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Emotion dysregulation and dyadic conflict in depressed and typical adolescents: Evaluating concordance across psychophysiological and observational measures

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ABSTRACT

Many depressed adolescents experience difficulty in regulating their emotions. These emotion regulation difficulties appear to emerge in part from socialization processes within families and then generalize to other contexts. However, emotion dysregulation is typically assessed within the individual, rather than in the social relationships that shape and maintain dysregulation. In this study, we evaluated concordance of physiological and observational measures of emotion dysregulation during interpersonal conflict, using a multilevel actor-partner interdependence model (APIM). Participants were 75 mother-daughter dyads, including 50 depressed adolescents with or without a history of self-injury, and 25 typically developing controls. Behavior dysregulation was operationalized as observed aversiveness during a conflict discussion, and physiological dysregulation was indexed by respiratory sinus arrhythmia (RSA). Results revealed different patterns of concordance for control versus depressed participants. Controls evidenced a concordant *partner* (between-person) effect, and showed increased physiological regulation during minutes when their partner was more aversive. In contrast, clinical dyad members displayed a concordant actor (within-person) effect, becoming simultaneously physiologically and behaviorally dysregulated. Results inform current understanding of emotion dysregulation across multiple levels of analysis.

1. Introduction

Adolescent depression is a pervasive and impairing condition characterized in part by emotion dysregulation and sensitivity to interpersonal conflict (Allen, Kuppens, & Sheeber, 2012). The prevalence rate of depression increases markedly during adolescence (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993), making this an opportune stage to observe the dynamic interplay of emotion dysregulation and interpersonal stress. Considerable socialization of both conflict resolution strategies and emotion regulation/dysregulation occurs within family relationships (Eisenberg, 2000; Morris, Silk, Steinberg, Myers, & Robinson, 2007). Parents and children shape one another's behaviors, emotions, and physiological responses through dyadic interaction patterns that occur thousands of times across development (see e.g., Patterson, Dishion, & Bank, 1984). Thus, parent–child conflict represents an ideal context in which to observe emerging regulatory strategies.

Emotion regulation comprises biological and social processes. However, few studies have examined both simultaneously. This is unfortunate given evidence that emotion regulation develops through interpersonal mechanisms (Cassidy, 1994; Coan, 2010; Crowell, Baucom, et al., 2013; Crowell, Skidmore, Rau, & Williams, 2013). A variety of labels have been applied to social processes that promote emotion regulation, including attunement, co-regulation, external regulation, synchrony, and mutual regulation (Coan, 2010; Helm, Sbarra, & Ferrer, 2012; Hughes, Crowell, Uyeji, & Coan, 2012). Regardless of the label used, the regulatory power of social relationships is well documented; vocal cues, touch, instrumental support, and emotion coaching are potent sources of regulation for infants and children (see Campos, Campos, & Barrett, 1989, for a review). Such co-regulation may be especially important in childhood and early adolescence, before neural systems implicated in top-down volitional modulation of affect have matured fully (see e.g., Beauchaine & McNulty, 2013). Yet even in adulthood, co-regulation within relationships contributes to better

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self-control, health, and interpersonal connectedness (Coan, Kasle, Jackson, Schaefer, & Davidson, 2013; Diamond & Aspinwall, 2003; Pietromonaco, Uchino, & Dunkel Schetter, 2013). Thus, social relationships serve powerful self-regulatory functions (Hofer, 1995; Hughes et al., 2012).

In most studies, emotion is assessed intrapersonally (e.g., Reis, Collins, & Berscheid, 2000), and emotion regulation is described as a set of processes through which an *individual*—either volitionally or automatically—modulates the intensity, duration, or valance of an emotion to meet contextual demands (Cole, Martin, & Dennis, 2004; Gross, 1998). According to nearly every theory, emotions are described as coordinated behavioral, physiological, and cognitive response tendencies (e.g., Ekman & Friesen, 1976). For example, anxiety facilitates survival-related behavior and physiological activation in response to threat. When the threat is removed or appraised differently, behavioral and physiological recovery should occur (Cole et al., 2004; Gross, 1998). However, stimulus conditions are rarely so simple or circumscribed. Rather, biological, social, behavioral, and cognitive systems each act upon one another to produce dynamic emotional states, and regulation (or dysregulation) of these states. This has led many scholars to promote multi-method, multiple-levels-of-analysis approaches to the study of emotion and emotion regulation (Beauchaine & McNulty, 2013; Beauchaine & Gatzke-Kopp, 2012; Calkins, 2010). As a result, we now have a richer understanding of the complexity that follows from gathering data across multiple levels of analysis.

2. Concordance: a multimethod approach

Concordance can be defined as a coordinated response across subjective, cognitive, expressive, and physiological measures of emotion (see e.g., Hollenstein & Lanteigne, in this issue; Marsh, Beauchaine, & Williams, 2008). According to functionalist accounts, concordance reflects emotional wellbeing, whereas discordance may indicate vulnerability to psychopathology (Ekman, 1999; Levenson, 1994). However, after several decades of empirical study, evidence in support of this theory is inconsistent (Marsh et al., 2008; Lanteigne, Flynn, Eastabrook, & Hollenstein, 2012). This has led some to conclude that emotional response systems are only loosely or probabilistically correlated, and that concordance may only be observed during the experience of very strong emotions, or in specific contexts (Cacioppo, Berntson, & Klein, 1992; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005; Reisenzein, 2000). Notably, these arguments apply to intrapersonal concordance. Assessing interpersonal concordance is even more complicated, since each participant's behavioral and physiological responses are affected by both endogenous experiences and partner behaviors.

In addition, much of the existing literature has tested concordance hypotheses during tasks designed to elicit specific, discrete emotions (e.g., anger or sadness; Hubbard et al., 2004; Reisenzein, Studtmann, & Horstmann, 2013). In these study designs, emotion regulatory efforts could disrupt attempts to measure concordance, producing inconsistent results (Butler et al., in this issue; Mauss et al., 2005). Thus, there are two distinct and conflicting hypotheses that follow from research with typical controls. On the one hand, healthy participants should show greater concordance across measures of emotion relative to clinical participants because concordance presumably reflects wellbeing (Marsh et al., 2008). On the other hand, controls may evidence less concordance if they have better emotion regulation skills and are actively regulating or suppressing their expressions (Mauss et al., 2005).

3. The present study

In the present study, we examined minute-to-minute concordance across physiological and behavioral markers of emotion dysregulation during a mother–daughter conflict task. We also explored how patterns of concordance/discordance differ between typical mother-daughter dyads (controls) and those in which the daughter is depressed (clinical). We operationalized behavior dysregulation as observed aversiveness during conflict, and physiological dysregulation as respiratory sinus arrhythmia (RSA) reactivity. Unique to this study, we model concordance simultaneously within each dyad member (e.g., concordance between the mother's RSA and her own aversive behavior) and between members (e.g., concordance between the mother's RSA and her adolescent's aversive behavior). This is a more thorough test of concordance within an interpersonal stress paradigm than most studies conducted to date.

3.1. Respiratory sinus arrhythmia

Respiratory sinus arrhythmia is often used as a psychophysiological index of emotion regulation capacity (see Beauchaine, 2001, 2012; Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996). Interest in RSA follows from polyvagal theory (PVT; Porges, 1995), including its application to both normative development of emotion regulation (e.g., Hinnant, Elmore-Staton, & El-Sheikh, 2011) and the development of emotion dysregulation in psychopathology (e.g., Beauchaine, 2001; Beauchaine, Gatzke-Kopp, & Mead, 2007). According to PVT, parasympathetic efference to the heart (from the nucleus ambiguous through the vagus nerve) serves to inhibit fight/flight (F/F) responding and promote adaptive behaviors, including social affiliation (Beauchaine et al., 2007; Porges, 2007).

When faced with conspecifics, mammals must decide quickly whether to affiliate, initiate F/F behaviors, or withdraw/freeze (Porges, 2003). Affiliation requires sustained attention, which is served through increased vagal activity. In contrast, conflict requires rapid mobilization of sympathetically mediated cardiac output, which is often accompanied by vagal withdrawal (see Beauchaine, 2001; Beauchaine et al., 2007; Porges, 1995). Following from these functional relations, estimates of vagal activity and reactivity may serve as a peripheral measures of self-regulation in contexts of interpersonal interactions. Increases in vagal activity may mark better regulation in the service of social affiliation, whereas decreases in vagal activity often reflect compromised regulatory capacity.[1]

3.2. Behavioral dysregulation

Behaviorally, emotion regulation is often measured through self-reports or observational coding. Analytic approaches vary, but many scholars suggest that emotion and its regulation should be assessed independently (Cole et al., 2004). However, this presents a measurement challenge because participants often anticipate their emotional reactions and modify their responses accordingly (e.g., through cognitive reinterpretation or avoiding the situation). In contrast, emotion *dysregulation* is easier to identify and measure behaviorally. According to one useful definition, dysregulated emotions are characterized by four central features: (1) they persist for too long and attempts at regulation are ineffective; (2) they interfere with appropriate behavior; (3) they are inappropriate to the context; and/or (4) they change too abruptly

[1] Under appropriate stimulus conditions (e.g., control of posture, respiration, movement), vagal efference to the heart can be estimated by RSA and psychological interpretation is possible (see Ritz, 2009; Zisner & Beauchaine, 2014). When ideal conditions are not met, RSA may nevertheless be a useful marker of clinical state. For example, deficiencies in RSA appear to index emotion dysregulation across a wide range of psychiatric disorders (see Zisner & Beauchaine, 2014).