



Relational victimization and depressive symptoms: The role of autonomic nervous system reactivity in emerging adults

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ABSTRACT

The goal of the current study was to investigate the association between relational victimization, defined as being the target of aggressive acts that damage relationships (e.g., gossip, social exclusion) and depressive symptoms during the relatively understudied developmental period of emerging adulthood. In addition, as individual differences in stress reactivity may influence the outcomes associated with victimization by peers, the moderating roles of sympathetic nervous system (SNS; as measured by skin conductance reactivity) and parasympathetic nervous system (PNS; as measured by respiratory sinus arrhythmia) reactivity to social and non-social stressors were examined. Findings indicated that relational victimization was positively related to depressive symptoms in individuals demonstrating *coactivation* (i.e., high SNS and PNS reactivity) and *coinhibition* (blunted SNS and PNS reactivity) to both social and non-social stressor tasks. These patterns may reflect a breakdown of regulation in the body's physiological response to stress, thus increasing risk for depressive symptoms in the context of peer stress. Findings highlight potential areas for future interventions.

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1. Introduction

Peer victimization occurs when an individual is the target of aggressive behavior by at least one peer (Hawker and Boulton, 2000). Research indicates that relational victimization, defined as being the target of aggressive acts that damage relationships (e.g., gossip, social exclusion), is associated with a host of negative developmental outcomes, including depressive symptoms (e.g., Crick and Grotpeter, 1995). However, work investigating the association between relational victimization and symptoms of depression has been limited in several important ways. First, although relational victimization may be a highly salient form of peer victimization during the transition to adulthood, the vast majority of research in this area has been conducted with children and adolescents; as such, little is known about the outcomes associated with these experiences during emerging adulthood. In addition, although increasing evidence suggests that individual differences in the physiological stress response play a role in the relationship between adversity and adjustment outcomes (Rudolph et al., 2010; Scarpa and Ollendick, 2003), limited work has investigated whether autonomic nervous system (ANS) stress reactivity moderates the association between relational victimization and depressive symptoms. The goal of the current study was to determine whether experiences of relational victimization were related to

depressive symptoms in a sample of emerging adults, and whether these associations were moderated by sympathetic nervous system (SNS) and parasympathetic nervous system (PNS) reactivity to stress. Additionally, as the role of ANS stress reactivity in the prediction of maladaptive outcomes can vary based on the nature of the stressor (Obradović et al., 2011), these relationships were examined across several types of stressor tasks (i.e., social and non-social).

A growing body of research has documented positive associations between relational victimization and depressive symptoms, both concurrently and prospectively (Boivin et al., 1995; Crick and Bigbee, 1998; Crick and Grotpeter, 1995; Klomek et al., 2008; Prinstein et al., 2001; Reijntjes et al., 2010; Verduin and Kendall, 2008; Yeung Thompson and Leadbeater, 2013). However, little work to date has examined these associations in emerging adulthood (ages 18–29; Arnett, 2015). Relational victimization in the face of the social challenges of this developmental period may undermine emerging adults' sense of support from peers, thereby putting victimized youth at risk for symptoms of depression. Therefore, the first goal of the current study was to investigate the association between relational victimization and symptoms of depression during emerging adulthood, a developmental period that is relatively understudied.

Associations between relational victimization and internalizing symptoms in child and adolescent samples tend to be fairly modest in size (e.g., $r = 0.21$ to $r = 0.33$; Desjardins and Leadbeater, 2011), highlighting the possibility of significant heterogeneity in individuals' reactions to relational victimization. Therefore, it is important for researchers to investigate factors that may impact associations between relational victimization and depressive symptoms. One potential

Abbreviations: SCL-R, skin conductance reactivity; RSA-R, respiratory sinus arrhythmia reactivity; BSC, biological sensitivity to context; SCI, Social Competence Interview; IBI, interbeat-interval.

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moderator is ANS stress reactivity; in fact, increasing evidence suggests that individual differences in the ANS stress response play a role in the relationship between adversity and adjustment outcomes (Rudolph et al., 2010; Scarpa and Ollendick, 2003). The ANS is responsible for maintaining homeostasis, facilitating adaptation to the environment, and regulating physiological responses (Richter and Wright, 2013), and is made up of the sympathetic nervous system (SNS; responsible for initiating physiological arousal) and the parasympathetic nervous system (PNS; the activation of which is responsible for restoring homeostasis and decreasing arousal; Porges, 2007). SNS and PNS activity in the face of a stressor can be examined using multiple measures, including skin conductance reactivity (SCL-R; Dawson et al., 2007) and respiratory sinus arrhythmia reactivity (RSA-R; Porges, 2007), respectively. Increased sweat production, as measured with SCL-R, is an indicator of increased SNS activity. Respiratory sinus arrhythmia (RSA), a measure of the variability in heart rate that occurs naturally with the respiratory cycle, is an indicator of PNS influences on the heart (Porges, 2007).

Several researchers have found empirical support for the notion that ANS activity moderates the association between adversity and adjustment outcomes in child and adolescent samples (e.g., El-Sheikh et al., 2007 and Rudolph et al., 2011). However, limited research to date has examined the joint role of the SNS and the PNS in these relationships (El-Sheikh et al., 2009). Four profiles of stress system activity have been identified that may influence how individuals react to experiences of adversity, such as peer victimization. *Reciprocal activation* occurs when one branch is activated while the other withdraws (Berntson et al., 1991; Del Giudice et al., 2011). Specifically, *reciprocal SNS activation* occurs when the SNS is activated and the PNS withdraws (resulting in increased arousal), and conversely, *reciprocal PNS activation* occurs when the PNS is activated and the SNS withdraws (resulting in decreased arousal; Berntson et al., 1991). Individuals may also demonstrate either *coactivation* patterns, where both systems are activated at the same time, or *coinhibition* patterns, where neither system is activated in the face of threat (Del Giudice et al., 2011; El-Sheikh et al., 2009).

El-Sheikh and colleagues (El-Sheikh and Erath, 2011; El-Sheikh et al., 2009) hypothesized that coinhibition and coactivation would exacerbate risk for poor adjustment in the face of adversity, because these physiological patterns denote that the body is experiencing a breakdown in physiological stress regulation. For instance, during a coactivation response, SNS activation initiates physiological arousal and the mobilization of metabolic resources to engage with the stressor (Obradović, 2012; Sijtsma et al., 2011). However, increases in RSA to stress, thought to reflect poor emotion regulation capabilities, may lead to coping difficulties and adjustment problems such as internalizing symptoms (Graziano and Derefinko, 2013; Hinnant and El-Sheikh, 2009). Therefore, when individuals experience coactivation, the lack of emotion regulation from the PNS combined with the physiological arousal from the SNS may lead to dysregulated emotional reactivity, potentially resulting in negative outcomes and a failure to cope effectively with stressors such as victimization (El-Sheikh et al., 2009; Wagner and Abaied, 2015). During a coinhibition response, the individual experiences PNS withdrawal, which increases attention (Porges, 2007; Wagner and Abaied, 2015). This is coupled with a failure of the SNS to activate, which may prevent sufficient metabolic input to allow for effective behavioral self-regulation (El-Sheikh et al., 2009; Wagner and Abaied, 2015). This pattern may result in increased attention to the threat, but without adequate input from the SNS, effective coping responses may be impaired (Wagner and Abaied, 2015). For instance, this pattern may represent a passive response to stress and lead to a failure to use active coping techniques (El-Sheikh et al., 2013). Consistent with this perspective, studies conducted with children (El-Sheikh et al., 2009) and emerging adults (Wagner and Abaied, 2015) have found that patterns of coinhibition and coactivation exacerbated risk of negative adjustment in the face of adversity.

However, alternative theoretical perspectives highlight the possibility that other patterns of interactions between the SNS and PNS may

promote depressive symptoms in the context of peer victimization. According to Biological Sensitivity to Context (BSC) theory, individuals differ in their level of susceptibility to their environments due to neurobiological differences (Belsky and Pluess, 2009; Ellis et al., 2005); thus, high physiological stress reactivity is thought to bring about beneficial outcomes in supportive environments and maladaptive outcomes in negative, high-stress environments (Boyce and Ellis, 2005; Rudolph et al., 2011). Researchers have hypothesized and subsequently provided evidence that suggests that a high SNS response (Quas et al., 2004) and greater PNS withdrawal (Obradović et al., 2010) in the face of a stressor are both indicative of a BSC response. Lafko et al. (2015) recently suggested that the combination of these two patterns (i.e., SNS activation coupled with PNS withdrawal, or reciprocal SNS activation) may serve as a particularly potent indicator of BSC. Thus, the second goal of the current study was to examine competing hypotheses regarding the moderating role of the interaction between the SNS and PNS in the association between relational victimization and depressive symptoms. As proposed by El-Sheikh et al. (2009), relational victimization may be associated with depressive symptoms among emerging adults who exhibit coactivation and coinhibition stress responses. Alternatively, consistent with Lafko et al. (2015), these associations may be present among individuals who exhibit a reciprocal SNS response.

Finally, the third goal of this study was to investigate whether patterns of ANS reactivity moderation occurred across tasks that were both social and non-social in nature. Obradović et al. (2011) demonstrated that the moderating role of physiological stress reactivity in associations between adversity and maladaptive outcomes can vary depending on the nature of the stressor. The authors called for a move from conceptualizing stress reactivity as a trait characteristic, and highlighted the need to consider reactivity in context. In order to build on this previous research (Obradović et al., 2011), in the current study, we included two peer social stressor tasks related to experiences of relational victimization (one standardized to control for experiences across participants and one semi-structured interview in which participants recounted recent experiences of victimization to increase ecological validity) and one cognitive challenge stress task. There is some preliminary evidence that reactivity to peer stress may be relevant to understanding the relationship between peer victimization and depressive symptoms in children (Rudolph et al., 2011). Moreover, given the theoretical processes proposed to underlie physiological moderation of associations between relational victimization and symptoms of depression (e.g., patterns of coactivation and coinhibition may impair effective responses to peer stress, thus increasing risk for depressive symptoms), it is possible that moderation will only be evident when reactivity is assessed in the context of peer stressors (Obradović et al., 2011). Thus, we expected moderation to occur in the social stressors, but not the cognitive stressor. However, the hypothesis that moderation would not occur when reactivity was assessed in response to cognitive stress was tentative, as this question has not been addressed in prior research.

2. The current study

The first goal of this study was to examine the association between relational victimization and depressive symptoms in a sample of emerging adults. We expected that relational victimization would be positively associated with depressive symptoms. The second goal of this study was to test which patterns of ANS activity (i.e., coactivation/coinhibition or reciprocal SNS activation) would exacerbate risk for depressive symptoms in the context of relational victimization. Finally, the third goal of this study was to investigate whether the moderating role of ANS reactivity in the association between relational victimization and depressive symptoms occurred in the social stressor tasks but not the cognitive stressor task. We expected that ANS reactivity would be emerge as a moderator when assessed in response to a social, but not a cognitive, stressor.

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