



The implicit affiliation motive moderates cortisol responses to acute psychosocial stress in high school students



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Received 24 February 2014; received in revised form 17 June 2014; accepted 17 June 2014

KEYWORDS

Cortisol;
Affiliation motive;
Psychosocial stress;
Physical stress;
Adolescents;
School

Summary It has been previously shown that the implicit affiliation motive – the need to establish and maintain friendly relationships with others – leads to chronic health benefits. The underlying assumption for the present research was that the implicit affiliation motive also moderates the salivary cortisol response to acute psychological stress when some aspects of social evaluation and uncontrollability are involved. By contrast we did not expect similar effects in response to exercise as a physical stressor. Fifty-nine high school students aged $M = 14.8$ years were randomly assigned to a psychosocial stress (publishing the results of an intelligence test performed), a physical stress (exercise intensity of 65–75% of HR_{max}), and a control condition (normal school lesson) each lasting 15 min. Participants' affiliation motives were assessed using the Operant Motive Test and salivary cortisol samples were taken pre and post stressor. We found that the strength of the affiliation motive negatively predicted cortisol reactions to acute psychosocial but not to physical stress when compared to a control group. The results suggest that the affiliation motive buffers the effect of acute psychosocial stress on the HPA axis.

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1. Introduction

Both, psychosocial and physical stress affects the activity of the hypothalamic–pituitary–adrenal (HPA) axis resulting in an increased release of cortisol. For chronically increased activity of the HPA axis several negative effects have been found including for example impairment of health (Dickerson and Kemeny, 2004). Researchers in the field are highly interested in individual difference variables that moderate the cortisol response to psychological and physical stress (Kudielka et al., 2009). Past research suggested age, gender, smoking, coffee, or alcohol consumption as moderators of the cortisol response to stress (Kudielka et al., 2009). However, less research focused on moderating personality variables.

One important moderating personality variable is the implicit affiliation motive (need for affiliation, *nAff*). The implicit affiliation motive is defined as the need to establish or maintain friendly, warm, and close interpersonal relationships (Murray, 1938; Atkinson et al., 1954; McAdams, 1980; McAdams and Constantian, 1983). Characteristics of the implicit affiliation motive are that it energizes behavior toward actively pursuing affiliative goals, it orients a person toward affiliative cues and it makes a person learn better (e.g., social networks) what is needed to reach an affiliation goal (Biernat, 1989; Koestner and McClelland, 1992). Baumeister and Leary (1995) suggest that the need to belong is a universal drive for frequent, affectively pleasant, stable and enduring relationships with others which includes concern for each other's welfare (p. 498). It is also suggested that this need for affiliation has an evolutionary base because of its benefits for reproduction and survival (e.g., care for offspring, food, hunting, protection) (Axelrod and Hamilton, 1981; Ainsworth, 1989). For this reason it is evolutionarily functional that the satisfaction of the affiliation motive has positive affective consequences and the dissatisfaction results in negative affect states (McClelland, 1985; McAdams and Bryant, 1987; Baumeister and Leary, 1995; Schöler et al., 2008). In addition to these emotional consequences, the implicit affiliation motive also possesses the qualities of a fundamental human need because it elicits goal-oriented behavior directed at satisfying the affiliation motive (Boyatzis, 1973) and has been linked to a variety of social behaviors (Lansing and Heyns, 1959; Exline, 1962; McAdams and Constantian, 1983).

The affiliation motive has been associated with chronic health benefits including, for example, decreased diastolic blood pressure (McClelland, 1979), increased immune function and decreased susceptibility to disease (Jemmott et al., 1990), fewer reported severity of illnesses (Mehta and Josephs, 2010) and a more positive perception of a neutral social interaction leading to increased well-being (Kordik et al., 2012). Other authors additionally focused on whether the implicit affiliation motive is also reflected in self-reports of personal affiliation values and goals (Brunstein et al., 1995; Schöler et al., 2008). They found that a congruence between self-reports of affiliation strivings and the implicit affiliation motive affected well-being positively. Moreover, different behavior associated with a dispositional need for affiliation (e.g., social interaction and support) has been previously shown to lead to protective health effects including decreased cortisol levels in research with primates

(Abbott et al., 2003) and humans alike (Thorsteinsson and James, 1999; Heinrichs et al., 2003). The latter research studies suggested that social affiliation and integration in a social group render situations that involve social evaluation less threatening and more controllable. Summing up, the dispositional desire to belong has several stress-reducing and therewith health-enhancing effects.

In previous studies it has not been tested whether the dispositional need for affiliation also results in a stress reducing effect without actually experiencing social interaction. Thus the aim of the present study was to test whether the implicit affiliation motive as an individual difference variable moderates the individual's cortisol response to acute psychosocial stress. To aim this we compared the cortisol response to psychosocial stress with the response to physical stress – another typical stressor found in school – and to a control condition. To our knowledge, the stress-reducing effect of the implicit affiliation motive has not yet been reported in an adolescent sample.

2. Materials and methods

2.1. Study design and data collection

Participants filled in the implicit affiliation motive measure and completed questionnaires on sociodemographic variables before they participated in the test. Students were then randomly assigned to one of the three experimental groups. In the psychosocial stress group (PSY, $n = 19$, female: 12) participants worked on verbal and mathematical tasks of an intelligence test (HAWIK-IV; Petermann and Petermann, 2006) for 15 min. In order to induce psychosocial stress, students were told before they started working on the tasks that their IQ score would be made public at the end of the session. The tasks in the intelligence test exceeded all students' capability. The psychosocial stressor thus involved an aspect of social evaluation by peers and the experimenter as well as an achievement aspect because students assumed they could perform well or poorly. In the physical stress group (PHYS, $n = 18$, female: 9) participants had to run in a noncompetitive mode at a moderate exercise intensity of 65–75% of their individual HR_{max} for 15 min. The control group (CON, $n = 23$, female: 11) took part in a teacher-centered lesson for the same amount of time. Salivary cortisol samples were taken before (pre) and after (post) being exposed to the stressor. Participants were told not to eat and drink 1 h before the testing took place.

2.2. Study group

Fifty-nine adolescents (32 female) aged $M = 14.8$ years ($SD = 0.5$) from a high school in Berlin, Germany, participated in the study. Participants and their parents signed an informed consent form prior to participation. The present study was approved by the relevant ethics committee of the German Psychological Society (DGPs) and performed in accordance with the declaration of Helsinki. Exclusion criteria for the study were: dyslexia (verified by teachers' statements), obesity, physical or mental impairments, and the use of psychoactive substances (e.g. Ritalin). Findings of this study, but not related to the affiliation motive were

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