1147-49-914 **Debra Lewis*** (lewis@ucsc.edu). *Hang loose–be optimally chill.*

When modeling a conscious agent via optimal control, the constant cost function of a time minimization problem can be interpreted as a uniform stress or risk throughout the task, while more general cost functions model stresses and risks determined by the current state and control values. An inadequate response can have immediate fatal consequences, but over-reaction to every stressor leads to unsustainable wear-and-tear. A moderation incentive is a control-dependent cost term that is identically zero on the boundary of the admissible control region, and is subtracted from the 'do or die' cost function to reward sub-maximal control utilization.

A multi-parameter family of moderation incentives for affinely controlled systems with quadratic control constraints facilitates illustrates the influence of moderation on optimal behavior. The controls determined by this family approach those determined by a logarithmic penalty function as one of the parameters approaches zero, while the cost term remains bounded. One member of this family yields a shifted version of the kinetic energy-style control cost term frequently used in geometric optimal control.

Applications range from risk-dependent motion planning to simple models of study/assessment behavior of students. (Received January 29, 2019)