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Aggression proneness: Transdiagnostic processes involving negative valence and cognitive systems[☆]

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ABSTRACT

Aggressive behavior is observed in persons with various mental health problems and has been studied from the perspectives of neuroscience and psychophysiology. The present research reviews some of the extant experimental literature to help clarify the interplay between domains of functioning implicated in aggression proneness. We then convey a process-oriented model that elucidates how the interplay of the Negative Valence and Cognitive System domains of NIMH's Research Domain Criteria (RDoC) helps explain aggression proneness, particularly reactive aggression. Finally, we report on a study involving event-related potential (ERP) indices of emotional and inhibitory control processing during an emotional-linguistic go/no-go task among 67 individuals with histories of violence and criminal offending (30% female, 44% African-American) who reported on their aggressive tendencies using the Buss–Perry Aggression Questionnaire. Results provide evidence that tendencies toward angry and aggressive behavior relate to reduced inhibitory control processing (no-go P3) specifically during relevant threat-word blocks, suggesting deterioration of cognitive control by acute or sustained threat sensitivity. These findings highlight the value of ERP methodologies for clarifying the interplay of Negative Valence and Cognitive System processes in aggression proneness.

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1. Introduction

NIMH's Research Domain Criteria initiative (RDoC; Cuthbert and Insel, 2013) has shifted the focus from disorder categories to core biobehavioral domains of functioning (e.g., Negative Valence System) that can be understood across units of analysis (self-report, physiology, behavior). In applying this new model to mental health research, a key first step is to identify and systematically examine transdiagnostic symptom dimensions that are both clinically-meaningful and amenable to RDoC mapping. Aggressive behavior and violence, along with related tendencies (e.g., anger, hostility), are observed in persons with various mental health problems (American Psychiatric Association, 2013); ten Have et al., 2014) and have been studied from perspectives of neuroscience and psychophysiology (Coccaro et al., 2007; Davidson et al., 2000; Kruk et al., 2004; Verona et al., 2002, 2009). However, the current literature does not provide a framework for understanding the role of biologically-related dysfunctions related to aggression that have transdiagnostic relevance. We believe a unified model that helps position

aggression within the RDoC framework would help further our understanding of mechanisms involved in broader psychopathologies marked by aggression and violence.

This paper is meant to encourage an understanding of aggression/violence as a critical transdiagnostic dimension characterized by aberrations in the interplay between Negative Valence and Cognitive System functioning (see Process Model in Fig. 1). To illustrate this conceptualization, findings are presented from an event-related potential (ERP) study using an emotional-linguistic go/no-go task to identify neurophysiological indices of systems activation involved in aggression proneness, particularly of the reactive type.

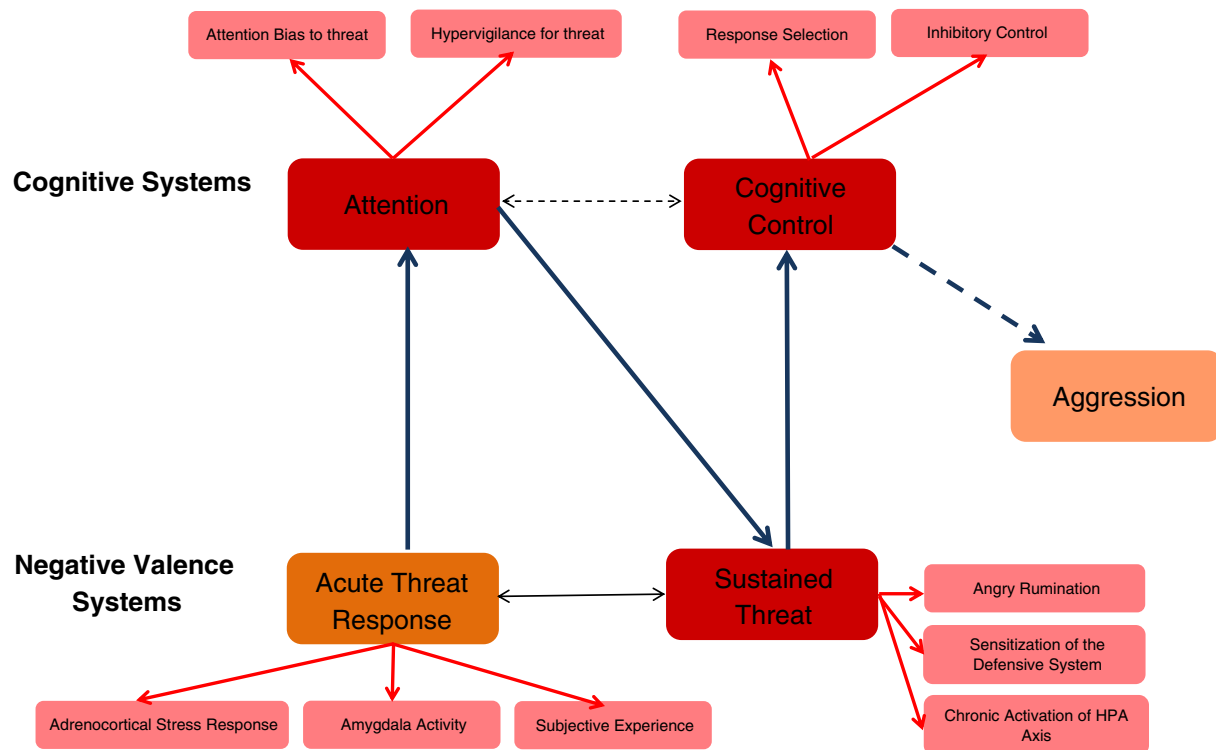
1.1. Aggression proneness

Similar to other scholars (e.g., Anderson and Bushman, 2002), we define aggression as behavior directed toward an individual or individuals with some intent to cause psychological or physical harm, and aggression proneness is defined as the dispositional tendency to use aggression. Theorists often distinguish between different functions of aggression, specifically reactive (or hostile) and proactive (or instrumental) aggression (Anderson and Bushman, 2002; Berkowitz, 1990; Dodge, 1991). Whereas reactive aggression is emotional and has the ultimate goal of harming the target of the aggression, proactive aggression is considered premeditated, executed with limited emotional reaction, and to achieve a goal beyond harming the target (e.g., money in the

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Note: Solid lines denote a positive relation and dashed lines denote a negative relation

Fig. 1. Process model of aggression.

case of armed robbery). Although there are conceptual distinctions between these two types of aggression, meta-analytic work has found a large correlation between self-report measures of reactive and proactive aggression (Polman et al., 2007), suggesting that individuals prone to one type of aggression are also engaging in the other. Despite this overlap, research supports the distinction, in that these types of aggression differ in developmental origins, prognosis, and correlates (Brendgen et al., 2001; Vitaro et al., 2006).

Our position is that broader aggression proneness is implemented by neural circuitry and psychological processes that are common to various type of aggression. While disinhibition and prefrontal functioning deficits may represent one core vulnerability to aggression (Patrick and Bernat, 2009), the affective disruption of cognitive control is a highly-relevant predisposing process for reactive aggression or aggression proneness among persons with capacity for heightened emotionality.

1.2. RDoC and aggression proneness

The RDoC initiative is meant to encourage the conceptualization of psychopathology in terms of dysfunctions in thought and behavior that can be understood at the level of neuroscience. Aggression has been studied in the field of psychology and behavioral neuroscience as a key social behavior, tightly linked to stressful social interactions in animals (Blanchard et al., 2001), with several neural circuits and hormonal processes identified as antecedents or consequences of aggressive behavior (van Erp and Miczek, 2000; Kruk et al., 2004). However, it is less common to apply this rich tradition of research on aggression to the service of understanding broader psychopathological processes (although see McLaughlin et al., 2014).

Aggression was initially considered for inclusion, along with fear, by the RDoC workgroup tasked with populating the matrix for the Negative Valence Systems domain (see Cuthbert and Insel, 2013, Table 2). A summary of the proceedings indicates that members of the workgroup considered aggression too heterogeneous as a construct (e.g., reactive,

proactive) to identify a specific set of biological mechanisms involved, and that it may be best described as a behavior, not a “motivational state” (see <http://www.nimh.nih.gov/research-priorities/rdoc/negative-valence-systems-workshop-proceedings.shtml> for workgroup summary). For example, the workgroup considered reactive aggression as potentially involving dysfunction in responses to acute threat in the Negative Valence System, whereas proactive aggression was thought to involve a different RDoC domain, such as the Social Processes domain, involving orientations toward others (e.g., dominance and empathy). Of course, any form of aggression would involve multiple system functioning. Our goal is to revisit the role of aggression in RDoC, with a particular focus on reactive aggression as a symptom dimension that can be understood via existing constructs in RDoC.

1.3. Transdiagnostic relevance of aggression

There are a number of disorders in our current diagnostic taxonomy that include aggression proneness or related constructs (e.g., anger outburst) as a symptom of the disorder (American Psychiatric Association, 2013). These include oppositional defiant disorder and conduct disorder in terms of childhood diagnoses (e.g., Blair et al., 2014), as well as antisocial personality disorder, borderline personality disorder, and intermittent explosive disorder in terms of adult disorders (American Psychiatric Association, 2013). More generally, aggression proneness has been identified as co-occurring with a number of other disorders. For instance in a large population-based study from the Netherlands Mental Health Survey, ten Have and colleagues (2014) found that bipolar disorder, alcohol dependence, and antisocial personality disorder were all marked by concurrent and prospective physical aggression; and that bipolar disorder, substance use disorders, antisocial personality disorder, and social phobia were related to psychological aggression (e.g., name-calling, belittling) when adjusting for demographic characteristics, previous victimization, number of negative life events, and social support. Other work has linked aggression to a plethora of DSM

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