Mental Disorders (*DSM-IV*, American Psychiatric Association 1994), for example, "the essential feature of Impulse-Control Disorders is the failure to resist an impulse, drive, or temptation" (p. 609) when the consequences are harmful. Thus, impulsivity and lack of impulse control (an inhibition deficit, as it were) represent the modern version of a lack of willpower.

To Ainslie's arguments against such constructs we would add the fact that the degree to which individuals discount delayed rewards is positively (but weakly) correlated with the degree to which they discount probabilistic rewards (Myerson et al. 2003). A unitary faculty of willpower and an impulsivity trait both imply that a negative correlation between temporal and probability discounting should be observed. For instance, the term "impulsivity" often is used to refer to both an unwillingness to wait for delayed rewards and a willingness to gamble in the hope of getting larger rewards. If the tendencies to discount steeply the value of delayed rewards and a failure to discount the value of probabilistic rewards were both reflections of a single, impulsive trait, then a negative correlation would exist between temporal and probability discounting. Our data are clearly inconsistent with this view.

In *Breakdown of Will*, Ainslie builds on his early insights into the implications of hyperbolic discounting of delayed rewards. Using these insights as a foundation, he constructs a theoretical framework that is able to account for violations of preference consistency, violations that often are mistakenly viewed as representing failures of willpower or as the result of misjudgments about oneself and the world. These mistaken views are represented in many disciplines – economics, philosophy, and experimental, social, and clinical psychology – and it is to be hoped that Ainslie's book will provide a needed corrective. In addition, the book may be of help to individuals seeking better control of their own behavior (not to mention providing fodder for the self-help industry). In closing, we point out that we share with Ainslie the belief that a better understanding of the fundamental properties of discounting will shed light on the mechanisms that underlie both successes and failures in controlling one's own behavior. Our comments on specific aspects of these fundamental properties (e.g., on the form of the discounting function and the relationship between temporal and probability discounting) are offered in the hope of furthering such understanding.

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Comparing apples to oranges: Who does the framing?

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Abstract: The idea of "bundling" lesser later rewards so they outweigh smaller sooner rewards is compelling, but the sophisticated cognitive activity involved in this bundling is not yet modeled; in particular the role of language is hard to assess.

Contrary to the old adage, you *can* compare apples to oranges, but if you want the results to be worthwhile, you have to do some clever framing. Just "bundling" them together and weighing them on some scale is not apt to give you a meaningful (or effective) result. Ainslie's mathematical model is enticing, but he hasn't yet told us how the backstage carpenters do all the framing.

Ainslie (2001) wants to show how it is that we sometimes come to maximize larger, later (LL) rewards in the face of the default hyperbolic discounting so readily seen in nonhuman animals. He suggests that choosing "according to a principle" or "bundling" can approximate exponential discounting, overwhelming the smaller, sooner (SS) rewards with the summed force of an *imagined* or at least *anticipated* series of LL rewards. He also suggests that this ability requires a self-awareness that is probably unavailable to nonhumans. It probably requires language. In Ainslie's model, however, the bundles of LL rewards are simply summed and if the value is high enough, this will trump the SS impulse. This is mathematically neat, but is it psychologically accurate? Does each bit of the bundle have the same value? One voice, one vote? This doesn't seem likely. A pianist who likes to have several glasses of wine at night might refrain from doing so because of a simple albeit value-laden reason: he has an important performance tonight. What will he do in the future? It may depend on the importance of the gig. A couple of glasses of Pinot Noir may be just the ticket for a chamber rehearsal. The mechanism may be a summing function, but "I" get to prepare the bundles – indeed *have to* prepare the bundles – before they are put on the scales. (What do you get when you cross B. F. Skinner with J. P. Sartre? George Ainslie!)

Ainslie follows a tradition dating back to Plato when he proposes disassembling this "I" into a group of lesser agents or agencies, and composing the competence (and incompetence) of the whole person out of the interactions of these subpersonal homunculi, which he calls "interests." There is nothing wrong with this tactic so long as none of the homunculi are *too smart*. Here is where Ainslie tempts fate somewhat. His *interests* are not like the myopic and obedient clerks that populate most cognitive models or even the eager-beaver competitive homunculi of pandemonium models. Interests are more like different personalities than subpersonal modules or cognitive organs. What is particularly striking about them is that the rules or principles they bargain with are explicitly expressed, not implicit somehow in the hardware. We do not yet know how to devise mechanistic models that can discharge such worldly sub-agencies, with their long time horizons, world knowledge, and access to language.

Language is a tool for thinking, and thinking is a tool for doing a lot of things, or *not* doing a lot of things. Children are often told to "think before they act" and we often remind ourselves to do the same. Indeed, research with children (and chimpanzees) shows that learning apparently simple associations can be quite difficult when prepotent responses are involved (e.g., pointing to a larger food reward but receiving the smaller). Although perseverative errors abound in these cases, they can be alleviated when symbols are introduced as an intermediary. For instance, in tasks indexing young children's ability to deceive, 3-year-olds have great difficulty actually pointing somebody in the wrong direction (it's that-away), though their performance increases dramatically if they use an arrow symbol rather than their finger (Carlson et al. 1998). There are many similar findings, and the dictum among developmentalists might as well be "reduce/enhance the salience, reveal the competence." Language is just such an intermediary, and can both reduce and enhance the salience of various phenomena. But the conceptual/emotional structures of which language is part are neither born of a cookie cutter nor are they immutable to change over time, whether isolated or bundled.

What Ainslie provides, then, is a proposal about the architecture of a model of choosing, rather than a model whose mode of operation is already even sketched. This does not diminish the importance of what he proposes. Inverting the modeler's imagination, getting us all to see that our self-control (and its many problems, so revealingly analyzed by Ainslie) must somehow be constructed out of the hyperbolically discounted urges that we are born with, is a contribution that opens up new vistas. It is hyperbolic except when it is not, and that's when things get interesting.

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