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You can't always remember what you want: The role of cortisol in self-ascription of assigned goals

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ABSTRACT

Past work indicates that persistent stress leads people to misremember assigned tasks as self-selected, a phenomenon known as self-infiltration [Baumann, N., & Kuhl, J. (2003). Self-infiltration: Confusing assigned tasks as self-selected in memory. *Personality and Social Psychology Bulletin, 29*, 487–497; Kazén, M., Baumann, N., & Kuhl, J. (2003). Self-infiltration vs. self-compatibility checking in dealing with unattractive tasks and unpleasant items: The moderating influence of state vs. action-orientation. *Motivation & Emotion, 27*, 157–197; Kuhl, J., & Kazén, M. (1994). Self-discrimination and memory: State orientation and false-self-ascription of assigned activities. *Journal of Personality & Social Psychology, 66*, 1103–1115]. The present research examined the link between self-infiltration and cortisol, a well-established stress hormone. Participants selected simple office tasks for later enactment and were assigned to do an additional set of office tasks by an instructor. After an 8-min stress induction, participants were unexpectedly asked to recognize which tasks were self-selected or assigned. Cortisol was assessed before and after the stress induction. As expected, self-infiltration was predicted both by pre- and by post-manipulation cortisol levels. These results point to some of the neuroendocrine functions that underlie the self.

1. Introduction

Several years ago, one of the authors of this article knew a young man who was destined by his parents to run the family business, a large manufacturing company. After completing his studies, the young man started to work in the family company, convinced that he himself chose this profession. However, within a few months' time, the young man became burned out in his job. After a year of soul-searching, the young man decided to try his luck elsewhere, and began a successful career in acting.

Conflicts between personal desires and the demands of social environment are an inevitable aspect of social life. People are often acutely aware of these conflicts but may nevertheless adapt their goals to external demands, or "introject" imposed goals (Deci & Ryan, 2002). At times, however, individuals may lose sight of the precise origins of their goals and consider it freely chosen, even when the goal in question is not fully integrated into the self. The process whereby external goals, expectations, standards, and values become introjected into the self without the individual's awareness of the self-alien nature of the goal is known as *self-infiltration* (Kuhl & Kazén, 1994). Self-infiltration processes are of fundamental interest to social and personality psychologists, because they speak to the question how external demands become internalized (see Deci & Ryan, 2002; Moretti & Higgins, 1999). Moreover, self-infiltration is associated with reduced psychological well-being and poor physical health (Baumann, Kaschel, & Kuhl, 2005; Brunstein, Schultheiss, & Grässman, 1998). It is therefore important to improve our understanding of self-infiltration processes.

Our aim in the present research is to illuminate some of the neuroendocrine functions that underlie self-infiltration. In particular, we investigate the influence of cortisol release before and after a stress task on self-infiltration. Cortisol is one of the most widely investigated stress hormones (Dickerson & Kemeny, 2004). Because self-infiltration occurs especially under stress (Baumann & Kuhl, 2003; Kazén, Baumann, & Kuhl, 2003), we suspect that cortisol might be associated with self-infiltration. In the next paragraphs, we begin by reviewing previous work on self-infiltration. After this, we consider the theoretical rationale for linking cortisol to self-infiltration. Finally, we present a study that empirically addressed the association between cortisol release and self-infiltration.

The study of personal goals has traditionally relied heavily on self-report measures (e.g., Brunstein et al., 1998; Sheldon,

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Williams, & Joiner, 2003). Although self-report measures are an important source of information, they are less suitable to the study of self-infiltration processes. This is because self-infiltration by definition implies that individuals are confused about the true source of their goals. It is thus necessary to use indirect or implicit measures to investigate self-infiltration. Implicit measures avoid asking individuals directly about their psychological responses, and are increasingly used in social and personality psychology (Greenwald & Banaji, 1995; Koole & DeHart, 2007).

In a pioneering set of studies, Kuhl and Kazén (1994) developed an indirect method to assess self-infiltration processes, the so-called "self-discrimination task". In the self-discrimination task participants are asked to select a certain number of tasks from a list that are to be performed out later on in the experiment. In addition, participants are also assigned by the experimenter to perform certain tasks from the list. Finally, some tasks on the list are neither self-selected nor assigned. In an unexpected memory retrieval test, participants are later asked about the initial *source* of each task, whether it was self-selected, assigned, or neither. The rate of tasks that are self-ascribed but originally assigned by the experimenter is taken as an index of self-infiltration.

Kuhl and associates have theorized that self-infiltration is particularly likely to occur under persistent stress (Kuhl, 1992, 2000, 2001). The basic idea is that persistent stress blocks people's ability to retrieve integrated self-representations. In line with this reasoning, Kuhl and Kazén (1994) found in two experiments that individuals with an impaired ability to downregulate stressful affect, so-called "state-oriented" individuals (Kuhl & Beckmann, 1994), showed higher levels of self-infiltration than individuals who are efficient at down-regulating stressful affect, so-called "action-oriented" individuals. Baumann and Kuhl (2003) replicated and extended these findings, by showing that state-oriented individuals differ from action-oriented individuals in the level of self-infiltration only when stressful affect is high rather than low. This effect was found both for self-reported (Study 1) and experimentally induced (Study 2) stressful emotion. The stress-dependent nature of self-infiltration was replicated by Kazén et al. (2003) in two additional experiments.

Using the self-discrimination task, Kazén et al. (2003) showed that self-infiltration occurred for low attractive but not high attractive items. This finding supports the notion that the self-infiltration task does not tap into identification tendencies. Identification is an adaptive process whereby individuals integrate new goals into the self (Deci & Ryan, 2002). Identification processes operate especially when new goals are attractive to the person. Thus, if state-oriented individuals confuse assigned goals as self-selected because of their enhanced identification with assigned goals, one would expect state-oriented individuals to misremember assigned goals as self-selected more when the assigned goals are attractive as opposed to unattractive, after controlling for memory guessing. In fact, the opposite pattern occurred among state-oriented individuals. The self-discrimination task thus taps into introjection rather than identification processes.

To date, no study has yet directly investigated a possible relationship between self-infiltration and endocrine functioning. Nevertheless, Baumann et al. (2005) found suggestive evidence of such a relationship. Baumann, Kaschel, et al. measured self-infiltration indirectly, by assessing the congruency between goals and emotional needs. When people's goals do not match their emotional needs, they choose goals with low intrinsic value to the self. The presence of goal-need discrepancies is therefore a sign of self-infiltration processes. In line with this reasoning, Baumann, Kaschel, et al. found that goal-need discrepancies are enhanced under the same conditions as self-infiltration, i.e., among state-oriented individuals with high levels of stress. Notably, goal-need discrepancies were correlated with increases in physical symptoms (e.g., back and stomach aches). These findings are relevant to the present research, in that stress-contingent cortisol dysregulation contributes to the development and continuation of physical diseases (McEwen, 1998).

Cortisol is a glucocorticoid hormone released into the blood stream by the adrenal glands as a reaction to a cascade of transmitter processes involved in the hypothalamic–pituitary–adrenal (HPA) system (e.g., Lovallo & Thomas, 2000). Specifically, through hypothalamic release of corticotropin releasing hormone (CRH) which in turn stimulates the pituitary gland to release adrenocorticotropic hormone (ACTH). Finally, ACTH stimulates release of cortisol from the adrenal glands into the blood stream, which by itself down-regulates HPA system activation in a negative feedback loop. Activity of the HPA system increases in reaction to a broad spectrum of threats. A recent meta-analysis found that HPA system is strongly activated by stressors that threaten the social self, for instance, threats to social acceptance or self-esteem (Dickerson & Kemeny, 2004; Gruenewald, Kemeny, Aziz, & Fahey, 2004). The meta-analysis also found that the HPA system becomes activated in response to uncontrollable stressors (see also Biondi & Picardi, 1999; Mason, 1968), although this effect was smaller than that of social threat. For example, exposure to uncontrollable noise has been found to increase HPA activity (e.g., Bollini, Walker, Hamann, & Kestler, 2004).

Prolonged phases of negative affect can result in persistent cortisol dysregulation, which is in turn associated with a number of negative health outcomes. For example, cortisol dysregulation is associated with chronic stress, depressive symptoms, posttraumatic stress, reduced hippocampal volume, and psychosomatic diseases (e.g., Herman, Ostrander, Mueller, & Figueiredo, 2005; McEwen, 1998). Cortisol dysregulations have also been observed for individuals with personality traits such as low autonomy or self-esteem (e.g., Bollini et al., 2004; Pruessner et al., 2005) or high attachment anxiety (Quirin, Pruessner, & Kuhl, 2008).

The present research was designed to investigate the link between cortisol release and self-infiltration. Both self-infiltration and cortisol have been found to increase under stress. It therefore stands to reason that cortisol may be empirically associated with self-infiltration. Establishing an empirical association between self-infiltration and cortisol would substantiate the theoretical notion of the influence of stress (or negative affect) on self-infiltration and would give rise to a discussion on potential neuroendocrine underpinnings of self-infiltration, a topic that has remained unaddressed in previous research. Not least, the investigation of this relationship would add to the interdisciplinary field of research on the link between biological and psychological processes in general.

To assess self-infiltration, we used the self-discrimination task (Baumann & Kuhl, 2003; Baumann, Kuhl, & Kazén, 2005; Kazén et al., 2003; Kuhl & Kazén, 1994). Because high task attractiveness increases the probability that individuals identify with externally-assigned tasks with the consequence that goal introjection and goal identification may be confounded (cf. Baumann & Kuhl, 2003; Kazén et al., 2003), we confined the experiment to tasks that were judged as low attractive in previous studies. Using only *low*-attractive items, false-self-ascriptions of assigned goals can be attributed to self-infiltration rather than identification processes (Baumann & Kuhl, 2003; Kazén et al., 2003).

To stimulate HPA arousal, participants were exposed to uncontrollable startle noises that were repeatedly applied via headphone while they performed on a visual-classification task. Salivary cortisol was assessed at the beginning of the experiment as a baseline, as well as 25 min after the onset of stress induction. Additionally, we measured participants' negative moods before and after the stress manipulation to establish the extent to which our findings were mediated by subjectively experienced stress.