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The Effect of Hydrocortisone Administration on Intertemporal Choice*

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Abstract

Intertemporal choices — decisions involving trade-offs of outcomes at different points in time —are often made under stress. Stress activates the hypothalamic-pituitary-adrenal (HPA) axis, resulting in the release of corticosteroids. Recent studies provide evidence that corticosteroids can induce rapid non-genomic effects focused on immediate resolution of the stressful situation, followed by slower genomic effects focused on long-term recovery after stress. It remains unknown, however, how corticosteroids affect intertemporal choice. We randomly assigned healthy men to receive either 10 mg hydrocortisone or a placebo before measuring intertemporal choice. To target time-dependent effects, hydrocortisone was administered either 195 or 15 minutes before choice elicitation, while a placebo was administered at the other timepoint, in a double-blind design. Intertemporal choices were elicited by offering subjects decisions between small rewards available sooner vs. large rewards available later. We demonstrate a time-dependent effect of cortisol administration on intertemporal choice: when tested 15 minutes after hydrocortisone administration, subjects showed a strongly increased preference for the small, soon reward over the larger, delayed reward. In contrast, this effect was not found when testing occurred 195 minutes after hydrocortisone administration. Together, these results suggest that the physiological effects of acute, but not delayed, stress may increase temporal discounting.

Keywords: Intertemporal choice; hydrocortisone; laboratory experiment

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