Won't You Think of the Children?: Traits Predicting Intergenerational Preferences

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Abstract

Individuals are frequently asked to make sacrifices in an attempt to produce benefits for future generations. Such decisions are referred to as intergenerational dilemmas. Previous research on intergenerational dilemmas has shown that situational manipulation of factors such as the delay between sacrifice and benefits and the perceived similarity with future others modulate intergenerational preferences. However, it is unclear whether there are traits that predict intergenerational preferences across a variety of dilemmas. Individual differences were quantified using econometric measures of delay discounting and social discounting. Results indicated that individual differences on these measures accounted for a significant portion of the variance observed in a broad measure of intergenerational preferences.

Keywords: intergenerational choice, delay discounting, social discounting

It is increasingly clear that many of our everyday actions not only have immediate consequences, but also have consequences for those in future generations. Decisions about such actions are somewhat peculiar in that a thorough evaluation requires considering the interests of individuals that do not yet exist. These decisions become even more complicated when they require short-term sacrifices on the part of the present generation in order to achieve benefits for (or to avoid harming) future generations. Decisions about such tradeoffs have been referred to as intergenerational dilemmas (e.g., Gardiner, 2006).

Intergenerational dilemmas are frequently encountered in the context of policy-making and involve everything from global warming and overfishing to more mundane decisions about infrastructure investments. Occasionally, policy makers place will act on behalf of future generations. For example, Norway's gasoline prices are among the world's highest at $10.12 per gallon, resulting from taxes on fossil fuels designed to reduce global warming (Randall, 2012; Romero, 2005). However, due to a lack of political will, intergenerational dilemmas are often resolved in ways that favor the current generation.

Intergenerational dilemmas are an example of a larger class of social dilemmas in which the interests of the decision maker are at odds with the interests of others. Despite the pervasive assumption of self-interested motives by economists (see Frederick, Loewenstein, & O'Donoghue, 2002 for a review of this literature), altruistic behavior has been observed in a range of contexts and across a variety of species (Piliavin & Charng, 1990). The dominant models suggest that altruism is highly dependent on reciprocity. That is, decision makers may act in order to achieve benefits for others, even at personal cost, if the beneficiaries may later return the favor. In the context of intergenerational dilemmas, however, reciprocity plays no obvious role. That is, decision makers in the present generation have no reason to behave altruistically towards future generations because future generations have neither an opportunity to reciprocate beneficial actions nor the means to retaliate for detrimental actions. In fact, according to traditional models of altruism, it is in the present generation's best interest to make decisions that ignore the welfare of future generations.

An Economic Perspective

When contemplating intergenerational dilemmas at the policy level, economists are typically employed to produce cost-benefit analyses that are used to guide policy-making. When a policy's consequences (either costs or benefits) extend over long time periods, these analyses are forced to specify exactly how current and future welfare are balanced. The strategy typically taken is to take the interests of future generations into consideration, but to a lesser extent than the interests of the current generation. The degree to which future consequences impact intergenerational choices is controlled by what is known as the social discount rate (Moore, Boardman, Vining, Weimer, & Greenberg, 2004). Assuming a social discount rate of ten percent, immediate consequences are considered to be twice as important as identical consequences that will occur in seven years and ten times greater than consequences that will occur in 14 years. For example, imagine a proposal to fix aging sewer systems. If the proposed legislation would cost $100 million dollars immediately, but would avert a potentially costly failure estimated to occur in 30 years, then the ultimate cost of the failure would have to exceed $2 billion in order to justify the immediate expenditure.

These social discount rates can lead to potentially undesirable conclusions. For example, the ten percent discount rate suggests that the welfare of the current generation's grandchildren (two generations or 50 years from now) will be valued at less than one percent of the

welfare of the current generation. Thus, these standard discount rates suggest that we ought to essentially disregard the welfare of future generations and instead act to maximize welfare over a short temporal horizon.

However, policymakers and even economists themselves often disagree about what social discount rates are appropriate. For example, the Stern Review (2007), a comprehensive report assessing the costs of climate change, was criticized by some economists for employing a social discount rate that was too low (e.g., Beckerman & Hepburn, 2007), whereas others have argued for a lower discount rate (e.g., a discount rate of zero, Cline, 2008).

In contrast, Dasgupta (2007) noted that one could be similarly dissatisfied with the selection of another parameter in Stern's model, what Stern calls eta (η). Eta is an ethical parameter that reflects people's attitude about disparities in welfare both between individuals within the current population and disparities in welfare between current and future populations. Dasgupta (2007) argues that society ought to have more egalitarian attitudes than implied by the value of eta Stern selected.

A Psychological Perspective

Psychologists have also investigated factors related to intergenerational preferences (though to a far more limited degree). Wade-Benzoni (2008), for example, has compiled a set of factors that appear to modulate intergenerational preferences. These factors include the delay and uncertainty associated with future consequences, affinity towards future generations, and the behavior of past generations. Both individually and taken together, these factors appear to predict, to varying degrees, one's intergenerational choices.

One intuitive influence on intergenerational preferences is the delay between the current generation's behavior and the associated consequences. This mirrors the economic idea of a social discount rate reviewed above. That is, consequences expected to occur only after long delays are discounted more (i.e., exert less of an influence on intergenerational choices) than those expected to occur after shorter delays. For example, Wade-Benzoni (2008) found that participants who were told that future generations would begin to reap the benefits of a proposed gas tax in the relatively near future were willing to bear significantly higher gas taxes than those who believed the benefits were more temporally delayed.

Preferences in intergenerational dilemmas have also been found to depend on the affinity between decision-makers and the recipients of future benefits. For example, Wade-Benzoni (2008) asked office staffers to distribute a sum of money between themselves and a future subject in the study. Results indicated that participants left significantly larger sums of money if they believed they were leaving money for a fellow staff member (high affinity) than when they believed they were leaving money for a stranger (low affinity). This is in line with past findings (e.g., Hoffman, McCabe, & Smith, 1996) that social distance acts to attenuate generosity toward others.

Lastly, intergenerational preferences appear to be influenced by the behavior of past generations. As described above, intergenerational generosity (or greed) cannot generally be reciprocated. However, there is recent evidence that individuals unable to reciprocate may "pay forward" past acts on unrelated third parties (Gray, Ward, & Norton, in press). In the case of intergenerational dilemmas, this would suggest that individuals might attempt to "reciprocate" the actions of previous generations, but to do so with future generations. That is, if previous generations have sacrificed on our behalf, then perhaps we may be more willing to do so on behalf of future generations. Consistent with this suggestion, Wade-Benzoni (2002) found that intergenerational precedents can exert a strong influence on intergenerational choices, but only when individuals believed that previous generations were willing to make sacrifices. Apparently, previous generations' generosity serves as a model for the current generation in a way that previous generations' selfishness does not.

This previous work has pointed to several major factors that influence intergenerational preferences. However, these previous studies have focused on the manipulation of situational factors. For example, beliefs about the consequences of overfishing predicted were related to willingness to accept fishing quotas (Wade-Benzoni, 2008). Furthermore, because factors such as delay, uncertainty, and precedent should vary from one intergeneration dilemma to another, one would also expect people's intergenerational preferences to vary from one dilemma to another as well.

The goal of the current study is to explore how intergenerational preferences may be predicted by decision-related traits that are relatively stable across decision making contexts. That is, the current study concerns our ability to predict individual differences in intergenerational preferences. Because of our focus on individual differences, we evaluate decision-relevant traits using measures that are both quantitatively rigorous and that generalize across a variety of contexts.

Specifically, we evaluate decision makers' preferences regarding delay and social distance because past work has found situational manipulation of these factors to modulate intergenerational preferences. To evaluate preferences about delay, we use a standard delay discounting task (Kirby & Marakovic, 1996). Delay discounting refers to the tendency for immediate rewards to be preferred over delayed rewards and for the value of rewards to decline with increasing delay. To evaluate social preferences, we employ a recently developed measure of social discounting (Rachlin, 2002). Similar to delay discounting, work on social discounting has found that rewards to the self are preferred over rewards given to others and that the subjective value of others' rewards declines as social distance increases.

Method

Participants

Sixty-three Stony Brook University undergraduate students participated for partial course credit.

Dependent Measures

The intergenerational decision-making task consisted of four scenarios. Specifically, we adapted items involving the topics of overharvesting fisheries and a gasoline tax (based on materials from Wade-Benzoni, 2008). Two additional scenarios were developed specifically for the current study, one involving an increase in tuition and one involving an increase in rent. These items were included to increase the relevance of the intergenerational dilemmas to our undergraduate participants. Each scenario embodied the same basic set of features characteristic of a standard intergenerational dilemma. That is, the scenarios each described an immediate, costly sacrifice and stated that the benefits of this sacrifice would only be enjoyed by other individuals (but not by the participant) and that the benefits would only arrive at some point in the future. As in Wade-Benzoni's (2008) study, each scenario involved reading a brief passage that provided factual information about the issue, including short-term costs and future benefits, and included a graphical visualization of the relationship between the magnitude of the short-term sacrifice and the corresponding benefits to future generations. The graph did not include numbers of any sort and was not intended to be thoroughly informative. Instead, it was intended to simply illustrate the idea that greater present sacrifice would yield greater future benefit. Participants were then asked to indicate whether they would agree with a series of proposed sacrifices. For example, participants were asked if they would agree to pay an additional $0.20 tax, raising the price of a gallon of gasoline to $3.20.

The delay discounting task was adapted from a previous study by Kirby and Marakovic (1996). On each trial of this task, participants chose between a smaller reward, which was available immediately (i.e., "tonight"), and a larger reward, which was only available after some delay. For example, one item asked participants to select between $30 dollars tonight and $85 to be delivered in 70 days. Each of these items is associated with a discount rate that represents how patient a decision maker would need to be in order to be indifferent between the immediate and delayed rewards. For example, in the preceding example, indifference would be associated with a discount rate of exactly .008571. The task consisted of 27 items. Twenty-one of these items were identical to those used by Kirby and Marakovic (1996), capable of detecting discount rates from 0.0007 to 0.25. In our experience, we have found that undergraduates' preferences fall toward the impatient end of this range. To ensure that we did not artificially exclude particularly impatient participants, we amended the original 21 items with 6 additional items that extended the range of measurable discounting rates from 0.0007 to 1.0, a change we have adopted in previous investigations (Luhmann, in press).

The social discounting task was adapted from Jones and Rachlin (2006). Participants were first asked to imagine 100 people, ranging from one's closest friend or relative (i.e., person #1) to a mere acquaintance (person #100). On each trial, participants were asked to choose between a reward for themselves and a reward for someone on their list of 100 people. For example, one item asked participant to choose either $30 dollars for themselves and $85 for Person #70. The specific quantities were identical to those used in the delay discounting task. That is, the reward magnitudes were identical and the delays (e.g., 70 days) were converted into social distances (e.g., person #70).

Procedure

Before the experiment began, instructions were read to participants. Participants were told that they would complete a number of measures on their preferences on a variety of topics. The instructions further emphasized that there were no "correct answers". The order for both the scenarios within the intergenerational decision task and the three measures themselves were counterbalanced across participants. The entire procedure took approximately 30 minutes.

Results

Each participant's delay discount rate was estimated as the discount rate most consistent with her choices. For example, if a participant chose the larger reward for all items representing discount rates equal to and smaller than .01 but chose the smaller reward for all items equal to and larger than .02, her discount rate would be estimated as the geometric mean of the discount rates associated with the items on each side of this "switch point" (.014 in this case). If more than one discount rate was found to be equally consistent with a set of choices, the geometric mean of the consistent estimates was taken to be the participants' discount rate (for further details, see Kirby & Marakovic, 1996). The procedure for estimating of social discount rates was identical. Because discount rates are highly skewed, they were transformed by taking their natural log before being submitted to the statistical analyses described below.

To quantify participants' intergenerational preferences, we first estimated the maximum sacrifice that each participant would accept in each scenario. This maximum was estimated using a procedure similar to that used to estimate the discount rates. For example, if a participant agreed to all the sacrifices equal to and smaller than $300 but rejected all sacrifices equal to and larger than $400, her maximum willingness was estimated as the mean of these two "cross-over" quantities (e.g. $350). If more than one estimate was found to be equally consistent with a set of choices, the mean of the most consistent estimates was taken. These estimates were then normalized by computing z-scores. This yielded a total of six z-scores for each participant, one for each scenario. Finally, each

Variable	Coefficient	SE	*t*	*p*
Intercept	-1.59	0.574	-2.77	0.007
Delay Discounting	-0.79	0.351	-2.24	0.028
Social Discounting	-1.06	0.404	-2.61	0.011
Delay * Social Discounting	-0.54	0.246	-2.18	0.033

Note: Overall $R^2 = 0.1264$ ($p < .005$)

participant's six z-scores were averaged. These averages represent participants' intergenerational preferences: their average, relative willingness to sacrifice on behalf of future generations.

We constructed a multiple regression model with the social and delay discount rates acting as predictor variables and the intergenerational preference measure acting as the outcome variable (Table 1). Results demonstrated that this model accounted for a significant proportion of the variance in intergenerational choices. Turning to the individual factors (see Figure 1), results indicate that participants' delay discount rates significantly predicted their intergenerational choices, with lower delay discount rates (i.e., greater patience) predicting greater willingness to sacrifice on behalf of future generations. Social discount rates were also a significant predictor of intergenerational preferences, with lower social discount rates (i.e., greater generosity) predicting greater willingness to sacrifice on behalf of future generations. Finally, results indicate that the interaction between social discounting and delay discounting was also a significant predictor of intergenerational preferences. Specifically, the direction of this relationship suggests that delay and social discounting combined super-additively to predict intergenerational choices. That is, a decision maker who was both patient and generous was even more willing to sacrifice on behalf of future generations than would have been expected by her individual delay and social discount rates.

Discussion

The goal of the current study was to investigate intergenerational preferences; the willingness to make sacrifices on behalf of future generations. Whereas prior studies have focused on situational factors that influence intergenerational decision making, we have instead investigated how individuals' decision-related traits might predict their intergenerational preferences. Our results suggest that both delay discount rates (i.e., patience) and social discount rates (i.e., generosity) were significant predictors of intergenerational preferences. Individuals displaying greater patience when choosing between personal rewards were also significantly more willing to make sacrifices for the benefit of future generations. Similarly, individuals who made more generous choices, more frequently preferring rewards to others at personal cost, were also more inclined to make intergenerational sacrifices. Finally, we also found that individuals who displayed both greater generosity and greater patience were even more willing to sacrifice on behalf of future generations than would be expected given these individual traits.

The finding that individuals' generosity predicts their intergenerational preferences is consistent with previous research. For example, Jones and Rachlin (2009) have demonstrated that social discount rates (but not delay discount rates) predict altruistic behavior in public goods games, which is a multi-player version of the classic Prisoner's Dilemma game (Axelrod, 1984). Those with low social discount rates (i.e., high generosity) have been found to be more cooperative than those with high social discounting rates. Jones and Rachlin (2009) suggest that when assessing the tradeoff between personal rewards and rewards to others, the latter is necessarily discounted according to the social distance between the decision maker themselves and the others. Wade-Benzoni (2008) has also reported that individuals are more willing to make intergenerational sacrifices on behalf of similar others than dissimilar others. Wade-Benzoni (2008) refers to this dimension as affinity, but it is roughly equivalent to social distance, particularly as it has been conceived by Trope and colleagues (Trope & Liberman, 2011).

The finding that individuals' patience predicts their intergenerational preferences is somewhat more curious. Of course, individuals' distaste for delayed payoffs is a robust finding (Soman et al., 2005). Indeed, delay has been found to systematically devalue rewards. Wade-Benzoni (2008) has reported a related finding in which intergenerational

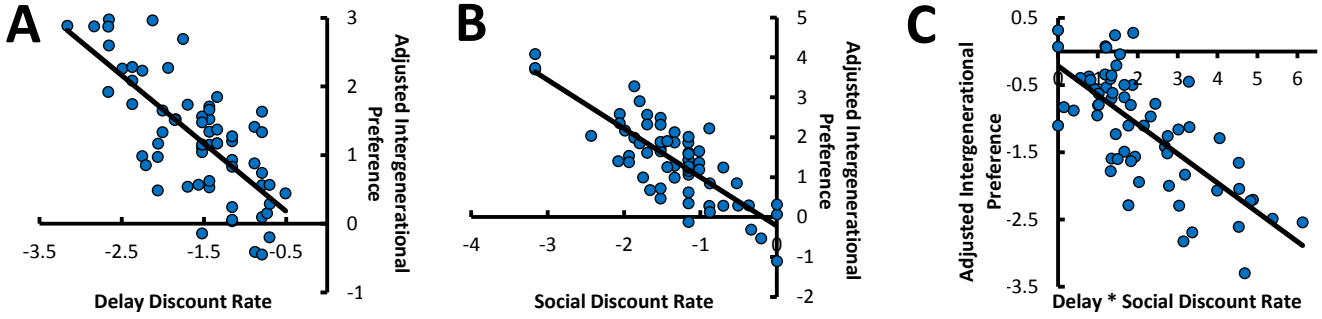

Figure 1 – Partial residual plots illustrating the relationship between intergenerational preferences and delay discounting (A), social discounting (B), and the interaction between delay and social discounting (C). Discount rates have been log-transformed.

preferences were found to be more generous when the benefit to future generations was described as occurring sooner rather than later. Given that intergenerational benefits only arrive in the distant future, it may seem reasonable that patience should be associated with greater intergenerational discounting. However, delay discount rates are typically assumed to describe attitudes toward the delay associated with personal rewards, not the rewards of others. Given that intergenerational tradeoffs are between the current self and future others, it is not immediately obvious why one's evaluation of one's own future rewards is particularly relevant. However, if one is attempting to assess the magnitude of the intergenerational benefits, it may not be possible to perform this evaluation without one's own intertemporal attitudes influencing the valuation. Alternatively, some researchers have suggested that intertemporal attitudes may reflect one's beliefs about the uncertainty present in the environment (Bixter & Luhmann, 2012). That is, it is permissible, and even advisable, to be impatient if it is believed that future rewards are unlikely to be delivered as promised. Under this view, patience is not about one's unique attitudes toward personal rewards, but about the risk associated with waiting; risk that everyone faces. Consistent with this account, Wade-Benzoni (2008) reported that intergenerational preferences were more selfish when the future benefits were associated with greater uncertainty.

The interaction between patience and generosity is interesting and may be a natural extension of the reasoning outlined above. Because intergenerational sacrifices are made so as to bring about benefits that are both temporally and socially distant, it makes sense that these two factors might jointly influence intergenerational preferences. Indeed, the way in which discounting is typically formulated suggests that rewards are reduced by a discount factor that combines both the magnitude of the dimension (e.g., delay) and the decision maker's attitude toward that dimension (e.g., patience). When rewards are discounted along more than one dimension, these discount factors are combined multiplicatively (e.g., Ho, Mobini, Chiang, Bradshaw, & Szabadi, 1999), which naturally predicts an interaction and more specifically suggests that patience and generosity should combine super-additively.

It is also interesting to note that our results found patience and generosity to be independent because prior work (Jones & Rachlin, 2009) has found these traits to be significantly correlated. The correlations reported by Jones and Rachlin were not overwhelming (r = .25-.28), so it is possible that we did not have sufficient power to detect this relationship. However, the predictive power each factor provided in our multiple regression analysis suggests that this may not be a plausible explanation. It is perhaps even more surprising that we failed to find any overlap between patience and generosity because our study assessed these dimensions using nearly identical tasks (e.g., identical rewards and distances). If participants were not paying close attention to the materials and simply making choices based on the numbers presented on each trial, their choices should have been identical. This suggests that the independence of delay and social discounting is even stronger evidence for separable traits.

The current results suggest implications for policymaking. Specifically, the current study suggests that social discount rates should reflect a variety of decision-related psychological attitudes. For example, one cannot simply assume that the delay between immediate costs and future benefits captures the entirety of the current generation's attitudes toward future generations. Echoing the concerns of Dasgupta (2007), more general attitudes about equality, fairness, and generosity appear to be just as powerful in determining individuals' intergenerational preferences. Though this may complicate the calculation of social discount rates, attitudes about social equality are arguably easier to contemplate because they can be evaluated intra-generationally.

The notion that intergenerational preferences are a unique blend of intertemporal and social preferences also has implications for those seeking to encourage intergenerational sacrifice. For example, policymakers can make efforts to deemphasize the delay until intergenerational benefits will be achieved (thereby mollifying impatience) and deemphasize the social differences between current and future generations (encouraging greater generosity). Indeed, because of the interactivity between these factors, policymakers accomplishing both of these goals simultaneously would be expected to get an extra "boost" of selflessness toward future generations.

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