

## Proposal for 2009 Russell Ackoff Doctoral Student Fellowships

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### 1. Project Title:

“Hot Drive States, Perception of Delays, and Impatience in Delay Discounting Task”

### 2. Descriptive Summary:

Research on intertemporal decisions has well documented systematic temporal preference inconsistencies: an individual who may prefer a larger later reward over a smaller sooner reward when both are delayed well in the future switches her preference and chooses the smaller reward as the rewards draw closer in time (e.g., Kirby and Herrnstein 1995). This type of impatient preference to weigh immediate outcomes more heavily than delayed outcomes as they get closer to the present has often been referred to present bias (O'Donoghue and Rabin 1999; Rabin 2002), and modeled with non-exponential discount functions such as hyperbolic (Chung and Herrnstein 1967; Ainslie and Haslam 1992; Loewenstein and Prelec 1992) or quasi-hyperbolic discount functions (Laibson 1997).

An interesting aspect of present bias is the cross-domain effect: activation of a drive state in one domain (e.g., mating desire) increases impatience for outcomes in another domain (e.g., money). For instance, male heterosexual participants who rated photographs of attractive women showed increased level of present bias toward monetary outcomes compared to other students who rated photographs of unattractive women or neutral objects (e.g., Wilson and Daly 2003). Although this finding is inconsistent with theoretical and empirical works on visceral factors (e.g., Loewenstein 1996; Nordgren, van der Pligt, and van Harreveld 2007), where researchers argue the domain specific impact of drive states on decision making, no convincing explanations have been offered to address this cross-domain effect.

In the my dissertation, I aim to demonstrate that such cross-domain effect of drive states on present bias can be explained not by the changes in the valuation of outcomes in different domains but simply by the changes in the perceived duration of delays. By doing so, we present a new theoretical account for the cross-domain effect of drive states on present bias.

This perceived-delay-based account of the cross-domain effect in present bias is consistent with recent findings showing that present bias itself could be explained by the basic psychophysics of time, that is, non-linear perception of time (Zauberan, Kim, Malkoc, and Bettman, in press). Zauberan et al. argued the reason consumers show present bias (or discount delayed outcomes in a hyperbolic way rather than exponentially) is not because they discount the value of outcomes hyperbolically but because they subjectively

perceive time non-linearly. As a result, even exponential discounters would show present bias because shorter delays are perceived to be relatively longer per unit of time than longer delays (e.g., 3 months are not perceived subjectively 3 times as longer than 1 month).

Extending the time perception account of present bias, I hypothesize that activated drive states would change the perception of delays in delay discounting task. When delays are perceived to be longer, consumers would discount the value of outcomes more. As a result, activation of a drive state in one domain (e.g., mating desire) would cause greater discounting of delayed outcomes in another domain (e.g., money).

My hypothesis is consistent with findings in cognitive psychology of time perception and clinical psychology of impulsive individuals, where arousal was shown to cause overestimation of the experienced duration of short time intervals (e.g., a sound lasts 1000ms). However, no research has examined whether arousal would result in overestimation of anticipatory delays, which are longer (e.g., months or years) and have not been experienced (i.e., future durations). In addition, it has not empirically shown whether overestimation of delays would result in greater level of discounting for monetary outcomes. Thus, the current project aims to examine 1) the impact of hot drive states (or arousal) on perception of delays, and 2) the subsequent impact of overestimation of delays on impatience to money in delay discounting task.

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