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Correlation between self-esteem and stress response in Chinese college students: The mediating role of the need for social approval

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ABSTRACT

Interpersonal theories of self-esteem assume that the importance that others place on oneself contributes to individual levels of self-esteem. Recent studies further suggest a possible link between self-esteem and the endocrine stress response, mediated through individual levels of locus of control, without taking levels of social approval into account. The present set of studies aimed to explore the correlation between self-esteem and stress response in Chinese students, and simultaneously take into account the possible mediating role of internal locus of control and need for social approval. In study one, twenty-eight college students' heart rates and saliva samples were collected while they underwent the Trier Social Stress Test (TSST). Their self-esteem scores were assessed using the Rosenberg self-esteem scale. Results showed a positive correlation between self-esteem and their endocrine stress responses to the TSST. In study two, forty-one college students' heart rates were collected while they underwent the TSST. Their locus of control scores were assessed by the Internality, Powerful Others, and Chance Scale, and their social approval scores were assessed by the Marlowe–Crowne Social Desirability Scale. Results indicated a significant positive correlation between self-esteem and heart rate changes during the TSST, with a mediating role of the need for social approval in the association between self-esteem and heart rate stress responses. We speculate that cultural differences may moderate the association between self-esteem and stress response.

1. Introduction

Previous psychoneuroendocrinological studies have consistently reported a role of self-esteem in the perception and processing of stress (Kirschbaum et al., 1995; Pruessner, Hellhammer, & Kirschbaum, 1999; Pruessner et al., 2005). In one such study, the association between self-esteem and free cortisol stress response with regard to experimentally induced success or failure was investigated. Results showed a significant negative correlation between the free cortisol response to this stress task and self-esteem in the failure condition (Pruessner et al., 1999). In another study, 20 healthy male subjects were exposed five times to an identical stressor (the Trier social stress test; TSST), a task designed to induce moderate psychosocial stress in a laboratory setting through a combination of public speaking and mental arithmetic. Interestingly, about one third of the tested population displayed large increases to each of the five experimental treatments instead of habituating to the repeated stress exposure. Psychometric analysis suggested that low self-esteem was the best predictor of a lack of habituation of the cortisol response to repeated stress exposure (Kirschbaum et al., 1995). In another study with young subjects, low self-esteem again predicted a higher cortisol stress response when subjects were exposed to the Montreal Imaging Stress Task (MIST), a combination of social evaluative and mentally challenging tasks (Pruessner et al., 2005). Low self-esteem has further been shown to be associated with greater cortisol reactivity in a rejection stress task (Ford & Collins, 2010).

One possible biological mechanism underlying this association involves appraisal theories. Since self-esteem and internal locus of control are usually highly correlated, it has been postulated that in the evaluation of whether a given situation is perceived as stressful, self-esteem and internal locus of control systematically interact with situational factors (Pruessner, 2009). Low self-esteem

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individuals attribute little importance to oneself, and speculate that they have little impact on the outcome of their actions, thus finding more situations uncontrollable and unpredictable, and consequently will be evaluating more situations as stressful. Conversely, high self-esteem individuals tends to be strongly associated with internal locus of control, or the confident perception that one's outcomes are determined by one's actions; therefore, they would not interpret the same situations as stressful as low self-esteem individuals do (Pruessner, 2009).

Although traditional *intrapersonal* theorists have conceptualized self-esteem as a person's private self-evaluation of one's goodness or worth (MacDonald, Saltzman, & leary, 2003), *interpersonal* theories of self-esteem suggest that people's thoughts and feelings about themselves reflect, in part, how they believe they are perceived and evaluated by others (Leary, Haupt, Strausser, & Chokel, 1998; Leary, Tambor, Terdal, & Downs, 1995). For example, according to sociometer theory, others' reactions have such a strong effect on self-esteem because the self-esteem system itself is a subjective monitor or gauge of the degree to which the individual is being accepted and rejected by other people (Leary, 1999; Leary & Baumeister, 2000).

Another factor that would affect the form and sources of self-esteem is cultural difference (Luk & Bond, 1992). Over the past decades, it has been suggested that the construct of individualism–collectivism may be reflected in self-esteem (Tafarodi & Swann, 1996). Basis of self-esteem in the individualistic culture is the ability to express the self and to validate internal attributes, whereas in the collectivistic culture it is the ability to adjust, to restrain the self, and to maintain harmony with social context (Markus & Kitayama, 1991). Self-esteem for those in individualistic cultures depends on one's abilities, attributes, and achievements, whereas for those in collectivistic culture, it may be the more public aspects of the self, like one's significant social roles, status, and important interpersonal relations, that would be focal in self-esteem maintenance (Markus & Kitayama, 1991).

With regard to the possible link between self-esteem and the endocrine stress response, previous studies focused on individual levels of locus of control, however, without taking levels of social approval into account. In the current manuscript, the standardized TSST was used to examine the correlation between self-esteem and stress response in Chinese students in one study, and to examine the mediating role for either internal locus of control and/or need for social approval simultaneously in a second study. On one hand, people's self-esteem largely depends on one's social roles in collectivistic culture and in Chinese context, people are seeing oneself as part of an encompassing social relationship and they are recognizing that one's behavior is determined and to a large extent organized by the thoughts, feelings, and actions of others in the relationship (Markus & Kitayama, 1991); on the other hand, social evaluative threat is prominent throughout the TSST (Dickerson & Kemeny, 2004). Therefore, we hypothesized that self-esteem and the need for social approval would interact with situational factors in the evaluation of whether a given situation is perceived as stressful. In a collectivistic culture, specifically in the Chinese context in the current study, high self-esteem individuals attribute a lot of importance to social approval, thus we speculated that they would focus on social desirability when regarding outcome of their actions. Thus, we hypothesized that these individuals would evaluate situations more stressful when they find that the situation is a threat to their needs of social approval. Conversely, low self-esteem tends to be weakly associated with social approval, or the confident perception that one's outcomes are determined by one's evaluation; therefore, we speculated that low self-esteem individuals would not interpret the psychosocial stressor to be as stressful as high self-esteem individuals.

2. Study 1

2.1. Methods

2.1.1. Participants

Thirty healthy University students were recruited by posting flyers at local university buildings and through an advertisement on a website. Upon initial contact, a telephone interview was conducted to establish eligibility for the study through assessment of medical history, and obtain demographic information in case of recruitment. Exclusion criteria consisted of past or current depression, current infections as well as current medication treatment. Two participants were excluded because of their high scores on the Beck Depression Inventory (Beck, 1967), which resulted in a final dataset of 28 students (15 male, mean age 21.04 ± 1.43). All women were free cycling, and were tested during their follicular phase of their menstrual cycle (confirmed by oral reports). All participants refrained from smoking, eating, drinking alcoholic beverages, and physical exercise at least 1 h prior to testing. After participants were given a complete explanation of the study, written informed consent was obtained. Participants were paid for their participation.

2.1.2. Measures

2.1.2.1. Questionnaire. Participants completed the Rosenberg self-esteem scale (RSE), a questionnaire that assesses a person's overall evaluation of his or her self-worth (Rosenberg, 1965). The RSE is made up of 10 items such as 'On the whole, I am satisfied with myself' or 'I feel I do not have much to be proud of' and is coded on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree), with the negative items needing to be reverse scored. Cronbach's α of this scale for the present sample was 0.769.

2.1.2.2. Endocrine measurement. Saliva samples were taken via salivette sampling device (SARSTEDT, Germany) throughout the experiment in order to assess levels of cortisol. These samples included two samples before the preparation period (baseline, pre-preparation), one before the speech and arithmetic task (pre-TSST), and six following the TSST (post-TSST, 10, 20, 30, 40, 50 min). All cortisol samples were stored in a −20 °C freezer until subsequent analyses. Cortisol measures were established by using a time-resolved fluorescence immunoassay. Intra- and inter- assay variability were less than 10% and 12%, respectively.

2.1.2.3. Heart rate measurement. Heart rate was monitored continuously employing a wireless signal transmission device (Spirit, Netherlands). The sensor is placed on the middle finger of participants' non-dominant hand. Heart rates were averaged across 1 min intervals.

2.1.3. Procedure

Participants were exposed to the TSST between 14:30 and 17:00. During the TSST, participants had to give a speech and performed serial subtractions in front of a committee, usually for a total of about 10 min (Kirschbaum, Pirke, & Hellhammer, 1993). The committee consisted of two persons of the opposite sex, who maintained a neutral facial expression throughout the subject's presentation. During the speech, participants were asked to give a mock job interview and to convince the committee that they were the perfect applicant for the vacant position. During the serial subtraction, participants were asked to serially subtract the number 13 from 13,497 as fast and as accurately as possible. Upon committing an error, participants had to restart at 13,497.