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Social stressors and cardiovascular response: Influence of ambivalent relationships and behavioral ambivalence

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ABSTRACT

Objective: The protective influence of social relationships on health is well documented; however, not all relationships are positive and negative aspects of relationships may be detrimental. Relatively less is known about the relationships characterized by both positivity and negativity (i.e., ambivalence). The goal of this study was to examine the relative influence of ambivalence in relationship quality and social behavior on cardiovascular response.
Methods: 104 healthy young adults were randomly assigned to bring in either a supportive or ambivalent same-sex friend to the experiment. Participants were also randomly assigned to receive positive, negative, ambivalent or ambiguous feedback from their friend after giving a series of speeches. Cardiovascular response was obtained before, during, and after the social stressor (speech task).
Results: Results indicate a significant effect of relationship type before, during, and after the stressor task. Adjusting for baseline, heart rate reactivity and anxiety was significantly higher among those assigned to ambivalent friends relative to those assigned to supportive friends during the stressor task ($ps < .05$). There was also a significant effect of behavioral feedback during the speech task, such that those receiving ambivalent messages had the greatest systolic blood pressure (SBP) and diastolic blood pressure (DBP) reactivity ($p < .05$); however, there was no interaction between relationship and feedback conditions. Those in the ambivalent friend condition also exhibited significantly higher SBP, DBP, and anxiety during the baseline and recovery periods ($ps < .05$).
Conclusions: These findings suggest that both relationship quality and the actions of relationships may have a significant influence on health-relevant physiology.

1. Introduction

The protective influence of social relationships on mental and physical health outcomes is well documented (Holt-Lunstad et al., 2010); however, not all relationships are entirely positive and research also suggests that negativity in social relationships may be detrimental (Tucker et al., 1995, 1996). Importantly, positivity and negativity are separable dimensions and can coexist (Finch et al., 1989; Fiore et al., 1983; Newsom et al., 2003, 2005). For instance, some relationships may be characterized primarily by positivity (supportive) or negativity (aversive), while others may be characterized by low levels of positivity and negativity (indifferent), or a mix of both positivity and negativity (ambivalent; Uchino et al., 2001). This distinction may be important because the joint contribution of high positivity and negativity (ambivalence) in social relationships may have unique implications for health (Holt-Lunstad et al., 2003; Uchino et al., 2012, 2001).

There is evidence that concurrent positivity and negativity may be detrimental relative to both supportive and aversive (primary negative) social relationships. For instance, ambivalent relationships are associated with higher depression (Uchino et al., 2005, 2001) and greater cardiovascular reactivity to stress in the laboratory (Holt-Lunstad et al., 2007; Reblin et al., 2010; Uchino et al., 2001). Likewise, interactions with ambivalent relationships are associated with higher ambulatory blood pressure during daily life (Holt-Lunstad et al., 2003) and greater number of ambivalent ties in one's social network is associated with shorter telemere length (Uchino et al., 2012). Importantly, shorter telomeres are strong predictors of mortality across different diseases including cardiovascular disease, cancer, and infectious diseases (Cawthon et al., 2003; Epel et al., 2009). Together these findings suggest that ambivalent relationships may have a detrimental influence on health-relevant processes. Likewise, because contact with ambivalent relationships is frequent, perceptions are stable over time, found in long-term relationships, and are maintained voluntarily (Campo et al., 2009; Bushman and Holt-Lunstad, 2009), there is ample opportunity for ambivalent relationships to broadly influence health-relevant outcomes.

When considering the pathways by which ambivalent relationships may influence health, we consider the influence of these relationships on stress processes. Prior studies have proposed that ambivalent social relationships may have a detrimental influence by providing less

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effective support during times of stress (support interference hypothesis) or being a source of interpersonal stress (stress enhancing hypothesis; Holt-Lunstad et al., 2007). However, less is known about the antecedent processes that guide such responses.

What about ambivalent relationships leads to detrimental reactions? Is it who they are (our general perception based on relationship history), or what they do (behavior in the moment)? For instance, it is possible that ambivalent friends may be less supportive or more critical, such that they may be less appropriately responsive in the situation than supportive friends. However, it is also possible that regardless of how appropriately supportive an ambivalent friend may be in the moment, past relationship history guides one's response to the situation. In a prior study it was found that behavioral positivity, negativity, and joint positivity and negativity (ambivalence) exhibited by an experimenter were each significantly related to cardiovascular reactivity; however, it was ambivalence that was associated with the highest SBP reactivity (Birmingham et al., 2009). Although these data suggest that such valenced behaviors are influential, given it was coming from a stranger it is unclear how such behaviors may be interpreted in the context of an existing relationships for which one's history might influence appraisals. In another study ambivalent friends were rated by independent judges to provide less emotional support and engage in more negative behaviors (Reblin et al., 2010), suggesting ambivalent friends may objectively behave differently. However, prior research has shown that memory of social information influences future processing and behavior (see Quinn and Rosenthal, 2012, for review). Therefore, interpretations of others behavior may, in part, be viewed through a lens that is colored by our past history with that person.

1.1. Aims and hypotheses

The primary aim of this study is to test whether the influence of ambivalent relationships is most strongly influenced by their behaviors or our general perceptions of them. To test this, participants were randomly assigned to the type of friend they interacted with (supportive, ambivalent) and we experimentally manipulated the type of behavior their friend elicited (i.e., providing positive, negative, ambivalent, or ambiguous messages). We hypothesize that ambivalent and negative behaviors would be associated with greater cardiovascular reactivity relative to positive or ambiguous behaviors. Consistent with prior work we also hypothesized that ambivalent friends would be associated with the greatest cardiovascular reactivity. Importantly, evidence suggests that exaggerated cardiovascular reactivity to stressful situations predicts hypertension, atherosclerosis, and stroke (Matthews et al., 2004, 2006; Jennings et al., 2004; Everson et al., 2001), and an association with risk of cardiovascular disease (see Chida and Steptoe, 2010, for meta-analysis). We further hypothesized, based on the social psychological principal of a self-confirming bias that this association would hold regardless of the behavior of the friend. The second aim of this study was to replicate previous findings demonstrating an association between ambivalent social relationships and heightened cardiovascular reactivity, and extend prior research by also examining the potential effect on recovery.

2. Method

2.1. Participants

We recruited 136 healthy undergraduate students, and their same-sex friend, from introductory psychology courses and through paid advertisement. The participant's friend received monetary compensation. The following self-reported inclusion criteria were used to select healthy participants: no existing hypertension, no cardiovascular prescription medication use, no past history of chronic disease with a cardiovascular component (e.g., diabetes), no recent history of psychological disorder (e.g., major depressive disorder), no tobacco use, and no consumption of more than 10 alcoholic beverages a week. After final inclusion criteria were met and verifying that relationship type criteria was met for the friend (see below), final analyses included 104 participants (63 women and 41 men). The average age was 21.10 ($SD = 2.72$) and BMI was 23.11 ($SD = 3.28$) Recruitment of subjects and study protocol were approved by the university Institutional Review Board committee.

2.2. Procedure

Testing was divided into two sessions. For the first session participants were asked to rate up to 10 friends on the Social Relationships Index (SRI), and based on these ratings friends were classified as either supportive or ambivalent (see details under description of SRI). Based on random assignment, we selected from their list either a supportive or ambivalent friend for the participant to bring with him/her to the experiment. Participants were blind to the conditions for which they were assigned. Thus, they were unaware that we selected a particular type of friend (ambivalent, supportive). As a cover story, participants were told that this is a study on public speaking and cardiovascular functioning, and that some people will be giving their speeches in front of a stranger and some would be asked to give them with a friend present. This was done to ensure that participants act as naturally as possible around their friend.

After the initial screening, participants were scheduled to come into the lab with their friend for the second part of the study. After consent was obtained, participants were then escorted to a separate sound attenuated section of the lab. An occluding blood pressure cuff of appropriate size was placed on the upper left arm. Following an adaptation period of approximately 20 min, the participant was instructed to relax for the next 12 min while resting measures of cardiovascular function were obtained. During the final 5 min of the resting assessment, cardiovascular assessments of systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR) were obtained once every 90 s. The participant completed a state anxiety scale at the end of the rest period.

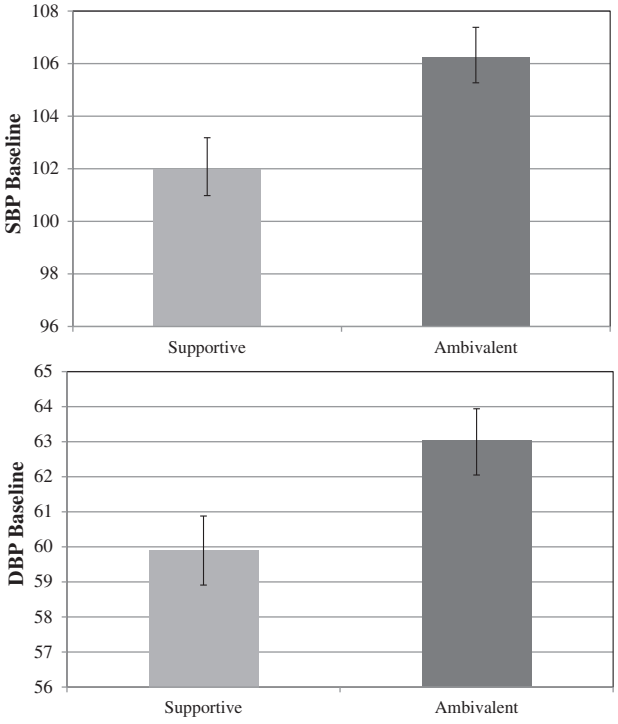

Fig. 1. Baseline blood pressure according to relationship type.