

Competition viewed biologically: choice impulsivity, work cost and serotonin in domestic chicks

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Ecology of foraging behaviors in groups (social foraging theory) gives us a unique opportunity to synthesize the idea of kleptoparasitism (parasitic utilization of food resources ‘produced’ by other individuals) with neuroeconomics. Assuming that scrambled food is sharable in a manner proportionate to the proximity of foraging individuals, a simple optimization rule (*i.e.*, maximization of individual selfish gain) allows us to predict that the competition enhances both (1) the choice impulsivity and (2) the work cost. Behavioral experiments actually revealed that (1) chicks trained for operant conditioning (reinforced by delayed food rewards) showed enhanced choices of immediate reward over delayed alternative when they had been communally trained, (2) and the enhancement occurred without actual interference of food. Similarly, (3) the work cost (or investment accompanying the food gain) measured in terms of the total running distance / pecking was strongly facilitated by competitors being there, again without actual interference. Systemic application of serotonin-selective uptake inhibitors (SSRI) suppressed both of the impulsivity and the work investment, suggesting that serotonergic neurons could orchestrate striatal / pallial network so that the economical decision makings are adaptively modified according to the individual social contexts and foraging experiences.