NA to explore self-cutting risk factor relationships among late adolescents. In this current study, we applied NA to examine the relationships between previously identified SDV risk factors and to clarify patterns of risk among a sample of adolescent girls with a history of DV.

1. Methods

1.1. Participants and procedure

Data for this study were drawn from the baseline assessment of a larger clinical trial evaluating the efficacy of a DV and sexual risk prevention program (Date SMART; Rizzo et al., 2017). One-hundred forty-four adolescent girls (ages 14–17) who endorsed lifetime history of physical DV perpetration and/or victimization were recruited from five urban high schools in the Providence, RI area. One-hundred nine (76%) of the 144 eligible youth consented to participate in the parent study and were included in this analysis (Table 1). Parents/guardians provided informed consent and adolescents provided assent for their participation. Adolescents received a $20 gift card for completing the assessment, administered using audio computer-assisted structured interviews (ACASI). This study was approved by the affiliated hospital Institutional Review Board.

1.2. Measures

Self-cutting was measured using one item (i.e., have you ever intentionally cut your body using pins, knives, razorblades, safety pins or other things?) from the AIDS Risk Behavior Assessment (ARBA; Donenberg, Emerson, Bryant, Wilson, & Weber-Shifrin, 2001). The ARBA also assessed lifetime use of alcohol and drugs. Depressive symptoms were assessed using the Beck Depression Inventory (BDI; $\alpha = .88$; Beck, Steer, & Brown, 1996). Family and social cohesion was assessed using four items (i.e., in general, how much of a problem do you think you have with getting along with your: mother; father; brother or sister; other kids your age) from the Columbia Impairment Scale ($\alpha = .82$; Bird, Shaffer, Fisher, & Gould, 1993). Internal and external emotional dysregulation were measured using the Regulation of Emotion Questionnaire (internal $\alpha = .69$, external $\alpha = .71$; Phillips & Power, 2007). Childhood trauma was assessed using the total abuse and neglect subscale of the Childhood Trauma Questionnaire ($\alpha = .87$; Bernstein, Ahluvalia, Pogge, & Handelsman, 1997). The UCLA-PTSD Index ($\alpha = .92$; Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998), measured posttraumatic stress disorder (PTSD) symptom severity. DV was measured using the total victimization and perpetration subscales of the Conflict in Adolescent Dating Relationships Inventory (victimization $\alpha = .89$, perpetration $\alpha = .87$; Wolfe et al., 2001). All scales included in the final model were standardized to control for potential influence of differential scale variability on network structure.

1.3. Statistical analyses

Network analysis was utilized to identify patterns of associations among self-cutting risk factors. In the models computed, nodes represented self-cutting risk factors and edges represented zero-order correlations between each pair of risk factors. The analysis was conducted utilizing recommendations for small sample sizes (see Epskamp, Borsboom, & Fried, 2017). Non-significant edges ($p > .05$) were omitted, a correlation threshold of $r = 0.2$ was utilized in the creation of the network and calculation of density measures, and bootstrapping was used to address differences in group size (see Borsboom & Cramer, 2013; Rhemtulla et al., 2016).

Network density was calculated as a global network property. It represents the proportion of all potential connections in a network that are actually connected and has a value between 0 and 1. To compare global network characteristics, the sample

Table 1
Sample demographics.

Characteristics	Total ($n = 109$)
Age (in years), mean (SD)	15.75 (.94)
Ethnicity and race[a], n (%)	
Hispanic	55 (50%)
African American	38 (35%)
White	24 (22%)
American Indian	8 (8%)
Asian	3 (3%)
Mother figure at home, n (%)	105 (96%)
Father figure at home, n (%)	68 (62%)
Free or reduced lunch, n (%)	88 (81%)

[a] Multiple options could be endorsed.

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