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How Do People Value Life?

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Abstract

Who should be saved when health resources are limited? Although bioethicists and policymakers continue to debate which metric should be used to evaluate health interventions, public policy is also subject to public opinion. We investigated how the public values life when evaluating vaccine-allocation policies during a flu epidemic. We found that people's ratings of the acceptability of policies were dramatically influenced by question framing. When policies were described in terms of lives saved, people judged them on the basis of the number of life years gained. In contrast, when the policies were described in terms of lives lost, people considered the age of the policy's beneficiaries, taking into account the number of years lived to prioritize young targets for the health intervention. In addition, young targets were judged as more valuable in general, but young participants valued young targets even more than older participants did.

Keywords

framing, decision making, policy making, judgment

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Imagine having to choose between saving the life of a young person or an old person. Although painful, such decisions are inherent in the appropriation of scarce resources for public-health initiatives. For example, in the event of pandemic flu, who should receive the limited supply of vaccines and antiviral medication (Emanuel & Wertheimer, 2006)? These decisions entail, even if only implicitly, the prioritization of certain individuals' lives over others. Are all lives equally valuable, and if not, whose lives are more valuable?

In the current article, we put aside the important issues of risk (who is at highest risk of dying?) and efficacy (for whom is the intervention most effective?; Galvani, Medlock, & Chapman, 2006) and instead focus on how people quantify the outcome of health interventions—the metric for valuing life. Potential metrics include the number of lives saved, the number of life years gained, and the number of quality-adjusted life years (QALYs) gained (Pliskin, Shepard, & Weinstein, 1980). These metrics imply different optimal policies. The number-of-lives metric requires that the optimal policy maximize the number of individuals being saved, assuming no priority in saving certain individuals over others. Under a life-years-saved metric, however, one would prioritize younger individuals, to the extent that they have a greater number of years left to live. Some government agencies, such as the Food and Drug Administration, use life years saved to quantify benefits (U.S. Food and Drug Administration, 2006). The QALYs metric is similar but assigns greater value to lives of healthy compared with ill individuals, given the same life expectancy, and greater value to interventions that improve quality of life.

Bioethicists and public-health policymakers have extensively debated which metric to adopt (Evans, 1997; Williams, 1997a, 1997b). The controversy reflects the inherently moral nature of placing a value on life. Aside from these debates, if we accept that public-health policies should reflect the moral values of the public, it is critical to understand how the public thinks life should be valued and the underlying mechanisms that give rise to these value judgments. Such an understanding is also relevant to the debate on what kinds of inequities constitute ageism in health care (Kane & Kane, 2005).

Previous studies indicate that the public values the lives of young people more than those of older people (Busschbach, Hessing, & de Charro, 1993; Cropper, Aydede, & Portney, 1994; Johannesson & Johansson, 1997; Lewis & Chamy, 1989; Ratcliffe, 2000; Rodriguez & Pinto, 2000; Tsuchiya, Dolan, & Shaw, 2000). People may value young people more than older people for a number of reasons (Rodriguez & Pinto, 2000). Not only do young people have more years left to live, and thus receive more benefit from a lifesaving intervention, they also have fewer years lived so far and thus deserve their "fair innings" (Williams, 1997a). For example, a 20-year-old

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has about 3 times as many years left as a 60-year-old (assuming an average life expectancy of 80 years); however, saving one 20-year-old is viewed as equivalent to saving seven 60-year-olds (Cropper et al., 1994), which indicates greater value for younger individuals even beyond what the life-years-saved metric would predict. This response pattern may stem from a sentiment that the death of a younger person is perceived as more tragic and unjust than the death of an older person (Chasteen & Madey, 2003). A similar message is conveyed in the Chinese saying, "Nothing is sadder than for the gray-haired to see the dark-haired go."

Do people use a years-left metric, a years-lived metric, or a combination of both, to value life? Under normal circumstances, years left (equivalent to remaining life expectancy) is almost perfectly correlated with years lived (equivalent to age), making it impossible to separate these two bases of evaluating life. In our study, we disentangled years left from years lived by manipulating the life expectancy of individuals in a hypothetical scenario, where individuals of various ages were described as either having a normal life expectancy or having only 2 years left due to a preexisting health condition.

If a years-left metric is adopted, value of life should be a negative linear function of age for individuals with normal life expectancy (because years left depends on age) but should not vary by age for individuals with a fixed 2 more years to live (because years left is independent of age). However, if a years-lived metric is adopted, value of life should be a negative linear function of age (years lived is age), regardless of whether the individuals are expected to live to a normal life expectancy or only 2 more years.

We explored whether the metric people use to evaluate life is influenced by how the question is asked. Past research on decision making has demonstrated the powerful influence of question framing (Tversky & Kahneman, 1981)—two equivalent descriptions can lead to very different preferences. Framing can even influence moral behavior (Kern & Chugh, 2009). We hypothesized that "lives saved" and "lives lost" frames would not merely alter preference between options, as shown in previous studies, but would actually invoke different psychological processes or strategies for evaluating lifesaving interventions.

Specifically, we expect the "lives saved" frame to prompt people to evaluate the benefits of the lifesaving interventions and focus on what the victims stand to gain: the number of life years they are expected to gain from the intervention. In contrast, the "lives lost" frame is expected to prompt people to consider what the victims stand to lose: the loss of life. Consequently, we hypothesize that in the "lives saved" frame, people will use a years-left metric, judging younger victims as more valuable only when they have more years left to live; and those in the "lives lost" frame will adopt a years-lived metric, judging younger victims as more valuable regardless of number of years left, because the death of a young person feels more tragic than the death of an older person (Chasteen & Madey, 2003).

Studies 1 and 2

Method

We conducted two Internet survey studies using two different populations of participants. Study 1 included 290 college students (age: 17–33 years, $M = 18.63$), and Study 2 involved 503 participants recruited through a commercial survey company, with an age distribution representative of the U.S. adult population (age: 18–89 years, $M = 46.42$; see Table S1 in the Supplemental Material available on-line, for detailed demographic information).

Both studies used the same scenario. It presented a rationing situation similar to the 2004 influenza season, in which health policymakers must prioritize certain age groups of the population when allocating a limited health resource: a flu outbreak that would result in 1,000 deaths on an island with limited flu vaccines. Participants used a scale ranging from 0, *least acceptable*, to 100, *most acceptable*, to rate vaccination policies that varied in terms of the age and life expectancies of the beneficiaries. Each policy was described as targeting 500 people belonging to one of six age groups (i.e., 5, 20, 30, 40, 60, and 80 years of age), all of whom either had a normal life expectancy (taken from Arias, 2007) or had only 2 years to live, due to a health condition, regardless of age. These two factors (age and health status) were combined, resulting in 12 policies being presented to each participant. All 12 appeared on the same page, in the same fixed order. Policies were arranged from oldest to youngest and alternated between normal life expectancy and 2-year life expectancy, with the policy concerning individuals with a normal life expectancy presented first. For half of the participants, vaccination policies were described as saving 500 lives, and for the rest of participants, policies were described as resulting in 500 deaths (out of the 1,000 deaths expected if no intervention were undertaken; see Questionnaires in the Supplemental Material available on-line).

Results and discussion

Figure 1 shows mean ratings of each vaccination policy, so that higher ratings represent more value placed on the people targeted by each policy. Hierarchical linear modeling (HLM) was used to analyze the data (overall fixed effects are presented in Tables S2 and S3 in the Supplemental Material available on-line). As presented in Figure 1, in general, participants in both studies valued younger targets of the vaccination more than older targets(bs per year of age = –0.29 for Study 1 and –0.20 for Study 2, ps < .001). In addition, in both studies, targets with normal life expectancy were valued more than those of the same age who had only 2 years to live: Ms = 69.50 versus 42.72, $b = 26.78$, $t(2896) = 41.16$, $p < .001$, for Study 1; Ms = 71.49 versus 52.26, $b = 19.23$, $t(5022) = 23.27$, $p < .001$, for Study 2. Thus, the participants clearly did not value all lives equally.

Of primary interest, question framing influenced the metric people used to evaluate lifesaving interventions. In both studies, there was a significant interaction among target age,

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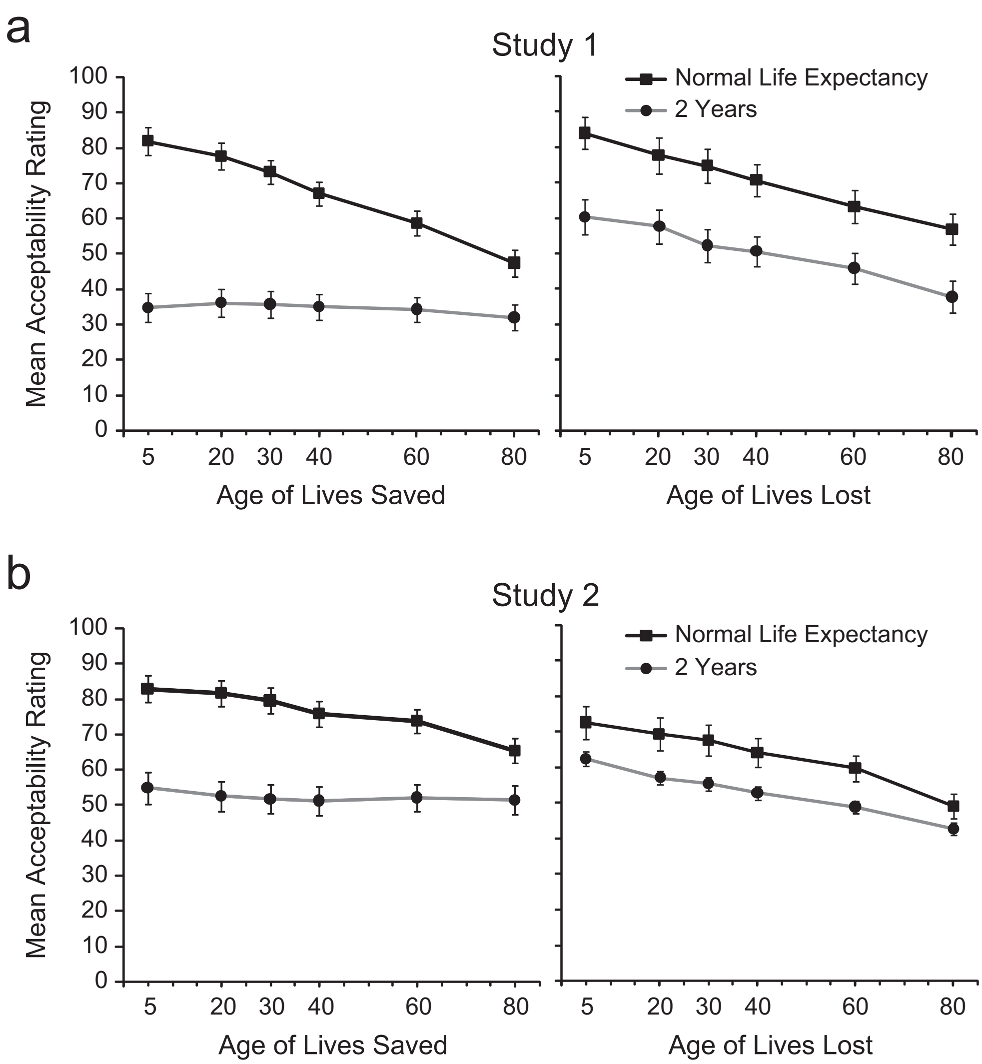

Fig. 1. Participants' mean ratings of acceptability of vaccination policies as a function of targets' age group, targets' life expectancy (normal or 2 years left), and framing of the question ("lives saved" or "lives lost"). Results are shown separately for (a) Study 1 and (b) Study 2. Ratings were made on a scale ranging from 0, *least acceptable*, to 100, *most acceptable*. Targets of policies were 5- to 80-year-old people who had either a normal life expectancy or 2 more years to live because of a health condition. Error bars represent ±2 *SE*.

life expectancy status, and framing: $b = 0.36$, $t(2896) = 6.92$, $p < .0001$, for Study 1; $b = 0.14$, $t(5022) = 3.16$, $p < .01$, for Study 2. As illustrated by the nonparallel curves in the left panels of Figure 1, the *lives saved* framing elicited evaluations indicative of a years-left metric. Targets with a normal life expectancy were assigned values that decreased with their age, whereas all targets with a shortened life expectancy were assigned a constant value ($b = –0.47$, $p < .001$, for normal targets, and $b = –0.04$, $p = .19$, for targets with 2 years left, in Study 1; $b = –0.22$, $p < .001$, for normal targets, and $b = –0.04$, $p = .15$, for targets with 2 years left, in Study 2). The interactions between target age and life expectancy status were significant in both studies, $b = 0.43$, $t(2896) = 12.11$, $p < .001$, for Study 1; $b = 0.17$, $t(5022) = 5.26$, $p < .001$, for Study 2. In contrast, the *lives lost* framing elicited evaluations of lives based on a years-lived metric. In this framing condition, targets with normal life expectancy, as well as those with 2 years to live, were all valued more if they were young. As illustrated by the parallel lines on the right panels of Figure 1, the values declined by age, with similar rates for both types of targets (*b*s = –0.36 and –0.30 for normal targets and for targets with 2 years left, respectively, *p*s < .001, in Study 1; *b*s = –0.29 and –0.26 for the two types of targets, respectively, *p*s < .001, in Study 2). There were no significant differences between the slopes in either study.

In Study 2, we also examined the influence of the respondents' age on their ratings. We found that the younger a respondent was, the faster his or her ratings declined according to target age, $b = –0.003$, $t(500) = 3.28$, $p = .001$. However, this effect was present only for targets with a normal life expectancy. Figure 2 illustrates the ratings by the typical 18-year-old participant versus the typical 80-year-old participant, as estimated from the

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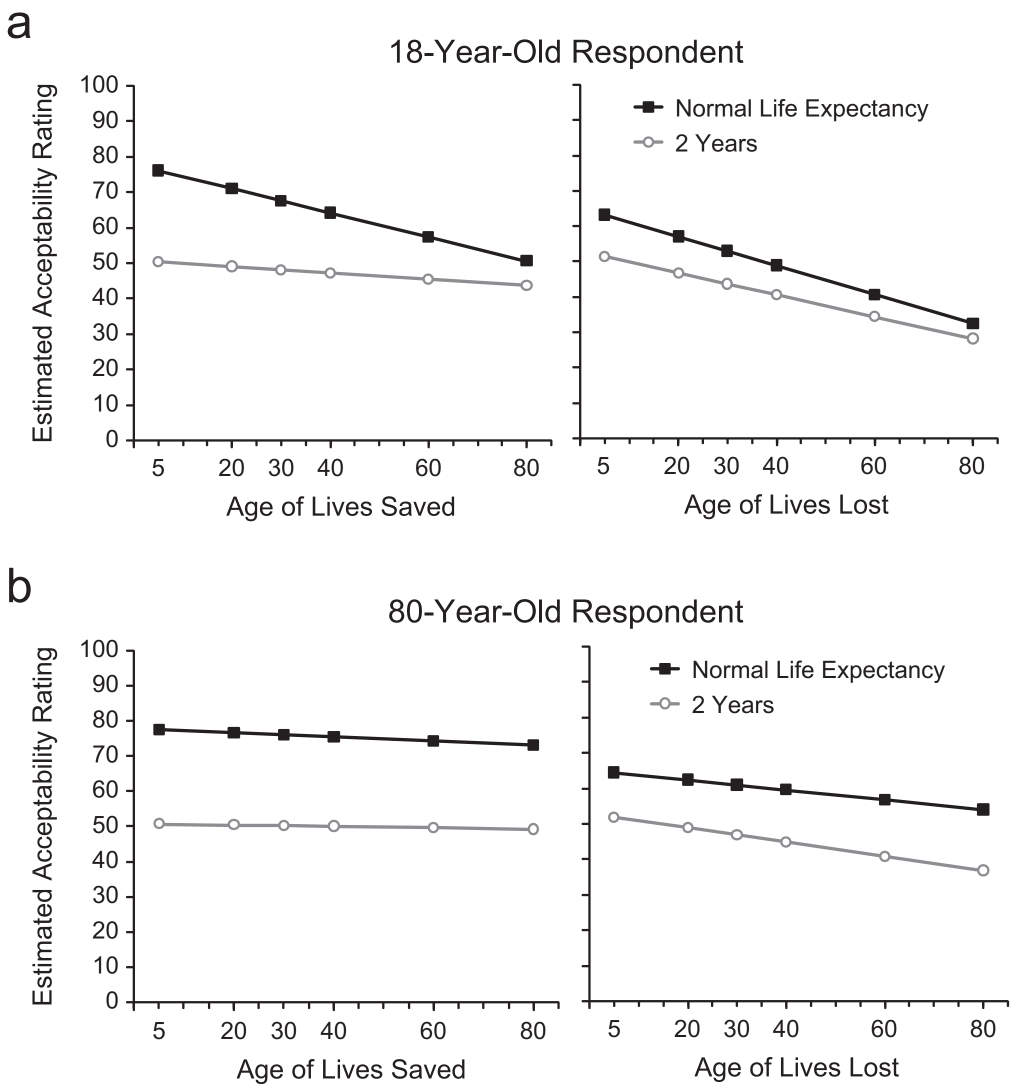

Fig. 2. Estimated ratings of acceptability of vaccination policies as a function of targets' age group, targets' life expectancy (normal or 2 years left), and framing of the question ("lives saved" or "lives lost"). Results are shown separately for (a) a typical 18-year-old participant and (b) a typical 80-year-old participant in Study 2. Ratings were made on a scale ranging from 0, *least acceptable*, to 100, *most acceptable*. Targets of policies were 5- to 80-year-old people who had either a normal life expectancy or 2 more years to live because of a health condition. Estimations for ratings were made using hierarchical linear modeling.

HLM model. When life expectancy was specified as normal, the average 18-year-old participant assigned life values that decreased with the target's age (*b*s = –0.32 and –0.41 per year of age in the "lives saved" and "lives lost" frames, respectively, *p*s < .001). In contrast, the average 80-year-old participant assigned much more equal values to all targets ($b = –0.07$, $p = .14$, in the "lives saved" frame; $b = –0.14$, $p < .01$, in the "lives lost" frame). Thus, respondents showed an egocentric tendency, giving increased weight to the lives of people whose ages were close to their own. That this pattern emerged only in judgments of targets with normal life expectancies suggests that egocentric valuations of life are more likely when the targets of evaluation are similar to the self (assuming most participants believe themselves to have a normal life expectancy). For more information, see Additional Analysis in the Supplemental Material available on-line.

General Discussion

These findings indicate that the public does not judge all lives equally. Overall, the younger the individual, the more highly he or she is valued. Perhaps more strikingly, different question frames appeared to trigger different metrics for evaluating life. When the scenario was presented in a "lives saved" frame, respondents were sensitive to years left; when the scenario was presented in a "lives lost" frame, respondents seemed to focus on years lived. Thus, the choice between saving the life of a young person with few years left and that of an older

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person with many years left would be critically determined by the framing of the scenario.

The focus on years lived in the "lives lost" frame is consistent with a fair innings rationale (Rodriguez & Pinto, 2000; Williams, 1997a): The young deserve the opportunity to live life, whereas older individuals have already enjoyed their share of life. The current study indicates that the fair innings rationale is compelling primarily in the "lives lost" frame.

One often hears about health policies in terms of how many lives would be saved, and almost never in terms of how many deaths would result. Policymakers' use of the "lives saved" framing in describing interventions seems reasonable, given the awkwardness in describing lifesaving interventions as having a "lives lost" consequence, but in so doing, it can inadvertently affect how the public evaluates the policy. To the extent that the "lives saved" framing elicits use of a years-left metric, the public would support a policy described in this way if it is expected to maximize the number of life years saved—as it is proposed, that is, before the intervention is carried out and its consequences realized. During or after an epidemic, however, evaluations of the same policy could be quite different. Now that lives are actually lost, and the public has observed and experienced the consequences, they may adopt a "lives lost" frame and, thus, a years-lived metric. Due to this shift of concern from years left to years lived, policies maximizing the number of life years saved could become incompatible with the public's considerations—perhaps even seem morally offensive—because they do not prioritize younger individuals enough, as the fair innings rationale would dictate.

What constitutes an ideal health policy is ultimately measured by its effects on the lives involved. The findings presented here suggest that people's valuation metric hinges on the question frame, as well as on their age. These findings shed light on the processes by which people judge whose life should be prioritized when health resources are scarce. Notably, a change in framing does not merely change the preference between two policies. Instead, different frames alter the computational metric that people select to judge the value of life. These factors have implications for policymakers, because they can greatly influence people's judgments, perhaps even those of the policymakers themselves. There may not be an absolute standard in valuing life, but there could be a best way to design and present policies that make the most sense to the public.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interests with respect to their authorship and/or the publication of this article.

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Supplemental Material

Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

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