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Implicit need for achievement predicts attenuated cortisol responses to difficult tasks

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ABSTRACT

The present research tested the hypothesis that the implicit need for achievement (n Achievement) predicts attenuated cortisol (C) responses to difficult tasks, because it represents a propensity to view difficulty as a cue to mastery reward. In two studies, n Achievement was assessed through content-coding of imaginative stories and salivary C was assessed both at baseline and post-task. In Study 1 (N = 108 US students), n Achievement predicted an attenuated C response to a one-on-one competition in the laboratory, regardless of whether participants won or lost. In Study 2 (N = 62 German students), n Achievement predicted an attenuated C response to the Trier Social Stress Test (Kirschbaum, Pirke, & Hellhammer, 1993), but not to a non-stressful control task. In Study 2 only, the attenuating effect of n Achievement was moderated by gender, with only men showing the effect. Across both studies, the average effect size of the association between n Achievement and C responses to difficult tasks was r = –.28. These findings point to a role of n Achievement in emotion regulation.

1. Introduction

A growing literature documents that implicit motives, that is, nonconsciously operating affective preferences for specific classes of incentives (McClelland, Koestner, & Weinberger, 1989; Schultheiss, 2008), are closely associated with the release of hormones from the hypothalamic–pituitary–adrenal (HPA) and the hypothalamic–pituitary–gonadal (HPG) axes (for an overview, see Schultheiss, 2013). For instance, the need for power (or n Power), a preference for having impact on others (Winter, 1992), is associated with basal levels of testosterone in men and estradiol in women and predicts changes in these hormones in response to experimental variations in dominance victory and defeat (Stanton & Schultheiss, 2009). The need for affiliation (n Affiliation), a preference for establishing, maintaining, or restoring close, friendly relationships with others (Koestner & McClelland, 1992), is reciprocally associated with the release of progesterone (Schultheiss, Wirth, & Stanton, 2004; Wirth & Schultheiss, 2006). However, so far comparatively little is known about the hormonal correlates of the need for achievement (n Achievement), a preference for doing things better and surpassing standards of excellence (McClelland & Koestner, 1992). In the present research, we explore the notion that this motive has a damping effect on HPA activation in response to challenging tasks under conditions of competition (Study 1) and public speaking (Study 2).

1.1. n Achievement: Measurement and concept

n Achievement is assessed with the picture-story exercise (PSE; McClelland et al., 1989), a descendant of Morgan and Murray's (1935) Thematic Apperception Task. PSE measurement of n Achievement is based on causal validation studies (see Borsboom, Mellenbergh, & van Heerden, 2004; McClelland, 1958) in which achievement motivation was experimentally aroused in a group of participants by having them work on personally challenging tasks. Control participants worked on the same tasks under neutral conditions. All participants then wrote stories about the same set of picture cues, which depicted a variety of achievement-related situations. Researchers found that arousal- and control-group participants' stories systematically differed in their content, with the former writing more frequently than the latter about long-term goals, unique accomplishment, or competing with a standard of excellence. These differences were distilled into coding manuals, allowing researchers in subsequent studies to assess dispositional differences in the spontaneous occurrence of achievement-related thoughts (McClelland, Atkinson, Clark, & Lowell, 1953; for replications, see Haber & Alpert, 1958; Klinger, 1967; Pang, 2010; Schroth, 1987). Thus, the PSE measure of n Achievement presents a window into the process of how individuals automatically construe challenging, achievement-related situations. It has little overlap with questionnaire measures of the self-attributed need to achieve, that

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is, of how people *think* they typically behave when faced with challenging tasks (Spangler's, 1992, meta-analysis yielded an average correlation of .09 between both types of measures) – hence the term *implicit*.

A large body of literature built on the PSE measure of n Achievement documents that individuals high in n Achievement respond to difficulty and challenge in a different manner than individuals low in n Achievement (for recent reviews, see Pang, 2010; Schultheiss & Brunstein, 2005). The former are more likely than the latter to choose challenging goals (i.e., goals with only a moderate chance of success), to persist on such goals, and to increase their efforts when receiving negative performance feedback (e.g., Brunstein & Maier, 2005; see McClelland, 1987, for a review). Their mastery-oriented approach to challenges also makes achievement-motivated individuals more likely to come up with innovative problem solutions and to succeed in business contexts (McClelland, 1961). High-achievement individuals' propensity for seeking and mastering challenges has been traced back to childhood socialization practices that emphasize and reward autonomous mastery of age-appropriate tasks (reviewed in Schultheiss & Brunstein, 2005).

Summarizing theory and research on n Achievement, Schultheiss and Brunstein (2005) have characterized the mindset of the achievement-motivated person as follows:

> "[...] deviations from expectation, or moderate uncertainty when tackling a task, is the cue which through previous learning has become associated with the positive affect of mastery and regaining certainty and control at a higher level of complexity or quality. This knowledge (which is emotional, not declarative) inoculates achievement-motivated individuals against the initial frustrations of working on a challenging task and turns the challenge into an opportunity for reward: *per aspera ad astra*, through hardship to new heights [...]" (p. 44, italics in original).

This suggests that achievement-motivated individuals view difficult tasks as challenges that hold the promise of reward rather than as threats of impending failure. Thus, a person high in n Achievement should view a difficult task as less stressful and more manageable than a person low in n Achievement would (see also Lazarus & Folkman, 1984).

There is some direct evidence that high n Achievement is associated with a positive view of difficulty and an active-coping approach. An experimental study by Reeve, Olson, and Cole (1987; Study 2), in which participants competed against another person on a challenging puzzle task and the outcome (win, lose) was varied experimentally, revealed that high n Achievement predicted higher expectancy to succeed, greater felt importance of the task, and, regardless of winning or losing, greater positive affect after the competition and better actual and perceived performance. A study by Engeser and Rheinberg (2008) shows that individuals high in n Achievement experience flow to a greater extent than individuals low in n Achievement when confronted with moderately difficult tasks (see also Baumann & Scheffer, 2010, 2011, for replications of this finding with a novel measure of n Achievement). These findings are consistent with McClelland et al's (1953) original observation that, if given the choice, individuals high in n Achievement prefer challenging tasks, whereas individuals low in n Achievement avoid them.

1.2. The current research

In the present research, we explored whether the differences between individuals high or low in n Achievement in dealing with difficult tasks also extends to HPA responses. We proceeded on the notion that difficult tasks are only stressful if the individual feels overtaxed and fails to view them as manageable – in other words, if he or she responds to them like a low-n Achievement person would. Under these circumstances, an increase in the release of cortisol (C) through the HPA axis is part of the typical physiological stress response (Sapolsky, 2002). Elevated C helps to make and keep glucose available for the muscles and other systems required to deal with the stressor, particularly if the individual's capability of effectively dealing with the stressor is uncertain and the resulting energy demand may be protracted. If, on the other hand, an individual is high in n Achievement and views a difficult task as manageable or even attractive, because it promises the experience of mastery, the task should not represent a stressor and C should therefore not be elevated.

We tested this hypothesis in two experimental studies that featured demanding tasks whose outcome was uncertain. In Study 1, we examined how US students differing in their n Achievement levels respond to experimentally manipulated victory or defeat in a face-to-face competition against another participant. Competitions, be they real or staged in the laboratory, frequently elicit anticipatory and reactive C increases (e.g., Kivlighan, Granger, & Booth, 2005; Passelergue & Lac, 1999), which, along with the uncertainty of the outcome, suggests that they represent difficult, stressful tasks for participants on average. In Study 2, we examined whether adult Germans' n Achievement moderates their responses to the Trier Social Stress Test (TSST, Kirschbaum et al., 1993; for meta-analyses, see Campbell & Ehlert, 2012; Dickerson & Kemeny, 2004), a well-established psychosocial stressor that causes a robust activation of the HPA axis, relative to a non-stressful control task. In both studies, n Achievement was assessed with the PSE at the beginning of the testing session and C was assessed in saliva before and after the critical task. This allowed us to examine the role of n Achievement in C changes in response to difficult tasks.

2. Study 1: n Achievement and cortisol responses to a competition

In the first study, we analyzed data from a study originally conducted to test effects of n Power and victory and defeat in a one-on-one competition on HPG and HPA responses (Stanton & Schultheiss, 2007; Wirth, Welsh, & Schultheiss, 2006, Study 2) for predictive effects of n Achievement on post-competition C changes. Based on the previously reviewed findings by Reeve et al. (1987, Study 2), who failed to find a moderating effect of competition outcome on n Achievement-associated affect and performance, we expected n Achievement to predict C changes among competition winners and losers in a similar way. More specifically, we hypothesized that individuals high in n Achievement would show a smaller C response to the contest situation than individuals low in n Achievement.

2.1. Method

2.1.1. Participants

Undergraduate students ($N = 116$, aged $M = 20$ years) from the University of Michigan participated in same-sex pairs. Paired participants were not previously acquainted with one another. Psychology majors were not admitted to the study. Five participants had missing hormone and/or motive data and were discarded from further analyses. Three had previously participated in a similar study with false contest feedback and were excluded, too. The remaining sample consisted of 108 participants (53 women, 14 of them on birth-control pills). Participants had refrained from eating and oral hygiene for at least 1 h prior to the start of the study. Sessions were scheduled to start between 10:30 am and 4:30 pm, with a duration of 2.5 h. Participants were paid a total of $35 for