

The Agent's Impatience: A Self-Other Decision Model of Intertemporal Choices

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Abstract

Intertemporal choices represent one of the most common and fundamental tradeoffs in consumer decision-making. While prior research has focused on choices made for oneself, intertemporal choices often involve one individual choosing on behalf of another individual. How do intertemporal choices made for another person differ from similar choices made for oneself? This research introduces the first self-other decision model, incorporating a distinction between vicarious utility and reactive utility. In thirteen experiments ($N = 4,799$) involving decisions between peers, we test model-derived hypotheses. We confirm, per the model, that when intertemporal choices are made for a specified other person, the choices are typically more “impatient” than an otherwise identical choice for oneself. This finding is contrary to what previous studies have assumed, predicted, and reported when using abstract and unspecified recipients. Consistent with model predictions, “agent’s impatience” is attenuated when the decision-maker expects a delay in the anticipated affective reactions from the recipient and is moderated by contextual and individual differences that reduce reliance on visualization in decision-making. This research sheds new light on interpersonal consumer behaviors and highlights the pivotal role of anticipated affective reactions as a source of reactive utility in interpersonal decision-making.

Keywords: intertemporal choice, self-other decision-making, reactive utility, interpersonal affective feedback

How does a person choose between an immediately gratifying option (i.e., a “smaller-sooner” option) and an alternative that yields greater long-term benefits (i.e., a “larger-later” option)? Such intertemporal tradeoffs underlie a broad range of decisions, including daily consumer choices (e.g., purchasing the current state-of-the-art laptop vs. waiting a few months to buy the next-generation model), financial planning (e.g., spending now vs. saving to enable more spending later), managerial decisions (e.g., maximizing immediate revenue vs. maximizing sustainable long-term performance), medical decisions (e.g., receiving unpleasant vaccines now vs. being exposed to health risks later), and career decisions (e.g., earning a lower salary now vs. studying for a higher degree to earn a higher salary later). A large research literature has examined how people resolve the fundamental tradeoff between value and time in these choices (e.g., see Frederick, O’Donoghue & Rabin 2002; Soman et al., 2005; Urminsky & Zauberan 2015 for reviews).

Consumers live in a world that is not only dynamic, but also social—involving not only tradeoffs between the present and the future, but also interactions between oneself and other people. While intertemporal choice has been studied primarily in terms of individual decisions made for oneself, many intertemporal choices involve a recipient other than the decision-maker. When a person makes a proxy decision, selects a gift, or gives advice and recommendations to a peer (e.g., friends, acquaintances), the decision-maker is making a tradeoff between the smaller-sooner and larger-later options that will have a direct impact on the peer recipient and also may have an indirect impact on themselves.

This research investigates how a decision-maker resolves intertemporal tradeoffs for a peer recipient, and how the resulting decision differs from making an otherwise equivalent decision for oneself. To date, limited research exists on self-other intertemporal choices. Prior theories have focused primarily on the role of egocentric preference projection and adjustment processes in shaping these choices (e.g., Ziegler & Tunney, 2012). By focusing

on projection accuracy, this approach treats an intertemporal choice for another person as a type of “guess and match” problem—estimating what the other person would want from a choice set and then attempting to match that estimated preference.

However, research suggests that self-other decision-making may also involve other critical factors. In particular, converging evidence shows that interpersonal affective feedback, such as verbal and nonverbal expressions of emotions, plays a distinct role in motivating and rewarding interpersonal choice (Niedenthal et al., 2010; Nikitin & Freund, 2019; Tsukiura & Cabeza, 2008; Yang & Urminsky, 2018). A decision for a peer therefore can involve intertemporal tradeoffs not only between “smaller-sooner” versus “larger-later” benefits for the peer, but also between “smaller-sooner” versus “larger-later” affective rewards for the decision-maker. This insight gives rise to new predictions for how an intertemporal choice for others differs systematically from such choices for oneself in ways that are distinct from previously posited or assumed.

In this paper, we first provide a review of both prior research on intrapersonal decision-making, including in the context of intertemporal choice, as well as relevant research typically neglected by such theories. We then develop a testable quantitative model of self-other intertemporal choices, expanding on standard models of intrapersonal intertemporal choice to incorporate the expected utility of interpersonal affective feedback. The inclusion of this factor in the model reveals novel predictions about differences between choices made for a peer compared to choices for oneself, distinct from predictions based on prior theorizing. Specifically, prior theories (and limited empirical studies) mostly speculated or reported that intertemporal choices for others reveal more “patience” than similar choices for oneself. In contrast, our model predicts that decisions are more “impatient” when made for others than oneself, an effect we refer to as “agent’s impatience.” In other words, we predict that people will be more likely to choose a more immediately gratifying, “smaller-

sooner” option (vs. the “larger-later” option) for a similar peer than for themselves, all else equal. Our model also offers theoretical moderators (e.g., recipient specificity) that reconcile the present and previous findings and clarify when and why our primary predictions apply.

We then present thirteen experiments ($N = 4,799$) that test the proposed agent’s impatience effect and other key model predictions across a diverse set of intertemporal choices for peers (e.g., proxy decisions, gift giving, and consumer recommendations). Our findings support these predictions and showcase a strong agent’s impatience effect. Moreover, we find that agent’s impatience is moderated by the timing (i.e., immediate vs. delayed) of interpersonal affective feedback, the specificity of the peer recipient (i.e., choosing for a specified and imaginable recipient vs. an unspecified abstract recipient), and individual differences in the decision-maker’s tendency to engage in visualization in the decision process. Our findings challenge currently prevalent models of self-other decision making that rely solely on intrapersonal processes and outcomes and demonstrate the importance of incorporating anticipated affective consequences in theories of self-other decisions. These insights may benefit fellow researchers in studying interpersonal decision-making, a burgeoning area of research that has wide-reaching implications for marketing practice and consumer welfare.

THEORETICAL DEVELOPMENT AND MODEL

Intertemporal Choices for Self versus for Other

In an intertemporal choice, a person chooses between a smaller-sooner (*SS*) option, often immediate, and a larger-later (*LL*) option. To understand how people make these choices, various normative or behavioral models of temporal discounting have been proposed and tested (see reviews in Doyle 2013, Soman et al., 2005; Urminsky & Zauberan, 2015),

typically with a focus on the causes of individual impulsivity and myopia which may contribute to negative welfare consequences for the decision-maker. In these models, the decision-maker's likelihood of choosing *SS* over *LL* options, often represented as an individual-level discount factor, is widely considered as capturing their general level of "impulsivity".

When a decision-maker chooses on behalf of another person—such as when acting as an agent to whom the decision has been delegated, making a gift choice, or giving advice and recommendations—the decision-maker does not expect to experience the value of the outcomes personally. Instead, she imagines the respective decision outcomes and how they will influence the recipient. These choices typically involve a peer as the recipient, such as a friend, a colleague, a neighbor, or an acquaintance, who is specified and imaginable to the decision-maker. These types of choices are distinct from non-peer principle-agent decisions in which additional factors may be involved, such as policy-makers' decisions for the general public, or parents' decisions for children (see also Liu et al., 2019).

The decision process in such choices, made for peer recipients, has been understood typically through the lens of an anchoring-and-adjustment process of social projection (e.g., (Epley et al., 2004; Krueger, 2007; Van Boven & Loewenstein, 2003). In this process, a decision-maker forms beliefs about the recipient's preferences by first anchoring on one's own preferences and then potentially adjusting from that, based on salient cues of self-other difference (Epley et al., 2004; Van Boven & Loewenstein, 2003). For an intertemporal choice, these projected values may include both the static evaluation of outcomes and the personal discount factor that determines the reduction in value due to delay. Potential cues determining adjustment may include self-other differences and in-group vs. out-group differences (e.g., Jones & Rachlin, 2006; Mullen et al., 1992; cf. Orhun and Urminsky 2013). However, because explicit knowledge about self-other differences is not always available,

and inferences of such differences are often effortful, people tend to stay close to their self-anchor, insufficiently adjusting when assessing the preferences of others (Epley et al., 2004; Eyal et al., 2018; Tamir & Mitchell, 2013). Therefore, to the degree that choices for a peer recipient are based on self-anchored beliefs, choices for others will often be highly similar to choices for oneself.

In the specific context of intertemporal choices, the social distance between the decision-maker and the recipient results in psychological distance that has been theorized to mitigate the temptation to choose a more immediate *SS* option over an *LL* option (Hoch & Loewenstein 1991; Kim, Schnall, & White, 2013; Metcalfe & Mischel 1999). Accordingly, prior research has posited that intertemporal choices made for another person, even when highly similar to oneself, would be less “impatient” than choices for oneself (e.g., Albrecht et al., 2011; Pronin, Olivola, and Kennedy 2008; Ziegler & Tunney, 2012). Notably, this prediction relies on the implicit assumption that the decision for the other person should be made by choosing based on one's own preferences projected onto the other person, and failed to do this due to the increased psychological distance between the decision-maker and the consumption reward.

There are, however, compelling reasons to reconsider the prediction that people will make less impatient choices for their peers, in light of recent research. While we agree that a “guess and match” process can be one important component of interpersonal decision making, we posit that a second important component has been omitted in this analysis. We argue that making choices for peers is not merely a guessing game that the decision-maker performs in isolation. What is missing is that decision-makers also anticipate the interpersonal consequences of their choices, including the positive or negative affective reactions that the decision recipient may have. This interpersonal, affect-rich feedback provides utility (Charlton et al., 2013; Jones & Rachlin, 2006) and can serve as a potent

reward or punishment that reinforces future behaviors, often in ways that differ from a cold, vicarious consideration of the recipient's estimated welfare (de Waal, 2008; Preston & de Waal, 2002; Rand et al., 2014; Yang & Urminsky, 2018). We suggest that understanding intertemporal choices for others requires taking interpersonal affective feedback into consideration, because choice for others involves not only evaluating *indirect* utility outcomes, but also anticipating and maximizing the *direct* interpersonal affective outcomes for the decision-maker.

As such, we propose that intertemporal decisions for others should be thought of as guided by two related questions: "How will the *recipient* value either outcome?" and "How will *I* value the recipient's affective reaction to either outcome?" In utility terms, what we suggest is that a decision-maker choosing for a peer recipient may simultaneously consider the impact of their choice on two sources of utility: expected *vicarious utility*, obtained by vicariously valuing the benefit that the recipient is presumed to derive from the chosen outcome, and expected *reactive utility*, obtained by experiencing the recipient's verbal and nonverbal affective reactions in response to the realization of the chosen outcome.

Although these two factors sometimes overlap in decision-making, converging findings suggest that they primarily constitute different psychological processes. A large literature shows that the prediction of other people's internal preference states relies on a high-level perspective-taking process that is deliberate, effortful, and frequently miscalibrated (Epley, 2008; Eyal et al., 2018; Flavell, 1992; Van Boven et al., 2013; Van Boven & Loewenstein, 2005). By contrast, the anticipation of others' affective reactions tends to be spontaneous and dominates the regulation of behavior even in early stages of development (Baumeister et al., 2007; March & Flier, 2017). In fact, there is ample evidence that perceptual cues central to the processing of interpersonal affective reactions take precedence in social cognition and interactions.

For example, visual research finds that facial expressions of emotion attract attention faster than other stimuli and evoke automatic emotional responses (Calvo & Esteves, 2005; Stenberg et al., 1998; Young-Browne et al., 1977), suggesting a set of mechanisms specialized for processing such information (Farah, 2000; Fox, 2002; Hasselmo et al., 1989). The prioritized processing of these emotional cues is consistent with adaptive benefits to humans of optimizing social interactions (Calvo & Esteves, 2005; Fox, 2005). Given the prominent role of interpersonal affective reactions in capturing attention and evoking affective responses, it is not surprising that research in developmental psychology and neuroscience shows that external displays of affective reactions are highly effective as primary reinforcers that reward and motivate behaviors (Grossmann, 2010; Nikitin & Freund, 2019; Toates, 1988; Tronick, 1989; Tsukiura & Cabeza, 2008; Wang et al., 2018).

Bolstering the distinction between these processes, a growing body of research in social psychology and consumer behavior demonstrates that the anticipation of interpersonal affect exerts a direct influence on social behaviors in ways that differ from the self-other projection of preferences and attitudes (Galak et al., 2016; Garcia-Rada et al., 2019; Knapp & Hall, 2013; Wang et al., 2018; Yang & Urminsky, 2018). For example, prior research has found that people often select gifts that maximize the recipient's affective reactions even when such gifts fail to maximize the recipient's preference, due to less practical benefits (Yang & Urminsky, 2018; see also Garcia-Rada et al., 2019). Moreover, as interpersonal consequences are internalized during repeated social experiences, the anticipation of these consequences can shape social decisions both by providing concrete goals in impression management and by eliciting spontaneous behavioral responses that facilitate social goals (Gesiarz & Crockett 2015). These findings call into question the practice of treating interpersonal affective reactions merely as a downstream consequence of internal utility attainment in self-other decisions, such that interpersonal affective feedback is ignored or

treated as a signal of the success of preference matching, but is assumed to provide no value or utility per se.

We argue that vicarious and reactive expected utility both factor into interpersonal decisions. On the one hand, the assessment of expected vicarious utility is based on an estimate of the recipient's *internal* experience, so it primarily involves the decision-maker's projection of one's own preferences to the recipient (and potential adjustment if self-other differences in preference are salient to the decision-maker). On the other hand, because the assessment of expected reactive utility is based on an estimate of the recipient's *external* display of affect, it involves the decision-maker's mental simulation of the recipient's observable reactions (e.g., based on experience from past social interactions and social heuristics obtained from related experiences; de Waal, 2008; Gesiarz & Crockett, 2015; Preston & de Waal, 2002; Rand et al., 2014).

Next, we introduce a novel quantitative model of self-other intertemporal choices to formalize the above theorization. The model builds on a long history of quantitative time-discounting models and follows a standard discrete-choice framework (see Doyle 2013 for a detailed review). Committing to a quantitative model enables us to formulate a specific and falsifiable theory that incorporates differential effects of vicarious utility and reactive utility in the theorized process of decisions for others, that accounts for how they differ from decisions for oneself. A useful feature of the model is that it helps identify empirically testable predictions of moderators and boundary conditions, which guides the experimental studies in this paper and may inform empirical work in future research. The proposed model is certainly, at best, incomplete. Nevertheless, we believe the model is a useful starting point that can spur subsequent discussions and model improvements toward a more thorough and rigorous understanding of interpersonal decision making.

A Decision Model of Self-Other Intertemporal Choice

Starting with the basic model of intertemporal choice for oneself, consider that person i faces an intertemporal choice today between SS and LL options. The current valuation of a future outcome x_t to be received at time t is typically denoted as $f(t)x_t$, where the individual's discount factor $f(t)$ is a function of delay t and varies between 0 and 1. This generic function can take the form of one of many discounting models (see reviews in Doyle 2013 and Urminsky & Zauberman 2015), including exponential (Samuelson, 1937), hyperbolic (Mazur, 1987, 2001), and quasi-hyperbolic models (Laibson, 1997). We assume a quasi-hyperbolic model, with $f(t) = \beta^D \delta^t$, where $\beta \in [0,1]$ is the present-bias parameter, $\delta \in [0,1]$ is the long-run discount factor, $D = 1$ if $t > 0$, and $D = 0$ if $t = 0$ (i.e., in the “current period” defined by $t = 0$, Jang and Urminsky 2022).

To extend the model, $U_{ij}(x)$ will denote the time-dependent net subjective utility of each option x for person i when choosing for person j . Here, net subjective utility is defined as the sum of both positive and negative consequences of the choice, or “experiences of pleasure and pain” (Bentham 1789), thereby allowing disutility as well. When person i chooses for themselves ($j = i$), the expected utility of choosing option x_t (an option of magnitude x to be received at time t) is discounted to the time of the decision, namely, $U_{ii}(x_t) = f_i(t) \cdot V(x_t)$. When person i chooses for another person j , however, we propose that the expected utility $U_{ij}(x_t)$ of choosing x_t will be the weighted average of two components:

$$(1) \quad U_{ij}(x_t) = \varphi_i [(1-w_{ij}) \cdot f_{ij}^V(t) \cdot V_j(x_t) + w_{ij} \cdot f_i^R(T) \cdot R_{ij}(x_t)]; f^V, f^R, w \in [0,1]$$

Based on research that cues of self-other differences are usually insufficiently incorporated and that people instead anchor on their own preferences (Epley et al., 2004; Tamir & Mitchell, 2013), we make a simplifying assumption that decision-makers believe that the outcome value to a (presumably similar) peer is the same as to the self: $V_j(x_t) = V_i(x_t)$. This is a relatively non-controversial assumption when considering monetary outcomes or goods that are similarly valued across individuals. However, this assumption

should be relaxed when consumers have heterogenous preferences over the goods, particularly when the decision-maker has sufficiently specific knowledge about the recipient's preferences (Gino & Flynn, 2011), as we discuss in the General Discussion.

The second component involves the expected reactive utility, $R_{ij}(x_t)$. This is the utility that the decision-maker expects from observing the recipient reaction triggered by receiving the chosen goods. The extent of reactive utility is determined by the decision-maker's belief, at the time of choice, about the recipient reaction based on the decision-maker's mental simulation of that future social interaction, such as visualizing the recipient's facial expressions. While the value of reactive utility and of vicarious utility are likely correlated, expected reactive utility can deviate systematically from expected vicarious utility, as some goods are expected to evoke greater affective reactions than others, holding the economic value constant (Wang et al., 2018; Yang & Urminsky, 2018).

Given that temporal discounting applies not only to resources but also to the anticipation and evaluation of future interpersonal affective feedback (Charlton et al., 2012, 2013), both components are discounted by the decision-maker to the present. First, the recipient's future value is discounted to the recipient's presumed net present value. We assume that the decision-maker applies their own temporal discount factor, $f_i(t)$, under the assumption that they project their own impatience onto peers. As we discuss in the general discussion, the model predictions under this assumption will not necessarily hold in situations where decision-makers have a strong reason for believing that their recipients are more patient than them.

Second, the future reactive utility $R_{ij}(x_t)$ is also discounted from the time of interpersonal affective feedback T (either at the time of receipt, $T = t$, or later, $T > t$), by the decision-maker's discount function for affective feedback, $f_i^R(T)$. Theories of impulsivity suggest that outcomes that are more (vs. less) innately evaluable generate greater impulsivity.

Because the recipient's affective reactions are innately evaluable (e.g., (Gewirtz & Pehleznogueras, 1992; Grossmann, 2010; Toates, 1988), they directly reward or punish the decision-maker with emotional payoffs, whereas the consumption outcome for the recipient influences the decision-maker vicariously and indirectly. Therefore, we propose that the future reactive utility from interpersonal affect will be discounted to the present more steeply than will value consumed by the self (see Loewenstein 1996), with $f^R(t) > f(t)$ for $t > 0$. For quasi-hyperbolic discounting (or for exponential discounting, setting $\beta = 1$), these constraints are satisfied by $f^R(t) = \beta^D(k\delta)^t$, with $k < 1$.

Overall utility of an outcome is then a weighted average of the net present value of the two components. The relative weight placed on reactive utility depends on both the recipient and the decision-maker. To the extent that the decision-maker has more difficulty imagining a particular recipient's reactions with sensory details (i.e., compared to estimating the value to the recipient), the decision-maker will place less weight on reactive utility in the decision (denoted by a lower $w_{ij} \in [0,1]$). In particular, $w_{ij} = 0$ when the decision-maker chooses for an unspecified other person (e.g., abstract, generic, and nonidentified) whose reactions cannot be imagined. Furthermore, w_{ij} also depends on the individual differences in the decision-maker's propensity to anticipate and value future interpersonal affective outcomes. For instance, people who tend to anticipate and visualize others' affective reactions spontaneously can be deemed as placing more weight on reactive utility in making decisions for others relative to people who tend not to visualize and incorporate others' affective reactions.

Lastly, decision-makers may not always value recipients' outcomes to the full extent. For instance, some decision-makers are indifferent about others' welfare, and people generally value socially distant recipients' outcomes less (Jones and Rachlin 2006). When less concerned, the decision-maker expends fewer attentional resources in the decision

process and is more likely to choose at random (e.g., choosing 50% *SS* vs. 50% *LL* on average). We can use a social discount factor $\varphi_{ij} > 0$, to denote the degree of concern and attention invested when choosing for another person. A low value of φ_{ij} thus represents less consideration of both vicarious and reactive utility when making a decision.

Taken together, the overall expected utility of choosing any option for a similar peer is represented by the following fully specified model:

$$(2) \quad U_{ij}(x_t) = \varphi_{ij} \cdot [(1 - w_{ij}) \cdot f_j(t) \cdot V_j(x_t) + w_{ij} \cdot f_i^R(T) \cdot R_j(x_t)]; \varphi_{ij} > 0, w_{ij}, f_i, f_i^R \in [0, 1]$$

After incorporating the additional assumptions discussed above, the utility from choices made for other reduces to the following:

$$(3) \quad U_{ij}(x_t) = \varphi_{ij} \cdot [(1 - w_{ij}) \cdot \beta^D \delta^t \cdot V_i(x_t) + w_{ij} \cdot \beta^D (k\delta)^T \cdot R_i(x_t)]; \beta, \delta \in [0, 1], k < 1$$

Defining g as a monotonically increasing function with range in $[0, 1]$ (such as the logit):

$$(4) \quad P_{ij}(SS/\{SS, LL\}) = g(U_{ij}(SS) - U_{ij}(LL))$$

Person i is more likely to choose one option over another for recipient j to the degree that it provides person i with greater discounted expected utility.

We introduce three simplifying assumptions that are commonly reasonable in intertemporal choices for peer recipients: (1) the *SS* option is in the present period ($t = 0$), (2) the decision-maker anticipates a reaction from the recipient commensurate with the believed value to the recipient ($R_i(x_t) = V_j(x_t)$), and (3) the decision-maker expends similar attentional resources on a decision for the recipient as a decision for self ($\varphi_{ij} = 1$). With these assumptions, the model predicts that the threshold for picking *SS* when choosing for a similar peer is lower than when choosing for oneself, an effect we refer to as “agent’s impatience.” The derivation is presented in the supplementary web appendix I, where we also discuss the implications of loosening these assumptions.

Intuitively, this is because future reactive utility is discounted more steeply than future vicarious utility (i.e., because $k < 1$), and therefore future interpersonal affective

feedback provides the decision-maker with an additional incentive that favors the *SS* when choosing on behalf of another person, compared to when choosing for oneself, all else equal.

This is the main hypothesis tested in this research, which we term “*agent’s impatience*”:

H1: Decision-makers are more likely to choose *SS* for a peer than to choose *SS* for oneself in an intertemporal choice, all else equal.

Theoretical Moderators

Moreover, based on the model, the degree of agent’s impatience should be conditional on theoretically relevant situational factors and individual differences. In particular, our main hypothesis (H1) is contingent on the role of *reactive* utility. Next, we discuss three primary factors that modulate its role: the timing of the interpersonal affective feedback, the specificity of the decision recipient (which influences the imaginability of the reaction), and the decision-maker’s reliance on visual processing.

First, we distinguished between time t —when the recipient receives the outcome, and time T —when the decision-maker expects to observe the recipient’s affective reactions. This yields a testable prediction: all else equal, agent’s impatience should be mitigated by a delay in the recipient’s affective feedback. Suppose a decision-maker is choosing between an *SS* in the present ($t = 0$) and an *LL* at time t . However, the decision-maker expects the recipient’s affective reaction to be postponed to a time in the future, $T = t + d$, $d > 0$, for both the *SS* and *LL* options. Since the delay of affective reactions ($T + d$ for *SS*, d for *LL*) does not influence the recipient’s consumption at time t , the discounting of vicarious utility (t) is unaffected by the delay, unlike the discounting of reactive utility. Because $f(T)$ decreases with T , as T increases, the anticipated reactive utility will have less of an impact, relative to vicarious utility, on the decision. Furthermore, the delay of reactive utility is longer, resulting in a greater discounting, for the *SS* than for the *LL*, yielding our second hypothesis:

H2: Delaying interpersonal affective consequences will mitigate agent's impatience.

Second, recipient specificity should be a necessary condition for agent's impatience. In the model, when the recipient is entirely unspecified, the decision-maker i cannot vividly imagine the interpersonal affective reactions and therefore $w_{ij} \rightarrow 0$. The lower w_{ij} , the more the decision process will primarily rely on vicarious utility, such that choice for the unspecified recipient becomes a projected preference resembling choice for oneself (unless salient cues suggest adjustment). Consistent with research showing that interpersonal decision-making is often critically influenced by the identifiability of the decision recipient (Erlandsson et al., 2015; Small & Loewenstein, 2003, 2005) and the imaginability of affective outcomes (Lurie & Mason 2007; Nanay 2016), the model predicts:

H3: When the recipient is unspecified, the mental representation of affective reactions is obscured, reducing agent's impatience.

The proposed role of recipient specificity also offers a potential way to reconcile the present research with the results from limited prior studies that examined intertemporal choices made for entirely unspecified peers (e.g., Albrecht et al., 2011; Pronin et al., 2008; Takahashi, 2007; Ziegler & Tunney, 2012). In reality, most decisions for peer recipients are for a specified individual whose reactions are easily imaginable to the decision-maker. However, choices for others were operationalized differently in these prior studies, which typically had participants make an intertemporal choice for an unspecified, abstract person without conceivable interpersonal consequences (e.g. "a stranger they would never meet," Albrecht et al. 2010; a generic fellow student unknown to the decision-maker with no possible subsequent interactions, Pronin, Olivola, and Kennedy 2008; "someone else," Takahashi 2007), or make normative judgments about how another person *should* themselves choose (Ziegler & Tunney, 2012). Therefore, whereas most of these studies reported that

choices for others were similar to (or even less impatient than) choices for oneself, these results are actually consistent with our model predictions for unspecified recipients (with potential adjustment for self-other differences when salient cues are provided, as was the case in some of these studies).

Finally, our model indicates that the degree of agent's impatience also depends on the weight on reactive utility, w_i . A higher w_i denotes more reliance on reactive utility and predicts stronger agent's impatience. The value of w_i arguably varies across individuals, reflecting how much individuals engage in the anticipation of affective reactions. One theoretically relevant individual difference is the degree of visual processing orientation in decision making (Marks, 1973; Nelis et al., 2014). Most people rely on visual channels in perceiving and processing information (Jawed et al., 2019), especially social information (Fox, 2005).

Interpersonal affective reactions contain primarily visual information, as in facial expressions and bodily gestures, which has been shown to dominate non-visual, verbal information in the communication and interpretation of emotions (Argyle et al., 1970; Burns & Beier, 1973; Walker & Trimboli, 1989). Therefore, we expect that most people would consider reactive utility to some degree in their decision process (i.e., $w_i > 0$). The degree of agent's impatience would then depend on as the weight people place on reactive utility (i.e., w_i) in their decision-making.

H4: People who generally rely less on visual processing will exhibit a weaker agent's impatience effect.

This prediction can be tested empirically using existing measures of individual differences in visual imagery usage.

As previously mentioned, theories of psychological distance imply that people should be more patient for more distant others, in part because they will have less empathy and

hence will not be as vicariously tempted by immediate gratification (Metcalfe & Mischel, 1999). In this view, the more empathetic the decision-maker feels toward others, the smaller the gap between their choice for others and choice for self. This line of reasoning suggests that for highly empathetic people, their choices for others should be similarly impatient as their choices for themselves.

By contrast, our model does not yield a clear prediction regarding how individual differences in empathy influences the degree of agent's impatience. This is because higher empathy would increase both the weight on vicarious utility (i.e., ϕ_i) and the weight on reactive utility (w_i), which have opposite effects on agent's impatience. Therefore, our model does not predict a systematic moderation by trait empathy. Testing between these sets of predictions for individual difference variables will enable us to further disambiguate whether reactive utility is a necessary component in the self-other decision model.

Overview of Studies

We test predictions of the model in thirteen experiments ($N = 4,799$), as shown in Table 1. We first test the agent's impatience effect in Study 1 with choices between *SS* and *LL* financial rewards. We then present replications of this finding in seven studies (2A - 2G) across various decision contexts and stimuli, with consequential choices in two studies (2B & 2C). Next, we examine how agent's impatience is moderated by critical situational factors implied by the model, including delays in interpersonal affective feedback (Studies 3A and 3B), and lack of recipient specificity (Study 4). Finally, we explore if the decision-maker's individual differences in trait empathy (Study 5A) or visual processing (Study 5B) moderate the effect. These thirteen experiments yielded results highly congruent with our theorization and model predictions. We report all methods and measures in all studies and report secondary analyses in the supplementary web appendix. We share all data on OSF (https://osf.io/faj3r/?view_only=fb10bade1db44ceaa363f41ae1f7e56a).

Table 1. Summary of main results.

Study	<i>n</i>	Choice of <i>SS</i>		Other conditions/factors	The agent's impatience effect
		For a specified peer	For oneself		
Study 1	440	28.1%	18.8%	--	$\chi^2(1, N = 440) = 3.93, p = .015, \eta = .12$
Study 2A	403	49.2%	39.4%	--	$\chi^2(1, N = 403) = 3.93, p = .048, \eta = .10$
Study 2B	88	61.4%	34.1%	--	$\chi^2(1, N = 88) = 6.6, p = .018, \eta = .27$
Study 2C	116	41.4%	19.0%	--	$\chi^2(1, N = 116) = 6.9, p = .015, \eta = .24$
Study 2D	155	50.6%	27.6%	--	$\chi^2(1, N = 155) = 8.6, p = .003, \eta = .24$
Study 2E	420	51.4%	43.1%	--	GEE Wald $\chi^2(1, N = 840) = 14.44, p < .001$
Study 2F	383	56.3%	49.0%	--	GEE Wald $\chi^2(1, N = 1532) = 6.64, p = .010$
Study 2G	208	55.7%	41.8%	--	GEE Wald $\chi^2(1, N = 1872) = 13.51, p < .001$
Study 3A	637	43.0%	33.5%	<i>with delayed recipient feedback: 31.0%</i>	$b_{\text{for_other}} = .40, \text{Wald} = 4.01, p = .045;$ $b_{\text{delay}} = -.52, \text{Wald} = 6.65, p = .010$
Study 3B	605	67.5%	45.3%	<i>with delayed recipient feedback: 33.8%</i>	$b_{\text{for_other}} = .92, \text{Wald} = 19.7, p < .001;$ $b_{\text{delay}} = -1.40, \text{Wald} = 44.88, p < .001$
Study 4	533	60.0%	35.8%;	<i>For unspecified other: 42.1%</i>	McNemar's $\chi^2(1, N = 271) = 51.25, p < .001$
Study 5A	404	41.1%	31.9%	<i>Tested interaction with trait empathy</i>	McNemar's $\chi^2(1, N = 404) = 17.28, p < .001;$ GEE interaction <i>n.s.</i>
Study 5B	407	45.5%	33.4%	<i>Tested interaction with spontaneous usage of imagery</i>	McNemar's $\chi^2(1, N = 407) = 27.76, p < .001;$ GEE $b_{\text{interaction}} = .19, \text{Wald} = 13.33, p < .001$

STUDY 1: IMMEDIATE VS. DELAYED FINANCIAL REWARDS

In Study 1, we compared how participants made an intertemporal choice between *SS* and *LL* compensation options for another person, with how participants made the same choice for themselves, between subjects. Our main hypothesis (H1) suggests that participants will be more likely to choose the *SS* payment (vs. *LL* payment) when choosing for another person than when choosing for themselves, all else equal. We pre-registered this study (<https://aspredicted.org/blind.php?x=re5ur7>).

Method

We planned for a sample size of at least 400 and received 467 surveys from Prolific UK respondents. Per the pre-registered exclusion criteria, we obtained 440 complete and valid sets of responses ($M_{\text{age}} = 35$, 69% female) after excluding 15 incomplete entries, 12 participants who failed a generic instructional manipulation check (IMC), and 23 participants who failed an additional attention check about the content of the survey. Similar screening procedures were used in the other online samples. Details of the screening procedures and pre-registration links for all studies are reported in full detail in the web appendix (Table S1).

Participants were asked for the first name of a friend with whom they often spent time. Then participants were asked to imagine that a local pizza franchise invited customers to fill out an extensive online survey about their food delivery services. Survey-takers were compensated with digital vouchers that could be used at any outlet of the franchise, and the digital vouchers will arrive in the survey-taker's email and have no expiration date.

Participants were randomly assigned to one of two (choice for self vs. choice for other) between-subjects conditions. In the choice-for-self condition, participants were asked to imagine that they had taken part in the survey and were given a choice between two options for the digital voucher: "to receive a £8 voucher today," or "to receive a £10 voucher in two weeks." Participants were asked "Which option would you choose?" In the choice-for-other condition, participants were asked to imagine that the friend took part in the survey and was given a choice between two options for the digital voucher, as in the for-self condition. Participants were then asked, "If [the friend] asked you to choose between the options on behalf of him/her, which option would you choose for [the friend]?" Participants made a binary choice between the two options, completed a generic IMC, and indicated their gender and age.

Results

Consistent with the hypothesized agent's impatience, participants in the choice-for-other condition were more likely to choose the *SS* payment (£8 voucher today) than were participants in the choice-for-self condition (28.1% for other vs. 18.8% for oneself, $\chi^2(1, N = 440) = 3.93, p = .015, \eta = .12; b_{\text{recipient}} = -.55, \text{Wald} = 5.92, p = .015$; Figure 1). Gender and age did not influence choice or moderate this effect.

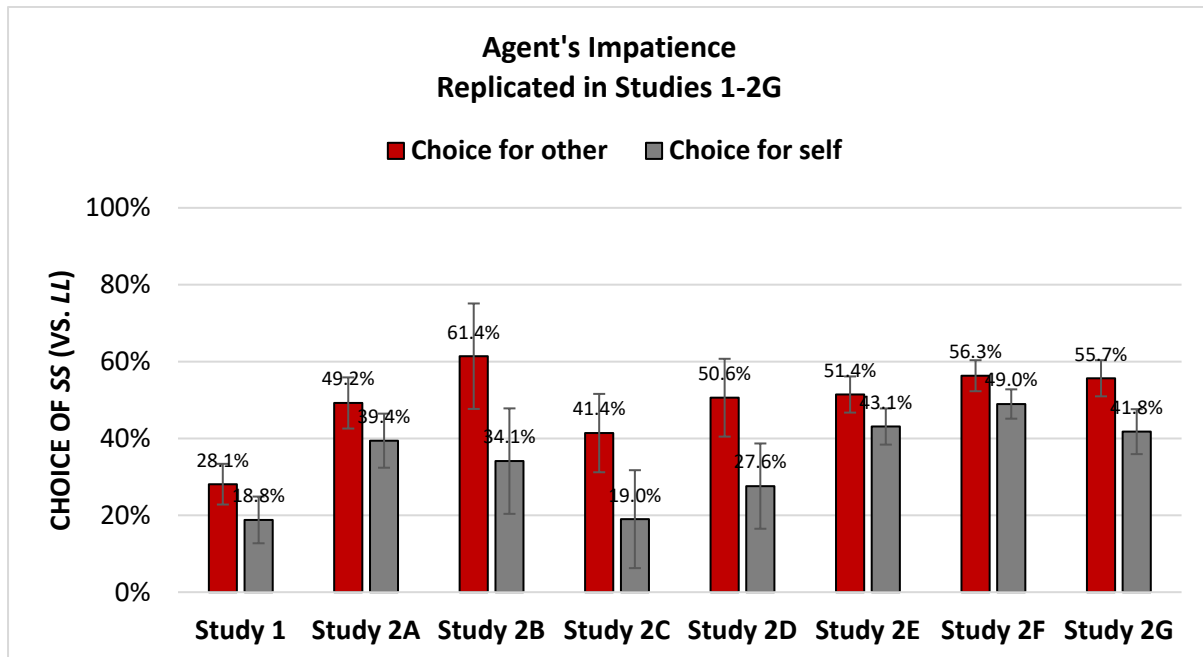


Figure 1. Summary of main effects across Studies 1-2G. Participants were more likely to choose the *SS* payment when deciding for a peer than when deciding for themselves. Error bars represent 95% confidence intervals.

Discussion

Study 1 supports the agent's impatience hypothesis (H1): participants were more likely to choose the *SS* option when making an intertemporal choice for a specified friend than when asked to make an otherwise identical intertemporal choice for themselves. Next, in Studies 2A-2G, we test the robustness and generalizability of this effect across a variety of choice stimuli and decision contexts, including decisions with behavioral consequences.

STUDIES 2A–2G:

REPLICATION AND GENERALIZATION ACROSS STIMULI AND CONTEXTS

Each of the seven studies (2A-2G) followed the basic paradigm in Study 1, having participants choose between an *SS* and an *LL* option, either for themselves or for another specified person. All studies randomly assigned participants to either a choice-for-self or a choice-for-other between-subjects conditions, except Study 2E in which this factor was within-subjects. More specifically, Study 2A tested choices between *SS* and *LL* financial rewards for online freelance work in a different population and context than Study 1. Studies 2B, 2C, and 2D each tested the effect in consequential decisions. Studies 2E, 2F, and 2G tested the effect's generalizability to non-monetary rewards, using choices between consumer goods.

We also varied the type of peer relationships across these studies: either two strangers who had been randomly paired up and became acquainted during the study (Study 2B), a pair of friends who visited the lab together (Study 2C), or the participant and a friend who came to the participant's mind (all other studies). We pre-registered Studies 2A, 2E, and 2F (see Table S1 in the web appendix).

Method

We summarize here the key details that distinguish the studies, and report additional details, including screening procedures and secondary exploratory measures, in the web appendix (section II).

Study 2A. We recruited participants from Amazon Mechanical Turk (MTurk) and received 403 complete and valid responses ($M_{\text{age}} = 38$, 51% female, $M_{\text{closeness}} = 8.71$). The procedure was similar to Study 1, except that the financial rewards (“receive \$8 today” versus “receive \$10 in two weeks”) were from completing MTurk HITs and were presented as either regular remuneration or a bonus payment (to test generalizability to windfall gains). Thus, the study had a 2 (recipient: choice for self vs. choice for other) x 2 (description: remuneration

vs. bonus payment) factorial design. In addition, participants were asked to indicate how close they felt toward the listed friend on a 10-point scale (1 = not close at all, 10 = extremely close).

Study 2B. We recruited 88 participants in the behavioral lab of a large US Midwestern university ($M_{\text{age}} = 26$, 52% female, $M_{\text{closeness}} = 4.5$ out of 10). We randomly paired up the participants and asked each pair to first engage in a 5-minute relationship-closeness induction task (RCIT; Sedikides et al. 1999). Then, the paired participants were split up into two different rooms, played and won an online game together as a team. We asked one participant (randomly assigned to be the decision-maker) to choose between two bonus payments for the other participant (assigned to be the recipient): either a \$4 Amazon e-gift card redeemable right away or a \$5 Amazon e-gift card redeemable in ten days, both of which would be delivered via email immediately after the experiment. The recipients learned that they would receive the bonus payment and were asked which of the two options they preferred. Participants then rated their interpersonal closeness and mood and indicated their gender and age. The experimenter debriefed and paid them and then immediately emailed the recipient the bonus payment chosen by the decision-maker.

Study 2C. We recruited pairs of friends to the behavioral lab of a large US Midwestern university and received 116 participants ($M_{\text{age}} = 19$, 53% female, $M_{\text{closeness}} = 6.3$). Because the participants were already friends, the RCIT was not used. Decision-makers chose between a \$5 Starbucks gift card redeemable right away and a \$6 Starbucks gift card redeemable in two weeks, and the decision-maker (instead of the experimenter) handed the gift card to the recipient at the end of the experiment.

Study 2D. We recruited students from two MBA class sessions at a large US Midwestern university for a 5-minute “Thanksgiving Survey” on paper during a class break and received 155 participants ($M_{\text{age}} = 29$, 39% female, 3 gender undisclosed, $M_{\text{closeness}} = 7.0$).

We offered each student a small candy bar and a chance to receive a monetary bonus in return for participation. Participants first wrote down a specific friend to whom they would like to express gratitude and with whom they would meet up in the coming weeks (near Thanksgiving), and a short thank-you message to that friend. On the second page, participants were presented with two Starbucks gift cards (\$5 now or \$6 in two weeks). In the choice-for-self condition, participants were asked first to choose between the two options for themselves, and then to indicate what they would have chosen if they were choosing a gift for their listed friend instead. In the choice-for-other condition, participants were asked first to make a choice for the friend they had listed, and then to indicate what they would have chosen if the choice had been for themselves instead. In both conditions, it was made clear that the first and second choices were independent to each other. Participants then answered questions about their perceived closeness with the friend, perceived similarity between the friend and the participant, mood, and gender and age. Upon completing the survey, the participants in the choice-for-self condition received the gift card that they had chosen for themselves, whereas the participants in the choice-for-other condition received the gift card that they had chosen for the listed friend, with the instruction to give the gift card to the friend when they met up in the coming weeks.

Study 2E. We recruited participants from MTurk and received 420 complete and valid responses ($M_{\text{age}} = 38$, 48% female). This study had a mixed design with 2 (recipient: choice for self vs. choice for other) within-subjects conditions and 2 (consumer goods: affect-rich vs. affect-poor) between-subjects conditions, with the order between recipients counterbalanced. Motivated by debates about whether time discounting is domain-specific, such that the discount factor is steeper for affect-rich goods than affect-poor goods (e.g., Odum and Rainaud 2003, Tsukayama and Duckworth 2010; see critiques in Holt et al. 2016; Sawicki, Markiewicz, & Bialek 2019; Urminsky & Kim 2021), we tested the generalizability of

agent's impatience across consumer goods of different affective values. Participants were asked to read a scenario in which an online store rewarded its loyal customers (including the participant) with store credits as part of their customer loyalty program. Similar to Study 2D, each participant made two decisions in a counterbalanced order: choosing store credits for themselves and for a friend they had listed, based on the same scenario, yet independent to each other. The two options were "store credits of \$18 value redeemable immediately on the website" and "store credits of \$25 value redeemable in 4 weeks (when the website is updated to accept the code)." We also randomly assigned participants to either an affect-rich condition, in which the store credits could be redeemed for chocolate candies only, or an affect-poor conditions, in which the store credits could be redeemed for vitamin supplements only. We included a manipulation check for the affective value of the products, adapted from Rottenstreich and Hsee (2001).

Study 2F. We recruited participants from MTurk and received 383 complete and valid responses ($M_{\text{age}} = 38$, 47% female). Participants were randomly assigned to either choice-for-self or choice-for-other conditions, and then made four different types of consumer choices, which have been theorized as involving explicit or implicit intertemporal tradeoffs (Khan, Dhar, and Wertenbroch 2005; Milkman, Rogers, and Bazerman 2008). Thus, the study had a mixed design with 2 (recipient: choice for self vs. choice for other) between-subjects conditions and 4 (choice type) repeated choice measures. The four choices were between financial rewards (\$50 cash vs. \$60 cash in two weeks), product purchases (standard headphones now vs. premium headphones when back in stock in a month), entertainment (a sit-com episode vs. an educational documentary), and food (a tempting dessert vs. a healthier salad).

Study 2G. We recruited participants from MTurk and received 208 complete and valid responses ($M_{\text{age}} = 35$, 50% female). The study had a mixed design with 2 (recipient: choice

for self vs. choice for other) between-subjects conditions and 9 (product domains) repeated measures. Each of the nine consumer choices had an explicit intertemporal tradeoff with both *SS* and *LL* options from the same product category (cash, e-gift cards, dinnerware, snacks, wallets, dinner reservations, concert tickets, iTunes songs, and ice cream vouchers; Table S2 in the web appendix). For example, for dinnerware, participants chose between “a set of 6 pieces of sturdy dinnerware shipped and delivered this week” (the *SS* option) and “a set of 10 pieces of sturdy dinnerware shipped and delivered next month” (the *LL* option); for concert tickets, participants chose between “a back-section ticket for a big concert this weekend” (the *SS* option) and “a middle-section ticket for a big concert in six months” (the *LL* option).

Results

Participants in the choice-for-other condition were more likely to choose the *SS* option than participants in the choice-for-self condition across all the studies, as shown in Figure 1 (Study 2A: 49.2% vs. 39.4%, $\chi^2(1, N = 403) = 3.93, p = .048, \eta = .10$; Study 2B: 61.4% vs. 34.1%, $\chi^2(1, N = 88) = 6.6, p = .018, \eta = .27$; Study 2C: 41.4% vs. 19.0%, $\chi^2(1, N = 116) = 6.9, p = .015, \eta = .24$; Study 2D: 50.6% vs. 27.6%, $\chi^2(1, N = 155) = 8.6, p = .003, \eta = .24$; Study 2E: 51.4% vs. 43.1%, GEE Wald $\chi^2(1, N = 840) = 14.44, p < .001$ correcting for repeated measures; Study 2F: 56.3% vs. 49.0%, GEE Wald $\chi^2(1, N = 1532) = 6.64, p = .010$; Study 2G: 55.7% vs. 41.8%, GEE Wald $\chi^2(1, N = 1872) = 13.51, p < .001$).

The results were robust to the numerous factors that were manipulated or measured. Agent’s impatience generalized to a variety of financial rewards (Studies 2A, 2B, 2C, and 2D) and to consumer choices (Studies 2E, 2F and 2G), including consequential choices (Studies 2B, 2C and 2D), repeated choices (Studies 2F and 2G), and within-subjects tests (Studies 2E and 2D). Further, agent’s impatience was robust to a variety of contextual factors not predicted to matter in the model: We found no evidence that the difference in choices for self versus choices for a peer depended on framing the financial rewards as remuneration vs.

bonus (Study 2A, interaction $p = .892$), affective-richness of the rewards (Study 2E, interaction $p = .326$), or explicitness of the intertemporal tradeoff (Study 2F, interaction $p = .575$).

Moreover, in Studies 2D and 2E where participants made both choices for self and for other, we regressed choice for others on choice for self (choices coded as $SS = -1$ and $LL = 1$) and found that the intercept was significant and negative (Study 2D: $b = -1.28$, Wald = 25.2, $p < .001$; Study 2E: $b = -.50$, Wald = 14.7, $p < .001$), verifying the agent's impatience effect while controlling for own preferences. Furthermore, in the same regressions, choice for self positively predicted choice for others (Study 2D: $b = 1.22$, Wald = 22.7, $p < .001$; Study 2E: $b = 1.43$, Wald = 121.9, $p < .001$), consistent with our model assumption that vicarious utility involves egocentric projection of one's own intertemporal preferences onto the recipient.

Last, closeness of relationship to the recipient, mood, gender, and age did not consistently moderate the effect of decision recipient (self vs. other) on choice, and the effect persisted when we controlled for mood or other covariates.

Discussion

These seven replication studies revealed strong support for our hypothesis (H1) that people are more likely to make an "impatient" choice when choosing for a peer than when making an otherwise identical choice for themselves. Moreover, because choice of SS for a specified peer was not only higher than choice for oneself in all studies, but also significantly higher than 50% in Study 2B (as well as Studies 3B and 4 later; see Table 1), the agent's impatience effect cannot be explained by indifference between the options when making choices for others (which predicts choice shares to be generally closer to 50%-50% in choice-for-other conditions than in choice-for-self conditions).

STUDY 3A & 3B: WHEN INTERPERSONAL FEEDBACK IS DELAYED

Our model also predicts circumstances under which agent's impatience should be reduced or even eliminated. A key boundary condition is the timing of the interpersonal feedback, which we test in two parallel studies. Both Studies 3A and 3B had 3 between-subjects conditions (choice for self vs. choice for other with an immediate reaction vs. choice for other with the reaction delayed). Given that the value of reactive utility will be lower when more delayed, decision-makers' choices for another person are predicted in our model to be more patient and more similar to choices for themselves when the recipient reaction is delayed (H2). We pre-registered both Study 3A (<https://aspredicted.org/blind.php?x=4gs7xr>) and Study 3B (<http://aspredicted.org/blind.php?x=ky4ez2>).

Method

In Study 3A, we recruited 700 participants from MTurker and obtained 637 complete and valid responses ($M_{\text{age}} = 39$, 48% female). Participants were asked to imagine that they have two friends, Alex and Blair, who also work on MTurk from time to time. In the scenario, both Alex and Blair are similar to the participant in many ways. The participant's friendships with Alex and Blair were equally close, and the participant meets up with either Alex or Blair equally often. Participants then read that, due to upcoming events that they had committed to, that "You are going to meet up with Alex and hang out this evening. You won't be able to see Blair until after about a month."

Participants were randomly assigned into the three conditions. In the choice-for-self condition, participants were asked to imagine that they would be receiving a payment from one of their recent HITs and needed to choose between two options: \$5 today or \$6.50 in two weeks. In both choice-for-other conditions, participants read that their friend [Alex/Blair] asked the participant to take care of their MTurk account for one day since they did not have access to internet that day. Participants logged on [Alex/Blair]'s account and found that they

had to make a choice between two payment options, identical to that in the choice-for-self condition. Thus, in the immediate reaction version, participants were asked to make a choice for Alex, and in the delayed reaction version, participants were asked to make a choice for Blair. After participants indicated their choice, they completed a generic IMC and indicated their gender and age.

In Study 3B, we recruited 650 MTurkers and obtained 605 complete and valid completes ($M_{\text{age}} = 37$, 48% female). The procedure was similar to that of Study 3A except that the scenario and intertemporal choice involved choosing between Starbucks reward points instead of work payment. We asked participants to imagine that they often visited Starbucks and used a Starbucks rewards phone application, which awards stars as reward points for purchases. Participants read that they had just received a message via their Starbucks app and were asked to make a choice (for themselves, Alex, or Blair) between “receive 100 stars (US\$10) today” and “receive 125 stars (US\$12.50) in three weeks.” Every ten stars are worth US\$1, and customers can apply these stars to any in-store purchases with no expiration date.

Results

In Study 3A, participants’ choices differed significantly across the three conditions ($\chi^2(1, N = 637) = 7.56, p = .023$). Participants who were asked to choose for Alex (whose affective feedback would occur sooner) were more likely to choose the *SS* option (43.0%) than participants who were asked to choose either for Blair (whose affective feedback would be delayed; 31.0%), or than participants who were asked to choose for themselves (33.5%).

We dummy-coded recipient (for self = 0, for other = 1) and reaction delay (for self or for Alex / immediate = 0, for Blair / delayed = 1). Using these predictor variables, a binary logistic regression predicting choice of *SS* ($SS = 1, LL = 0$) revealed that participants who chose for another were more likely to choose *SS* than participants who chose for themselves

($b_{\text{for_other}} = .40$, Wald = 4.01, $p = .045$), and participants who chose in a delayed-reaction scenario were less likely to choose *SS* than in an immediate-reaction scenario ($b_{\text{delay}} = -.52$, Wald = 6.65, $p = .010$).

In Study 3B, participants' choices likewise differed significantly across the three conditions ($\chi^2(1, N = 605) = 48.35$, $p < .001$). Participants who were asked to choose for Alex (whose affective feedback would occur immediately) were more likely to choose the *SS* option (67.5%) than participants who were asked to choose for Blair (whose affective feedback would be delayed; 33.8%), or participants who were asked to choose for themselves (45.3%). Using the same dummy coding as Study 3A, a binary logistic regression revealed that participants who chose for another were more likely to choose *SS* than participants who chose for themselves ($b_{\text{for_other}} = .92$, Wald = 19.7, $p < .001$), and participants who chose in a delayed-reaction scenario were less likely to choose *SS* than in an immediate-reaction scenario ($b_{\text{delay}} = -1.40$, Wald = 44.88, $p < .001$).

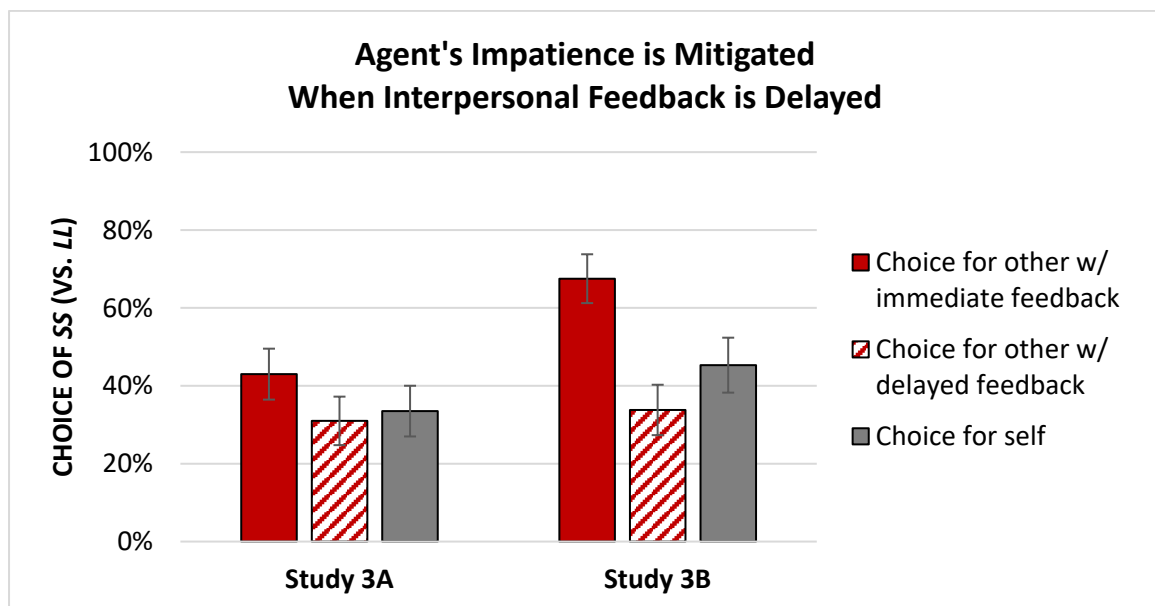


Figure 2. Summary of results in Studies 3A and 3B. Error bars represent 95% confidence intervals.

Discussion

Study 3A supported our prediction, per H2, that agent's impatience occurs only when the decision-maker anticipates immediate interpersonal feedback, and not when the decision-maker anticipates delayed interpersonal feedback. These findings were fully replicated in study 3B.

STUDY 4: THE ROLE OF RECIPIENT SPECIFICITY

Another critical moderator of the agent's impatience effect is recipient specificity (H3)—whether the decision-maker was choosing for a specified or generic other person. We test this moderator in Study 4 using a mixed design, with 2 (decision recipient: for self vs. for other) within-subjects repeated measures and 2 (recipient specificity: specified vs. unspecified) between-subjects conditions. When the decision recipient was specified, the model predicts that participants who chose for another will be more impatient than participants who chose for themselves, because the specificity of the decision recipient facilitates the vivid mental simulation of interpersonal affective reactions, which increases the relative impact of reactive utility. When the recipient was unspecified, we expect that participants who chose for another will be less likely to visualize an affective reaction, which renders their decision for the other person more similar to their choice for self because the choice for other would be based relatively more on vicarious utility.

Another purpose of this study was to directly test the relative impact of expected vicarious utility and expected reactive utility in the decision process of choosing for specified versus unspecified others. We asked participants to predict their recipient's evaluation of each option and to predict their recipient's reaction to each option. We then tested whether these differences mediated the difference between choices for a specified vs. unspecified other person. We pre-registered this study (<https://aspredicted.org/blind.php?x=jj7ia3>).

Method

We received 533 complete and valid responses ($M_{\text{age}} = 37$, 49% female) from MTurk after applying the pre-registered screening procedure (Table S1 in the web appendix).

Participants were first instructed, “Think of a person that you do not know very well but frequently interact with (e.g., a barista at a local coffee shop) [and] briefly describe the person you are thinking about.” We referred to the listed person as Person A in the subsequent scenario. Participants then read that many consumers, including Person A, filled out a large-scale online survey from Starbucks and were compensated with store credit. These consumers were given a choice between two options: receive \$28 in store credit today or receive \$35 in store credit in three weeks. We randomly assigned participants to two conditions. In the specified-recipient condition, participants read, “Imagine that Person A took part in the survey and was given these two options. If you were asked to choose on behalf of Person A, which option would you choose for Person A?” In the unspecified-recipient condition, participants read, “Imagine the average customer who took part in the survey and was given these two options. If you were asked to choose on behalf of the average customer, which option would you choose?”

After participants made a choice, they were asked to predict how the recipient would react to each option (“How do you think [the recipient] would react to receiving [option] (i.e., with facial and bodily expressions of emotion)?”) and how the recipient would evaluate each option (“How do you think [the recipient] would evaluate (i.e., objectively assess) the receipt of [option]?”, on two 9-point scales; -4 = very negatively, 4 = very positively). Next, in the choice for self, participants were asked, “Imagine instead that you took part in the survey and were given the two options of compensation. Which option would you choose for yourself?” Last, participants indicated the perceived closeness between themselves and the recipient on a 10-point scale (1 = not close at all, 10 = extremely close), completed a generic IMC,

completed an additional attention check about the content of the study, and indicated their gender and age.

Results

Comparing the first choice made by each participant across conditions, those who chose for a specified other were more likely to choose *SS* (60.0% for person A) than participants who chose for an unspecified other (42.1% for the average customer; $\chi^2(1, N = 533) = 13.50, p < .001, \eta = .16; b_{\text{recipient_specificity}} = .64, \text{Wald} = 13.38, p < .001$). Participants' choices for themselves did not differ significantly between specificity conditions (35.8% vs. 37.4%, $\chi^2(1, N = 533) = .15, p = .699$).

Next, comparing the within-subjects choices, participants were much more likely to choose *SS* for a specified other (60.0%) than to choose *SS* for themselves (35.8%; McNemar's $\chi^2(1, N = 271) = 51.25, p < .001$). Participants also were somewhat more likely to choose *SS* for an unspecified other (42.1%) than to choose *SS* for themselves (37.4%; McNemar's $\chi^2(1, N = 262) = 5.03, p = .025$), but the difference was smaller when the recipient was specified vs. unspecified ($\Delta = 24.2\%$ vs. 4.8%). Generalized estimation equations confirmed that the non-specific recipient significantly reduced the agent's impatience effect (interaction between self vs. other and recipient specificity condition, Wald $\chi^2(1, N = 1066) = 20.71, p < .001$).

Next, we examined decision-makers' anticipation of recipient reactions and recipient evaluations. First, recipient specificity influenced participants' anticipation of both recipient reactions and recipient evaluations: participants expected larger differences in recipient reactions to the two options when the decision recipient was a specified person than when the decision recipient was unspecified ($\Delta_{\text{reaction}} = 1.05$ vs. .47; $F(1, 531) = 12.64, p < .001$; Table S4 in the web appendix), with more positive reactions for the sooner option. Participants also expected larger differences between recipient evaluations of the two options when the

decision recipient was a specified person than when the decision recipient was unspecified ($\Delta_{\text{evaluation}} = .82$ vs. $.29$; $F(1, 531) = 8.78, p = .003$). More importantly, the difference in anticipated reactions to the options mediated the effect (indirect effect = $.24, SE = .09, CI_{95\%} = [.09, .44]$), even when controlling for the difference in anticipated evaluations (indirect effect = $.18, SE = .08, CI_{95\%} = [.05, .36]$).

We also conducted separate multivariate binary logistic regressions to examine the predicted impact of anticipated recipient reactions and recipient evaluation on choices, controlling for egocentric projection. Among participants who chose for a specified other person, the difference in anticipated reactions significantly predicted choice ($b_{\Delta\text{reaction}} = -.54, Wald = 15.13, p < .001$) whereas the difference in anticipated evaluations only had a directional effect ($b_{\Delta\text{evaluation}} = -.17, Wald = 1.94, p = .164$). Among participants who chose for an unspecified other, the difference score of anticipated reactions and of anticipated evaluation had similar coefficients ($b_{\Delta\text{reaction}} = -.31, Wald = 3.89, p = .049$; $b_{\Delta\text{evaluation}} = -.37, Wald = 6.34, p < .012$). In both regressions, choices for oneself also strongly predicted choices for others (for the specified other $b = 3.19, Wald = 45.18, p < .001$; for the unspecified other $b = 3.48, Wald = 68.49, p < .001$), consistent with the assumption that own impatience is projected. In sum, anticipated reactions significantly explained the other-oriented decision process, separately from the role of anticipated evaluations.

Last, as intended, interpersonal closeness with the decision recipient did not differ between the specified and unspecified other ($M_{\text{closeness}} = 4.07$ for the specified other, $SD = 2.29$ vs. $M_{\text{closeness}} = 3.91$ for the unspecified other, $SD = 2.66, t(514.3) = -.73, p = .463$).

Closeness, gender, and age did not moderate the effect.

Discussion

We observed a large agent's impatience effect when the decision recipient was specified, and this effect was nearly eliminated when the recipient was unspecified. In other

words, decision-makers are more likely to make an “impatient” intertemporal decision for another person if they can imagine the decision recipient’s affective reactions, compared to when choosing for a person for whom the interpersonal consequences are hard to imagine. These results support model predictions that recipient specificity is a critical moderator of the effect (H3).

This moderator also helps reconcile our findings with prior research, which had concluded that choices for another (unspecified) person were not as “impatient” as choices for oneself (Albrecht et al. 2010; Pronin, Olivola, and Kennedy 2008; Takahashi 2007; Ziegler and Tunney 2012). Our results in Study 4 suggest that the differences between our findings and prior results can be explained by recipient specificity, which modulates the extent to which the decision-maker relies on the anticipated or imagined future interpersonal consequences in their decision process. More specifically, choices for another person are more “impatient” than choices for oneself when the decision recipient is a specified, identifiable individual—as in our studies, and as is typically the case in real-world choices for others. By contrast, agent’s impatience no longer holds when the recipient is an arbitrary, unspecified other person—as was the case in the prior research.

This study also provided additional process evidence that further supported our theorization. First, the distinct influences of vicarious utility and reactive utility on choice were confirmed, in line with our model. Second, reactive utility played the primary role in causing agent’s impatience. Third, and complementing these results, we also found that egocentric projection was a relatively larger component in choice for the unspecified other than in choice for the specified other, because choice for oneself correlated more strongly with choice for unspecified other ($r = .70, p < .001$) than with choice for specified other ($r = .53, p < .001$). These results corroborate converging evidence in the prior literature that observed and anticipated external displays of interpersonal affect exert a direct influence on

social behaviors(e.g., Knapp & Hall, 2013; Niedenthal et al., 2010; Nikitin & Freund, 2019; Tsukiura & Cabeza, 2008; Yang & Urminsky, 2018), contrary to some prior theorizing which had assumed that affective reactions are mere external displays of internal appraisal outcomes (e.g., evaluation; see Kaiser & Wehrle 2001).

It is notable that the predicted moderation occurred despite the use of a hypothetical scenario in this study. Obviously, in this setting, decision-makers are not anticipating actual reactive utility from a post-decision interaction with the recipient. However, because specifying the recipient facilitates participants' simulation of a hypothetical anticipated affective reaction, the model predicts a stronger agent's impatience effect for the specified recipient, even in hypothetical choice. This feature of our model is consistent with findings in the charitable giving literature that donations increase when the funds would go to an identifiable victim even though no subsequent social interactions or reactions would ensue (Small & Loewenstein, 2003, 2005). Therefore, our model predicts similar results for real and hypothetical decisions as long as the recipient is a specified person whose affective reactions are vividly imaginable.

STUDIES 5A AND 5B: INDIVIDUAL DIFFERENCES IN VISUAL PROCESSING VS. EMPATHY

Next, we examine the degree to which agent's impatience is influenced by individual differences. We test two sets of predictions: one derived from theories of psychological distance (the theoretical basis of previous accounts), and the other derived from our model. More specifically, we conducted Study 5A to test whether the decision-maker's degree of empathy moderates agent's impatience, as predicted by the standard psychological distance account, and we conducted Study 5B to test the prediction that the decision-maker's reliance

on visual processing style moderates agent's impatience (H4). We test these two individual difference measures in otherwise identical but separate studies so that measurement of one factor that does not affect measurement of the other. Both studies had a within-subjects design of 2 (recipient: for oneself vs. for other) decisions, with individual differences in empathy (Study 5A) and in visual processing style (Study 5B) measured at the end of the studies. We pre-registered both studies (https://aspredicted.org/64C_Z2R and https://aspredicted.org/X1Q_SN8).

Method

In Studies 5A and 5B, we received 404 and 407 complete and valid responses ($M_{\text{age}} = 36.3$, 69% female, 8 non-binary; $M_{\text{age}} = 39.6$, 66% female, 8 non-binary) after applying the pre-registered screening procedure, respectively.

The procedure in both studies was identical to the specific other condition in Study 4: Participants were asked to imagine an acquaintance, indicated a decision they would make for the acquaintance, and then indicated a decision they would make for themselves under the same circumstances.

After that, participants completed additional measures. In Study 5A, participants were asked to complete the full empathy scale from Reniers et al. (2011), which included five subscales capturing different aspects of empathy, including perspective taking and emotion contagion. In Study 5B, we included three measures. First, participants were asked to indicate how vivid the mental imagery of the recipient was in their mind, a 5-point scale adapted from the Vividness of Visual Imagery Questionnaire (Marks 1973), where a lower number indicates greater vividness (1= "Perfectly clear and as vivid as normal vision" and 5 = "No image at all, you only "know" that you are thinking of the object"). Second, participants completed a spontaneous usage of imagery scale (SUIS; Nelis et al. 2019), which measures spontaneous engagement in visual processing during decision making, where a higher score

indicates greater reliance on visual processing. Last, participants completed the style of processing questionnaire (Childers et al. 1985), which measures a general tendency to engage in visual vs. verbal processing of information.

Results

Study 5A

Participants were more likely to choose *SS* when choosing for another person (41.1%) than when choosing for self (31.9%; McNemar's $\chi^2(1, N = 404) = 17.28, p < .001$). However, neither the overall QCAE empathy scale nor any of its subscales interacted with the within-subjects agent's impatience effect ($ps > .34$).

Study 5B

Participants were again more likely to choose *SS* when choosing for another person (45.5%) than when choosing for self (33.4%; McNemar's $\chi^2(1, N = 407) = 27.76, p < .001$).

Furthermore, people chose more impatiently for others (but not for themselves) the more they vividly imagined the recipient. Participants who chose *SS* for the specified other person reported more vivid mental imagery (on the adapted VVIQ measure) than participants who chose *LL* for that person ($M_{SS} = 2.37, SD = 1.01$, vs. $M_{LL} = 2.61, SD = 1.01, t(405) = 2.34, p = .020$). In contrast, participants who chose *SS* versus *LL* for themselves reported similarly vivid mental imagery, $t > -1, p = .594$. A significant interaction between decision recipient (other vs. self) and imagery vividness validated these differences ($F(1, 405) = 4.36, p = .037$).

We then explored whether the individual differences in visual processing tendencies likewise moderated agent's impatience. We found that participants with a higher tendency to engage in spontaneous use of imagery (measured by the SUIS score) were more impatient in their choice for the specified other person but not for oneself ($F(1, 405) = 14.73, p < .001$; GEE $b_{\text{interaction}} = .19, \text{Wald} = 13.33, p < .001$; Figure 3). Indeed, the SUIS score negatively

correlated with low mental imagery vividness ($r = -.240, p < .001$), validating the relevance of visual processing in the decision process.

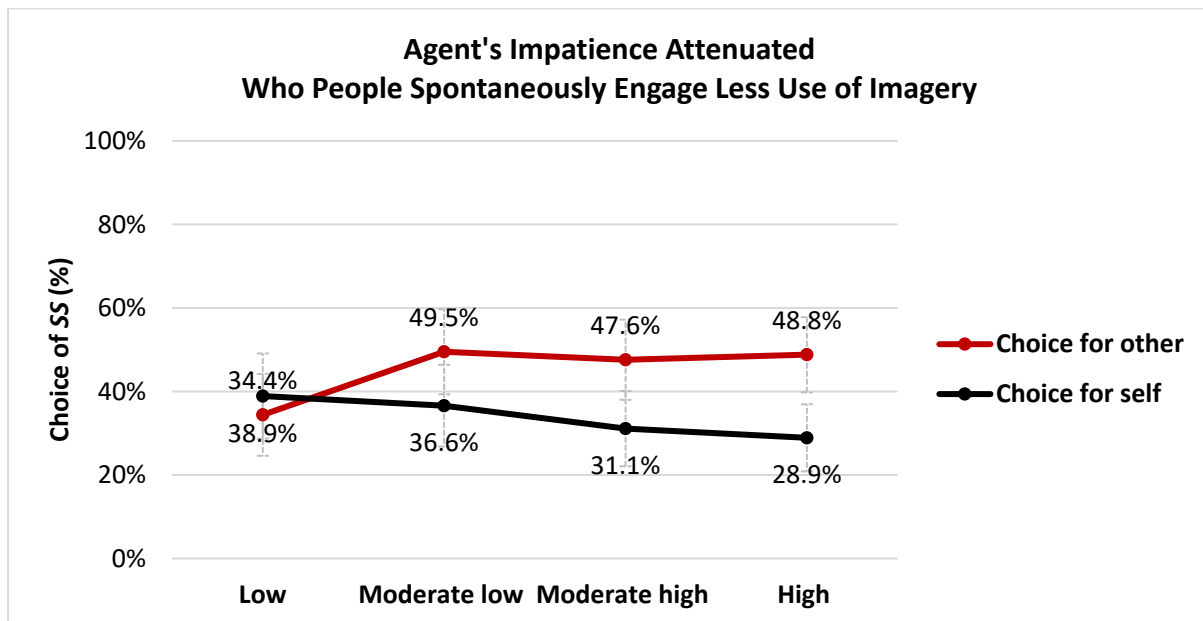


Figure 3. X axis represents four levels of spontaneous imagery use (SUIS); low = first quartile (<37), moderate low = between first and second quartiles (37-42), moderate high = between second and third quartiles (42,46), high = fourth quartile (≥ 46).

By contrast, we found that the more general visual vs. verbal style of processing scale did not moderate the effect ($p = .74$) and was not correlated with self-reported imagery vividness ($r = .035, p = .48$). Overall, our results suggest, based on two of the three included measures, that spontaneously engaging in more visualization during the intertemporal choices predicts greater impatience in choosing for others. This is consistent with the model prediction, under the assumption that greater visualization results in a greater weight on reactive utility.

Discussion

Participants' trait empathy did not moderate the effect in this study, or overall in another three studies (using different empathy measures, see web appendix). By contrast, the agent's impatience effect was stronger among participants who tend to rely spontaneously on visual processing. These results support H4 and are consistent with our theorization that

agent's impatience arises primarily from the steeper discounting of reactive utility tied to interpersonal affective reactions.

GENERAL DISCUSSION

We present the first set of experiments that systematically test differences between intertemporal choices for another person and otherwise identical choices for oneself. These experiments revealed that intertemporal choices for a specified peer recipient are typically more “impatient” than otherwise identical choices for oneself, different than previously theorized or reported. These results support our main hypothesis and other key predictions of a self-other decision model that incorporates interpersonal affective feedback into the intertemporal tradeoff. This research joins growing research that incorporates the role of affect into decision-making models (Lerner et al., 2015; Loewenstein & Lerner, 2003; Yang & Urminsky, 2018) and highlights the pivotal yet previously neglected role of interpersonal affective feedback in shaping self-other decisions.

In this research, we focused on intertemporal choices between peers who are presumably comparable and similar. This is admittedly a simplified assumption, and the role of salient self-other differences can be further incorporated into the decision model, among other potentially relevant factors. For example, previous theories suggest that increased social and psychological distance between the decision-maker and the recipient weakens the temptation of specifically immediate rewards. The model could be extended to incorporate this, by introducing a weight on the *SS* option in vicarious utility component that is reduced by psychological distance. Nevertheless, we would expect reactive utility to at least partially attenuate the effect of psychological distance on intertemporal choices, by motivating impatient choices for even psychologically distant peer recipients, as long as the recipient

reaction is visualizable.

Related, in this model, we restricted interpersonal feedback to the affective reaction and exclude other types of interpersonal feedback such as specific comments on decision quality. In some cases, indeed, recipients may offer explicit feedback about the “goodness of fit” between the recipient’s true preference and the decision-maker’s selection (e.g., Loewenstein, Thompson, and Bazerman 1989). In repeated choices, it is conceivable that such feedback will enable the decision-maker to learn valuable information about how much the recipient’s preference deviates from their own (e.g., the recipient is usually more vs. less patient than oneself). Therefore, should our model be expanded into a dynamic model of repeated choices, these factors should also be incorporated into the expected utility components.

Beyond decisions between peers, many other types of interpersonal decisions involve goals that introduce alternative or even competing considerations in the decision process, distinct from those that we focused on in this research. For example, parents making decisions for their children not only anticipate their children’s immediate affective feedback, but also expect their decisions to shape character and deliver substantial benefits in other regards. When doctors give medical advice or decisions to their patients, these decisions bear a host of physical, emotional, and legal consequences. In these decisions, while we expect the influence of interpersonal affective component to hold to varying degrees, we also conjecture that its influence can be overridden by other considerations, many of which tilt the overall intertemporal tradeoff toward beneficial future consequences (i.e., favoring larger-later options).

Previously, it has been often presumed or implied that the interpersonal delegation of intertemporal choices leads to more “far-sighted” decision outcomes. The present findings suggest that interpersonal decision-making may yield decisions that are more *short-sighted*,

as long as interpersonal affective feedback is in sight. These findings have implications for not only consumers but also marketers and policymakers. Consumers may benefit from taking this finding into account either when they make decisions for peers or when they relegate decisions to their peers. Marketers can use this insight to better predict and manage marketing outcomes that involve peer decisions, including agent decisions, gift choices, advice giving and recommendations. Policymakers can also use this insight to design decision systems that facilitate choices that lead to greater welfare consequences.

In everyday life, we are constantly interacting with others, making decisions that affect them, and experiencing how they react to our actions, immediately and in the future. There is a growing consensus that decisions for others implicate potentially gratifying social outcomes that involve complex intertemporal tradeoffs (Charlton et al., 2013; Galak et al., 2016), and the attainment of the social outcomes further shape subsequent choices (Liu et al., 2019; Wang et al., 2018; Yang & Urminsky, 2018). To truly understand self-other decision making, a comprehensive framework must incorporate not only intrapersonal processes of projection, estimation, and matching, but also the role of interpersonal affective reactions. When both components are taken into account, as in our model, intertemporal choice for others is revealed to entail not only judicious guesswork, but also impatient anticipation.

REFERENCES

- Albrecht, K., Volz, K. G., Sutter, M., Laibson, D. I., & von Cramon, D. Y. (2011). What is for me is not for you: Brain correlates of intertemporal choice for self and other. *Social Cognitive and Affective Neuroscience*, 6(2), 218–225.
<https://doi.org/10.1093/scan/nsq046>
- Argyle, M., Salter, V., Nicholson, H., Williams, M., & Burgess, P. (1970). The Communication of Inferior and Superior Attitudes by Verbal and Non-verbal Signals*. *British Journal of Social and Clinical Psychology*, 9(3), 222–231.
<https://doi.org/10.1111/j.2044-8260.1970.tb00668.x>
- Bartels, D. M., & Urminsky, O. (2015). To Know and to Care: How Awareness and Valuation of the Future Jointly Shape Consumer Spending. *Journal of Consumer Research*, 41(6), 1469–1485. <https://doi.org/10.1086/680670>
- Baumeister, R. F., Vohs, K. D., Nathan DeWall, C., & Zhang, L. (2007). How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation. *Personality and Social Psychology Review*, 11(2), 167–203.
<https://doi.org/10.1177/1088868307301033>
- Burns, K. L., & Beier, E. G. (1973). Significance of Vocal and Visual Channels in the Decoding of Emotional Meaning. *Journal of Communication*, 23(1), 118–130.
<https://doi.org/10.1111/j.1460-2466.1973.tb00936.x>
- Calvo, M., & Esteves, F. (2005). Detection of emotional faces: Low perceptual threshold and wide attentional span. *Visual Cognition*, 12(1), 13–27.
<https://doi.org/10.1080/13506280444000094>
- Charlton, S. R., Fantino, E., & Gossett, B. D. (2013). Hyperbolic discounting of delayed social interaction. *Learning & Behavior*, 41(2), 159–167.
<https://doi.org/10.3758/s13420-012-0093-3>

- de Waal, F. B. M. (2008). Putting the Altruism Back into Altruism: The Evolution of Empathy. *Annual Review of Psychology*, 59(1), 279–300.
<https://doi.org/10.1146/annurev.psych.59.103006.093625>
- Epley, N. (2008). Solving the (Real) Other Minds Problem. *Social and Personality Psychology Compass*, 2(3), 1455–1474. <https://doi.org/10.1111/j.1751-9004.2008.00115.x>
- Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective Taking as Egocentric Anchoring and Adjustment. *Journal of Personality and Social Psychology*, 87(3), 327–339. <https://doi.org/10.1037/0022-3514.87.3.327>
- Erlandsson, A., Björklund, F., & Bäckström, M. (2015). Emotional reactions, perceived impact and perceived responsibility mediate the identifiable victim effect, proportion dominance effect and in-group effect respectively. *Organizational Behavior and Human Decision Processes*, 127, 1–14. <https://doi.org/10.1016/j.obhdp.2014.11.003>
- Eyal, T., Steffel, M., & Epley, N. (2018). Perspective mistaking: Accurately understanding the mind of another requires getting perspective, not taking perspective. *Journal of Personality and Social Psychology*, 114(4), 547–571.
<https://doi.org/10.1037/pspa0000115>
- Farah, M. J. (2000). *The cognitive neuroscience of vision* (pp. xix, 380). Blackwell Publishing.
- Flavell, J. H. (1992). Perspectives on perspective taking. In *Piaget's theory: Prospects and possibilities* (pp. 107–139). Lawrence Erlbaum Associates, Inc.
- Fox, E. (2002). Processing emotional facial expressions: The role of anxiety and awareness. *Cognitive, Affective, & Behavioral Neuroscience*, 2(1), 52–63.
<https://doi.org/10.3758/CABN.2.1.52>

- Fox, E. (2005). The role of visual processes in modulating social interactions. *Visual Cognition*, 12(1), 1–11. <https://doi.org/10.1080/13506280444000067>
- Frederick, S., Loewenstein, G., & O’donoghue, T. (2002). Time Discounting and Time Preference: A Critical Review. *Journal of Economic Literature*, 40(2), 351–401. <https://doi.org/10.1257/jel.40.2.351>
- Galak, J., Givi, J., & Williams, E. F. (2016). Why Certain Gifts Are Great to Give but Not to Get: A Framework for Understanding Errors in Gift Giving. *Current Directions in Psychological Science*, 25(6), 380–385. <https://doi.org/10.1177/0963721416656937>
- Garcia-Rada, X., Anik, L., & Ariely, D. (2019). Consuming together (versus separately) makes the heart grow fonder. *Marketing Letters*, 30(1), 27–43. <https://doi.org/10.1007/s11002-019-09479-7>
- Gesiarz, F., & Crockett, M. J. (2015). Goal-directed, habitual and Pavlovian prosocial behavior. *Frontiers in Behavioral Neuroscience*, 9. <https://doi.org/10.3389/fnbeh.2015.00135>
- Gewirtz, J. L., & Pehlez-Nogueras, M. (1992). *B. E Skinner’s Legacy to Human Infant Behavior and Development*. 12.
- Gino, F., & Flynn, F. J. (2011). Give them what they want: The benefits of explicitness in gift exchange. *Journal of Experimental Social Psychology*, 47(5), 915–922. <https://doi.org/10.1016/j.jesp.2011.03.015>
- Grossmann, T. (2010). The development of emotion perception in face and voice during infancy. *Restorative Neurology and Neuroscience*, 28(2), 219–236. <https://doi.org/10.3233/RNN-2010-0499>
- Hasselmo, M. E., Rolls, E. T., & Baylis, G. C. (1989). The role of expression and identity in the face-selective responses of neurons in the temporal visual cortex of the monkey.

- Behavioural Brain Research*, 32(3), 203–218. [https://doi.org/10.1016/S0166-4328\(89\)80054-3](https://doi.org/10.1016/S0166-4328(89)80054-3)
- Jawed, S., Amin, H. U., Malik, A. S., & Faye, I. (2019). Classification of Visual and Non-visual Learners Using Electroencephalographic Alpha and Gamma Activities. *Frontiers in Behavioral Neuroscience*, 13, 86. <https://doi.org/10.3389/fnbeh.2019.00086>
- Jones, B., & Rachlin, H. (2006). Social Discounting. *Psychological Science*, 17(4), 283–286. <https://doi.org/10.1111/j.1467-9280.2006.01699.x>
- Knapp, M., & Hall, J. (2013). *Nonverbal Communication in Human Interaction 8th Edition Knapp Test Bank*. 27.
- Krueger, J. I. (2007). From social projection to social behaviour. *European Review of Social Psychology*, 18(1), 1–35. <https://doi.org/10.1080/10463280701284645>
- Laibson, D. (1997). Golden Eggs and Hyperbolic Discounting. *The Quarterly Journal of Economics*, 112(2), 443–478. <https://doi.org/10.1162/003355397555253>
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and Decision Making. *Annual Review of Psychology*, 66(1), 799–823. <https://doi.org/10.1146/annurev-psych-010213-115043>
- Liu, P. J., Dallas, S. K., & Fitzsimons, G. J. (2019). A Framework for Understanding Consumer Choices for Others. *Journal of Consumer Research*, 46(3), 407–434. <https://doi.org/10.1093/jcr/ucz009>
- Loewenstein, G., & Lerner, J. S. (2003). The role of affect in decision making. In *Handbook of affective sciences* (pp. 619–642). Oxford University Press.
- Loewenstein, G., & Prelec, D. (1992). Anomalies in Intertemporal Choice: Evidence and an Interpretation. *The Quarterly Journal of Economics*, 107(2), 573–597. <https://doi.org/10.2307/2118482>

- Malkoc, S. A., & Zauberan, G. (2006). Deferring versus Expediting Consumption: The Effect of Outcome Concreteness on Sensitivity to Time Horizon. *Journal of Marketing Research*, 43(4), 618–627. <https://doi.org/10.1509/jmkr.43.4.618>
- March, S., & Fleer, M. (2017). The Role of Imagination and Anticipation in Children's Emotional Development. In M. Fleer, F. González Rey, & N. Veresov (Eds.), *Perezhivanie, Emotions and Subjectivity: Advancing Vygotsky's Legacy* (pp. 105–127). Springer. https://doi.org/10.1007/978-981-10-4534-9_6
- Marks, D. F. (1973). VISUAL IMAGERY DIFFERENCES IN THE RECALL OF PICTURES. *British Journal of Psychology*, 64(1), 17–24. <https://doi.org/10.1111/j.2044-8295.1973.tb01322.x>
- Mazur, J. (1987). *The Effect of Delay and of Intervening Events on Reinforcement Value: Quantitative Analyses of Behavior, Volume V*. Psychology Press.
- Mazur, J. (2001). Hyperbolic value addition and general models of animal choice. *Psychological Review*, 108(1), 96–112. <https://doi.org/10.1037/0033-295X.108.1.96>
- Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106(1), 3–19. <https://doi.org/10.1037/0033-295X.106.1.3>
- Mullen, B., Dovidio, J. F., Johnson, C., & Copper, C. (1992). In-group-out-group differences in social projection. *Journal of Experimental Social Psychology*, 28(5), 422–440. [https://doi.org/10.1016/0022-1031\(92\)90040-Q](https://doi.org/10.1016/0022-1031(92)90040-Q)
- Nelis, S., Holmes, E. A., Griffith, J. W., & Raes, F. (2014). Mental imagery during daily life: Psychometric evaluation of the Spontaneous Use of Imagery Scale (SUIS). *Psychologica Belgica*, 54(1), 19–32. <https://doi.org/10.5334/pb.ag>
- Niedenthal, P. M., Mermillod, M., Maringer, M., & Hess, U. (2010). The Simulation of Smiles (SIMS) model: Embodied simulation and the meaning of facial expression.

Behavioral and Brain Sciences, 33(6), 417–433.

<https://doi.org/10.1017/S0140525X10000865>

Nikitin, J., & Freund, A. M. (2019). The Motivational Power of the Happy Face. *Brain Sciences*, 9(1), 6. <https://doi.org/10.3390/brainsci9010006>

Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25(1), 1–20.

<https://doi.org/10.1017/S0140525X02000018>

Pronin, E., Olivola, C. Y., & Kennedy, K. A. (2008). Doing Unto Future Selves As You Would Do Unto Others: Psychological Distance and Decision Making. *Personality and Social Psychology Bulletin*, 34(2), 224–236.

<https://doi.org/10.1177/0146167207310023>

Rand, D. G., Peysakhovich, A., Kraft-Todd, G. T., Newman, G. E., Wurzbacher, O., Nowak, M. A., & Greene, J. D. (2014). Social heuristics shape intuitive cooperation. *Nature Communications*, 5(1), 3677. <https://doi.org/10.1038/ncomms4677>

Samuelson, P. A. (1937). A Note on Measurement of Utility. *The Review of Economic Studies*, 4(2), 155. <https://doi.org/10.2307/2967612>

Scholten, M., & Read, D. (2010). The psychology of intertemporal tradeoffs. *Psychological Review*, 117(3), 925–944. <https://doi.org/10.1037/a0019619>

Small, D. A., & Loewenstein, G. (2003). Helping a Victim or Helping the Victim: Altruism and Identifiability. *Journal of Risk and Uncertainty*, 26(1), 5–16.

<https://doi.org/10.1023/A:1022299422219>

Small, D. A., & Loewenstein, G. (2005). The devil you know: The effects of identifiability on punishment. *Journal of Behavioral Decision Making*, 18(5), 311–318.

<https://doi.org/10.1002/bdm.507>

- Soman, D., Ainslie, G., Frederick, S., Li, X., Lynch, J., Moreau, P., Mitchell, A., Read, D., Sawyer, A., Trope, Y., Wertenbroch, K., & Zauberman, G. (2005). The Psychology of Intertemporal Discounting: Why are Distant Events Valued Differently from Proximal Ones? *Marketing Letters*, *16*(3–4), 347–360. <https://doi.org/10.1007/s11002-005-5897-x>
- Stenberg, G., Wiking, S., & Dahl, M. (1998). Judging Words at Face Value: Interference in a Word Processing Task Reveals Automatic Processing of Affective Facial Expressions. *Cognition and Emotion*, *12*(6), 755–782. <https://doi.org/10.1080/026999398379420>
- Takahashi, T. (2007). A comparison of intertemporal choices for oneself versus someone else based on Tsallis' statistics. *Physica A: Statistical Mechanics and Its Applications*, *385*(2), 637–644. <https://doi.org/10.1016/j.physa.2007.07.020>
- Tamir, D. I., & Mitchell, J. P. (2013). Anchoring and adjustment during social inferences. *Journal of Experimental Psychology: General*, *142*(1), 151–162. <https://doi.org/10.1037/a0028232>
- Toates, F. M. (1988). Motivation and Emotion from a Biological Perspective. In V. Hamilton, G. H. Bower, & N. H. Frijda (Eds.), *Cognitive Perspectives on Emotion and Motivation* (pp. 3–35). Springer Netherlands. https://doi.org/10.1007/978-94-009-2792-6_1
- Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist*, *44*(2), 112–119. <https://doi.org/10.1037/0003-066X.44.2.112>
- Tsukiura, T., & Cabeza, R. (2008). Orbitofrontal and hippocampal contributions to memory for face–name associations: The rewarding power of a smile. *Neuropsychologia*, *46*(9), 2310–2319. <https://doi.org/10.1016/j.neuropsychologia.2008.03.013>

- Urminsky, O., & Zauberman, G. (2015). The Psychology of Intertemporal Preferences. In G. Keren & G. Wu (Eds.), *The Wiley Blackwell Handbook of Judgment and Decision Making* (pp. 141–181). John Wiley & Sons, Ltd.
<https://doi.org/10.1002/9781118468333.ch5>
- Van Boven, L., & Loewenstein, G. (2003). Social Projection of Transient Drive States. *Personality and Social Psychology Bulletin*, 29(9), 1159–1168.
<https://doi.org/10.1177/0146167203254597>
- Van Boven, L., & Loewenstein, G. (2005). Empathy Gaps in Emotional Perspective Taking. In *Other minds: How humans bridge the divide between self and others* (pp. 284–297). Guilford Press.
- Van Boven, L., Loewenstein, G., Dunning, D., & Nordgren, L. F. (2013). Chapter Three - Changing Places: A Dual Judgment Model of Empathy Gaps in Emotional Perspective Taking. In J. M. Olson & M. P. Zanna (Eds.), *Advances in Experimental Social Psychology* (Vol. 48, pp. 117–171). Academic Press.
<https://doi.org/10.1016/B978-0-12-407188-9.00003-X>
- Walker, M. B., & Trimboli, A. (1989). Communicating Affect: The Role of Verbal and Nonverbal Content. *Journal of Language and Social Psychology*, 8(3–4), 229–248.
<https://doi.org/10.1177/0261927X8983005>
- Wang, X., Krumhuber, E. G., & Gratch, J. (2018). The interpersonal effects of emotions in money versus candy games. *Journal of Experimental Social Psychology*, 79, 315–327. <https://doi.org/10.1016/j.jesp.2018.08.014>
- Yang, A. X., & Urminsky, O. (2018). The Smile-Seeking Hypothesis: How Immediate Affective Reactions Motivate and Reward Gift Giving. *Psychological Science*, 29(8), 1221–1233. <https://doi.org/10.1177/0956797618761373>

Young-Browne, G., Rosenfeld, H. M., & Horowitz, F. D. (1977). Infant Discrimination of Facial Expressions. *Child Development*, 48(2), 555–562.

<https://doi.org/10.2307/1128653>

Zauberman, G., Kim, B. K., Malkoc, S. A., & Bettman, J. R. (2009). Discounting Time and Time Discounting: Subjective Time Perception and Intertemporal Preferences.

Journal of Marketing Research, 46(4), 543–556.

<https://doi.org/10.1509/jmkr.46.4.543>

Ziegler, F. V., & Tunney, R. J. (2012). Decisions for Others Become Less Impulsive the Further Away They Are on the Family Tree. *PLoS ONE*, 7(11), e49479.

<https://doi.org/10.1371/journal.pone.0049479>

The Agent's Impatience: A Self-Other Decision Model of Intertemporal Choices

SUPPLEMENTARY WEB APPENDIX

I. Additional modeling details

Derivation of the key prediction

In an intertemporal choice for oneself, the threshold for choosing SS is defined by $U_{SS}|0 > U_{LL}|0$ or, equivalently, by (1): $\frac{V_{SS}}{V_{LL}} > f$.

In an intertemporal choice for another person, the threshold for choosing SS is defined by $U_{SS}|1 > U_{LL}|1$ or, equivalently, by (2):

$$\frac{(\varphi f V_{LL} + \psi f_R R_{LL})}{(\varphi V_{LL} + \psi R_{LL})} = \frac{(\varphi f + \psi c f)}{(\varphi f + \psi c \frac{f}{f_R})} = f - \frac{(\psi c f (f - f_R))}{(\varphi f_R + \psi c f)}$$

Because $f - f_R > 0$, the value of threshold (2) is smaller than the value of threshold (1). Therefore, it is easier to attain threshold (2) than threshold (1). In other words, people will be more likely to choose SS when making an intertemporal choice for another person than when making an otherwise identical choice for themselves.

Expanded model of vicarious utility

More generally than specified in the paper, vicarious utility can be specified as involving an anchoring and adjustment process:

$$V_j(x_t) = V_i(x_t) + a (V_j(x_t) - V_i(x_t))$$

In this anchoring and adjustment model, the degree of anchoring on the self vs. adjustment in the direction of the recipient's actual preferences is governed by the parameter a . At one extreme, when $a = 0$, the decision-maker simply assumes that the recipient shares their own preference. In this paper, we have assumed this case. This is likely to be a reasonable assumption when investigating *average* choices, particularly those involving money or goods with homogeneous valuations. At the other extreme, when $a = 1$, the decision-maker has accurate beliefs about the recipient's preferences. Any other value of the parameter (i.e., $0 < a < 1$) reflects anchoring on own preferences and partially adjusting in the direction of the recipient's preference.

II. Additional materials and results

Table S1. Summary of screening procedure and results in all studies

Study	Recruited sample	Exclusions	Final sample	Pre-registration link
Study 1	Received 467 data entries from Prolific respondents (UK).	Per the pre-registered exclusion criteria (same for all pre-registered studies), we excluded 0 participants from duplicate IP addresses, 15 incomplete entries, 12 participants who failed a generic IMC, and 23 participants who failed an additional attention check about the content of the survey.	440	https://aspredicted.org/blind.php?x=re5ur7
Study 2A	Received 479 data entries on MTurk.	14 data entries for duplicate IP addresses, 27 incomplete entries, 12 participants who failed a generic IMC, and 23 participants who failed an additional attention check about the content of the survey.	403	https://aspredicted.org/blind.php?x=fv4un6
Study 2B	Received 88 lab participants.	N/A	88	N/A
Study 2C	Received 116 lab participants.	N/A	116	N/A
Study 2D	Recruited 117 MBA students during class break.	2 participants did not complete the questionnaire	115	N/A
Study 2E	Received 530 data entries on MTurk.	41 data entries from duplicate IP addresses, 23 incomplete entries, 28 participants who failed a generic IMC, and 18 participants who failed an additional attention check about content of the survey.	420	https://aspredicted.org/blind.php?x=y4kc7v
Study 2F	Received 484 data entries on MTurk.	24 data entries from duplicate IP addresses, 30 incomplete entries, 14 participants who failed a generic IMC, and 35 participants who failed an additional attention check about the content of the survey.	383	https://aspredicted.org/blind.php?x=94ib9j
Study 2G	Received 230 data entries on MTurk.	8 data entries from duplicate IP addresses, 4 incomplete entries, and 10 participants who failed a generic IMC.	208	N/A
Study 3A	Received 794 data entries on MTurk.	95 data entries from duplicate IP addresses, 51 incomplete entries, and 10 participants who failed a generic IMC.	637	https://aspredicted.org/blind.php?x=4gs7xr
Study 3B	Received 739 data entries on MTurk.	84 data entries from duplicate IP addresses, 38 incomplete entries, and 12 participants who failed a generic IMC.	605	http://aspredicted.org/blind.php?x=ky4ez2
Study 4	Received 663 data entries on MTurk.	26 data entries from duplicate IP addresses and 54 incomplete entries, 16 participants who failed a generic IMC, and 34 participants who failed an additional attention check about the content of the survey.	533	https://aspredicted.org/blind.php?x=jj7ia3
Study 5A	Received 435 data entries on MTurk.	8 data entries from duplicate IP addresses, 11 incomplete entries, and 2 participants who failed a generic IMC.	404	https://aspredicted.org/64C_Z2R
Study 5B	Received 442 data entries on MTurk.	12 data entries from duplicate IP addresses, 18 incomplete entries, and 5 participants who failed a generic IMC.	407	https://aspredicted.org/X1Q_SN8

Study 2

In Study 2C, the agent's impatience was stronger among female participants than among male participants ($b_{\text{condition} \times \text{gender}} = 1.76$, $SE = .78$, $Wald = 5.04$, $p = .025$), but this moderation by gender was not replicated in any other study in this paper.

In Study 2D, sequentially presenting participants with both decisions did not eliminate the agent's impatience. Within-subjects analyses revealed that a sizable subset of participants indicated a more "impatient" preference for the friend than for themselves: in the choice-for-another condition, 40.8% of those who chose *SS* for their friend indicated that they would have chosen *LL* for themselves, whereas only 3.9% of those who chose *LL* for the friend indicated that they would have chosen *SS* for themselves; in the choice-for-oneself condition, 19.2% of those who chose *LL* for themselves would have chosen *SS* for their friend, whereas only 2.6% of those who chose *SS* for themselves would have chosen *LL* for their friend. Together, participants in both conditions were more likely to choose the *SS* gift card for their friend than for oneself (choice-for-another condition: 50.6% for another vs. 34.2% for oneself; choice-for-self condition: 64.5% for another vs. 27.6% for oneself, $\chi^2(1)s > 14.2$, $ps < .001$).

In Study 2E, the chocolate candies were rated as significantly more affect-rich than vitamin supplements ($M_{\text{chocolate}} = 6.11$, $SD = 1.08$, $M_{\text{vitamin}} = 3.90$, $SD = 1.90$, $t(328.9) = 14.64$, $p < .001$). We tested if choice was predicted by decision orientation, affective value, choice order, and any interactions between them. Only decision orientation had a main effect on choice (GEE Wald $\chi^2(1, N = 840) = 14.44$, $p < .001$; GLMM $b = -.34$, $p < .001$), and none of the other factors had an effect or interacted with decision orientation ($ps > .250$). Moreover, the effect held irrespective of the affective value of consumer goods (affect-rich: 51.18% for another person vs. 41.23% for oneself, McNemar's $\chi^2(1, N = 211) = 9.30$, $p = .002$; affect-poor: 51.67% for another person vs. 44.98% for oneself, McNemar's $\chi^2(1, N = 211) = 3.84$, $p = .050$).

Table S2. Nine pairs of choices in Study 2G.

<i>Choice Category</i>	<i>SS</i>	<i>LL</i>
Cash	\$100 cash in a red envelope	A check in a red envelope, redeemable for \$150 cash in a month
Amazon e-gift card	\$50 Amazon gift card that can be redeemed immediately	\$75 Amazon gift card that can be redeemed a month from now
Dinnerware	A set of 6 pieces of sturdy dinnerware shipped and delivered this week	A set of 10 pieces of sturdy dinnerware shipped and delivered next month
Snacks	A box of healthy unsalted mixed nuts available now	Two boxes of healthy unsalted mixed nuts available next week
Wallet	A name-brand wallet delivered this week	A premium designer wallet delivered in a month
Dinner booking	A dinner reservation at a Michelin one-star restaurant this weekend	A dinner reservation at a Michelin two-star restaurant three months from now
Concert tickets	A back-section ticket for a big concert this weekend	A middle-section ticket for a big concert in six months
iTunes songs	A voucher for 10 iTunes songs this month	A voucher for 15 iTunes songs, one redeemable each month starting now
Ice cream vouchers	A waffle cone with one big scoop of the receiver's favorite ice cream now	Two waffle cones, each with one big scoop the receiver's favorite ice cream, next week

Table S3. Separate choices in Study 2G.

Decision Orientation	Cash	Amazon e-gift card	Dinnerware	Snacks	Wallet	Dinner booking	Concert tickets	iTunes songs	Ice-cream vouchers
<i>Choice for another</i>	<i>SS %</i> 57.69%	50.00%	54.81%	55.77%	45.19%	75.00%	31.73%	64.42%	66.35%
	<i>SD</i> 0.50	0.50	0.50	0.50	0.50	0.44	0.47	0.48	0.48
<i>Choice for oneself</i>	<i>SS %</i> 39.42%	22.12%	36.54%	35.58%	35.58%	55.77%	25.00%	61.54%	64.42%
	<i>SD</i> 0.49	0.42	0.48	0.48	0.48	0.50	0.44	0.49	0.48

Study 4**Table S4.** Anticipated reactions and anticipated evaluations from recipients who receive the *SS* or *LL* option in Study 4.

Option	Choosing for a specified other		Choosing for an unspecified other	
	<i>SS</i>	<i>LL</i>	<i>SS</i>	<i>LL</i>
Anticipated reaction	3.02 (1.03)	1.97 (1.72)	2.62 (1.32)	2.15 (1.72)
Anticipated evaluation	2.75 (1.29)	1.93 (1.89)	2.35 (1.47)	2.05 (1.73)

Other Studies

In addition to Study 5A, we ran three other studies (A1-A3) testing whether trait empathy influences the size of agent's impatience. These studies used slightly different stimuli and empathy measures than Study 5A. Study A1 used choices similar to those in Study 1, Study A2 had each participant make three choices, similar to those in Study 2F, and Study A3 used the same choices as in Study 5A. The empathy scales included those developed in Davis (1980), Reniers et al. (2011), and Zoll and Enz (2010). While the agent's impatience effect was always replicated in these studies ($ps < .010$), trait empathy did not consistently moderate this main effect; in all cases, moderation by empathy was either non-significant (five tests across Studies A1-A3, $ps > .25$) or weakly significant (one test in A3, $p = .030$). Correcting for multiple comparisons, no effect is found. Overall, we conclude, consistent with Study 5A, that empathy does not moderate the agent's impatience effect more than would be expected by chance.

Additional details on these studies can be found in the OSF repository (https://osf.io/faj3r/?view_only=fb10bade1db44ceaa363f41ae1f7e56a).