



Social support and prolonged cardiovascular reactivity: The moderating influence of relationship quality and type of support



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ABSTRACT

The present study investigated the moderating influence of relationship quality on the cardiovascular effects of social support during anticipation of, performance of, and recovery from an evaluative speaking task. Additionally, the generalizability of effects across different types of support was addressed. Sixty normotensive female students were assigned to one of the five support conditions: active verbal support provided by either a supportive or ambivalent friend, mental activation of either a supportive or ambivalent friend, no support. Active support by an ambivalent friend was found to elicit higher magnitude increases in systolic blood pressure (SBP) across all stressor phases. A detrimental influence of mental activation of ambivalent ties on SBP reactivity was observed during speech performance, only. Effects of ambivalence did not extend to experienced emotions and cognitive appraisals. The present findings extend previous research by indicating that interactions with ambivalent ties might be an important determinant of sustained cardiovascular activity.

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1. Introduction

Reviews of prospective epidemiological research have provided convincing evidence for a relationship between social support and lower risk of cardiac and all-cause morbidity and mortality (e.g. Barth, Schneider, & von Kanel, 2010; Holt-Lunstad, Smith, & Layton, 2010). Research on potential mechanisms linking social support to physical health has emphasized the importance of biological pathways with a special focus on the cardiovascular system (for a review see Uchino, Carlisle, Birmingham, & Vaughn, 2011). The most influential theoretical perspective in this field has been the stress-buffering hypothesis (Cohen & Wills, 1985), which assumes that perceived and/or received support may alleviate the psychophysiological impact of stressful events. Empirical evaluations of this hypothesis in the context of laboratory stress paradigms suggest that the presence of supportive others (Allen, Blascovich, & Mendes, 2002; Christenfeld et al., 1997; Christian & Stoney, 2006; Fontana, Diegnan, Villeneuve, & Lepore, 1999; Gerin, Milner, Chwala, & Pickering, 1995; Glynn, Christenfeld, & Gerin, 1999; Kamarck, Manuck, & Jennings, 1990; Lepore, 1995; Lepore, Mata Allen, & Evans, 1993; Phillips, Carroll, Hunt, & Der, 2006; Phillips, Gallagher, & Carroll, 2009), or mental activation of supportive ties

through structured writing (Ratnasingam & Bishop, 2007; Smith, Ruiz, & Uchino, 2004; van Well & Kolk, 2008) may attenuate cardiovascular reactivity (CVR) during stressor exposure. With few exceptions (Allen et al., 2002; Gerin et al., 1995; Lepore, 1995; Smith et al., 2004), the stress buffering effects did not extend to self-reports of distress emotions and cognitive task appraisals.

Several studies have failed to replicate the buffering effects of social support on physiological stress responses. Some observed no difference in the cardiovascular responses of supported vs. unsupported individuals (e.g. Anthony & O'Brien, 1999; Creaven & Hughes, 2012; Taylor et al., 2010), others found the presence of supportive others to augment stress-related reactivity (Allen et al., 2002; Ciosa Leon, Nouven, & Sheffield, 2007; Gramer, 2002; Gramer & Reitbauer, 2010; Hilmert, Christenfeld, & Kulik, 2002; Kamarck, Peterman, & Raynor, 1998; Phillips et al., 2009). These discrepant results have either been attributed to the evaluation potential of support providers (Allen et al., 2002; Phillips et al., 2009) or to enhanced task-related effort resulting from a beneficial effect of social support on self-efficacy and motivation (Gramer & Reitbauer, 2010; Hilmert et al., 2002; Kamarck et al., 1998). In this respect, it has to be noted that psychophysiological theories (Obst, 1981; Wright & Kirby, 2001) have provided convincing evidence that sympathetically mediated cardiovascular effects in evaluative performance situations might partly be the result of effort and task engagement. More specifically, effort in demanding performance situations was found to be proportional to experienced task

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difficulty as long as success is perceived as possible and worthwhile. In situations exceeding perceived coping ability attenuated cardiac reactivity or inhibited coping might be observed. Drawing from this “energization” (Brehm & Self, 1989) concept, social support might reduce effort and task engagement by lowering perceived demand or enhancing feelings of control (Schnall, Harber, Stefanucci, & Proffitt, 2008), it might also motivate to further increase effort in highly taxing conditions and thus elicit heightened reactivity (Gramer & Reitbauer, 2010). According to Bolger and Amarel (2007), received support may also communicate a sense of inefficacy to recipients which may enhance perceived demand and lead to heightened cardiovascular reactivity as long as success is perceived as possible. However, it might also lead to abandonment of effort and reduced reactivity. Thus, reduced physiological reactivity may not consistently indicate a stress-buffering effect of social support.

Recent research has identified relationship quality as an important moderator of social support effects on physiological reactivity. This domain has adopted a conceptual framework in which positivity and negativity within relationships represent distinct, separable dimensions (Uchino, Holt-Lunstad, & Uno, 2001). Thus, individuals in one’s social network can be sources of positivity (supportive ties), negativity (aversive ties), a source of both positivity and negativity (ambivalent ties), or may involve low intensity on both relationship dimensions (indifferent ties). Several studies found direct social interactions with ambivalent ties, or subliminal priming with this relationship type, to elicit markedly greater elevations in systolic blood pressure (SBP; Birmingham, Uchino, Smith, Light, & Sanbonmatsu, 2009; Holt-Lunstad, Uchino, Smith, & Hicks, 2007; Reblin, Uchino, & Smith, 2010), cardiac output (CO; Uno, Uchino, & Smith, 2002), or heart rate (HR, Carlisle et al., 2012), relative to supportive ties. The psychological mechanisms driving this heightened reactivity are largely unknown. None of the studies observed a mediating influence of cognitive appraisals or affective arousal. However, findings by Holt-Lunstad et al. (2007) suggest that a history of prior negative experiences might contribute to physiological reactivity, independent of actual interaction quality. These experiences might be spontaneously activated without people’s awareness (Ferguson & Bargh, 2004) and undermine self-efficacy or increase uncertainty in performance situations resulting in greater effort mobilization. The observed effects of ambivalent ties on SBP, HR, and CO indicate heightened cardiac activity (Manuck, 1994) and, therefore, appear consistent with an effort interpretation. In this respect, it should also be noted that most studies on the comparative effects of ambivalent vs. supportive ties did not include a no-support control condition. Thus, heightened reactivity to ambivalent ties might also reflect reduced efficacy of support (Uchino, 2009) and not necessarily undermining of self-efficacy.

To date, no study has evaluated the relative impact of ambivalent ties by directly comparing the effects of actual support transactions with the effects of mental activation of relationship schemas. Prior research on this issue focused on supportive ties and found active verbal support as effective as mental activation of support (Gramer & Reitbauer, 2010), whereas passive support (silent presence of a supportive tie) proved less effective, compared to mental activation (van Well & Kolk, 2008). These studies utilized a supraliminal prime in the form of writing about a specific supportive tie. There is some indication that structured recall of ambivalent relationships may not necessarily have detrimental effects because individuals might focus on the positive qualities of these relationships (Bloor, Uchino, Hicks, & Smith, 2004). A main purpose of the present study was to further evaluate the generalizability of the cardiovascular effects of ambivalent and supportive ties across different conceptualizations of support. The design comprised an active verbal support condition (the presence of a supportive or ambivalent companion offering positive feedback and reassurance), a mental activation of

relationships condition (thinking and writing about a supportive or ambivalent tie), and a no support condition (unaccompanied performance). Mental activation of casual acquaintances was included to control for potential distraction effects of support schema activation (e.g. Gramer & Reitbauer, 2010; Smith et al., 2004).

Proposals on the etiological significance of heightened cardiac activity suggest that acute cardiac effects during stressor exposure that are followed by swift recovery might be of minor importance, whereas physiological activity that is sustained after stressor exposure, or already present in anticipation of the demand, may carry disease risk (e.g. Dienstbier, 1989; Gerin et al., 2012). Research on the moderating influence of relationship quality has paid relatively little attention to periods of prolonged stressor exposure. No study has attended to stressor anticipation. One study has included stressor recovery, but it observed no effect of relationship quality (Birmingham et al., 2009). However, this study evaluated the effects of experimenter positivity/negativity and results may not generalize to long lasting close relationships. The perseverative cognition model (Brosschot, Gerin, & Thayer, 2006) attributes prolonged stress responses to anticipatory worrying and post-task rumination, and Uchino et al. (2001) suggested that the unpredictability of ambivalent ties may increase ruminative thinking. To provide further data on the issue of prolonged activity, the present study evaluated the impact of relationship quality during anticipation of, exposure to, and recovery from an evaluative performance situation: a speaking task requiring persuasive behavior. Additionally, the potential mediating influence of perseverative cognition during anticipation and recovery was investigated.

Drawing from theoretical contributions on determinants of cardiovascular responses in active performance situations (Obrist, 1981; Wright & Kirby, 2001) and available empirical evidence on the cardiovascular effects of ambivalent and supportive ties, support manipulations were expected to primarily influence task engagement and cardiac activity. In agreement with the stress-buffering hypothesis (Cohen & Wills, 1985), supportive ties might reduce perceived demand and effort-related cardiac activity resulting in lower SBP and/or HR effects, compared to unsupported individuals, whereas conflict in relationships may impair efficacy of support (Uchino, 2009) or may lower self-efficacy (Bolger & Amarel, 2007). Thus, individuals supported by ambivalent ties may either not differ from unsupported individuals or may show enhanced effort and cardiac activity due to higher perceived demand. Stressor anticipation and recovery were found to be characterized by vascular activity, indicated by elevations in peripheral resistance (TPR) and blood pressure (BP), but not CO and HR, a response pattern that may indicate passive experience of stress (Gregg, James, Matyas, & Thorsteinsson, 1999; Ottaviani, Shapiro, Goldstein, & Mills, 2007). Accordingly, BP was expected to be more likely to show effects of support manipulations during prolonged stressor exposure than HR. It should be noted, though, that anticipatory responses have also been considered a component of preparatory mobilization of resources (Obrist, 1981). Thus, effects on HR could not be excluded for stressor anticipation.

2. Method

2.1. Participants

Sixty normotensive female students participated in exchange for course credit and/or information on their blood pressure. Female participants were chosen because of an imbalanced gender distribution within the sampling population, and previous studies on the effects of relationship quality had reported no gender differences (Holt-Lunstad et al., 2007). Participants were recruited using the University’s Web-based experiment scheduling system and flyers posted throughout the campus. They ranged in age from 18 to 30 years ($M = 23.35$; $SD = 2.70$). Exclusion criteria included a BMI > 29, a hypertensive status, and use of medications that may influence CVR or may indicate psychological disorders. Participants were randomly assigned to one of the five support conditions: active verbal support provided by either a

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