

# Role of orexin and opioid dynorphin peptides in obesity behavioral dysregulation

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## Orexin, feeding and foraging

### Food-seeking behavior and uncertainty

Uncertainty can be understood as a measure of the expectation of the reward prediction error in given environment. This measure of difference between expected reward and current reward is encoded by dopamine neurons (Bayer and Glimcher 2005). Furthermore, this system can modify decision-making policies based on the reward-prediction error (Pessiglione et al. 2006). Food-seeking behavior, can be conceptualized as series of decision-making actions occurring in an environment with varying grades of uncertainty, where each feeding bout is evaluated by the reward prediction error, and over a history of bouts, uncertainty over environment rewards is obtained.

Under higher uncertainty levels of environment food disposition, animal food-seeking bouts are increased resulting in hoarding-type behavior, arguably as a mechanism to prevent possible starvation (Anselme and Güntürkün 2019). However, this behavior can also be explained by food scarcity or insufficient energetic supply by the environment. The latter case doesn't necessarily predict uncertainty as this can be high in average, but volatile from time to time. Nevertheless, when feeding environment is altered by constant changes in food position, an increased intake is observed (Forkman 1993), so food access variability can trigger, by itself, an increased food-seeking behavior. Conditioned responding to conditioned stimulus also increases when uncertainty about reward probabilities also increases (Anselme, Robinson, and Berridge 2013), that is, motivation is increased under uncertainty of reward delivery

**Obesogenic environments**

**Cafeteria diet and uncertainty**

**The decision making problem in obesity**

**Conclusions**

Anselme, Patrick, and Onur Güntürkün. 2019. “How Foraging Works: Uncertainty Magnifies Food-Seeking Motivation.” *Behavioral and Brain Sciences* 42: e35. <https://doi.org/10.1017/S0140525X18000948>.

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