

## 11. Individual Differences in Displaced Aggression as a Risk Factor for Poor Cardiovascular Health

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**Abstract:** Much evidence now supports the notion that high levels of anger-hostility-aggression (AHA) are a risk factor for cardiovascular disease. The present chapter discusses a related yet distinct personality dimension *trait displaced aggression* and its potential associations with poor cardiovascular health. Trait displaced aggression is characterised by the general tendency to ruminate and harm innocent others following interpersonal provocation. Because the distinction between general trait aggression and trait displaced aggression has emerged only recently, researchers have not yet investigated the role that individual differences in displaced aggression might play in cardiovascular diseases. In this chapter, it is argued that those high in trait displaced aggression may be at risk for experiencing poor cardiovascular health, perhaps even to a greater extent than those high in general AHA. Three pathways to poor cardiovascular outcomes are discussed. Specifically, individuals high in trait displaced aggression tend to (i) ruminate about provocations, (ii) alienate important sources of social support such as romantic partners, and (iii) are likely to engage in maladaptive, health-compromising self-regulatory behaviours. It also discusses possible harm reduction mechanisms including distraction, the mental activation of social support, and increasing forgiveness.

**Keywords:** Displaced aggression, Aggression, Cardiovascular health, Cardiovascular disease, Aggressive personality, Trait displaced aggression, Social support, Rumination.

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### Introduction

One of the most well-documented findings in health psychology is the relationship between individual differences in anger-hostility-aggressiveness (AHA) and negative cardiovascular outcomes. A large body of meta-analytic evidence supports a small-to-moderate positive relationship between AHA and poor cardiovascular health. For instance, a meta-analysis of Type A and B personalities indicated that the AHA component of the personality type was responsible for an increased occurrence of coronary heart disease [1]. Other meta-analytic reviews have also revealed positive relationships between trait anger and elevated blood pressure [2, 3] and between trait hostility and blood pressure reactivity to provocations [4].

The present chapter explores the potential effects of an additional personality dimension, namely trait displaced aggression (DA), on cardiovascular outcomes. Trait DA is a recently developed personality construct that is related to, yet distinct from AHA. Let us first discuss the

conceptualisation of trait DA, followed by a discussion of the possible pathways associated with high levels of trait DA that may place these individuals at risk for poor cardiovascular outcomes. In conclusion we will discuss implications for research on AHA and cardiovascular health, as well as several suggestions for future research.

### **Trait DA**

Trait DA refers to stable individual differences in the tendency to aggress against undeserving targets in response to prior provocation [5]. Evidence suggests that when provoked, individuals high in trait DA tend not to deal immediately and directly with the provocateur. Instead, when confronted with an interpersonal provocation (e.g. an insult), they are behaviourally inhibited, yet continue to experience extended anger and hostility. Specifically, those high in trait DA ruminate and dedicate extensive mental effort to planning revenge in the aftermath of the provocation [5]. Moreover, those high in trait DA often harm those closest to them, including their romantic partners [5].

Trait DA consists of three highly correlated, yet distinct affective, cognitive and behavioural components:

- Angry rumination (affect; e.g. “I keep thinking about events that angered me for a long time”)
- Revenge planning (cognition; e.g. “When someone makes me angry, I cannot stop thinking about how to get back at this person”)
- Behavioural DA (behaviour; e.g. “I take my anger out on innocent others”)

These three components comprise the DA questionnaire (DAQ), a reliable and valid 31-item self-report measure used to assess individual differences in trait DA [5]. Thus, those high in trait DA experience anger over an extended period of time (angry rumination), experience hostile cognition over an extended period of time (revenge planning), and harm those close to them (behavioural DA), thereby eliminating important sources of social support. Any one of these factors is likely to impair cardiovascular health. Individuals high in trait DA possess all three of these risk factors. As discussed below, it appears likely then, that those high in trait DA are at especially high risk for suffering from poor cardiovascular outcomes, perhaps even to a greater degree than those high in general AHA.

### **Pathways to Poor Cardiovascular Health**

Because trait DA is a recently developed construct, prior research on aggressive personality and health outcomes has not differentiated among individuals high in general AHA from those who tend to aggress against innocent others (i.e. trait DA). Although general AHA and trait DA are moderately correlated [5], there is good reason to suspect that those high in trait DA may be especially prone to negative cardiovascular health. Based on some of the author’s research and related empirical work by others, three possible pathways associated with trait DA that might contribute to poor cardiovascular health are discussed. Specifically, those high in trait DA are likely to (i) engage in angry and hostile rumination, (ii) alienate important sources of social support, and (iii) engage in poor self-regulatory strategies.

### **Rumination**

Because trait DA consists of angry and hostile rumination, this implies that anger and hostility are experienced for extended periods of time (e.g. potentially even days or weeks). Thus, whereas individuals high in general AHA may experience frequent anger and hostility that dissipates relatively quickly, those high in trait DA also experience these frequent emotional states but for longer periods of time, thereby increasing the harmful effects associated with AHA. For instance, when confronted with an inter-personal provocation, those high in general AHA might experience a brief activation of the physiological stress response, whereas when those high in trait DA are confronted with the same provocation, they likely experience an extended hyperactivation of the stress response. According to the reactivity hypothesis of disease, individuals who tend to demonstrate high levels of cardiovascular reactivity to stressful experiences may be at increased risk for negative cardiovascular outcomes [6]. Therefore, this extended activation of the stress response is likely to lead to poor cardiovascular health (e.g. Sapolsky, 1998).

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Empirical evidence is emerging suggesting that it is not the immediate reaction to a stressful experience that is the most important determinant of chronic, poor cardiovascular health, but rather the cognitive-affective experience following a stressor that may be an important risk factor. One such experience is rumination. Indeed, reviews of the empirical literature suggest that rumination may play a role in cardiovascular disease [8, 9]. Thus, examining cardiovascular recovery in the aftermath of a stressful experience may provide insight into long-term cardiovascular outcomes. For instance, in one experiment, Brosschot and Thayer [10] found that heart rate responses were longer after negative emotions than positive emotions and speculated that rumination may be responsible for this effect. Of more relevance to trait DA are the findings that individual differences in angry rumination predicted delayed cardiovascular recovery following a provocation [11] and after recalling angry life episodes [12]. Glynn, Christenfeld and Gerin [13] (experiment 1) exposed participants to somewhat hostile emotional stressors or non-emotional stressors, and then instructed participants to ruminate about their experiences. They found that only rumination following the hostile emotional stressors produced elevated systolic and diastolic blood pressure. In another study, Bermúdez and Pérez-García [14] administered Caprara's [15] Dissipation-Rumination scale – a measure of vengeance and very similar to the Revenge Planning sub-scale of the DAQ – and exposed them to a hostile emotional stressor. Those high in trait rumination demonstrated increased systolic and diastolic blood pressure reactivity.

How might rumination lead to a hyperactivation of cardiovascular activity? According to one account, it is perseverative cognition, a feature characteristic of rumination that may exacerbate cardiovascular, endocrine and immune responses to stress [16]. Specifically, repeatedly thinking about a stressor may lead to an extended stress response entailing hyperstimulation of the cardiovascular and hypothalamic-pituitary-adrenal (HPA) axis. In more cognitive terms, rumination maintains the likelihood of angry affect, physiological arousal and aggressive cognition [17] via an associative network of aggression-related concepts [18]. Such a network is characterised by activation of aggression-related concepts and inhibition of incompatible responses such as positive affect or empathy. Brosschot, Gerin and Thayer [16] conducted a review of literature on perseverative cognition and concluded that individual differences in rumination are associated with exacerbated cardiovascular, cortisol and immune reactivity. It is also important to note that cardiovascular disease and cortisol are interdependent, such that hyperactivation of the HPA axis is associated with cardiovascular disease [19].

In summary, emerging literature indicates that rumination, and especially the hostile-angry rumination that characterises those high in trait DA, may represent a risk factor for poor cardiovascular outcomes.

### **Loss of Social Support**

In addition to the exacerbated stress response linked to angry and hostile rumination, a second factor associated with trait DA is the tendency to aggress against close others – a phenomenon which is intricately connected with rumination. By maintaining the accessibility of aggressive constructs and angry affect, rumination makes subsequent aggression more likely to ‘transfer’ to undeserving others – a finding that has been experimentally demonstrated [20]. Over time, such aggressive behaviour is likely to push away close others, thereby reducing the availability of important sources of social support. Sources of social support, e.g. romantic partners are capable of providing a buffer to life’s provocations [21]. Indeed, a survey of American adults that simultaneously examined the relative effects of trait DA and general AHA revealed that trait DA accounted for a substantial proportion of the explained variance in self-reported acts of romantic partner abuse whereas the effect of general AHA did not reach statistical significance [5].

The consequences of loss of social support for cardiovascular health can be quite serious. Those who lack social support demonstrate increased mortality, largely from cardiovascular disease [22-24]. In contrast, high levels of social support are associated with lower ambulatory blood pressure [25] and less underlying atherosclerosis [26].

In light of the reactivity hypothesis [6], researchers have proposed that social support should buffer the effects of life stressors (including inter-personal provocations), thereby attenuating cardiovascular reactivity [21]. Several experiments support the notion that when individuals provide supporting comments during laboratory stress manipulations cardiovascular reactivity is indeed reduced [27, 28], but not always among those high in AHA [29]. Thus, although in general, social support is associated with better cardiovascular outcomes, no study to date has investigated the buffering role of social support on cardiovascular reactivity in individuals high in trait DA specifically. Therefore, it remains to be seen whether social support buffers the effects of acute stress on these outcomes among those high in trait DA. Nonetheless, those high in trait DA harm those close to them, which presumably leads to alienation of social support over time. Initial self-report data indicate that high levels of trait DA are related to lower social support, which in turn is related to more stress and subsequent increased negative health problems [30].

In addition to buffering emotional and cardiovascular reactivity to acute stress, there is a second mechanism through which social support may affect cardiovascular health [24]. Specifically, social support may also promote healthy behaviours and medication adherence [31]. Thus, those high in trait DA are unlikely to enjoy these additional benefits of social support.

### **Maladaptive Self-Regulation**

A third pathway through which individual differences in trait DA may affect cardiovascular health is through maladaptive self-regulation. When individuals high in trait DA are provoked, they are likely to experience a complex negative emotional response including anxiety, anger and hostility. In addition, rumination is associated with increased self-awareness [32]. Indeed, a large body of research demonstrates that a heightened state of self-awareness often intensifies negative feelings

[33], including anger [34]. Presumably, individuals are motivated to reduce this self-awareness and negative affect. One way to accomplish this is to stop the ruminative process. However, because rumination is characterised by uncontrollable, repetitive thoughts, this may prove difficult. The uncomfortable state that individuals high in trait DA find themselves in may lead them to engage in unhealthy behaviours intended to provide relief from the cognitive and affective sequelae of a provocation.

Individuals might engage in several types of self-regulatory behaviours in order to reduce self-awareness and improve mood. Unfortunately, these behaviours might also harm one's cardiovascular health. For instance, abusing alcohol or binging on unhealthy foods are both common mechanisms of reducing self-awareness [35, 36]. Because of their awareness-altering effects, using hard drugs that affect the cardiovascular system such as cocaine or methamphetamine may be another common coping mechanism among those high in trait DA. Also, given that trait DA is related to behavioural inhibition [5], which has been linked with avoidant coping strategies [37], those high in trait DA may be more likely to engage in avoidant coping strategies (such as binge drinking) rather than problem-solving coping.

There is indeed some preliminary support that high levels of trait DA are associated with unhealthy self-regulatory behaviours. In a survey of 827 adult American Internet respondents, it was found that trait DA predicted symptoms of alcohol dependence, eating an unhealthy diet, and use of hard drugs (but not marijuana or tobacco), when controlling for age, gender and income [38]. In this same study, participants were asked to answer questions about how they coped with a recent anger-inducing provocation. Those high in trait DA reported using more avoidant behaviours and fewer problem-solving behaviours in response to the provocation [38].

### **Implications and Suggestions for Future Research**

In light of the current review, it is likely that individuals high in trait DA are at risk for poor cardiovascular health, perhaps even to a greater extent than those high in general AHA. However, further research is necessary to empirically validate whether those high in trait DA relative to those high in general AHA differ in terms of cardiovascular health, and if so, to what extent. If trait DA is demonstrated to be a potent predictor of cardiovascular health, models of AHA should incorporate trait DA. Another implication drawn for the present review is that it is not only the immediate reaction to a provocation that impacts cardiovascular outcomes, but also that rumination delays recovery from interpersonal stress.

Future work could focus on cardiovascular reactivity to acute provocation in the laboratory as well as examining real world longitudinal disease outcomes and mortality. Longitudinal data are especially relevant to trait DA because it is expected that there may be a cumulative negative effect of the personality dimension on cardiovascular health as one ages. Specifically, when one is young and healthy, trait DA may exert little influence on one's cardiovascular state (including laboratory reactivity to stressful situations). However, as one becomes older, a lifetime of experiencing extended angry and hostile rumination coupled with harming key sources of social support, may take its toll on the cardiovascular system. Indirect support for this was found in the cross-sectional survey reported previously [38]. An interaction was observed between trait DA and age such that whereas trait DA remained a significant predictor across all three age groups (i.e. 21, 34 and 47 years), the effect of trait DA on self-reported physical health

symptoms (including cardiovascular symptoms) increased with age. Additional work should also focus on the relationships between cardiovascular disease, immune dysregulation, and endocrine dysregulation among those high in trait DA.

### **Reducing the Harm**

There is some evidence in the literature to support the notion that targeted interventions may eventually aid in decreasing the proposed harmful cardiovascular consequences associated with trait DA. Specifically, these interventions may include distraction techniques, the mental activation of social support and forgiveness. The General Aggression Model [39] describes aggressive cognition, angry affect and physiological arousal as three possible mediators of personality on aggression. Presumably, all three interventions discussed herein operate by inhibiting aggressive cognition as well as affecting and promoting cardiovascular recovery to inter-personal stressors.

Distracting oneself following an inter-personal provocation may be an especially promising research avenue to explore. Distraction should be especially helpful because it is affectively neutral, non-arousing and cognitively demanding, thereby permitting little room for aggressive thoughts or angry affect. Experimental evidence supports this notion. For instance, in the laboratory, when participants were provoked and subsequently asked to write about a neutral topic for 20 min, trait DA no longer predicted physical harm against an innocent participant [5]. Directly relevant to cardiovascular disease, in one experiment, participants were exposed to a hostile emotional stressor and then either completed a cognitively engaging, yet non-stressful moral dilemma task for 10 min or just sat quietly for 10 min [13] (Experiment 2). Those exposed to the distracting task evidenced faster cardiovascular recovery following the stressor than those who were simply asked to sit quietly. It is speculated that the distracting task prevented participants from ruminating. Similarly, in another experiment, participants who read a neutral, distracting article following an anger recall task displayed faster heart rate recovery than those instructed to do nothing for 10 min [40]. Distraction was associated with lower anger and rumination during the experiment. Thus, even brief (e.g. 10 min) distraction tasks may be effective.

Another strategy that may prove useful is the mental activation of social support [41]. In one laboratory study, participants who wrote about supportive people in their lives prior to being exposed to a public speech stressor had lower heart rate and blood pressure compared to those participants who wrote about casual acquaintances [41]. This held true for all participants except women high in trait hostility (although men high in trait hostility still benefitted from the mental activation of social support). There is one important caveat, however. Because those high in trait DA tend to harm close others, it may be more difficult for them to spontaneously activate an important source of social support.

A third strategy would be to increase forgiveness among those high in trait DA. Forgiveness is negatively associated with rumination [42] and positively associated with marital quality [43]. In one study, participants underwent a stressful interview about a time when someone had betrayed them [44]. Those high in trait forgiveness had faster blood pressure recovery following the stressful interview. These findings suggest that training those high in trait DA to be more forgiving when confronted with inter-personal provocation may protect their cardiovascular health and increase satisfaction with their romantic partners.

## Conclusion

Much evidence now supports the notion that high levels of AHA are a risk factor for cardiovascular disease. Although recent empirical work has differentiated between general trait AHA and trait DA [5], no work to date has directly investigated the role that individual differences in displaced aggression might play in cardiovascular health. Based on a review of the empirical literature, it appears that those high in trait DA are likely at risk for poor cardiovascular outcomes, perhaps even to a greater extent than those high in general AHA. Specifically, individuals high in trait DA tend to ruminate about provocations, alienate important sources of social support, and engage in maladaptive self-regulatory behaviours. All three pathways are likely to negatively impact cardiovascular outcomes. Those high in trait DA likely engage in all three behaviours, thus, further compounding their risk for poor cardiovascular health.

## Key Points

- ❑ Although recent empirical work has differentiated between general trait AHA and trait DA [5], no work to date has directly investigated the role that individual differences in displaced aggression might play in cardiovascular health.
- ❑ Based on a review of the empirical literature, it appears that those high in trait DA are likely at risk for poor cardiovascular outcomes, perhaps even to a greater extent than those high in general AHA.
- ❑ Specifically, individuals high in trait DA tend to ruminate about provocations, alienate important sources of social support, and engage in maladaptive self-regulatory behaviours.
- ❑ All three pathways are likely to negatively impact cardiovascular outcomes.
- ❑ Those high in trait DA likely engage in all three behaviours, thus, further compounding their risk for poor cardiovascular health.

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