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Valuing Different Human Lives

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Do people think of the value of all human lives as equivalent irrespective of age? Affirmations of the equal value of all human lives are culturally prominent, yet much evidence points to the fact that the young are often prioritized over the old in life-and-death decision-making contexts. Studies 1–3 aimed to reconcile this tension by showing that although individuals are seen as more equal with respect to negative rights not to be harmed or killed (though not completely equal), they are seen as less equal with respect to positive rights to be aided or saved. Age exerts a large and systematic impact on decisions about who to save and about whose death is more tragic, suggesting that individuals are seen as possessing differing amounts of contingent value. These initial studies also yielded the novel finding that, although children are prioritized over adults, older children are often prioritized over younger children. Study 4 replicated this finding with a think-aloud methodology; the study showed that the preference for older children appears to be driven by their having had more invested in their lives, their better developed social relations, and their greater understanding of death. Studies 5a–5c demonstrated the independent causal effects of each of these variables on judgments of life's value. Finally, in Studies 6 and 7, mediation methods were used to show that older children's more meaningful social relations primarily explain the greater value of older than of younger children. These findings have implications for bioethics and medical policy.

Keywords: valuing human lives, scarce resources, moral value, rights, equality

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A presumption of the fundamental moral equivalence of different human lives is built into the dominant modes of Western ethical thought. Both deontological and consequentialist ethical theories exhibit this emphasis on equality and impartiality. Deontology, for instance, allocates rights, duties, prohibitions, and so forth, in accordance with a notion of justice: All humans are endowed with essentially the same set of fundamental rights and duties. Anything else would be unfair. Similarly, consequentialism, while relying on a different primitive moral construct, the notion of consequences, rather than rights and duties, also emphasizes a strict impartiality. For instance, in calculations of the consequences of decisions that might affect different human lives, each life counts for one and not more (e.g., Mill, 1861/1998; Parfit, 1978; Singer, McKie, Kuhse, & Richardson, 1995).

One does not need to look far to find cultural expressions of this sentiment. The French Declaration of the Rights of Man and of the Citizen explicitly calls for a set of equivalent and universal rights for all men and for the destruction of aristocratic privileges. In one of the most well-known sentences in the English language (Lucas, 1989), the American Declaration of Independence holds the notion that "all men are created equal" to be self-evident. Article 1 of the United Nations' Universal Declaration of Human Rights states that "all human beings are born free and equal in dignity and rights." The Bill and Melinda Gates Foundation states that it is based on the belief that "all lives have equal value," a phrase that is prominently positioned on all of its main web pages. The bioethicist John Harris described this sort of sentiment as "the equality principle" and elaborated it as follows: "The equality principle covers young and old, present and future people, and may be taken as stating that people's lives and fundamental interests should be given equal weight regardless of race, creed, color, gender, and age, economic status and regardless of their generation" (Harris, 1988, p. 77). Indeed, Harris regards this principle as being at the heart of democratic political systems (Harris, 1987). Notwithstanding the fact that some utilitarians have explicitly disagreed with this principle (e.g., McKie, Kuhse, Richardson, & Singer, 1996), its widespread cultural expression suggests that people do generally think of the moral value of different human lives as being equivalent in some fundamental sense.

However, situations sometimes arise that force people to make decisions about which human lives should be prioritized in life-and-death situations, typically those involving scarce medical resources; this sort of decision has been referred to as a "tragic trade-off" (Tetlock, Kristel, Elson, Green, & Lerner, 2000). Such decisions are notoriously complex and involve multiple considerations, some of which are not moral or value based. For instance,

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these decisions sometimes hinge on strictly medical considerations regarding the patients' differential chances of successfully accepting the medical resource (e.g., a vital organ). Yet, these sorts of difficult decisions do seem to involve many value-based considerations as well, stemming in part from beliefs about which of the two individuals is a more worthy recipient (Elster, 1992). Critical to our current interests, ordinary individuals do seem, at least in some cases, willing and able to make such decisions. One primary factor in these sorts of decisions is the target individuals' ages, with younger individuals generally being accorded greater priority than older individuals. We review some of this evidence in more detail presently. For now, this issue calls our attention to a potential conflict with the equality principle just described. If all human lives are equal, holding constant nonmoral, medical considerations, why is a younger individual seen as a more worthy recipient of a lifesaving organ than is an older individual?

This question frames the first part of our current investigation. How do we reconcile the presumed endorsement of Harris's equality principle with the idea that people seem willing to accord differential value to different human lives as a function of the age of those lives? Is this an indication of moral inconsistency, or is there some way to reconcile these tendencies? Our proposed reconciliation invokes two different sorts of moral appraisal that afford people the ability to see human lives as equivalent in some respects but not others. According to this proposal, people think about the moral standing of different human lives in terms of at least two distinct moral constructs. One such construct is the fundamental rights—sometimes referred to as natural or inalienable rights—that each human life possesses (e.g., Hart, 1955). Natural rights are usually thought of as being both universal and noncontingent (or intrinsic). All people possess such rights by default, by virtue of being alive and human, unless they act to forfeit such rights by, for instance, committing a criminal offense (see, e.g., Dworkin, 1993). Thus, in terms of their fundamental or natural rights, all human lives may seem essentially equal in value.

Which sorts of rights are most likely to be classed among the most fundamental or natural rights that people possess? An extensive philosophical literature that bears on this question has distinguished between, on the one hand, *negative rights,* not to be interfered with, harmed, killed, and so forth, and on the other hand, *positive rights,* to be aided, helped, saved, and so on (see, e.g., Dinello, 1971; Foot, 1978; Green, 1980; Kamm, 1998; Quinn, 1991; Thomson, 1985; Trammell, 1975). Negative rights are usually thought to be more stringent and more fundamental than positive rights. For instance, the legal philosopher H. L. A. Hart argued that a prime candidate for a natural right was the "equal right of all men to be free" (Hart, 1955, p. 175), which is essentially a negative right to be free from interference. More directly, philosophers have also argued that the right not to be actively killed is more fundamental than the right to be saved (or aided) and, correspondingly, that the duty not to kill is therefore more stringent than the duty to save (Abelson, 1982; Cartwright, 1996; Dinello, 1971; Foot, 1978; Green, 1980; Quinn, 1989; Thomson, 1985; Trammell, 1975). The latter idea relates to a broader (though not always endorsed) distinction between acts and omissions (see, e.g., Bennett, 1966; Hall, 1989; Singer, 1979; Spranca, Minsk, & Baron, 1991; Stacy, 2002; Steinbock & Norcross, 1994; Sunstein & Vermeule, 2005).

To be sure, this distinction—specifically, the idea that killing is morally worse than allowing someone to be die—is philosophically controversial. It has been criticized by many philosophers who argue that there is no intrinsic moral difference between killing and letting die, once intentionality, motive, character, and other extraneous variables are controlled for (see, e.g., Bennett, 1966; Rachels, 1975, 1979; Russell, 1977; Tooley, 1994). Nonetheless, many arguments have been made in defense of this distinction. Green (1980) argued that the key difference between killing and letting die is that the actor makes a greater causal contribution to the victim's death in cases of killing; whereas the victim would have survived had the actor not killed him, this would not be true had the actor refrained from letting him die. A separate reason why negative rights may be seen as more fundamental than positive rights has to do with their differential "dischargeability" (Trammell, 1975). It is usually possible to discharge our negative duties fully—that is, to conduct our lives in such a way that we do not actively (and intentionally) kill anybody. But it is impossible to discharge our positive duties fully: No matter how many people we successfully save or aid, there is presumably at least one more person we could help (see, e.g., Trammell, 1975). Thus, although it is straightforward to treat all people equally in terms of negative rights (i.e., by not killing or harming them), it is more problematic to treat all people equally in terms of positive rights (i.e., it is not possible to save or aid everyone, and one person's positive right to be saved can at times conflict with another's).

A corollary of this difference in dischargeability is that negative rights can be posited in a more abstract, decontextualized fashion. I do not need to know anything in particular about you or your present circumstances in order to accord you a negative right not to be killed. But positive rights are different. Whether or not you have a positive right to be saved is hard to answer in the abstract. It depends on aspects of your present circumstances, including how difficult it is to save you, who else might need to be saved, and whether it is possible to save everyone. Answering this question may therefore require taking account of the relative value of the individual lives in question. Whether or not you have a right to be saved might depend on the relative value of your life in comparison with other possible recipients of aid. In other words, questions about positive rights invite taking into account *contingent*, non-universal features of the recipients of our aid—including their age—that bear on their overall value. This notion of life's value, in comparison with the notion of fundamental rights, thus allows for finer discriminations between different human lives and for regarding these lives as unequal in value.

Regardless of the normative status of this distinction between positive and negative rights, it is an open psychological question whether ordinary individuals' moral decision making accords with this distinction in the way we have hypothesized. Our theorizing takes as its starting point the notion that negative rights, such as the right not to be harmed or killed, would indeed be seen as stronger and more fundamental than positive rights to be saved or aided. Indirect support for this idea stems from research showing that acts are generally judged more harshly than omissions (e.g., Cushman, Knobe, & Sinnott-Armstrong, 2008; Gilovich, Medvec, & Chen, 1995; Ritov & Baron, 1990; Spranca et al., 1991; Sugarman, 1986). Further, and more specifically, we theorized that such negative rights should also tend to be seen as more universal and

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less contingent than positive rights. As a consequence, people could consistently make different responses regarding the moral standing of different human lives depending on the sort of moral construct they have in mind—negative (or natural) rights on the one hand and positive rights (or contingent value) on the other hand. In this manner, they would differentiate more between different individuals with respect to positive rights but would treat individuals as more equal with respect to positive rights.

We assessed this proposal empirically, in the first three studies that follow. Participants made a series of pairwise decisions about which of two individuals should gain priority, if either, across two distinct life-and-death contexts. The individuals differed only in terms of their age. Although there are many different sources of value of human lives, we focused on age in this investigation because of its importance to health care decision making and because of its extensive study in prior literature. One context posed a clash between two target individuals' positive rights to be saved, which according to our theorizing should prompt participants to resolve the decision by relying on their conceptions of the respective individuals' contingent value. A separate context posed a clash between two target individuals' negative rights not to be killed, which is less amenable to resolution by considering the target individuals' contingent value. Two broad predictions result from our theory that human lives are seen as relatively equivalent in terms of negative (or natural) rights but as more differentiated in terms of positive rights. When considering positive rights as opposed to negative (or natural) rights, people should call upon their conceptions of the contingent value of the different lives in question. As a consequence, they should (a) be more willing to make decisions that discriminate between individuals as a function of their age, as opposed to treating the two individuals as equal and making no choice between them, and (b) respond in such a way that there is more systematic variation in their responses as a function of the target's age, with some ages being systematically prioritized over others.[1]

This latter prediction gives rise to the second major part of our current investigation, which aimed to better understand how people value different human lives as a function of their age. Considerable evidence already bears on this issue, the majority of which points to a general prioritization of younger individuals (see, e.g., Busschbach, Hessing, & de Charro, 1993; Cropper, Aydede, & Portney, 1994; Dolan, Shaw, Tsuchiya, & Williams, 2005; Johannesson & Johansson, 1997; Lewis & Charny, 1989; Li, Vietri, Galvani, & Chapman, 2010; Ratcliffe, 2000; Rodríguez & Pinto, 2000; Tsuchiya, Dolan, & Shaw, 2003). The prioritization of younger individuals is usually thought to be based on a *years left* argument—all else equal, younger individuals have a greater number of valuable life years ahead and so ought to be prioritized in order to maximize future outcomes (i.e., a consequentialist argument), and, separately, a *years lived,* or *fair innings,* argument—younger individuals have not had as much time to live and should be prioritized on the grounds of fairness (i.e., a nonconsequentialist argument; see, e.g., Li et al., 2010; Williams, 1997). The years left argument is at the heart of the influential notion of QALYs, which is the idea that individuals who have a greater number of "quality adjusted life years" remaining ought to be prioritized. This notion has been hugely influential in health policy (see, e.g., Cubbon, 1991; Singer et al., 1995; Williams, 1985, 1996), though it is strongly opposed by some (e.g., Harris, 1987).

Although prior investigations have clearly revealed a strong preference for prioritizing younger individuals, these investigations have not told the whole story when it comes to age as a determinant of value of life decisions. In particular, they have largely neglected to investigate preferences regarding very young individuals (e.g., in Li et al.'s 2010 surveys, the youngest age was 5 years, and the next youngest was 20 years). Is it the case that people prioritize very young individuals, infants and babies, over slightly older individuals? Taken at face value, years left considerations suggest that they should, but is this true?

Several considerations suggest that, in contrast to this years left prediction, older children might be prioritized over younger children. We refer to this as the *increasing value* prediction. As Dworkin (1993) has argued, an older child has had more resources (both material and psychological) invested in his (or her) life, by himself, by others, and by society, than has a younger child. Yet, in neither case has there been full recovery of this investment, as the major milestones of each life lie at some point further in the future. Thus, according to Dworkin, the death of an older child frustrates a much greater prior investment than does the death of a younger child and will correspondingly be regarded as worse and more tragic. This idea is similar to well-known sunk-costs effects in consumer decision making (see, e.g., Arkes & Blumer, 1985).[2] We also hypothesized that older children may be valued more than younger children because they have formed more numerous and more meaningful social attachments than have younger children (see, e.g., Singer, 1994), and their death thus produces more negative overall consequences (we refer to this as the *social relations* argument). Notably, this argument is essentially consequentialist and forward looking, whereas the investment hypothesis is not consequentialist and is backward looking.

Although we expected social relations and investment considerations to be primary, other possible reasons for a prioritization of older children can be surmised. Older children have a greater cognitive understanding of the meaning of death, and so their death may be worse for them (as long as they can anticipate it) than is the death of a younger individual for that individual (see, e.g., Singer, 1994). Again, this is a consequentialist argument. Evolutionary considerations may also play some role. Older children are closer to the point of fertility than are younger children, and so their lives may be seen as having more value by virtue of their more immediately expected reproductive value (see, e.g., Burnstein, Crandall, & Kitayama, 1994). Finally, a preference for older children might be based on a more detailed assessment of QALYs than that yielded simply by estimating the years left in a person's life. Younger children may be seen as more likely to die in the course of everyday life than are older children and by a sufficient amount that the overall expected value of their life, in QALYs, is seen as lower than that of older children (i.e., once children pass the initial

[1] For ease of expression, in what follows, we sometimes simplify our terminology, by referring to decisions involving negative (or natural) rights as simply "rights-based" and to decisions involving positive rights, which invoke conceptions of contingent value, as simply "value-based." It should be kept in mind that we have negative rights and positive rights/contingent value in mind in using these terms, rather than, for instance, other kinds of moral rights, legal rights, or conventional rights or other senses of value.

[2] Dworkin, we think reasonably, takes perceptions of the degree of tragedy attending to a person's death as a good measure of its perceived value.

hurdle of surviving early childhood, the expected value of their life is greater than that of a very young child). This is again, of course, a consequentialist argument.

Prior to our investigations, no evidence clearly indicated whether, when judging the value of children's lives, individuals tend to apply a years left strategy, thus prioritizing younger children over older children, or whether they instead show the increasing value trend, such that older children's lives are prioritized over younger children's. Accordingly, in the seven studies that follow, in addition to investigating the distinction between contingent value (positive rights) and natural (negative) rights, we focused specifically on investigating whether the increasing value prediction holds with respect to questions that bear on individuals' positive rights and, if so, why. On the basis of the reasons given above, we predicted that the increasing value trend would be supported because of the greater investment in older children's lives and older children's better developed social connections.

Study 1: Comparing the "Value" and "Rights" Age-Related Functions

We investigated the distinction between contingent value and negative/natural rights in Study 1, which provided an initial test of the increasing value prediction. Participants made a series of pairwise choices between two individuals who differed from each other only in terms of their age. We sampled ages from across the lifespan and paid particular attention to sampling a variety of ages in the early stages of life.

Participants were asked two sets of questions, one of which was designed to capture their conception of the contingent value of different human lives, and the other of which was designed to capture their conception of individuals' negative rights. The first value-based question asked participants to indicate which of two individuals should receive a lifesaving organ. Because this question assesses positive rights to be saved, it should draw upon participants' conceptions of the contingent value of the individual lives in question. For this question and those that followed, participants also had the option of indicating that they did not wish to prioritize one individual over the other. Because answers to this organ donation question may be affected by medical considerations, such as which recipient might have a better chance of successfully receiving the organ, we asked two additional questions that are free from this problem and that provide convergent assessments of perceptions of life's value. That is, we asked participants to indicate which of the two individuals' accidental deaths would be more tragic and whose death would produce more grief in an immediate family member. All three of these questions were intended to test the increasing value prediction across the early years of childhood.

A second set of questions was designed to assess participants' conceptions of a fundamental, negative right that individuals of different ages arguably possess—the right not to be killed deliberately by another individual, which has been seen as being among the most plausible candidates for a natural right (see, e.g., Dworkin, 1993; Hart, 1955). Offering participants the same pairwise choices between individuals of different ages, we also asked them to indicate whether it would be more wrong deliberately to kill a person of one age or the other and whether these killings should be differentially punished. We predicted that for these questions we would see less differentiation between individuals of different ages. This prediction was based on the idea that people will likely regard everyone as having a roughly equivalent negative right not to be deliberately killed (even if their lives are perhaps not seen as possessing the same underlying value). If this prediction were borne out, it would help resolve the tension alluded to at the beginning of this paper: We see others as morally equivalent only in certain respects but not in others—that is, equivalent in terms of some basic natural or negative rights (i.e., the right not to be deliberately killed) but not necessarily equivalent in contingent value or positive rights to be saved.

Method

Participants. Twenty-nine undergraduate students (22 female, 7 male; M_{age} = 19.65 years, SD = 1.97, range = 17–28 years) participated in the study for course credit. The study was carried out with paper and pencil.

Materials, design, and procedure. The study was broken into two stages, in each of which the participants made pairwise choices between individuals of differing ages. The nine ages used in this study (as described to the participants) were a 1-day-old infant, a 2-year-old toddler, a 5-year-old child, a 10-year-old child, a 15-year-old teenager, a 20-year-old adult, a 30-year-old adult, a 50-year-old adult, and an 80-year-old adult. Given nine different ages, there were 36 possible pairs of ages to consider. In the value choices stage of the study, participants made three choices about each possible pair, in the following order: which of the two individuals should be allocated a lifesaving organ, whose accidental death would be more tragic, and whose death would produce more grief in an immediate family member. In each case, participants were given the option of not choosing between the two individuals—by indicating that it was impossible for them to make a decision about who should receive the organ, that neither individual's death would be more tragic than the other, and/or that immediate family members would be equally grief-stricken in the two cases.

In the "rights choices" stage of the study, participants made choices between the individuals in each of the 36 pairs, but this time they indicated which murder was more morally wrong—the murder of the younger or older individual—and, then, which murder should receive greater punishment. Again, the option not to make a choice was included in this stage, by indicating that the two murders are equally wrong and/or that they should receive equal punishment.

The order of these two stages of the study was counterbalanced. Within each stage, participants were randomly assigned to receive one of four different orders of the 36 pairs (these orders were randomly generated initially). Once assigned, this order remained constant across the two stages of the study. For each choice, the younger individual was always presented first, both within the question and within the response options.

At the end of the study, participants were presented with the list of nine ages they had chosen between and were asked to indicate which life they regarded as most valuable and which they regarded as least valuable in terms of how they responded to the organ donation questions. They were then asked to describe in an open-ended fashion what thoughts or reasons had guided their organ donation choices and then to indicate, on 6-point scales, how much

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they had thought about various factors in making their choices. (We do not present the analyses for these questions, as they were not illuminating.) Finally, participants indicated their opinions about several more general moral questions and reported demographic information, including their political and religious beliefs.

Results

Our first aim was to examine whether the value and rights curves differed from each other. We first compared how often participants indicated that they could not choose between the given ages for each question. If people are more inclined to see other individuals as morally equal with respect to the rights-based questions, they should be more likely not to choose between the given ages for such questions (i.e., to indicate that they could not decide between the two individuals or to choose the "equal" option). Indeed, that was the case. On average, participants made choices for 74% of the relevant comparisons for the three value-based questions (organ donation, 76%; tragedy, 75%; grief, 71%) compared with 55% for the rights-based questions (wrongness, 60%; punishment, 51%), $t(28) = 3.50$, $p = .002$.

To examine the response trajectories as a function of age, for each age, we aggregated across all of the choices in which that age appeared, assigning a score of 1 if that age was favored and a score of 0 if that age was disfavored or no choice was made. We also ran subsequent analyses in which the no choice decision was coded as 0.5; these produced similar results (see below). This procedure was used for each of the five key questions—the three value questions, organ assignment, tragedy of accidental death, and grief following accidental death, as well as the two rights questions, wrongness of killing and punishment for killing. For each age, the value questions (average Cronbach's $\alpha = .76$) and the two rights questions (average Cronbach's $\alpha = .75$) correlated well together, and so we averaged them to form separate value and rights indices.

Figure 1 displays the aggregated data across all ages in the study. The difference between the values and rights curves is visually striking, but to demonstrate this difference more formally, we ran a repeated-measures analysis of variance (ANOVA) entering both target age and the question type (value vs. rights). Mauchly's test showed that the assumption of sphericity had been violated, so a Greenhouse–Geisser correction was applied (the result is robust to not applying this correction). As predicted, a significant interaction emerged, indicating that the effect of age was significantly different for the value and rights questions, $F(3.56, 99.67) = 17.51$, $p < .001$, $\eta_p^2 = .39$. As is apparent in Figure 1, the value questions did in fact show the predicted increasing value trend, and they did so more clearly than did the rights questions. To corroborate this, we ran repeated-measures ANOVAs, examining the size and significance of the quadratic and linear effects for the rights and value questions, respectively. The increasing value prediction implies that there should be stronger quadratic effects for the value questions.[3] Corroborating this prediction, the quadratic effect was large and highly reliable for the value questions, $F(1, 28) = 77.92$, $p < .001$, $\eta_p^2 = .74$. The most highly prioritized age was 10 years old. The corresponding linear effect, though significant, was approximately half as large (in terms of variance explained),[4] $F(1, 28) = 13.86$, $p = .001$, $\eta_p^2 = .33$. This linear effect results from the declining priority placed on individuals as their age increases from age 20 onward. However, when the analysis was restricted to the seven ages ranging from 1 day to 30 years—which is the period during which the increase in value and its subsequent decline should be most pronounced—the quadratic trend remained significant, $F(1, 68) = 45.15$, $p < .001$, $\eta_p^2 = .62$, whereas the linear trend was no longer present, $F(1, 68) = 2.79$, $p = .106$, $\eta_p^2 = .09$. The overall pattern of results reported here was highly consistent across each of the value questions considered individually (which we do not present in the interests of space).

In contrast, for the rights-based questions, as also shown in Figure 1, there was a reliable quadratic effect, $F(1, 28) = 5.36$, $p = .03$, $\eta_p^2 = .16$, but the linear effect was almost four times as large, resulting from a general tendency to see killings of younger individuals as more wrong and more deserving of punishment, $F(1, 28) = 42.68$, $p < .001$, $\eta_p^2 = .60$. Reflecting this, the most prioritized age was 2 years old. This general pattern of results was also highly consistent across each of the rights questions considered individually.

We reran each of these analyses on the data that resulted from treating the no choice option as 0.5, rather than 0. All of the main results held in this analysis; chiefly, the interaction between age and construct and the larger quadratic effect of age for the value questions as opposed to the rights questions.

To test for the effects of any individual difference variables, we reran these repeated-measures ANOVAs on the value and rights questions, respectively, while also entering age, gender, religious belief (belief in God), and political orientation as covariates (separately). This thus amounted to conducting eight distinct analyses of covariance (ANCOVAs). There were no main effects of any of the individual difference variables, and the only (marginally) significant interaction was between gender and target age, for the value questions, $F(8, 216) = 1.95$, $p = .054$, $\eta_p^2 = .07$. Further inspection showed that the inverted U shape for the value questions was more pronounced for women than for men (η_p^2 for the quadratic effect was .82 for women and .48 for men). However, notwithstanding this one difference, the general picture from these

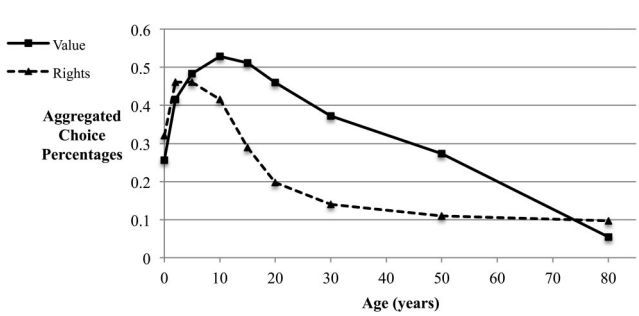

Figure 1. The aggregated choice percentages for the value and rights questions, with target age presented on an interval scale, in Study 1. The markers on each line represent the ages assessed in the study.

[3] This is based on the assumption that an early increase in perceived value will terminate at some point in late childhood and will then be followed by a decline in perceived value, giving rise to an inverted U-shaped function.

[4] Eta-squared is a measure of variance explained, and so, in what follows, we treat the relevant effect sizes as related on a ratio scale. Although we report partial eta-squared, this measure is equivalent to eta-squared in the context of the single-variable analyses we report.

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analyses was that the overall shape of the value and rights curves was largely consistent across these demographic variables.

We also examined which ages the participants indicated were the most and least valuable in answering the organ question. Participants' responses did not follow a straightforward linear trend here either. The most frequently cited least valuable age was the 80-year-old, but after that, it was the 1-day-old. The most frequently cited most valuable age was the 10-year-old.

Discussion

The results of Study 1 clearly corroborate the increasing value prediction. Participants thought that the tragedy of the accidental death of an individual was greatest when that individual in question was between 5 and 15 years of age (peaking at age 10), and similar effects were observed for convergent measures of organ allocation and family members' predicted grief.

In contrast, our predictions about the rights-based questions were only partially corroborated. For decisions about murders that differed only as a function of the age of the victim, there was a pronounced downward linear trend, such that there was a tendency to regard the killing of younger individuals (approximately 2–5 years) as more wrong and as deserving more punishment than the killing of older individuals. Thus, strict equality was not observed with respect to these rights-based questions. And, although there was greater overall reluctance to make any decision that discriminated between the two individuals in terms of these rights-based measures, participants were willing to make these discriminations more than half of the time.

Thus, the fact that any systematic preference was observed for these rights-based questions was surprising. However, it is possible that this result is somewhat artifactual, given aspects of the current design, which allowed room for participants to make inferences about the nature of the acts described. Without much contextual information provided in each case, participants may have reasoned that very young children are unlikely to have done anything to provoke their murder; so, an individual who kills such a young child must clearly be callous and coldhearted and therefore particularly deserving of punishment. This potential difference in provocation is separate from the specific age-based effect in which we were interested, and so we aimed to limit its influence in the next study.

Overall, these data are thus consistent with the idea that participants relied on two distinct moral constructs when answering the two sorts of question asked in this study. On the one hand, for the organ allocation, tragedy, and grief questions, which were designed to tap a notion of contingent moral value, participants' greater willingness to make comparative judgments and the more pronounced quadratic pattern in their responses suggest that they represented the underlying dimension of comparison for these questions in a more gradated or continuous fashion. On the other hand, for the wrongness and punishment questions, which arguably tap the notion of a natural, negative right, participants' lesser willingness to make judgments and the generally flatter pattern in their responses suggest that they represented the underlying dimension of comparison in a somewhat more equal (though clearly not completely equal) way.

Study 2: Replication With More Diverse Adult Participants

Our next study examined the extent to which the increasing value trend obtains among a more diverse sample of adult participants. In addition to the main goals of replication and generalization, we also made several changes to the wording of our scenarios and questions in order to rule out some pertinent alternative explanations of the findings in Study 1, as described below.

Method

Participants. Two hundred forty-nine individuals were recruited with the Amazon.com Mechanical Turk system and participated for monetary compensation. Thirty-three participants did not complete the study, leaving 216 (119 male, 97 female; M_{age} = 32.65 years, SD = 11.01, range = 18–68 years) for the final analysis.

Materials, design, and procedure. Each participant made pairwise choices between individuals of differing ages. The nine ages used in this study (as described to the participants) were a 1-week-old, a 1-year-old, a 3-year-old, a 9-year-old, a 15-year-old, a 20-year-old, a 40-year-old, a 60-year-old, and an 80-year-old, yielding 36 possible pairs of ages to consider.

Participants were randomly assigned to one of three conditions. Approximately one third of the participants (n = 69) completed the value choices condition. They were instructed that there was only one unit of medicine available to prevent death from a highly contagious, viral disease, and that the medicine could be allocated to only one of two individuals. Participants indicated which of the two individuals should be saved or, alternatively, that it was impossible for them to decide whom to save—in which case they understood that the decision would be made randomly. They next indicated which of the two individuals' deaths would be more tragic or, alternatively, that neither death would be more tragic than the other. As with the organ donation question used in Study 1, this context poses a decision about which of two individuals to save (thus also assessing positive rights and contingent value), but it improves upon the organ donation question because it does not bring into play concerns about whether each individual could successfully accept an organ.

A separate third of the participants (n = 69) were assigned to the rights choices condition. They read about two different "subway bombers" who had each planted a bomb in a subway station and then detonated it by remote control. The bombers were without knowledge of the identity of the eventual victims, who happened to differ by age and were killed by the bomb. Participants were asked to choose which of the two individuals to track down and punish (it was specified that it was not possible to track down both) and, separately, whether one killing was more wrong than the other. As with the organ allocation question, participants were instructed that if they did not choose one individual to track down, the choice would be made at random. Specifying that the murderers did not have had foreknowledge of the specific identities of their victims better equates them in terms of their presumed callousness and degree of provocation and thus focuses on the effects of the victims' rights and their value alone.

The remaining third of the participants (n = 78) indicated, for each possible pairwise contrast, which of the two individuals was

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more likely to die in a typical day from all possible causes of death. Because the results from this question are somewhat tangential to our present focus, we do not discuss them further here, although we return to them briefly in the General Discussion. The exact wording of all questions used in this study is presented in the online supplemental materials.

For all of the three conditions—value questions, rights questions, and likelihood of death questions—the order of mention of the two individuals in each scenario (younger or older first) was counterbalanced, and this order remained consistent within each participant. At the end of the study, participants responded to some demographic questions. They were then debriefed, thanked, and paid.

Results

Corroborating what we observed in Study 1, participants were more willing to make choices for the two value questions (M = 57%; medicine, 59%; tragedy, 55%) than for the two rights questions (M = 32%; wrongness, 23%; punishment, 42%), $t(136) = 5.35$, $p < .001$. Particularly revealing was the fact that 57% of the participants consistently refused to make any choices at all about which of the murders was more wrong, thus showing an entirely flat curve for this question, whereas only 6% of participants showed a similar no-choice tendency for the tragedy question (Mann–Whitney $U = 1{,}173.00$, $z = 6.41$, $p < .001$).[5]

To analyze the response trajectories in more detail, we aggregated across participants' choices in the same way as in Study 1. We added order (younger vs. older presented first) into all of the repeated-measures analyses reported below. It had no main effects or interactive effects, so we do not comment on it further.

We present the data resulting from treating no choice of either individual as 0. For each age, the two value questions (average Cronbach's $\alpha = .78$) and the two rights questions (average Cronbach's $\alpha = .66$) showed acceptable internal reliability, and so we again averaged them to form separate value and rights indices. Figure 2 illustrates the aggregated value and rights curves, averaged across the two value questions (medicine, tragedy) and the two rights questions (punishment, wrongness), respectively. As the figure shows, the value and rights questions elicited quite distinct responses, with only the value questions (medicine, tragedy) showing the inverted U-shaped curve. To corroborate this overall difference, we compared the value and rights questions in a mixed design ANOVA, entering both target age (within-subjects) and question type (value vs. rights, between-subjects). As predicted, an interaction emerged between target age and question type (value vs. rights), $F(8, 1088) = 7.17$, $p < .001$, $\eta_p^2 = .05$.

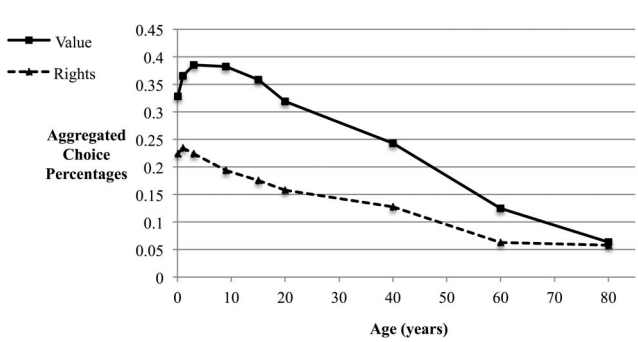

Figure 2. The aggregated choice percentages for the value and rights questions, with target age presented on an interval scale, in Study 2. The markers on each line represent the ages assessed in the study.

As shown in Figure 2, there was an upward-sloping trajectory in the early years of life for the two value questions (aggregated), followed by a later downward trajectory. This was reflected in the significant quadratic effects observed for these questions, $F(1, 68) = 41.09$, $p < .001$, $\eta_p^2 = .38$. There were also significant linear trends for these questions, $F(1, 68) = 42.63$, $p < .001$, $\eta_p^2 = .39$, reflecting the sharp decline in choosing an individual once he or she had reached adulthood. However, when the analysis was restricted to the six ages ranging from 1 week to 20 years—which is the period during which the increase in value and its subsequent decline should be most pronounced—the quadratic trend remained significant, $F(1, 68) = 19.17$, $p < .001$, $\eta_p^2 = .22$, whereas the linear trend was no longer present, $F(1, 68) = 0.79$, $p = .786$, $\eta_p^2 = .001$. The most highly prioritized ages were 3 and 9 years, which were virtually indistinguishable.

A different pattern emerged for the punishment and wrongness questions, as shown in Figure 2. There was no significant quadratic effect for these questions, $F(1, 68) = 0.77$, $p = .382$, $\eta_p^2 = .01$. However, the linear trend was significant, reflecting participants' sense that it was more wrong and more punishable to kill younger individuals, $F(1, 68) = 16.76$, $p < .001$, $\eta_p^2 = .20$. Consistent with this, the most prioritized age for the rights questions was 1 year old.

As in Study 1, we reran each of these analyses on the data that resulted from treating the no choice option as 0.5, rather than 0. Once again, the key results held in this analysis; chiefly, the interaction between age and construct and the larger quadratic effect of age for the value questions as opposed to the rights questions.

In order to test for the effects of individual difference variables, we reran these repeated-measures ANOVAs on the value and rights questions, respectively, while also entering age, gender, religious belief (how religious), and political orientation as covariates (separately). This amounted to conducting eight distinct ANCOVAs. There was one main effect, of age, such that older individuals were somewhat less likely to make any choices for the rights questions, $F(8, 536) = 4.04$, $p < .001$, $\eta_p^2 = .06$. The only significant interaction was between gender and target age, for the rights curve, $F(8, 536) = 5.65$, $p < .001$. Further inspection suggested that the rights curve was somewhat more linearly downward sloping for men than it was for women, for whom it was relatively flat (η_p^2 for the linear trend was .30 for men and .07 for women). However, notwithstanding these two differences, the general picture from these analyses was that the overall shape of the value and rights curves was largely consistent across these demographic variables.

[5] We regard the wrongness and tragedy measures as the most diagnostic for assessing conceptions of rights and value, respectively. The corresponding percentages for the punishment and medicine questions were 19% and 7%, respectively (Mann–Whitney $U = 2076.50$, $z = 1.98$, $p = .047$).

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Discussion

Study 2 corroborated the two main findings from Study 1. For the medicine and tragedy questions, participants were more willing to make definite choices between the two individuals than they were for the wrongness and punishment questions. Moreover, they did not simply apply a years left strategy in making these choices (cf. Li et al., 2010). In general, younger individuals tend to be prioritized over older individuals. However, older children were frequently prioritized over younger children, with the most prioritized ages in our data being 3 and 9 years of age. In contrast, for the wrongness and punishment questions, participants were less willing to make choices, and their responses were not characterized by the inverted *U* shape that characterized the value questions. But, even with the tighter control employed in this study, we did not observe anything like strict equality for the rights-based questions. Instead, the overall trajectory was linear, with greater prioritization of children (in general) as opposed to adults.

Although they are important in establishing the distinction between negative rights and value, the results of these initial studies raise some further questions. On the one hand, in Study 2, the protagonist knew the target's age for the value (medicine allocation) decision but not for the rights (subway killing) decision. There was reason for introducing this difference (as we described earlier), and this confound was not present in Study 1, which produced similar results. Nonetheless, it would be desirable to remedy this and replicate the effects without this confound. Additionally, whereas the medicine allocation question was framed positively ("who should be saved?"), the punishment question was framed negatively ("who should be punished?"). This difference in framing does not reflect the core distinction between positive and negative rights and is instead a more superficial linguistic feature (see, e.g., Kamm, 1998). This confound was not present in the tragedy and wrongness questions, which provides some assurance that it is perhaps not critical, but it is nonetheless desirable to control for it.

Finally, and perhaps most important, the dimensions we compared in the first two studies—whom to save versus whom to punish—differ in how directly they focus on the target individuals in question. The question about who to save focuses directly on the individuals of various target ages, whereas the question about who to punish focuses more indirectly on these individuals as victims of the perpetrators who are the main focus of the question.

Study 3: More Direct Assessment of the Difference Between Rights- and Value-Based Decisions

We therefore designed a third study that aimed to address each of these potential problems. It aimed to elucidate the difference between the rights-based and value-based decisions in a more direct way.

Method

Participants. Two hundred and forty-two undergraduate participants were recruited for course credit. Five participants did not complete the study, leaving 237 (94 male, 143 female; M_{age} = 19.07 years, SD = 11.01, range = 17–29 years) for the final analysis.

Materials, design, and procedure. Participants were randomly assigned to one of two closely matched cases in a between-subjects design. Approximately half of the participants (n = 117) were assigned to the *value* case, in which two individuals who differed only in terms of age were both dying of blood loss, and there was only one unit of their rare blood type available. Thus, once again, a dilemma was created in which only one of the two patients could be saved. Participants indicated to which of the two individuals the attending doctor ("Dr. Jones") should allocate the blood, if either. As in the previous studies, participants had the option of saying that neither individual should receive the blood. This case focuses on the target individuals' positive rights to be saved and was thereby intended to activate conceptions of the contingent value of the different lives in question. The individual who is not allocated the blood is allowed to die, rather than actively killed, and is thus unlikely to be viewed as having had a fundamental, negative right infringed upon. Accordingly, we expected participants to respond to this case by considering contingent features of each individual's life that affect the relative value of those lives—in particular, by considering the extent to which age affords a reason for prioritizing one over the other.

The remaining participants (n = 120) were assigned to the *rights* case, in which two individuals who differed only in terms of their age were again dying of blood loss. However, in this case, there was no unit of their rare blood type available. The only option open to the attending doctor (Dr. Jones) was to transfuse the blood from one of the patients (thereby killing this patient) into the other patient (thereby saving this patient). Participants indicated from which of the individuals the doctor should take the blood, if either. They were able to indicate that blood should not be taken from either patient, with both being allowed to die in this case. Unlike the value case—when blood is merely withheld from one of the individuals—in the rights case one of the individuals is directly killed rather than simply allowed to die, such that this individual's fundamental, negative right not to be killed is arguably being infringed upon. Thus, this case therefore focuses on the target individuals' negative rights not to be killed and should be less influenced by conceptions of the contingent value of the lives in question. The full text of each scenario used in this study is presented in the online supplemental materials.

Seven ages were used in this study, which were again varied within-subjects, yielding 21 possible pairs. We used equidistant ages, such that the seven ages were a 1-day-old, a 10-year-old, a 20-year-old, a 30-year-old, a 40-year-old, a 50-year-old, and a 60-year-old.

Our theory claims that the value case does not involve any infringement of a fundamental right, and it should therefore induce people to think about the contingent value of the different human lives in question. In contrast, the rights case does involve the infringement of a fundamental right not to be killed. It should induce lesser consideration of the contingent value of the different human lives in question. To corroborate this interpretation, we ran a separate study with a separate group of undergraduate participants (N = 100; 68 female; 32 male), in which we presented them with the value scenario and the rights scenario in a decontextualized fashion, with the two individuals in question described as Patient A and Patient B (with age not specified). Participants received these two scenarios in a counterbalanced order. In both cases, the doctor was described as having taken the necessary steps

to save Patient A—in the value case, by allocating him or her the blood, and in the rights case, by taking the blood from Patient B and transfusing it into Patient A. We asked participants to indicate whether it was more accurate to describe Dr. Jones as having "killed" Patient B, or as having "let" Patient B die; the extent to which they thought that Dr. Jones had violated a fundamental right of Patient B's (1 = *not at all*; 9 = *to a great extent*); and how wrong they thought Dr. Jones' actions were (1 = *not at all wrong*; 9 = *extremely wrong*). Corroborating our expectations, in a between-subjects analysis of the first scenario participants received, 96% of participants thought Dr. Jones had let Person B die in the value case, compared with 48% of participants in the rights case, $\chi^2(1) = 28.57$, $p < .001$, with the remainder indicating that Dr. Jones had killed Person B. Moreover, participants were much more likely to indicate that Dr. Jones had violated a fundamental right of Person B's in the rights case ($M = 7.32$, $SD = 1.89$) than in the value case ($M = 4.08$, $SD = 2.20$), $t(98) = 7.90$, $p < .001$, and that Dr. Jones' actions were more wrong in the rights case ($M = 6.00$, $SD = 1.88$) than in the value case ($M = 2.82$, $SD = 1.78$), $t(98) = 8.67$, $p < .001$. The same overall pattern of results held in within-subject analyses. This corroborates our theoretical interpretation of these scenarios.

Given these results, our theory straightforwardly predicts that individuals should be more open to considering the contingent value of the individuals' lives in the value (i.e., positive rights) condition than in the rights (i.e., negative rights) condition. Their judgments should accordingly be more sensitive to the different ages of the individuals in question. This does not require that participants will not consider the value of the different human lives at all in the rights case. After all, at least one of the target individuals must die in each case, and so from a consequentialist point of view it would arguably make sense to directly kill one to save the other. Our main prediction was simply that in comparison with the rights case, the value case would induce participants to make more choices overall that prioritized one individual over the other. Moreover, we predicted that they would do so in a systematic fashion, such that the increasing value trend would be more pronounced in the value condition than in the rights condition, for which a flatter, though not necessarily totally flat pattern, should be observed.

For both the value and rights cases we also manipulated the linguistic framing of the key questions. For half of the participants ($n = 118$) the questions were framed positively in terms of which patient should be saved ("which patient should Dr. Jones save?"), whereas for the remaining participants ($n = 119$) these questions were framed negatively in terms of which patient should be allowed to die or be killed (value case: "which patient should Jones allow to die [deny the blood]?"; rights case: "which patient should Dr. Jones kill [take the blood from]?"). This manipulation was orthogonal to the main value versus rights manipulation. We were uncertain whether this difference in framing would lead to different responses but included it to address the partial confounding of linguistic framing with our manipulations in Studies 1 and 2. Our main interest was in establishing whether the difference between the value and rights cases was robust to this difference in framing.

Finally, as in the previous studies, we also manipulated (between-subjects) the order in which the two individuals of each age were presented in the vignette. This variable was fully counterbalanced with both the value versus rights variable and the framing variable, creating an overall total of eight between-subjects conditions.

Results

Consistent with both of the previous studies, participants were more willing to make choices to save one individual over the other for the value questions ($M = 95\%$) than for the rights questions ($M = 56\%$), $F(1, 233) = 104.68$, $p < .001$, $\eta_p^2 = .31$. There was also a substantial effect of framing such that participants were more willing to make choices when the questions were framed positively in terms of who should be saved ($M = 85\%$), as opposed to when they were framed negatively in terms of who should be killed or allowed to die ($M = 66\%$), $F(1, 233) = 27.23$, $p < .001$, $\eta_p^2 = .11$. A significant interaction also emerged between moral construct (value vs. rights) and framing, $F(1, 233) = 15.92$, $p < .001$, $\eta_p^2 = .06$, such that the effect of moral construct (value vs. rights) was larger when the questions were framed negatively than when they were framed positively. Nonetheless, the difference between value and rights remained significant regardless of whether the questions were framed positively ($M_{value} = 97\%$, $M_{rights} = 73\%$), $t(116) = 4.60$, $p < .001$, or negatively ($M_{value} = 93\%$, $M_{rights} = 39\%$), $t(117) = 9.69$, $p < .001$, thus showing that the difference between the value and rights questions is robust to the way they are framed.

To test the effects of age more precisely, in the first set of analyses, we coded the choice of neither individual as 0 and aggregated across participants' choices in the same way as was done in Studies 1 and 2. We also checked whether order (younger vs. older presented first) had any significant effects by adding it to all of the analyses reported below. It had no main effects and no important interactive effects (it contributed to a single small, unimportant higher order interaction), and so for ease of interpretation we report the results from the analyses without order included.

Figure 3 illustrates the aggregated value and rights curves for the positively and negatively framed questions. We analyzed the data with target age, moral construct (value vs. rights), and framing as independent variables. This analysis revealed main effects of age, $F(6, 1398) = 238.28$, $p < .001$, $\eta_p^2 = .51$; moral construct, $F(1, 233) = 106.83$, $p < .001$, $\eta_p^2 = .31$; and framing, $F(1, 233) = 28.82$, $p < .001$, $\eta_p^2 = .11$. These latter two main effects reflect the

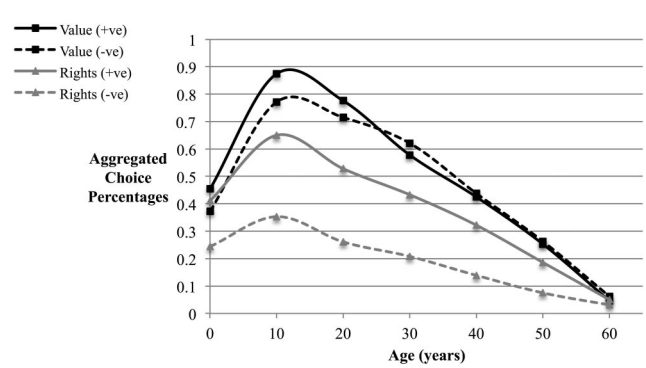

Figure 3. The aggregated choice percentages for the value and rights questions, with target age presented on an interval scale, in Study 3. The markers on each line represent the ages assessed in the study. +ve and –ve refer to positive and negative framing, respectively.

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fact that more choices to prioritize specific individuals were made for value as opposed to rights questions (in accordance with our theoretical prediction and the earlier results) and when the questions were framed positively. The key theoretical interaction between age and moral construct was also significant, $F(6, 1398) = 21.33$, $p < .001$, $\eta_p^2 = .08$. The quadratic effect of age was large and significant for the value questions, both when they were framed positively, $F(1, 57) = 82.52$, $p < .001$, $\eta_p^2 = .59$, and when they were framed negatively, $F(1, 58) = 117.00$, $p < .001$, $\eta_p^2 = .67$. The quadratic effect of age was also significant for the rights questions. But, in comparison with the value questions, the quadratic effect of age explained only half as much variance in responses to the positively framed rights questions, $F(1, 59) = 27.31$, $p < .001$, $\eta_p^2 = .32$, and less than a sixth as much variance in responses to the negatively framed rights questions, $F(1, 59) = 5.88$, $p = .018$, $\eta_p^2 = .09$. Finally, for these analyses, a small three-way interaction emerged among target age, moral construct, and framing, $F(6, 1398) = 2.15$, $p = .045$, $\eta_p^2 = .009$. As shown in Figure 3, this reflects the fact that the key interaction between moral construct and age was larger for the negatively framed questions, $F(6, 702) = 19.68$, $p < .001$, $\eta_p^2 = .14$, than for the positively framed questions, $F(6, 696) = 5.23$, $p < .001$, $\eta_p^2 = .04$. Though intriguing, this difference is not of primary theoretical importance. The main lesson is that the key interaction between age and moral construct holds regardless of question framing.

We reran these same analyses this time coding choices of neither individual as 0.5, which revealed essentially the same pattern of results. The only exception was the absence of the three-way interaction.

Discussion

The present experiment corroborates and clarifies the results of the previous experiments. It compared two closely matched scenarios in which participants had to choose which of two individuals to save from death or, alternatively, to save neither. The only difference between the scenarios was that in one case (*value-based*), one individual could be saved without directly killing the other individual, by simply allowing him or her to die, whereas in the other case (*rights-based*), the only way to save one of the individuals was to directly kill the other individual. The distinction between these cases parallels a well-known philosophical distinction between killing and letting die and a corresponding distinction between positive rights to be aided and negative rights not to be harmed. In the rights-based case, one of the individual's negative rights not to be harmed must be violated in order to save the other individual. In contrast, the value-based case does not involve the violation of either individual's negative (fundamental) rights but instead involves a clash of positive rights only.

Our key hypothesis was that participants would be more sensitive to the relative value of the target individuals' lives—as yielded by their relative ages—in the value case than in the rights case. We also expected that they would discriminate between those individuals so as to replicate the increasing value trend seen in the prior studies. We did not predict that participants would be totally insensitive to age in the rights case—after all, from a consequentialist perspective, it would be better to kill one individual to save the other. But we did expect that systematic prioritization of some ages over others would be reduced.

These key predictions was corroborated decisively. The increasing value trend was observed for both the value and rights questions, though, as predicted, it was more pronounced for the value questions. Because the present study presented participants with very closely matched scenarios, while also controlling for the framing of the key questions, it thus establishes most clearly the difference between value-based and rights-based questions and the different moral constructs (positive and negative rights) that accompany them.

Study 4: Think-Aloud Protocol

To explore the processes underlying the increasing value trend, we next conducted a replication of Studies 1–3 that incorporated a think-aloud procedure (Ericsson & Simon, 1980) in which participants verbally articulated their thought process for each decision as they made it. This exploratory methodology allowed us to examine what our participants were thinking while making their decisions in real time, including which reasons guided their decisions. We expected to once again replicate the curvilinear effect of age on perceived life-value that we found in Studies 1–3. Moreover, we hypothesized that participants would value older children more than younger children, because they have had more work and energy invested into their lives (see also Dworkin, 1993) and because they have more numerous and more meaningful social relationships. However, we used a think-aloud protocol specifically because it allowed the study to reveal other possibly influential reasons, if they exist.

For the sake of generalizability, the context in which participants made their decisions was once again changed. In one condition, participants were again asked to imagine that they were the dean of medicine at a hospital and that they had to choose which of two patients would receive a lifesaving transfusion of the hospital's only unit of their rare blood type. This scenario is almost identical to the blood allocation scenario in Study 3. In a separate condition, participants were asked to imagine that they were a police hostage negotiator and that a gunman had taken two people hostage. They were told that the gunman had agreed to safely release one hostage of their choosing but had sworn that he would kill the other hostage. This condition was introduced for the sake of generality. We expected these two conditions to produce similar data, as they both ask who should be saved (a question about positive rights, which should assess participants' conceptions of contingent value).

Method

Participants. Thirty participants, who were predominantly university students (21 female, 9 male; $M_{age} = 22.63$ years, $SD = 5.57$, range = 18–48 years), were recruited. They were paid for their participation.

Procedure. Participants arrived at the lab individually and were seated at a desk with a computer and a microphone headset. Upon arrival, all participants were randomly assigned to one of two conditions: blood or hostage. The experimenter told participants that "in this study, we would like you to 'think aloud' about how you are making decisions, and we will record the thoughts you say using that microphone headset. That is, we want you to try and say all the thoughts that come to mind as you are thinking

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about each decision you have to make." The participant put on the headset, and the experimenter sat down in a chair about three feet behind the participant. Participants were presented with 10 pairwise decisions about which life to save between targets of different ages. In this study, the ages used were 3 months, 2 years, 10 years, 18 years, and 35 years. This study did not include the tragedy, grief, wrongness, and punishment questions from Studies 1 and 2, focusing instead only on the decision to choose one life over another. We also did not include a neutral option, such as "It is impossible for me to make this decision," because we did not want participants to opt out of thinking through the decision simply because they found it difficult.

In both the blood and hostage conditions, participants had to articulate their thought processes into the microphone headset and then respond to the statement, "When you have finished thinking about everything you believe is relevant, please select which person you would SAVE below." Participants could not advance to the next decision until the present decision had been onscreen for at least 30 seconds. This forced participants to attend to each decision and to thoroughly articulate their thought processes. The experimenter remained silent throughout the experiment, unless a participant fell silent for more than five seconds, in which case he prompted the participant to "please keep thinking aloud." After making all 10 decisions, participants filled out a brief demographic questionnaire. They were probed for suspicion, debriefed, paid, and thanked for their participation.

Coding. After all 30 participants had completed the study, the recordings of their vocalizations were transcribed to text. Two research assistants who were blind to the purpose of the study then used the recordings and transcriptions to independently code participants' responses. The coding scheme required them to first code for whether a participant deliberated about a decision before making it, for how difficult the decision was for the participant to make, and for how long the participant took to make it. These data are somewhat peripheral to our main interests, so we do not report on them further. Most important, the coders also counted the number of times participants cited each of 20 possible reasons for saving each of the two targets in each decision. These reasons were adduced from an initial reading of the transcriptions made by the second author. The coding was independent of which target the participant eventually chose to save—if a participant stated one reason why he might save the older target, this would be counted even if he eventually chose to save the younger target. Moreover, the presence or absence of a reason was treated as dichotomous—if a participant stated the same reason multiple times in the same decision, it was not counted multiple times. The 20 different reasons, the definition of each reason given to the two coders, and a prototypical example of each one are presented in the Appendix. The two coders agreed in 96% of cases, and disagreements were resolved through discussion.

Results

Choice. The likelihood of a participant choosing to save targets of a given age was aggregated across all of the scenarios in which a target of that age appeared. As in Studies 1–3, plotting the likelihood of being saved by target age reveals a clear curvilinear effect of target age. In both conditions, as shown in Figure 4, participants were again more inclined to save older as opposed to younger children. In the blood condition, the most prioritized age was 10 years old, whereas in the hostage condition, the most prioritized age was 2 years old. To illustrate this more formally, we collapsed across the blood and hostage conditions, as no Condition × Target Age interaction was revealed in mixed-measures ANOVA analysis, $F(1.96, 55.57) = 0.38$, $p = .684$, $\eta_p^2 = .013$. Trend analyses revealed that a linear trend was a poor fit in capturing the effect of target age, $F(1, 28) = 1.49$, $p = .232$, $\eta_p^2 = .051$, but that a quadratic trend was a significant fit, $F(1, 28) = 21.53$, $p < .001$, $\eta_p^2 = .44$.

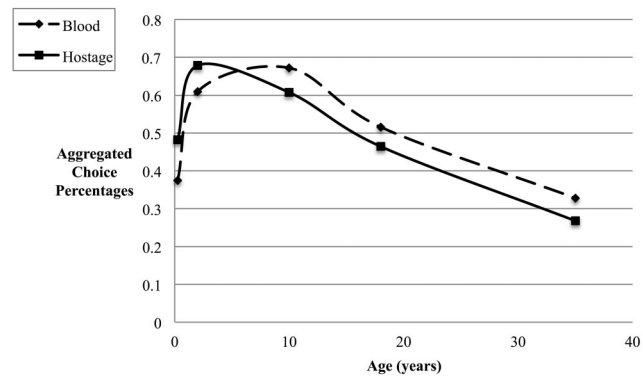

Figure 4. The aggregated choice percentages for the blood and hostage conditions, in Study 4. The markers on each line represent the ages assessed in the study.

Reasoning. To examine the importance of each of the 20 reasons participants provided for their decisions, we first summed the number of times each reason was stated in support of saving the younger target and the older target across our entire sample. These frequencies are shown in Table 1. We then computed a difference score by subtracting the number of times a reason was used to support saving the younger target from the number of times it was used to support saving the older target.[6] The magnitude of this difference score captures the extent to which a reason was frequently generated by participants in favor of one target or the other.

Table 1 ranks the 20 reasons by their difference scores. Visual inspection reveals two obvious qualitative break points in the magnitude of these difference scores. As shown at the top of the table, participants very frequently supported saving the younger target because he (or she) had more "years left" and had fewer "years lived" already (see also Li et al., 2010). However, the bottom of the table shows that our participants also frequently cited three reasons in support of saving the older target: social relations, investment, and understanding of death.

[6] The rank-order of the difference scores and their relative magnitudes remain nearly identical if multiple mentions of the same reason in the same decision are counted separately and/or if only reasons stated in favor of saving the target that the participant did eventually choose to save are counted. Importantly, the rank orders of years lived, years left, social relations, investment, and understanding of death do not change under these alternate coding schemes, and the two qualitative break points in the rank-ordered reasons remain apparent.

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Table 1
Frequency of Spontaneous Mention of 20 Reasons in Favor of Saving Younger and Older Targets, in Study 4

Reason	Younger	Older	Difference
Years left	54	0	−54
Years lived	48	1	−47
Younger	27	1	−26
Potential	27	5	−22
Consistency	32	17	−15
Social norms	13	0	−13
Innocence	11	0	−11
Life experience	26	16	−10
Psychological damage	10	2	−8
Emotion	9	2	−7
Unsure	5	2	−3
Other condition-specific concerns	10	8	−2
Balance	1	0	−1
Older	0	4	4
In-group favoritism	3	8	5
Contribution	5	11	6
Likelihood of survival	9	21	12
Understanding of death	6	38	32
Investment	1	40	39
Social relations	14	58	44

Discussion

Study 4 again replicated the curvilinear effect of target age on likelihood of being chosen to live, using two different scenarios. These data also support prior research showing that people often place value on younger persons because they have more time left to live and because they have not yet had a chance to live out much of their lives.[7] More importantly, the present data also elucidate why participants sometimes prefer saving older children over younger children and adults. One reason seems to be that older children have more numerous and more meaningful social relationships than do younger children. Their deaths may therefore be seen as causing more pain or loss to others than young children's deaths (i.e., as having more negative overall consequences). A second reason is that older children have had more effort invested into their lives by others and have also put more effort into their own lives than have younger children. Their deaths therefore seem more "wasteful," an effect similar to well-known sunk-costs effects (see, e.g., Arkes & Blumer, 1985). Lastly, older children are seen as being better able to understand and to fear their own deaths. It could be that participants see allowing younger children to die as less harmful overall than allowing older children to die, because younger children will not experience as negative an emotional state as their death approaches. The present study shows that these three considerations occur online when individuals are making value of life decisions, which we take as initial evidence that they were important in underlying the value of life decisions in Studies 1–3. There may also be other reasons why people tend to value older children's lives more than younger children's lives, but as these reasons emerged as most important to our participants in the present study's open-ended procedure, we focus on exploring them in greater depth in the remainder of this paper.

There are some reasons to be cautious in interpreting understanding of death as a genuine input to assessments of the value of a life. It is somewhat peculiar to think that a person's ability to understand death makes his life more valuable, even though it may make his death worse, more tragic, or more worth preventing. Nevertheless, because this consideration entered our participants' deliberations in Study 4, we continued to examine this variable in the ensuing studies and discuss this issue further in the General Discussion.

Because it provides an online, real-time picture of participants' thought processes, the think-aloud method used in this study provides a rich way to study participants' introspective understandings of their decision processes that is more reliable than are retrospective reports (Ericsson & Simon, 1980). Nonetheless, owing to well-known biases in reports of cognitive processes (Nisbett & Wilson, 1977), it is still possible that these reports are inaccurate. In order to assess the causal role of social relations, investment, and understanding death in value of life decisions, we experimentally manipulated these three considerations while holding age constant in Studies 5a, 5b, and 5c. We operationalized value using a continuous version of the tragedy question from Studies 1 and 2, as the tragedy of a person's death is a natural and direct measure of perceived value (Dworkin, 1993).

Studies 5a, 5b, and 5c: Manipulating Social Relations, Investment, and Understanding of Death

Because their methods were highly similar, the Method and Results sections of Studies 5a–c together are presented together. In each study, we predicted that the presence of social relations, high investment, and understanding of death would increase ratings of the tragedy resulting from the target person's death. In Study 5a (social relations), we manipulated the presence or absence of important familial relationships in a target's life while holding target age constant. In Study 5b (investment), we manipulated investment while holding target age constant. In Study 5c (understanding of death), we manipulated an individual's awareness that he was about to die as a proxy for investigating the understanding of death variable. In this study, we felt there was no way to manipulate whether an adult target was cognitively capable of understanding death short of making the target mentally handicapped—essentially, making his mental age less than his physical age. However, because this could potentially introduce a number of extraneous variables, particularly sympathy for the mentally handicapped individual, we instead manipulated whether or not a target was currently aware that he was about to die (a manipulation of mental state rather than capacity). We consider this to be a reasonable proxy for the ability to understand death in a life-threatening situation. For instance, it approximates the mental understanding of the 3-month-old target in Study 4, who cannot understand that a hostage taker intends to kill him and therefore cannot be aware that he is about to die.

Method

Participants. In each study, participants were recruited through Amazon's Mechanical Turk service and were paid for their partici-

[7] It is worth noting that years left and years lived reasons frequently co-occurred, with participants often mentioning both of them in the same breath. We treated them as separate reasons because they are theoretically dissociable and have been treated as distinct in other research (Li et al., 2010), but our participants seem to have often treated them as one and the same reason.

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pation. Study 5a (social relations) recruited 151 adult participants (96 female, 55 male; M_{age} = 38.43 years, SD = 13.98, range = 18–78 years). Study 5b (investment) recruited 256 adult participants (139 female, 116 male, 1 unreported; M_{age} = 33.36, SD = 13.20, range = 18–81 years). Study 5c (understanding of death) recruited 316 adult participants, seven of whom failed to complete the entire survey and were excluded from all analyses, leaving a final sample of N = 309 (102 female, 205 male, 2 unreported; M_{age} = 31.38 years, SD = 12.19, range = 18–68 years).

Procedure. Each study employed a mixed between/within-subjects design. Participants were presented with two blocks of several different person descriptions. Following each description, in Studies 5a and 5b, participants responded to the question "On a scale from 0 to 100, how tragic do you think it would be if [target] were to die from an accident (0 = 'Not at all tragic'; 100 = 'Extremely tragic')?" on a sliding scale. In Study 5c, the most tragic point (100) was labeled, "The most tragic event I can imagine." Across the two blocks, the person descriptions were the same, except for the experimental manipulation of the key variable (social relations, Study 5a; investment, Study 5b; or understanding of death, Study 5c), which was present (or high) or, alternatively, absent (or low) for all descriptions within each block. In each study, approximately half of the participants were assigned to the present/high first condition (Study 5a, n = 36; Study 5b, n = 123; Study 5c, n = 152), with the remainder assigned to the absent/low first conditions (Study 5a, n = 42; Study 5b, n = 133; Study 5c, n = 157). In both the present/high first and absent/low first conditions, the order of the person descriptions within each block was randomized. This design allowed us to test both for between-subjects effects of the key variables in the first block that participants completed and for within-subjects effects across both blocks. The actual materials used for each of these manipulations are reported in the online supplemental materials.

In Study 5a only, approximately half (n = 78) of the participants were assigned to the between/within design described above, whereas the remainder (n = 73) were assigned to a distinct comparative evaluation condition. In the comparative evaluation condition, participants read both the present and absent person descriptions on the same page, described as two separate cases, and answered the question "Imagine that [target] were to die from an accident. In which of the two cases above do you think his (her) death would be more tragic?" on a sliding scale. It ranged from −100 ("[target]'s death in Case 1 would be much more tragic") to 0 ("[target]'s death would be equally tragic in either case") to 100 ("[target]'s death in Case 2 would be much more tragic"). The order in which the two versions of the scenario were presented on the page was counterbalanced across participants, and the order in which the three scenarios were presented was randomized for each participant. We investigated this evaluation mode simply for the sake of generality, not because we expected it to produce markedly different patterns of judgment.

Following the main part of each survey, participants filled out a brief demographic questionnaire. They were then debriefed, thanked, and paid.

Results

Within-subjects analyses. As Table 2 shows, the predicted effects of each of the manipulated variables were significant in within-subjects t tests for all descriptions/scenarios in all experiments. The presence of important social relations, of high levels of investment in a person's life, and of awareness of one's impending death were thus all shown to exert causal effects on judgments of the tragedy of a person's death.

Between-subjects analyses. As revealed in Table 3, the effects of the manipulations were somewhat more inconsistent in between-subjects analyses. All three social relations manipulations

Table 2
Means and Standard Deviations of Tragedy Ratings, With Within-Subjects Inferential Statistics (Study 5a, Study 5b, and Study 5c)

Study 5a					
Description	Present block	Absent block	t(77)	p	d
Parents	79.26 (19.78)	70.56 (23.76)	4.99	.000	.58
Spouse	77.01 (23.02)	69.32 (23.22)	4.28	.000	.49
Children	91.18 (14.18)	81.29 (19.71)	7.52	.000	.96
Study 5b					
Description	High-investment block	Low-investment block	t(255)	p	d
Violin	82.99 (22.05)	81.32 (23.93)	2.22	.027	.14
Newborn	91.22 (18.56)	87.92 (21.47)	3.62	.000	.23
Journalist	81.39 (24.10)	78.06 (26.37)	4.55	.000	.29
Private school	85.92 (21.76)	81.66 (24.74)	4.66	.000	.30
Soldier	80.41 (23.63)	78.64 (25.78)	2.13	.034	.14
Study 5c					
Scenario	Aware block	Unaware block	t(308)	p	d
Plane	77.89 (18.82)	68.18 (22.22)	9.86	.000	.57
Skier	78.20 (19.11)	74.04 (20.52)	5.76	.000	.30
Shark	77.78 (20.64)	70.74 (25.64)	6.03	.000	.35
Fire	75.51 (25.64)	68.42 (27.05)	7.06	.000	.40

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showed significant between-subjects effects, but only one of five investment manipulations showed a significant effect (two were marginally significant), and only one of the four awareness of death manipulations showed the predicted effect significantly. Despite these somewhat mixed results, all scenarios produced results that were directionally consistent with the hypotheses.

Comparative evaluation condition, Study 5a. For the explicitly comparative condition in Study 5a, there were no effects of the order in which the two individuals were presented, and so we collapsed across this variable. As with the analyses reported above, participants felt that the target's death was more tragic in the present version than the absent version of the parents scenario, $t(72) = 12.02$, $p < .001$, $d = 1.41$; the spouse scenario, $t(72) = 8.12$, $p < .001$, $d = 0.94$; and the children scenario, $t(72) = 12.12$, $p < .001$, $d = 1.42$. (These results are not presented in Tables 2 and 3).

Discussion

These results thus support the findings produced by the think-aloud procedure in Study 4, by showing that participants incorporate social relations, investment, and understanding of death into their assessments of how tragic a person's death is and by implication, how valuable that person's life is. Studies 5a–5c clearly demonstrate the causal effect of each of these variables: Every scenario that we employed in Studies 5a–5c showed the predicted effects on tragedy judgments in within-subjects analyses. The fact that these effects emerged within-subjects suggests that participants consciously used information about social relations, investment, and understanding of death in their judgments of life's value and that they believed that it was appropriate for this information to impact their judgments (see, e.g., Bartels, 2008; Bazerman & Messick, 1998; Paharia, Kassam, Greene, & Bazerman, 2009). The studies were brief enough that participants most likely could explicitly recall their responses to the first block while completing the second and so could have made sure that their responses were identical (or nearly identical) if they believed this was the appropriate response. And because real-world value of life decisions are often made in an explicitly comparative way (e.g., which individual should be saved?), these within-subjects analyses may be most meaningful in revealing the effect of our three main variables. Between-subjects analyses were less clear cut. The effects for all scenarios were directionally consistent with the hypotheses, but consistent effects were revealed only for social relations.

Study 6: Mediation in a Between-Subjects Design

Our initial studies (Studies 1–3) showed that people tend to value the lives of older children more than the lives of younger children. In Study 4, people explained this in terms of older children having more numerous and more meaningful social relationships, their having had more invested into their lives, and their being better able to understand death. And, as Studies 5a–5c have shown, each of these three considerations affected judgments of life's value, even when people's attention is explicitly drawn to them. However, Studies 5a–5c did not show that these three considerations determine judgments of life's value when age is the only variable that distinguishes between different individuals. Thus, in the final two studies, we wanted to further corroborate the earlier findings of Study 4 by more directly testing the relative predictive strengths of these possible explanatory variables when they are placed in competition with each other and with other theoretically plausible mediators.

Table 3
Means and Standard Deviations of Tragedy Ratings for the First Block That Participants Encountered, With Between-Subjects Inferential Statistics (Study 5a, Study 5b, and Study 5c)

Study 5a					
Description	Social relation present	Social relation absent	$t(76)$	p	d
Parents	81.06 (19.80)	68.17 (24.63)	2.52	.014	.58
Spouse	79.39 (20.85)	66.05 (24.81)	2.55	.013	.58
Children	92.08 (10.86)	80.71 (19.50)	3.11	.003	.72
Study 5b					
Description	High-investment first	Low-investment first	$t(254)$	p	d
Violin	85.07 (18.25)	79.92 (26.59)	1.79	.074	.23
Newborn	92.54 (15.86)	88.77 (22.33)	1.55	.123	.20
Journalist	84.08 (19.37)	78.89 (27.60)	1.73	.085	.22
Private school	88.57 (18.25)	82.68 (26.02)	2.08	.039	.27
Soldier	80.31 (23.23)	79.50 (26.05)	0.26	.795	.03
Study 5c					
Scenario	Aware first	Unaware first	$t(307)$	p	d
Plane	76.14 (19.03)	69.23 (21.27)	3.01	.003	.34
Skier	75.92 (19.43)	75.70 (20.18)	0.10	.922	.01
Shark	75.54 (20.81)	72.64 (26.51)	1.07	.286	.12
Fire	72.45 (26.16)	72.08 (26.07)	0.12	.902	.01

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In Study 6, we explored whether these three explanatory variables—social relations, investment, and understanding of death—mediate the perceived greater value of older as opposed to younger children's lives in a between-subjects design. We predicted that each of these variables would significantly mediate the effect of target age when entered alone as a mediator, but it was an open question as to which of them would remain significant mediators when all were entered simultaneously.

Method

Participants. Seven hundred ninety-nine individuals were recruited through Amazon's Mechanical Turk service and were paid for their participation. Thirty participants began the survey but did not complete it, and they were therefore excluded from analysis. Twenty more failed a quality-control measure at the end of the survey intended to make sure that participants were reading all instructions. They were excluded from analysis,[8] leaving a final sample of $N = 749$ (334 female, 409 male, 6 unreported; $M_{age} =$ 30.53 years, $SD = 11.17$, range = 16–68 years).

Procedure. Participants were randomly assigned to one of three conditions: infant ($n = 251$), child ($n = 249$), or adult ($n = 249$). Participants then read the following description:

> Imagine that a six-month-old infant [ten-year-old child/thirty-year-old person] has contracted a life-threatening bacterial blood infection. A blood transfusion would cure the infant [child/person], but the hospital does not have any units of the infant's [child's/person's] rare blood type on hand. After a few hours in the hospital, the infant [child/person] dies from the infection.

Participants then responded to a four-item measure of perceived value, which was the primary dependent variable, and also answered nine questions about the target in the description (hereafter referred to as the mediator questions). The order of the four items of the value scale and the order of the mediator questions were randomized for each participant, and the order in which these two blocks were presented was counterbalanced. After responding to both blocks, participants completed a brief demographic questionnaire. They were then debriefed, thanked for their participation, and paid.

Materials. The life-value questions consisted of four items, two adapted from items used in earlier studies (e.g., for the infant: "How tragic would this infant's death be?" and "How much grief would an immediate family member of this infant feel because of their death?") and two new items ("How significant a loss would this infant's death be?" and "Compared to other events in the world, how bad/negative is this event?"). All four items were answered on sliding scales ranging from 0 to 100.

For each of the nine mediator questions, as a salient reference point, participants were asked to compare the target in the description to the "average American high school senior." All nine mediator questions were answered on sliding scales ranging from −10 to +10, with −10 indicating the target has "much less/many fewer" of the particular construct than does the average American high school senior and +10 indicating that the target has "much more/many more" of the construct. The nine mediator questions included two questions for each of the primary hypothesized mediators of the difference between older and younger children. For the social relations variable, one question assessed the *numerosity* of the target's social relationships, and the other question assessed the *meaningfulness* of those relationships. For investment in the target's life, one question assessed the investment made by the target *himself*, and the other question assessed the investment made by *others*. For the target's understanding of death, one question assessed *understanding*, per se, and the other question assessed the target's *capacity to fear* death. We also asked participants to indicate how much time left the target had in his life ("lifespan left") and how much of his life the target had already lived out ("lifespan lived"). Last, we included one item assessing participants' beliefs about the likelihood that the target would die in the course of everyday life even if he had not caught the blood infection that the study described.

Results

The four items of the value scale showed good internal reliability ($\alpha = .80$), so they were averaged into a single measure of life's value. This measure served as the dependent variable in all analyses. Before testing mediation models, we first tested for order effects by conducting a 3 (condition: infant vs. child vs. adult) by 2 (order: mediators first vs. value scale first) analysis of variance with the combined value scale scores as the dependent variable. We found a significant effect of condition, $F(2, 744) = 6.21$, $p = .002$, which we explore in depth below. Importantly, we did not find a significant effect of order, $F(1, 744) = 1.00$, $p = .316$, nor a significant Condition × Order interaction, $F(1, 744) = 0.32$, $p = .574$. We therefore collapsed across the order of presentation of blocks in all subsequent analyses.

All mediation analyses were carried out with a bootstrapping procedure (Preacher & Hayes, 2008) with 5,000 resamples. Following the recommendations of Preacher and Hayes (2008), we focus primarily on the magnitude of the indirect effects of the independent variable (target age) on the dependent variable (value) through each mediator. These effects are the "ab" paths in a traditional mediation analysis—the product of the direct effect of the independent variable on the mediator (the "a" path) and the direct effect of the mediator on the dependent variable (the "b" path). Because we did not expect a linear effect of age on life value, we separately compared the infant and child conditions and the child and adult conditions.

Infant condition and child condition. There was no overall difference between participants' assessments of the value of the infant's life and the child's life (76.86 vs. 76.96). Thus, in the analyses comparing the infant and child conditions, we did not observe a total effect ("c" path) of target age on life value, $\beta = .09$, $t(498) = 0.06$, $p = .955$. However, multiple mediation models allow for significant mediation despite null total effects, if the indirect effect of mediator variable(s) is canceled out by indirect effects of some suppressor variable(s). Indeed, as we show shortly, this appears to have been the case in this study.

Before testing a model in which multiple mediators are entered at once, however, we tested models in which each of the nine mediators was entered as the sole mediator in the model, to see

[8] To ensure participants were paying attention to all instructions, we instructed them to enter an unrelated keyword (*mindful*) into a text box on the final page of the survey. Participants who failed to do so were treated as not being attentive and were excluded from analysis.

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Table 4
Coefficients of Mediation Models When Mediators Are Entered Individually, in the Infant and Child Conditions of Study 6

Mediator	a path	b path	ab path	Lower bound	Upper bound
Number of social relations	**3.53*****	**0.71*****	**2.50***	**1.37**	**3.95**
Meaningfulness of social relations	**3.53*****	**1.25*****	**4.43***	**2.97**	**6.28**
Investment by self	**3.99*****	**0.49****	**1.93***	**0.71**	**3.34**
Investment by others	**3.24*****	**0.76*****	**2.48***	**1.44**	**3.81**
Understanding of death	4.91***	−0.16	−0.80	−2.70	1.13
Fear of death	**7.98*****	**0.51****	**4.05***	**1.32**	**6.92**
Lifespan left	**−1.24****	**0.68*****	**−0.85***	**−1.85**	**−0.25**
Lifespan lived	3.16***	−0.24	−0.78	−2.01	0.42
Likelihood of dying	−0.54	−0.64***	0.34	−0.08	1.08

Note. Significant indirect effects are indicated in bold. "a path" denotes the direct effect of target age on a mediator, "b path" denotes the direct effect of a mediator on value, and "ab path" denotes bootstrap estimates of the indirect effect of target age on value through a mediator. Exact p values cannot be computed for bootstrap estimates of the coefficients of ab paths; therefore, we indicate only whether the 95% bootstrap confidence interval contains zero.
* $p < .05$. ** $p < .01$. *** $p < .001$.

which models, if any, were consistent with mediation before controlling for the effects of the other proposed mediators. As can be seen in Table 4, 95% bootstrap confidence intervals estimating the indirect effects of number of social relations, meaningfulness of social relations, investment by others, investment by self, fear of death, and lifespan left did not contain zero, indicating that target age had significant indirect effects on life value through these mediators when other mediators were not controlled for. As expected, the indirect effect through lifespan left had a negative coefficient, indicating that it reduced the perceived value of the older target. That is, the infant was believed to have more life left to live than the child, which increased the relative value that participants placed on the infant's life. However, the indirect effects through number of social relations, meaningfulness of social relations, investment by others, investment by self, and fear of death all had positive coefficients, indicating that they increased the perceived value of the older target, in line with our predictions. As in Study 4, the child was seen as having more numerous and important social relationships than the infant, as having had more invested into his or her life, and as being more afraid of death, and these considerations increased the value that participants placed on the child's life. The indirect effects of target age on life value through understanding of death, years lived, and likelihood of dying were not significant.

A major advantage of multiple mediation methods is that they allow one to model the indirect effect of an independent variable on a dependent variable through a mediator while controlling for analogous indirect effects through other mediators. To test which indirect effects remained significant while controlling for all others, we next entered all nine of our mediators into one model. As Table 5 shows, the negative indirect effect through lifespan left was again significant, and a significant negative indirect effect through lifespan lived also emerged. And, once again, the positive indirect effects through number of social relations and meaningfulness of social relations were also significant, although the positive indirect effects through investment by self, investment by others, and fear of death were no longer significant. Surprisingly, a significant negative indirect effect through understanding of death emerged in this model, contrary to what Studies 4 and 5c would lead us to predict. The indirect effect through likelihood of dying remained nonsignificant.

Child condition and adult condition. Overall, and consistent with the results of Studies 1–4, there was a significant total effect of target age on life value, $\beta = -5.78$, $t(496) = 3.46$, $p = .001$, such that the child's life was seen as more valuable than the adult's life (76.96 vs. 71.18). When each mediator was entered individually, the model containing lifespan left showed a significant negative indirect effect ($\beta = -2.53$), and models containing number

Table 5
Coefficients of Mediation Models When All Mediators Are Entered Simultaneously, in the Infant and Child Conditions of Study 6

Mediator	a path	b path	ab path	Lower bound	Upper bound
Number of social relations	**3.53*****	**0.57****	**1.99***	**0.77**	**3.42**
Meaningfulness of social relations	**3.53*****	**0.90*****	**3.22***	**1.67**	**5.03**
Investment by self	3.99***	0.10	0.36	−1.09	1.89
Investment by others	3.24***	0.17	0.56	−0.56	1.73
Understanding of death	**4.91*****	**−0.44***	**−2.17***	**−4.30**	**−0.27**
Fear of death	7.98***	0.21	1.72	−0.91	4.37
Lifespan left	**−1.24****	**0.41***	**−0.51***	**−1.31**	**−0.09**
Lifespan lived	**3.16*****	**−0.48***	**−1.50***	**−2.89**	**−0.25**
Likelihood of dying	−0.54	−0.34	0.18	−0.03	0.76

Note. Significant indirect effects are indicated in bold. "a path" denotes the direct effect of target age on a mediator, "b path" denotes the direct effect of a mediator on value, and "ab path" denotes bootstrap estimates of the indirect effect of target age on value through a mediator. Exact p values cannot be computed for bootstrap estimates of the coefficients of ab paths; therefore, we indicate only whether the 95% bootstrap confidence interval contains zero.
* $p < .05$. ** $p < .01$. *** $p < .001$.

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of social relations (β = 2.64), meaningfulness of social relations (β = 1.19), investment by self (β = 2.91), and investment by others (β = 2.15) showed significant positive indirect effects. Essentially, these four variables partially suppressed the overall negative effect of target age on life value when entered as the sole mediator in the model.[9] When all nine mediators were entered into a mediation model simultaneously, only two significant indirect effects were found: a negative indirect effect through lifespan left (β = −1.18) and a positive indirect effect through meaningfulness of social relations (β = 0.68).

Discussion

These results indicate that social relations is the strongest and most robust predictor of the greater perceived value of older children's lives. The two social relations variables (numerosity and meaningfulness) emerged as significant mediators both alone and when controlling for the other hypothesized mediators. Investment and understanding of death do appear to matter as well, but their mediating effects do not withstand controlling for other possible mediators, which suggests that they are of lesser importance than are social relations. This overall picture is consistent with the results of Study 4, in which social relations was the reason most frequently cited in favor of saving the older target, and with the results of Studies 5a–5c, in which our experimental manipulation of social relations produced clearer and more consistent results than our manipulations of investment and understanding of death.

The fact that older children were not valued more than younger children in this study is apparently at odds with the results of Studies 1–4. However, the lack of an overall effect of target age for this comparison appears to have arisen from processes that are consistent with the earlier studies. That is, the negative indirect effects through lifespan left, lifespan lived, and understanding of death competed against and ultimately suppressed the positive indirect effects through number of social relations and meaningfulness of social relations. Moreover, Studies 1–4 all involved scenarios in which participants directly compared two targets of different ages, and so it could be that differences in life value are more likely to be found in that sort of explicitly comparative context than in between-subjects comparisons of ratings of single targets, as used in the present study. And, because real-world tragic trade-offs, particularly those confronted by policy makers, often explicitly involve comparative choices (which of the two individuals should be saved?), the earlier, explicitly comparative results are arguably closer analogs of the real-world decision contexts we wished to approximate. To gain further understanding of the processes that cause older children's lives to be valued more than younger children's, in Study 7, we returned to an explicitly comparative design and attempted to predict participants' greater valuation of older children over younger children through the same nine considerations used as mediators in Study 6.

Study 7: Prediction in an Explicitly Comparative Design

Our final study is conceptually similar to Study 6, but we used an explicitly comparative design akin to those employed in Studies 1–4. Our aim was to predict participants' greater valuation of an older child over a younger child from their beliefs about the nine concerns that served as mediators in Study 6.

Method

Participants. Two hundred thirty-six individuals were recruited through Amazon's Mechanical Turk service and were paid for their participation. Thirteen participants began the survey but did not complete it. They were therefore excluded from analysis, leaving a final sample of $N = 223$ (94 female, 129 male; M_{age} = 29.96 years, $SD = 10.54$, range = 16–67 years).

Procedure. After consenting to participate, participants were randomly assigned to one of two conditions: infant/child ($n = 111$) and child/adult ($n = 112$). They then read a description of two targets adapted from the materials used in Study 6. In the infant/child [child/adult] condition, this description read:

> Imagine that a six-month-old infant [ten-year-old child] and a ten-year-old child [thirty-year-old adult] have each contracted a life-threatening bacterial blood infection. A blood transfusion would cure them, but the hospital has only one unit of their rare blood type on hand. The hospital will have to decide which of the two individuals will receive the blood. Whoever does not get the blood will die painlessly in a few hours.

Participants then responded to a four-item measure of perceived value based on the measures used in Study 6 but altered to directly compare the two targets. Thus, whereas Study 6 included the question "How tragic would this infant's (child's/person's) death be?" Study 7 included the question "Whose death would be more tragic?" Responses to these four items were made on 15-point Likert scales, with the midpoint of 8 indicating that the two targets' lives were equally valuable and the end points indicating that the death of one target would be "much more tragic," "much worse," and so on than the death of the other target. Participants also responded to nine questions comparing the two targets on the nine mediator variables from Study 6. For instance, the lifespan left question in this study read, "Which of the two individuals would have had more of their natural expected lifespan left to live, if they had not died from the blood infection?" Responses to these nine questions were made on 15-point Likert scales. The orders of the four life-value questions and the nine predictor questions were randomized between subjects, and the order in which these two blocks of questions were presented was counterbalanced. We also counterbalanced the order in which the two targets appeared in the description and the questions. After responding to all measures, participants completed a brief demographic questionnaire. They were then debriefed, thanked, and paid.

Results

Before analysis, all responses were recoded such that higher numbers indicated that the older target was more valuable or had more of the measured construct. The four-item value scale again

[9] In both Studies 6 and 7, we do not present the detailed results of the analyses comparing the child and adult conditions, because these are not central to our point regarding why older children are sometimes valued more highly than younger children. The complete results of these analyses are available by request.

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showed good internal reliability ($\alpha = .81$), and so we collapsed the four items into a single measure of value. As in the analyses in Study 6, we separately analyzed the results of the infant/child condition and the child/adult conditions. The order in which the two targets appeared in the description and the questions and the order in which the two blocks of questions were presented did not significantly predict the dependent variable or interact with any predictors, so we collapsed across these order manipulations in all subsequent analyses.

Infant/child condition. We first tested whether participants placed greater value on the 10-year-old child than on the 6-month-old infant. Their responses to the life-value scale were compared in a one-sample *t* test to a hypothesized mean of 8, the midpoint of the 15-point scale (indicating equal valuation of the two targets). Participants' responses were significantly greater than this midpoint ($M = 8.52$, $SD = 1.81$), $t(110) = 3.00$, $p = .003$, $d = 0.28$, indicating that participants considered the child to be more valuable than the infant, as in Studies 1–4.

One-sample *t* tests revealed significant effects in the predicted direction for all of the potential mediating variables. Participants believed that the child had less of his lifespan left to live ($M = 4.76$, $SD = 3.91$), $t(110) = 8.75$, $p < .001$, $d = 0.83$, and had lived out more of his lifespan ($M = 12.23$, $SD = 3.16$), $t(110) = 14.11$, $p < .001$, $d = 1.34$, than had the infant. Participants also believed that, compared to the infant, the child had more numerous ($M = 12.97$, $SD = 2.50$), $t(110) = 20.94$, $p < .001$, $d = 1.99$, and more meaningful ($M = 10.45$, $SD = 2.89$), $t(110) = 8.92$, $p < .001$, $d = 0.85$, social relations; greater investment by self ($M = 12.44$, $SD = 2.61$), $t(110) = 17.90$, $p < .001$, $d = 1.70$, and by others ($M = 12.83$, $SD = 2.61$), $t(110) = 19.51$, $p < .001$, $d = 1.85$; and greater understanding ($M = 13.86$, $SD = 2.08$), $t(110) = 29.67$, $p < .001$, $d = 2.82$, and fear ($M = 13.93$, $SD = 1.97$), $t(110) = 31.68$, $p < .001$, $d = 3.01$, of death. Last, participants believed that the infant was more likely than the child to die in the course of everyday events ($M = 6.74$, $SD = 3.58$), $t(110) = 3.72$, $p < .001$, $d = 0.35$.

We next conducted a series of linear regression analyses with the collapsed measure of life value as the outcome variable and each of the nine predictor questions entered as the sole covariate. This procedure is analogous to the single-mediator analyses conducted in Study 6. As shown in Table 6, perceived life value was marginally predicted by lifespan left and lifespan lived. The less time the child was seen as still having left, relative to the infant, the less valued the child was in comparison with the infant; similarly, the more time the child was seen as having lived already, relative to the infant, the less valued the child was. Number of social relations and meaningfulness of social relations predicted the greater perceived value of the child as compared with the infant, as we found in Study 6. Moreover, investment by others was a significant predictor of the greater perceived value of the child as well, though investment by self was not. Understanding of death and fear of death both marginally predicted the greater perceived value of the child. Finally, unlike in Study 6, the perceived likelihood of a target's death, absent the disease described in the study, significantly predicted life value such that the infant was seen as less valuable to the extent that he or she was seen as having a greater chance of dying in the course of everyday life.

We next fit another linear regression model, this time including all nine predictor questions as covariates, in order to see which predictors remained significant while controlling for all others. As

Table 6
Standardized Coefficients, t Tests, and Significance Levels for Nine Predictor Variables, Each Entered as Sole Covariate, in the Infant/Child Condition of Study 7

Predictor variable	Standardized coefficient (β)	$t(109)$	p
Lifespan left	.16	1.67	.098
Lifespan lived	−.17	1.84	.068
Number of social relations	**.19**	**2.02**	**.046**
Meaningfulness of social relations	**.43**	**4.97**	**.000**
Investment by self	.14	1.52	.132
Investment by others	**.19**	**2.04**	**.044**
Understanding of death	.16	1.70	.092
Fear of death	.18	1.94	.055
Likelihood of dying	**−.37**	**4.19**	**.000**

Note. Significant indirect effects are indicated in bold.

Table 7 shows, lifespan lived emerged as a negative significant predictor (i.e., it predicted the greater value of the infant as compared with the child), as did likelihood of dying. Meaningfulness of social relations remained significant in the positive direction (i.e., it predicted the greater value of the child as compared with the infant). The other six predictors no longer explained a significant portion of the variance in perceived value.

Child/adult condition. As expected, participants placed greater value on the 10-year-old child than the 30-year-old adult ($M = 6.84$, $SD = 2.09$), $t(111) = 5.87$, $p < .001$, $d = 0.55$. The adult and child were seen as significantly different on each of the predictor variables, in the predicted ways: The older individual was seen as having less lifespan left to life, as having more numerous social connections, and so forth. When each of the nine predictors was entered as the sole covariate in a linear regression predicting judgments of life value, neither lifespan left nor lifespan lived significantly predicted life value (ps $> .11$), despite participants' clear acknowledgment that the targets differed on these variables. Life value was predicted by meaningfulness of social relations, $\beta = .28$, $t(110) = 3.08$, $p = .003$, and fear of death, $\beta = .34$, $t(110) = 3.73$, $p < .001$, and it was marginally predicted by number of social relations, $\beta = .18$, $t(110) = 1.93$, $p = .056$, and investment by others, $\beta = .18$, $t(110) = 1.93$, $p = .056$. In each case, the positive coefficients of these predictors indicate that they partially suppressed the greater overall valuation of the child than the adult. That is, the adult was valued relatively more than the child by virtue of his possessing more meaningful social relations, having had more invested in his life by others, and so forth. Likelihood of dying also emerged as a marginally significant predictor in this analysis, $\beta = -.17$, $t(110) = 1.75$, $p = .083$, indicating that the greater valuation of the child is partially driven by a belief that the adult is more likely to die in the course of everyday events. When all nine predictors were entered as covariates simultaneously, only two effects emerged: a marginal effect of understanding of death, $\beta = -.21$, $t(102) = 1.70$, $p = .092$, and a significant effect of fear of death, $\beta = .31$, $t(102) = 3.42$, $p = .001$. The negative coefficient of understanding of death implies that this consideration led participants to favor the child, despite believing that the adult had a clearer understanding of death. This is similar to a surprising result in the comparison of the infant and child conditions in Study 6. However, neither of these effects

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Table 7
Standardized Coefficients, t Tests, and Significance Levels for Nine Predictor Variables, Entered Simultaneously as Covariates, in Study 7

Predictor variable	Standardized coefficient (β)	$t(101)$	p
Lifespan left	.07	0.78	.436
Lifespan lived	**−.20**	**1.99**	**.049**
Number of social relations	.07	0.54	.590
Meaningfulness of social relations	**.33**	**3.41**	**.001**
Investment by self	−.13	0.82	.412
Investment by others	.04	0.26	.794
Understanding of death	.05	0.45	.652
Fear of death	.16	1.37	.174
Likelihood of dying	**−.22**	**2.38**	**.019**

Note. Significant indirect effects are indicated in bold.

emerged when this variable was entered as a single predictor, and so we refrain from interpreting them further.

Discussion

This study replicated the finding from Studies 1–4 that people value the life of an older child more than that of an infant. Moreover, it replicated the finding from Studies 4 and 6 that older children are seen as having more numerous and more important social relationships, more investment in their lives, and a greater understanding and fear of death than are younger children. These beliefs are not, by themselves, particularly surprising. What is most important is that, as in Study 6, these concerns were found to predict greater valuation of the child than the infant when entered individually in regression analyses. Also, as in Study 6, the only one of these three concerns that remained predictive of greater valuation of the child when controlling for other predictors was social relations; specifically, in this case, the meaningfulness of the target's social relations. This again suggests that beliefs about social relations, investment, and understanding of death all play some role in judgments of life value but that social relations matter the most.

Unlike in Study 6, greater valuation of a child than an infant was also predicted by a belief that the infant was more likely to die in the course of everyday events. We discuss the role that overall likelihood of dying plays in judgments of life value in the General Discussion. For now, we note that although likelihood of dying appears somewhat important, it cannot fully explain people's tendency to value older children more than younger children; even when controlling for beliefs about likelihood of dying, meaningfulness of social relations still emerged as the strongest predictor of participants' valuation of the child target relative to the infant target.

Somewhat surprisingly, neither lifespan left nor lifespan lived predicted the greater valuation of the child over the adult in the child/adult condition, even when each was entered as the only predictor in the model. As we are primarily interested in how people value the lives of older as compared with younger children, this result is not of primary importance here. However, it does suggest that the decline in life value after childhood may not be completely driven by concerns about years left and years lived.

General Discussion

We began this investigation aiming to resolve a striking tension regarding how people conceive of the moral value of different human lives. On the one hand, there appears to be a deeply ingrained cultural commitment to the notion that all human lives are equivalent in value. At the same time, when individuals are induced to make decisions about who to save in a life-or-death situation ("tragic trade-offs"), a wealth of prior research suggests that age is a critical factor in such decisions, with the young gaining priority over the old (see, e.g., Busschbach et al., 1993; Cropper et al., 1994; Dolan et al., 2005; Johannesson & Johansson, 1997; Lewis & Charny, 1989; Li et al., 2010; Ratcliffe, 2000; Rodríguez & Pinto, 2000; Tsuchiya et al., 2003). These prior results therefore pose a challenge to the idea that all lives are seen as equally valuable. They suggest, instead, that when making such decisions, people are conceiving of some individuals' lives as more valuable than those of others, by virtue of their having a greater number of years left or, alternatively, a greater number of QALYs (quality-adjusted life years). Indeed, some bioethicists are not reticent about making this claim about the nonequivalence in the value of different lives (e.g., McKie et al., 1996). The moral thinking that underpins these tendencies therefore has to be reconciled in some way with claims about the equality of all human lives.

We aimed to reconcile this tension by positing that people rely on different forms of moral appraisal and that they think of human lives as more equal with respect to some moral constructs than others. We postulated that, with respect to fundamental, natural, or negative rights, such as the right not to be actively killed, human lives are seen as more equivalent because the possession of such rights is universal and noncontingent. But with respect to positive rights to be aided or helped, human lives are seen as more variable. Questions about positive rights are harder to resolve in the abstract, in part because positive rights are inherently relational or competitive (whether or not a person has a positive right to be saved is determined in part by who else is competing for that right). They can only be resolved by taking into account contingent, nonuniversal features of the individuals in question, including their current age – which helps establish the individuals' overall level of contingent value.

This proposal follows a long-standing philosophical distinction between negative and positive rights and the closely related distinction between killing (which violates a negative right) and letting die (which does not impinge on any negative right but instead violates a positive right). Although not impervious to philosophical criticism, this distinction has attracted considerable support among philosophers. Furthermore, existing research indirectly suggests that ordinary individuals make a distinction between positive and negative rights, in that they generally judge acts more harshly than omissions (e.g., Cushman et al., 2008; Gilovich et al., 1995; Ritov & Baron, 1990; Spranca et al., 1991; Sugarman, 1986). However, no existing research that we know of bears directly on how such positive and negative rights are attributed to different people as a function of contingent features, such as their age.

Our chief proposals were that people of different ages would be seen as more equal with respect to negative rights than positive rights and that age would have a larger and more systematic effect for decisions about positive rights—because decisions about pos-

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itive rights draw upon participants' conceptions of the contingent value of the relevant individuals' lives. These proposals received support across a variety of methods. Studies 1 and 2 provided initial support by showing that although age exerted an effect on decisions as to how wrong it is to murder individuals of different ages (i.e., a decision about negative rights), it had a larger and systematically different impact on decisions about who to save and about whose death is more tragic (i.e., a decision about positive rights that invites resolution in terms of contingent value). This result arose in part because people were more willing to make choices for questions that assessed conceptions of contingent value (e.g., Who should be saved? Whose accidental death would be more tragic?) than for questions that assessed conceptions of negative (or natural) rights (e.g., Whose murder would be more morally wrong?). Moreover, people's choices for the contingent value questions also revealed a systematic trend in such choices that has not previously been demonstrated: Older children are often prioritized over younger children. However, while providing support for the difference between value and rights questions, these results also provided a striking disconfirmation of one of our auxiliary predictions. Strict equality was not seen for rights-based decisions. Instead, a robust linear effect emerged, with young individuals prioritized over older individuals.

Study 3 supported the framework that differentiates between value- and rights-based decisions more decisively, by using more tightly controlled scenarios. All participants received a scenario in which only one of two individuals differing only in age could be saved by a vital blood transfusion. However, for the participants who received the value-based case, the individual who is not saved in this scenario would be allowed to die. The question here is fundamentally one about who should be saved and is thus focused on positive rights and, thereby, contingent value. For the participants who received the rights-based case, the only way the necessary blood could be obtained was by directly killing the other individual, thereby violating a negative right of this individual not to be harmed or killed. Consistent with our theoretical predictions, participants were reliably more willing to make choices that discriminated between individuals in the value-based (positive rights) scenario. And their choices were more influenced by the difference in age between the two individuals (i.e., by differences in their contingent value). Both scenarios once again replicated the increasing value trend, although it was considerably more pronounced in the value-based scenario, as predicted. Moreover, the differences between the value and rights cases were robust to differences in the way the questions were framed (i.e., differences in their valence).

The increasing value trend observed in these initial studies is particularly noteworthy because it cannot be explained in terms of a years left decision strategy. And although some prior research may have appeared to support the increasing value trend (see, e.g., Burnstein et al., 1994), this prior evidence is not conclusive. In one study, for instance, Burnstein et al. (1994) found that undergraduate participants indicated lesser willingness to help an infant (less than three months old) escape from a burning building than a 10-year-old, in conditions of hypothetical famine in sub-Saharan Africa, which is consistent with the increasing value prediction. However, in this study, participants were explicitly instructed that they should take into account that infant mortality was very high in the hypothetical situation and that a large proportion of the newly born die within the first 6 months of life. It is therefore not clear that any tendency to prioritize older children would have been revealed without this instruction. Participants in this study were also instructed that the individuals in question had some degree of genetic relatedness to themselves, which may also limit the generalizability of these findings. Thus, the findings from Studies 1–3 provide the first clear-cut evidence in favor of the increasing value prediction.

Accordingly, our remaining studies aimed to elucidate the basis for this novel result. Study 4 replicated this novel finding using a think-aloud methodology and showed that the preference for older children appears to be driven by older children having had more invested in their lives (see, e.g., Dworkin, 1993), their more numerous and meaningful social relations (see, e.g., Singer, 1994), and their greater understanding of death (see, e.g., Singer, 1994). Studies 5a–5c demonstrated the independent causal effects of each of these variables on judgments of life's value. Finally, Studies 6 and 7 used mediation and regression methods to show that older children's more meaningful social relations primarily underpin their greater value in contrast to younger children. Of course, these studies do not show that social relational variables are the only determinants of increasing value throughout childhood. In particular, although eclipsed by social relations in joint mediation analyses, investment variables were also individually significant mediators in Studies 6 and 7 and were shown causally to increase perceptions of the value of a life (Study 5b). We did not explore the effect of these variables (social relations, investment, and understanding of death) for rights-based decisions. Our theory predicts that they should have less effect for such decisions, just as age does, but we delegate this as a task for future research.

Anomalous Findings

In Studies 1 and 2 (and to a lesser extent in Study 3), we predicted that the responses to the negative rights questions—wrongness and punishment—should show a relatively flat trajectory. But, although the observed trajectory was markedly flatter than that observed for the value questions, it was not close to completely flat. Instead, there was a marked downward trajectory, such that people indicated that it was less wrong and less punishable to murder older individuals (see Figure 2). This is particularly noteworthy for the results of Study 2, because it was clearly stipulated in that study that the murderer, a subway bomber, had no knowledge of the identity of his victim before detonating the explosive device. If it is true that people conceive of all individuals as having the same basic right not to be actively killed, they should not see it as more wrong to murder a 10-year-old than to murder an 80-year-old. What explains this result? One possibility is children are seen as more innocent than adults and thus somehow less deserving of death. This might affect judgments of wrongness and punishment worthiness, even when the offender's prior knowledge of his victim's identity is precluded. This explanation goes only part of the way, however, because as Figure 2 reveals, people did seem to think that it was also more wrong to murder young adults (20- and 40-year-olds) than older adults (60- and 80-year-olds). Do some people genuinely think it is less wrong to murder an older person? That seems surprising to us, and it also strikingly disconfirms our prediction that people would be seen as equal with respect to rights-based decisions. Nonetheless, the results of Study

2 seem to suggest so (for related evidence, see Callan, Dawtry, & Olson, 2012). However, at least insofar as our present investigation is concerned, this surprising result does not undermine the overarching theoretical point of Studies 1 and 2. The fact that the rights function was not flat should not obscure the fact that the function across these decisions was flatter than was the value function and was also different in form. It is worth recalling that in Study 2, over half of the participants (57%) consistently refused to make any choices at all about which of the murders was more wrong, thus showing an entirely flat curve, whereas only 6% of participants showed a similar tendency for the tragedy question.

The fact that the rights curve was not flat in Study 3 is more explicable. Even though in this case one of the individuals had to be killed in order to save the other one (thus violating a negative right), from a consequentialist perspective it is still morally better to perform the killing as it will save at least one life. Thus, in this scenario, the violation of one person's negative right may not have been overriding, with consequentialist (or other) considerations ultimately guiding some participants' decision making and giving rise to the effect of age.

Alternative Explanations and Limitations

Two important alternative explanations for the increasing value results are worth considering. The first alternative goes back to the notion of QALYs. Calculating a person's QALYs involves taking into account the years left in his life and the quality of those remaining years. However, calculating expected years left may not always give priority to younger individuals. In some circumstances, an older individual might be seen as having a greater likelihood of living a long life than a younger individual has, which could result in the older individual having a higher overall expected value in QALYs than the younger individual. In cases where infant mortality is sufficiently high, for instance, an average older child may be thought to have a greater expected lifespan than an average infant, by virtue of having passed through an initial selection bottleneck. This means that a years left strategy should favor the older child. Is it possible that an explanation of this sort explains our results, rather than social relations, investment, or understanding of death?

We think that this factor is part of what drives the preference for older children but that it clearly cannot explain all of our results. Study 2 revealed some indirect evidence supporting the role of this factor. One third of the participants in that study were asked to indicate which of two individuals would be more likely to die in the course of everyday life. The pattern of results for that question (which we did not report earlier) mapped reasonably well onto the shape of the value of life decisions made by a different group of participants. Young infants and older individuals were seen as having the highest likelihood of dying in the course of ordinary events. Nine-year-olds were seen as having the lowest overall likelihood of dying in the course of daily life, just as they were seen as having the highest value (along with 3-year-olds). However, Studies 4, 6, and 7 were also able to assess this likelihood of death explanation, and the support they provided for it was mixed at best. As Table 1 shows, in Study 4, participants sometimes raised likelihood of death as a reason underlying their choices when they thought aloud but not nearly as frequently as they mentioned social relations, investment, and understanding of death. Moreover, reasoning about likelihood of death was not overwhelmingly associated with choices of older targets. Study 6 assessed likelihood of death as a possible mediator of the preference for older children and showed that this variable was not significant either by itself or in competition with the other mediators. Study 7 provided the most direct support for the death likelihood account, in that likelihood of death did emerge as a significant predictor of the preference for older children and did so when controlling for all of the other mediators. However, in Study 7, differential meaningfulness of social relations still emerged as a significant predictive factor when pitted against likelihood of death. Overall, the evidence suggests that perceived differential likelihood of death may partially underlie the preference for older children but cannot fully explain it.

Another account of our results draws on evolutionary considerations. Perhaps older children are preferred simply because they have more immediately expected reproductive value than do younger children (see, e.g., Burnstein et al., 1994). Similarly, children may be preferred to currently fertile adults because children have their whole reproductive career ahead of them and thus have higher overall expected reproductive value. Study 4, in particular, and also Study 1 can speak to this explanation. It is noteworthy that not a single participant in either of these studies mentioned considerations such as this as a reason for his or her decisions, which we take as prima facie evidence against it. Of course, it is possible that this evolutionary logic underlies people's decisions in a way that escapes their introspective access (Nisbett & Wilson, 1977), and it is possible that further studies would provide more supportive evidence. Indeed, one of the virtues of this theory is that it does make clear-cut empirical predictions. For instance, if it is the case that the value of life is gauged by an individual's expected reproductive value, it should also be the case that the value of women's lives is perceived as dropping more precipitously across the lifespan than is the value of men's lives, given women's shorter fertility window. It should be also be the case that fertile individuals are preferred to nonfertile individuals of the same age and that the premium placed on individuals of maximal reproductive value should be particularly pronounced for individuals who share some genetic relatedness to the self, as compared with individuals who are more distally related. Whether these predictions would be borne out is a task for future research to explore.

One final issue deserves mention, which pertains specifically to the fear and understanding of death variables. Unlike the other variables that might explain the increasing value trend—social relations, investment, and death likelihood, which are all relatively stable and enduring characteristics of a person—fear and understanding of death are not necessarily stable or enduring. The experience of fearing one's own death is a transitory mental state, which may or may not be present when a person is going to die. We have suggested that understanding and fearing death are both potential inputs to people's judgments of the tragedy of a person's death and, by implication, to their valuation of different lives. But, is it reasonable to think that the actual value of a person's life momentarily increases if he happens to fear his impending death but does not similarly increase if he does not fear or is not aware

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of his impending death? This claim seems perverse, notwithstanding the fact that our participants in Study 5c did see death accompanied by fear and understanding as more tragic than death without such mental states. This therefore raises two important issues. The first is that there is a potentially important difference in the context of value of life decisions between mental states and mental capacities. Although Study 5c manipulated only mental states, as we mentioned earlier, the underlying point it was designed to make has do with the role of mental capacities. And it is not quite so perverse to think that a person's life might be seen as more valuable in consequence of the enduring mental capacities that the person possesses, rather than by virtue of the temporary mental states he experiences prior to death (although we acknowledge that this does not fully deal with the perversity, since in this case, the mental capacities of interest are directly relevant only by virtue of the mental states they can give rise to).

Second and more important, however, this example shows that there is not a one-to-one mapping between the tragedy or, more generally, the negativity that attends to a person's death and the value of that person's life. A different example also makes this point clearly: It does not seem that a person's life is more valuable if he happens to experience great pain in dying than if he does not, notwithstanding the fact that the pain might make the person's death worse, more tragic, and more worth preventing. Therefore, although tragedy, the badness of death, and the willingness to choose one individual over another are all good proxies for the value of a life in most cases, including those in which social relations and investment are the critical variables that differentiate between different lives, these measures are arguably less valid indicators of the value of a life when fear and understanding of death or other mental state variables, such as pain, are the critical variables. As a consequence, we regard differences between older and younger children in terms of social relations and investment as more valid overall explanations for the greater perceived value of older as opposed to younger children's lives, and we suggest that the understanding and fear of death results be interpreted with some caution. This general conclusion accords with the overall picture that results from present data, which tended to favor social relations and, to a lesser extent, investment, over fear and understanding of death as predictors of our measures of life's value (i.e., tragedy and negativity of death).

Conclusion

This paper shows that individuals view the moral standing of other people's lives as more equal in some respects than in others. When it comes to the possession of fundamental, natural, or negative human rights, lives that differ only in age do differ to some extent, largely in negative relation with a person's age. But, when it comes to contingent value, people are more willing to distinguish between different lives as a function of age. Moreover, though younger individuals are generally seen as more valuable than adults, older children are often seen as more valuable than younger children, primarily because of their more meaningful social relations and perhaps also because of the greater investment placed in their lives and their greater survival likelihood. These findings contribute to moral psychology, by elucidating some of the subtle moral concepts and reasons that inform people's moral judgments about the value of life and by revealing and explaining the increasing value trend. More generally, in shedding light on people's valuation of human life, they contribute to ongoing research within bioethics, medical policy, and economics regarding the appropriate allocation of scarce medical resources and other lifesaving policies. For instance, the present findings may contribute to a better understanding of public opinion about such policies, which not surprisingly can be divided and passionate. Our findings suggest that the way public opinion sides on these issues can hinge on whether people interpret the inequalities that are often inherent in such policies in terms of infringing upon natural or negative rights (e.g., in terms of rights not to be actively harmed) or in terms of positive rights, which reflect perceptions of contingent value (e.g., who should be saved?). More research is needed regarding how people value human lives, how such valuation interacts with deeply ingrained beliefs about fairness and equality, and how the framing of value-based policies affects their interpretation by the public. Similarly, in showing that people's judgments about contingent valuation are influenced by factors that fall outside the QALYs metric, some of which are consequentialist in a broader sense (e.g., social relations) and others of which are nonconsequentialist (e.g., investment), our research has implications for the acceptability of health policies that take only QALYs into account. Finally, the increasing value trend has relevance for applied decision-making contexts such as charitable giving, raising interesting questions regarding the extent to which people's valuation of different human lives might influence to whom and how much people donate to those in need.

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Appendix

Twenty Possible Reasons for Saving a Target, in Study 4

Reason	Definition in coding scheme	Prototypical example
Unsure	Participant does not know the basis of his (or her) decision and explicitly says this.	"I think this way, this particular situation, I'm probably leaning more so toward the 2-year-old, just because . . . just because, I don't really have a particular reason."
Older	Participant mentions only the older target's age, or the fact that he (or she) is older than the other target, but does not further elaborate on why this matters to the decision. If the participant does further explain why he thinks this is relevant to the decision, do not count this as an instance of "older."	"I think . . . that . . . um . . . I guess I would save them because they are a little older, um, and . . . I guess . . . um . . . yeah, because they're a little older."
Younger	Participant mentions only the younger target's age, or the fact that he (or she) is younger than the other target, but does not further elaborate on why this matters to the decision. If the participant does further explain why he thinks this is relevant to the decision, do not count this as an instance of "younger."	"I would have to go for saving the 2-year-old, um, even though both are children, and . . . neither have lived very long lives at all, um, I would save the 2-year-old, um, because he or she is younger, I guess."
Years left	Participant mentions that one target has more remaining years than the other, that more life years would be "saved" by picking the younger target, etc.	". . . and the 10-year-old has more time to live, so everything else aside, if everything else is equal between the two people, it would make more sense to save the person who has more time to live."
Years lived	Also called the "fair innings" argument: Participant mentions that one target has already had more time than the other, and the younger target deserves the chance to live the same number of years.	". . . a 3-month-old has had no time to live, as opposed to a 35-year-old, who has had much of their life to live, so I would most likely save the 3-year-old [sic]."
Social relations	Participant mentions that one target probably has more, stronger, or more important personal connections or relationships with his family or other important people in his life and thus deserves to be saved.	"Um, so I would save the 2-year-old, because they've kind of become a, um, they've really kind of—I'm assuming they've gotten into the—a routine of—of family life, and, um . . . I just see them as—as being, kind of, connected to the people around them, whereas a 3-month-old, um, is still really young, and, um, may not have those kind of relationships."
Investment	Participant mentions that one target has had more work, effort, money, emotional investment, etc. put into his life by others, or by the target himself, and thus deserves to be saved.	". . . and the 10-year-old has, like, is—has, more resources, and, like, like, attachment have been invested in the 10-year-old, like, in terms of, I guess, like, like—especially the, say, like, mother, is what I'm thinking of, but also, I guess, society as a whole."

(*Appendix continues*)

Appendix (*continued*)

Reason	Definition in coding scheme	Prototypical example
Understanding of death	Participant mentions that one target would more clearly understand the life-threatening situation (and thus probably feels more fear than the other or would be more grateful, appreciative, etc. if he were saved).	"... 2-year-old won't even really understand what's happening. It'll probably be quick. The 18-year-old fully grasps the, uh, the gravity of the situation."
Consistency	Participant cites a desire to remain consistent with reasoning that he used in previous responses.	"Um, I'm just gonna continue with my same process consistently, of just picking the younger out of the two."
Balance	Also called "deliberate inconsistency." Participant intentionally violates his previous reasoning in order to save a target that he sacrificed previously.	"... but ... and it kind of stinks, the 18-year-old's been sacrificed many times before. Um ... there's one unit of blood left. ... In this case, I'll have to give it to the 18-year-old."
Social norms	Participant mentions that the norms or values of society would dictate saving one target over the other.	"I think, um, newborns probably are, um, you know, both personally and, just kind of, culturally in society, we kind of all agree that newborns are valued, um, on the top of the priority list in terms of, like, when there's a crisis situation."
Emotion	Participant mentions that he feels greater emotion or sympathy for one target over the other or that his intuition or "gut" tells him to save one target over the other.	"... so, just, like, based off of, like, a sort of an instinctive emotional response, I would save the 3-month-old instead of the 10-year-old."
Likelihood of survival	Participant mentions that one target has a better chance of surviving in the long run and thus should be saved.	"... and it's also less likely that the 10-year-old will survive, perhaps, some childhood diseases."
Condition-specific concerns	Participant mentions something particular to the "blood" condition, such as a concern about the strength of a target's immune system, or something particular to the "hostage" condition, such as speculation about the likelihood of the hostage taker actually killing one target versus the other.	"... but I think that also, in the back of my mind, I would have difficulty thinking that anyone could kill a 2-year-old."
In-group favoritism	Participant mentions that he is around the same age as one of the targets and therefore feels "biased" toward or favors that target.	"I'm gonna pick the 18-year-old, because ... that's closer to my age, and ... I'm just gonna show a little bit of bias on this one."
Innocence	Participant mentions that one target is more "innocent," less likely to have done bad things in his life, etc., than the other.	"... and the 2-year-old is just an innocent child, and I think that that would be, um, just, the best option out of some really bad options."
Psychological damage	Participant mentions that one target is likely to experience less psychological damage or trauma from the event and therefore should be saved.	"... Um, I think also, it would be realistic to assume that if I had chosen the 35-year-old, um, somebody who has, kind of, um, the emotional maturity and development, that there would probably be lingering feelings of guilt, um, of survivor's guilt, or some—whatever the term is ... guilt, um, over, uh, being alive while—whereas the baby wasn't."
Contribution	Participant mentions that one participant has more to contribute to society or will contribute more than the other and thus should be saved.	"... the 35-year-old, whereas, like, it's reasonable to imagine that they have a position where they're contributing to society."

(*Appendix continues*)

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Appendix (*continued*)

Reason	Definition in coding scheme	Prototypical example
Life experience	Participant mentions that one target has more or less life experience than the other and thus should be saved. Note that this category should only be counted if "experience" is not being used as synonymous with years left, years lived, investment, or any other category above.	". . . so it would probably make more sense to save the 18-year-old, because they still haven't experienced a lot of the experiences that the 35-year-old has."
Potential	Participant notes that one target has more potential to accomplish things in the future or to have social value in the future than the other and thus should be saved. Do not classify any and all uses of the word *potential* as this category. Use only the limited definition above.	"Ugh . . . the 18-year-old . . . very young . . . and has more potential than the 35-year-old."

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