**Appetite-Regulating Hormone Ghrelin Predicts Decision-Making in Healthy Controls but Not Individuals With Low-Weight Eating Disorders**

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**Background:** Ghrelin is an orexigenic hormone known to regulate appetite, glucose homeostasis, and other food-related functions. The potential role of ghrelin beyond energy homeostasis is not well understood. Ghrelin receptors are evident in the mesolimbic reward pathway, and preclinical research has shown that ghrelin administration increases impulsive behavior and choices in rats. However, little is known about whether and how ghrelin is associated with food-independent behavior and decision-making in humans. We investigated the relationship between ghrelin levels and monetary decision-making using a well-established behavioral paradigm in healthy individuals and individuals with a low-weight eating disorder (LWED), as patients with LWEDs have been shown to have high ghrelin levels and resistance to the effects of this hormone. We hypothesized that higher ghrelin levels would predict more impulsive choices of immediate rewards in healthy individuals, while this relationship would be less pronounced in individuals with LWEDs.

**Methods:** Sixty-four female participants with a LWED and 34 healthy controls (HC), aged 10-22 years, presented after a 10-hour fast to undergo a standardized mixed meal followed by a delay discounting task. During this task, participants decided between smaller immediate and larger delayed monetary rewards. Based on their choices, the delay discounting parameter k was calculated as a marker of choice preferences with higher values indicating a stronger preference for the immediate smaller reward. Blood was drawn prior to and 30, 60, and 120 min after the meal for analysis of ghrelin, and area under the curve was calculated as a cumulative measurement of ghrelin levels.

**Results:** As per study design, BMI was lower in the LWED group (17.3±1.5 kg/m2) compared to the HC group (mean±SD: 21.4±2.5 kg/m2; $t[96]=11.33$, $p<0.0001$, $d=-1.99$). Groups did not differ by age (LWED: 18.3±3.2 years, HC: 18.0±3.1 years; $t[96]=-0.36$, $p=0.720$, $d=-0.10$). Ghrelin levels were higher in the LWED compared to HC group ($t[96]=-2.67$, $p=0.009$, $d=0.57$). K was numerically lower in the LWED compared to the HC group, but the difference was not significant ($t[96]=1.37$, $p=0.175$, $d=-0.30$). Importantly, in HC higher ghrelin levels were associated with higher k values ($r=0.37$, $p=0.032$). This relationship was not observed in the LWED group ($r=-0.13$, $p=0.304$).

**Conclusions:** In HC, higher levels of ghrelin predicted a stronger preference for smaller immediate rewards, which is consistent with increased impulsive choices shown in animal research. We did not observe this relationship in our LWED sample. Our results indicate that beyond energy homeostasis, ghrelin might play a broader role in reward-related behavior and decision-making, such as monetary choices. Future studies are required to further explore the role of ghrelin in human behavior in both clinical and non-clinical populations.