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Reference Point-Dependent Tradeoffs in Intertemporal Decision-Making

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Abstract: We agree with Ainslie's general approach to intertemporal choices and self-control. However, we argue that a concept of "will" is superfluous in explaining tradeoffs between SS (smaller and sooner) and LL (larger and later) rewards in a framework of temporal goal setting and goal aggregation. We provide an alternative framework of reference point-dependent tradeoffs between SS and LL options.

Ainslie brings human choices out of the realm of rational maximization of economic goods and into a psychological world of motivation, temptation, and risk preferences. We agree with his general approach to studying risky choices and self-control in a framework of temporal goal setting and goal aggregation. Ainslie suggests that "will" can be viewed as being the effect of aggregating goals over time to determine choice. This hypothesis affords some interesting reasons as to why people would prefer smaller and sooner options (e.g., cognitive deficits that make the aggregation of goals difficult; a foreshortened sense of the future; experience with unpredictable environments; self-efficacy in achieving long-term goals, etc.).

However, we argue that in a framework of goal settings and goal aggregation, a concept of will as an explanatory construct is superfluous. We propose a new conceptual framework of reference point (goal or a minimum requirement) dependent tradeoffs between SS and LL rewards to account for intertemporal decision-making and self-control.

Ainslie's description of will as aggregated choice is a potentially rich and informative perspective. However, Ainslie's conceptualization of the will is primarily descriptive, yet the construct of will in psychology is mainly promoted as explanatory. He defines "strong" will as the aggregation of future choice points to facilitate choosing LL over SS. He suggests that "strong" will manifests when the SS/LL choice is viewed as a class of choices and that choosing SS at one point in time is perceived as promoting SS choices at each successive time point. Ainslie states that individual differences in aggregation rules lead to adaptive or maladaptive consequences of the functioning of the will. What we do not know is how people develop variations of these aggregation rules, how some are able to view the aggregation of choices *against* SS as more reinforcing than the current choice *for* SS. The answer to that question provides explanatory power and yet this seems largely untouched in Ainslie's conceptualization of the will.

Contrary to the assumption indicated in Ainslie's book, that LL rewards are always superior to their SS alternatives, we intend to demonstrate that some ostensibly irrational and impulsive behaviors in favor of SS rewards over LL ones can be both normative and adaptive, given that risky choices are bounded by goals and deadlines in life.

The last three decades have witnessed great theoretical and empirical developments in the studies of reference points in human decision-making regarding risk (e.g., Heath et al. 1999; Kahneman & Tversky 1979; Lopes 1987; Tversky & Kahneman 1981) and in foraging behavior of nonhuman animals (e.g., Kacelnik & Bateson 1997; Stephens & Krebs 1986).

In making intertemporal decisions between SS and LL rewards, the process of approaching a goal (G) can be viewed as a process of status quo (SQ) improvement, whereas the process of falling towards a minimum requirement (MR) can be seen as a process of SQ deterioration. As illustrated in Figure 1, when faced with SS and LL alternatives, the choice becomes a tradeoff between the amount and the delay of rewards with reference to distances to the upper- and lower-bound reference points (i.e., G and MR).

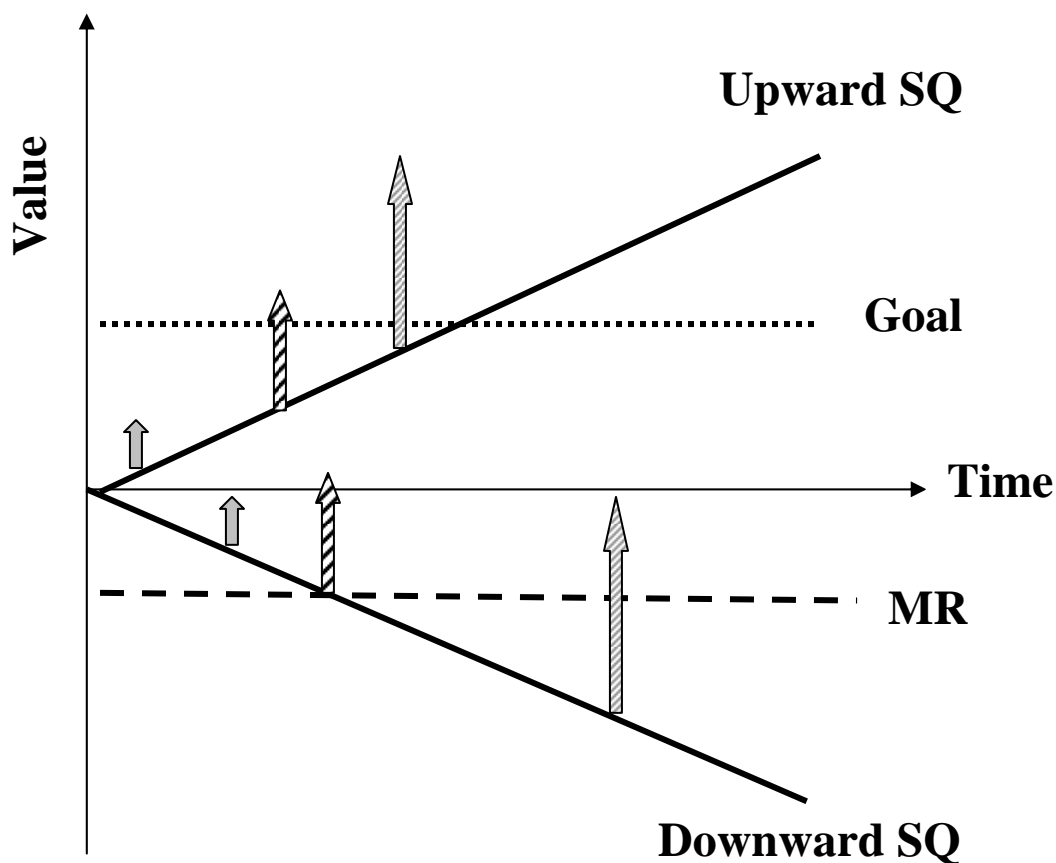


Figure 1. Expected future gains on top of either an upward status quo (SQ) trajectory or a downward status quo trajectory. The length of the arrows represents the amount (value) of rewards (gains) at different time points. MR = minimum requirement.

For an upward expected SQ over time, SS should be preferred to LL ($SS > LL$) if SS can reach a goal earlier. SS (or any choice) should be preferred whenever it will be sufficient for reaching the goal state. The upper middle arrow is LL in respect to the upper left arrow, but SS in respect to the upper right, yet in either case it should be preferred because it moves the person past the goal. Essentially, the crucial determinant is not maximizing value but minimizing the goal discrepancy as quickly as possible (cf. Carver et al. 1996). Outcomes that fall both below or both above a reference point (a goal or a minimum requirement) are expected to be more similar in their psychological values, whereas outcomes that are located on different sides of a reference point are expected to be markedly different in psychological values.

For a downward expected SQ over time, LL options should be preferred to the SS alternatives ($LL > SS$), provided that the delay will not allow the person to fall or remain below the MR. However, SS options should be preferred when they can keep the SQ above the MR or bring the SQ above the MR sooner than LL alternatives. In the case illustrated in the lower part of the figure, the medium gain would be superior to the largest gain ($SS > LL$) because survival cannot be delayed. A starved man needs any food that can feed him instead of a delayed larger supply. As the SQ approaches the MR in time, the temporal difference is vital, but the amount difference is functionally null.

This analysis suggests that some impulsive behavior such as drug use and unprotected sex may not be simply a result of intoxication or cognitive deficit, but adaptive reactions to perceived goal distance and to subjective estimation of SQ trajectory, which may or may not be accurate. That is, if one is below, or perceived to be falling below a MR, the option that most quickly returns the person to above the MR should be favored. Though the projected outcome of the LL may be superior, the individual is unable to be sustained below the MR to reach the LL choice point in time.

Hyperbolic discounting functions provide a general mathematical expression of psychological mechanisms of intertemporal decision-making. However, the functions themselves are not psychological mechanisms and seem not to be congruent with a framework of reference-dependent decision-making.

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