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Opportunity cost neglect and consideration in the domain of time

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Every decision regarding a course of action incurs an opportunity cost. Such costs are relevant to the decision but often neglected. Opportunity costs are more likely to be considered when alternatives are top-of-mind or when the decision maker faces severe resource constraints. Considering opportunity costs of time may differ from that of money because people are less likely to mentally account for their time and more likely to have specific plans for specific units of time. The benefit from a course of action may be realized at a different point in time than its opportunity cost. Such opportunity costs that arise in the context of intertemporal choice are more likely to be spontaneously considered for now than for later.

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Every choice involving a scarce resource requires trade-offs: choosing one option means foregoing another. The opportunity cost of a chosen option is the value of the best foregone alternative. Spending money on a new jacket means not spending that money on a nice dinner. Spending time at work means not spending that time at a museum. Here, the value of the dinner and museum visit represent opportunity costs of choosing the jacket and work, respectively. Such tradeoffs are inherent in resource allocation problems central to economic choice. Yet people attend more to opportunity costs in some contexts than others. How opportunity costs are considered as part of the decision process has important implications.

This selective review highlights recent research on the causes and consequences of the neglect and consideration of opportunity costs from a psychological perspective. The first half reviews research on opportunity cost neglect

and consideration generally, with primary focus on economic transactions. The second half reviews research on opportunity cost neglect and consideration with respect to time, with special attention to the opportunity costs of spending time and implications for intertemporal resource allocation.

Opportunity cost neglect and consideration

When making decisions, people tend to consider aspects of the decision that are explicitly included in the problem frame and to ignore aspects that are not [1–3]. The same formal decision can be reframed to include or exclude certain aspects. For example, the choice of whether or not to accept a new job can be reframed to whether to accept a new job or keep one's current job. One's current job has a greater impact in the second frame than the first, despite the fact that the two decisions represent the same problem [4]. The opportunity cost of a particular course of action is often not explicit in a decision frame and, as a result, is often neglected as a decision input. When deciding whether to buy a product, for example, the products one cannot buy as a result are often not included in the problem frame. Simply reminding people that not making a purchase will leave them with money for other purchases reduces their purchase likelihood [5]. Were people to spontaneously consider their opportunity costs, such a reminder would have no effect.

The sections below address factors that lead people to consider their opportunity costs and consequences of such consideration. The degree to which people neglect opportunity costs has been examined across psychology and adjacent fields including behavioral economics and consumer behavior. Though not a focus of this review, opportunity cost neglect has also been studied in the experimental accounting literature (e.g. [6–8]).

Consideration

Memory

Though the decision frame plays an important role in shaping the decision process, consumers can actively reframe their decisions. Memory accessibility of outside options increases the likelihood that they will be considered in a choice [9,10]. Such memory accessibility increases the likelihood of considering opportunity costs [5,11]. The accessibility of outside options can be driven by the resource in use. Resources that bring specific uses to mind (e.g. Starbucks gift cards bring coffee to mind) are more likely to induce opportunity cost consideration than resources that do not, and outside options that are more prototypical exemplars of the category of uses are more likely to be considered than less prototypical exemplars

(e.g. coffee is more prototypical use of a Starbucks gift card than is a sandwich; [11]).

Resource constraint

Resource constraints evoke consideration of opportunity costs. When resources are relatively unconstrained, the option that must be given up is temporally distant, of lower value, and may not even be identified. In contrast, when resources are highly constrained, the option that must be given up is temporally near, of higher value, and more likely to be clearly identified. People are more likely to spontaneously mention, search for, and give weight to specific outside options when resources are highly constrained [11,12]. Such constraints induce a greater focus on tradeoffs, reducing sensitivity to framing effects and leading to cognitive connections among purchases in different categories [13,14]. Opportunity cost reminders still decrease purchase incidence among the poor, however, suggesting opportunity cost neglect persists even in the presence of chronic resource constraints [15].

Individual differences

Some people are more likely to spontaneously consider opportunity costs than others. Academic success, intelligence, and economics training are each positively associated with consideration of opportunity costs [16,17]. Tightwads (people who chronically feel they cannot spend as much as they'd like to; [60]) are less sensitive to opportunity cost reminders than others, suggesting tightwads are more likely to consider opportunity costs spontaneously [5]. People with higher propensities to plan [18] are more likely to consider opportunity costs than those with lower propensities to plan, presumably because they have already mentally spent much of their perceived slack and feel more constrained ([19]; Lynch, Spiller, & Zauberman unpublished; [11]). Likewise, people with a future-orientation are less sensitive to reminders of future opportunity costs, indicating they consider such costs spontaneously [20]. Although there is relatively little evidence on cross-cultural comparisons of opportunity cost consideration, cultural differences with respect to context sensitivity may be relevant [21].

Consequences

Choice

One key consequence of opportunity cost neglect is its impact on choice. If people used a sufficient as-if proxy, neglecting specific foregone options would not affect choice. People could act *as if* they considered and fully weighted opportunity costs even without considering specific alternatives. Alas, this does not seem to be the case. People are more likely to forego an opportunity when opportunity costs are made explicit than when they remain implicit [4,5,15], and they become more sensitive to the value of the foregone option when opportunity costs are explicitly considered [11,19]. Earmarked funds establish clear opportunity costs, enabling savings when it

is otherwise difficult [22], but also increasing reliance on more expensive sources of funds [23].

Losses

Choosing from a well-defined choice set can lead to a sense of loss of the unchosen options, indicating affective downsides to considering opportunity costs. Choosing options benefitting one's self decreases happiness when it comes at the expense of options benefitting others [24], and satisfaction is lower with the last purchase from a budget when constraint is highest [25], reflecting a downside to salient attractive opportunity costs. Reminders of opportunity costs reduce willingness to upgrade by reminding people what they are losing by giving up the status quo [26]. Although opportunity costs can be painful when made salient, out-of-pocket costs are more likely to be considered losses spontaneously. Coupled with loss aversion, this leads to the endowment effect: people demand higher prices to sell goods than they are willing to pay to obtain them [27,28].

Preferences

Opportunity cost consideration during choice affects subsequent evaluation of both the chosen and foregone options. Evaluations of chosen options increase and evaluations of explicitly foregone options decrease through choice [29,30,31]. However, when opportunity costs are not salient at the time of choice, the implied rejection of outside options is less explicit. Rejecting an explicitly available option decreases its evaluation and choosing it increases its evaluation, but only if it is considered at the time of choice ([32]; see also Refs. [33,34]). Such effects of choice on evaluation may fade over time and recur with repeated choice [35].

Opportunity costs of time

Like any scarce resource, using time toward one end implies not using it toward another. Its value varies according to its opportunity cost [36]. Some of the cases above address opportunity costs of time directly [4,16,17,2], but some factors make time different.

First, time's non-fungibility can enhance the consideration of opportunity costs, given that hours are not interchangeable the way dollars can be. Individuals are particularly likely to consider opportunity costs of time when an opportunity appears during an ongoing activity: when approaching proximate subgoals, people are acutely aware of what they are giving up in exchange for accepting a new opportunity [37,38]. Making the opportunity cost of spending time later salient can encourage choice of smaller-sooner options when they come at lower costs [39].

Second, also as a result of its non-fungibility, goal conflict can be more pronounced for time. People use two types of plans to deal with goal conflicts that arise from scarce

time: efficiency planning involves stretching resources, and priority planning involves considering opportunity costs and making tradeoffs [40]. Whereas tradeoffs in some choices arise from internal constraints (e.g. a voucher that can be used on one of two trips), in others they arise from external constraints (e.g. two non-transferable vouchers that are usable on separate trips that happen to occur at the same time). People overweight opportunity costs arising from external constraints because they feel as though they miss out on both options [41*].

Such conflicting goals that each draw on one's time make opportunity costs clear, but there are also spillovers from goal conflict more generally. Conflicting goals lead to reduced perceptions of free time, even when they do not conflict over time, and an increasing monetary value of time increases feelings of time pressure, especially when opportunity costs are made salient [42,43].

Third, mental accounting for time tends to be more ambiguous and context-dependent than mental accounting for money [44–47]. When opportunity costs are more salient, as when employees consider hourly wages or billable hours, tradeoffs tend to be more sensitive to economic considerations, including sunk costs [48,49,47].

The cases above primarily address within-resource tradeoffs, but in some cases like efficiency planning, the benefits (e.g. savings from coupons) are gained in exchange for opportunity costs incurred in a different resource (e.g. the time spent searching and clipping). Such cross-resource tradeoffs tend to be less painful than within-resource tradeoffs [40]. The value of such cross-resource tradeoffs depends on the measurement: measuring hours per dollar lead to higher wage rates than dollars per hour because time scarcity receives greater weight, further suggesting opportunity costs of time are often more salient than those of money [50]. When spending time and money, people are more sensitive to reminders of temporal opportunity costs when considering experiential purchases and more sensitive to reminders of monetary opportunity costs when considering material purchases [51].

Opportunity costs over time

Opportunity costs typically have an intertemporal component: using a resource now prevents use of this resource in the future. Research on intertemporal choice necessarily touches on opportunity cost consideration (see [61]). The prototypical intertemporal choice problem is between a smaller sooner reward (e.g. \$5 today) and a larger later reward (e.g. \$10 next year). Choosing \$5 today implies \$0 next year and choosing \$10 next year implies \$0 today. Such implied payoffs may be trivial upon reflection but are underweighted during choice: making the 'hidden zeros' salient drives choosers to be more

patient [52]. People spontaneously account for the fact that \$10 next year implies \$0 today, but not the fact that \$5 today implies \$0 next year [20,53*].

Such intertemporal tradeoffs matter most when individuals care about the future. Seeing one's future self as more connected to one's current self leads to less discounting of the future [54–56], but only when one considers the intertemporal tradeoffs and opportunity costs involved [19].

Choices between spending now and spending later depend on the perceived availability of resources now and later. Asymmetries between now and later in perceived resource availability can account for present-biased patterns of discounting, and cross-resource differences in discounting, such that current resource constraints now lead to apparently impatient behavior [38,57]. Constraint makes opportunity costs salient and the salience of opportunity costs enhances perceived constraint (Lynch, Spiller, & Zauberman, unpublished). Future expenses are given less weight than future incomes when assessing available resources, further reducing the weight given to future opportunity costs [58], though individuals who exhibit stronger propensities to plan are more likely to spontaneously consider their future opportunity costs [11,18].

The cases above largely address situations in which people underweight opportunity costs in intertemporal choice, yet sometimes people *overweight* opportunity costs. When people have limited resources (e.g. a small number of vouchers for free flights) with limited opportunities for ideal use (e.g. a small number of flights with high prices), people are too reluctant to spend on less-than-ideal opportunities, missing out on the good in the unproductive pursuit of the perfect [59].

Conclusion

When people elect to pursue an opportunity, be it buying a new jacket, spending a weekend camping, or spending years pursuing an advanced degree, they necessarily incur a cost determined by the value of the best foregone option. When people neglect such opportunity costs, they risk allocating their scarce resources in ways that they themselves would not prefer. Though the literature on opportunity cost neglect extends back to the 1970s, research on opportunity cost neglect and consideration has expanded rapidly in the past decade. People often neglect opportunity costs, but constraint and accessibility increase the likelihood of opportunity cost consideration. While these principles extend to the domain of time, time has unique properties that shape opportunity cost consideration. People use more flexible mental accounting for time, making opportunity costs more ambiguous. Because time is non-fungible (e.g. an hour tomorrow cannot replace an hour today), alternative activities are

more likely to conflict, thereby increasing consideration of opportunity costs. Future opportunity costs are often underweighted in intertemporal choice. Context-sensitivity, which tradeoffs consumers weight the most, and consequences of consideration beyond choice remain rich opportunities for research.

Conflict of interest statement

Nothing declared.

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