MEDICINE

Do Defaults Save Lives?

Eric J. Johnson* and Daniel Goldstein

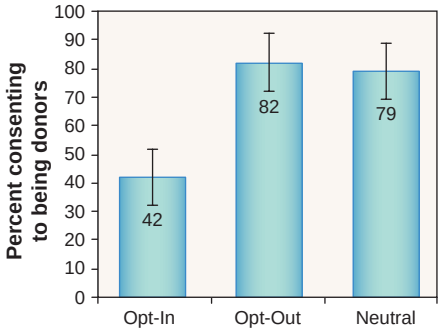
Since 1995, more than 45,000 people in the United States have died waiting for a suitable donor organ. Although an oft-cited poll (*1*) showed that 85% of Americans approve of organ donation, less than half had made a decision about donating, and fewer still (28%) had granted permission by signing a donor card, a pattern also observed in Germany, Spain, and Sweden (*2*–*4*). Given the shortage of donors, the gap between approval and action is a matter of life and death.

What drives the decision to become a potential donor? Within the European Union, donation rates vary by nearly an order of magnitude across countries and these differences are stable from year to year. Even when controlling for variables such as transplant infrastructure, economic and educational status, and religion (*5*), large differences in donation rates persist. Why?

Most public policy choices have a no-action default, that is, a condition is imposed when an individual fails to make a decision (*6*, *7*). In the case of organ donation, European countries have one of two default policies. In presumed-consent states, people are organ donors unless they register not to be, and in explicit-consent countries, nobody is an organ donor without registering to be one.

According to a classical economics view, preferences exist and are available to the decision-maker—people simply find too little value in organ donation. This view has led to calls for the establishment of a regulated market for the organs of the deceased (*8*, *9*), for the payment of donors or donors' families (*10*, *11*), and even for suggestions that organs should become public property upon death (*12*). Calls for campaigns to change public attitudes (*13*) are widespread. In classical economics, defaults should have a limited effect: when defaults are not consistent with preferences, people would choose an appropriate alternative.

A different hypothesis arises from research depicting preferences as constructed, that is, not yet articulated in the minds of those who have not been asked (*14*–*16*). If preferences for being an organ donor are constructed, defaults can influence choices in three ways: First, decision-makers might believe that defaults are suggestions by the policy-maker, which imply a recommended action. Second, making a decision often involves effort, whereas accepting the default is effortless. Many people would rather avoid making an active decision about donation, because it can be unpleasant and stressful (*17*). Physical effort such as filling out a form may also increase acceptance of the default (*18*). Finally, defaults often represent the existing state or status quo, and change usually involves a trade-off. Psychologists have shown that losses loom larger than the equivalent gains, a phenomenon known as loss aversion (*19*). Thus, changes in the default may result in a change of choice.



Effective consent rates, online experiment, as a function of default.

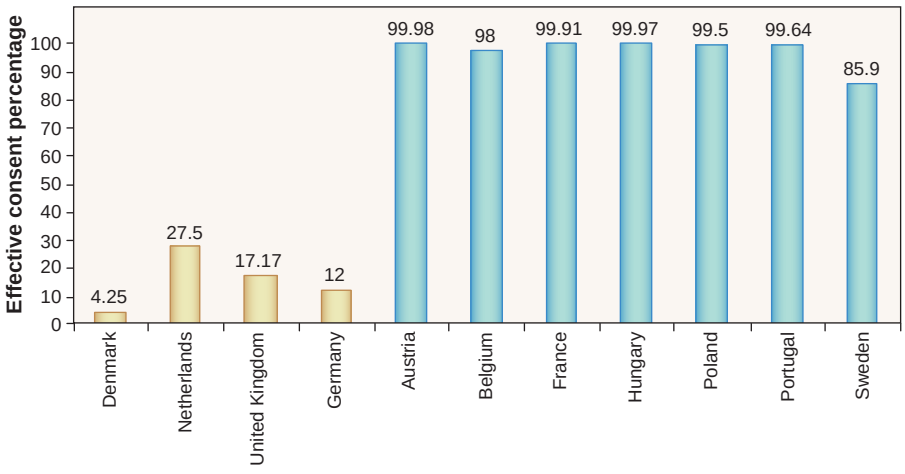
Governments, companies, and public agencies inadvertently run "natural experiments" testing the power of defaults. Studies of insurance choice (*20*), selection of Internet privacy policies (*21*, *22*), and the level of pension savings (*23*) all show large effects, often with substantial financial consequences.

Defaults and Organ Donations

We investigated the effect of defaults on donation agreement rates in three studies. The first used an online experiment (*24*): 161 respondents were asked whether they would be donors on the basis of one of three questions with varying defaults. In the opt-in condition, participants were told to assume that they had just moved to a new state where the default was not to be an organ donor, and they were given a choice to confirm or change that status. The opt-out condition was identical, except the default was to be a donor. The third, neutral condition simply required them to choose with no prior default. Respondents could at a mouse click change their choice, largely eliminating effort explanations.

The form of the question had a dramatic impact (see figure, left): Revealed donation rates were about twice as high when opting-out as when opting-in. The opt-out condition did not differ significantly from the neutral condition (without a default option). Only the opt-in condition, the current practice in the United States, was significantly lower.

In the last two decades, a number of European countries have had opt-in or opt-out default options for individuals' decisions to become organ donors. Actual decisions about organ donation may be affected by governmental educational programs, the

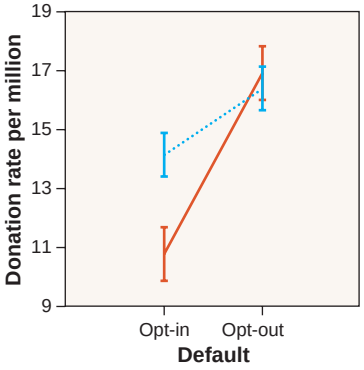


Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

The authors are at the Center for Decision Sciences, Columbia University, New York, NY 10027, USA.

*To whom all correspondence should be addressed: ejj3@columbia.edu

efforts of public health organizations, and cultural and infrastructural factors. We examined the rate of agreement to become a donor across European countries with explicit and presumed consent laws. We supplemented the data reported in Gäbel (*25*) by contacting the central registries for several countries, which allowed us to estimate the effective consent rate, that is, the number of people who had opted in (in explicit-consent countries) or the number who had not opted out (in presumed-consent countries). If preferences concerning organ donation are strong, we would expect defaults to have little or no effect. However, as can be seen in the figure (page 1338, bottom), defaults appear to make a large difference: the four opt-in countries (gold) had lower rates than the six opt-out countries (blue). The two distributions have no overlap, and nearly 60 percentage points separate the two groups. One reason these results appear to be greater than those in our laboratory study is that the cost of changing from the default is higher; it involves filling out forms, making phone calls, and sending mail. These low rates of agreement to become a donor come, in some cases, despite marked efforts to increase donation rates. In the Netherlands, for example, the 1998 creation of a national donor registry was accompanied by an extensive educational campaign and a mass mailing (of more than 12 million letters in a country of 15.8 million) asking citizens to register, which failed to change the effective consent rate (*26*).



Estimated donation rate, opt-in versus opt-out, as a function of default, 1991–2001. Means ± SEM; this paper, blue; Gimbel *et al.* (*5*), red.

Do increases in agreement rates result in increased rates of donation? There are many reasons preventing registered potential donors from actually donating. These include: families' objections to a loved one's consent, doctors' hesitancy to use a default option, and a mismatch with potential recipients, as well as differences in religion, culture, and infrastructure.

To examine this, we analyzed the actual number of cadaveric donations made per million on a slightly larger list of countries, with data from 1991 to 2001 (*27*). We analyzed these data using a multiple regression analysis with the actual donation rates as dependent measures and the default as a predictor variable. To control for other differences in countries' propensity to donate, transplant infrastructure, educational level, and religion, we included variables known to serve as proxies for these constructs (*5*) and an indicator variable representing each year.

This analysis presents a strong conclusion. Although there are no differences across years, there is a strong effect of the default: When donation is the default, there is a 16.3% ($P < 0.02$) increase in donation, increasing the donor rate from 14.1 to 16.4 million (see figure, this page, blue line). Using similar techniques, but looking only at 1999 for a broader set of European countries, including many more from Eastern Europe, Gimbel *et al*. (*5*) report an increase in the rate from 10.8 to 16.9, a 56.5% increase (see figure, this page, red line). Differences in the estimates of size may be due to differences in the countries included in the analysis: Many of the countries examined by Gimbel *et al*. had much lower rates of donation.

Conclusions

How should policy-makers choose defaults? First, consider that every policy must have a no-action default, and defaults impose physical, cognitive, and, in the case of donation, emotional costs on those who must change their status. As noted earlier, both national surveys and the no-default condition in our experiment suggest that most Americans favor organ donation. This implies that explicit consent policies impose the costs of switching on the apparent majority (*28*).

Second, note that defaults can lead to two kinds of misclassification: willing donors who are not identified or people who become donors against their wishes. Balancing these errors with the good done by the lives saved through organ transplantation leads to delicate ethical and psychological questions. These decisions should be informed by further research examining the role of the three causes of default effects. For example, one might draw different conclusions if the effect of defaults on donation rates is due primarily to the physical costs of responding, than if they were due to loss aversion.

The tradeoff between errors of classification and physical, cognitive, and emotional costs must be made with the knowledge that defaults make a large difference in lives saved through transplantation.

Our data and those of Gimbel *et al*. suggest changes in defaults could increase donations in the United States of additional thousands of donors a year. Because each donor can be used for about three transplants, the consequences are substantial in lives saved. Our results stand in contrast with the suggestion that defaults do not matter (*29*). Policy-makers performing analysis in this and other domains should consider that defaults make a difference.

References and Notes

1. The Gallup Organization, "The American Public's Attitude Toward Organ Donation and Transplantation" (Gallup Organization, Princeton, NJ,1993).
2. S. M. Gold, K. Shulz, U. Koch, *The Organ Donation Process: Causes of the Organ Shortage and Approaches to a Solution* (Federal Center for Health Education, Cologne, 2001),
3. H. Gäbel, H. N. Rehnqvist, *Transplant. Proc.* **29**, 3093 (1997).
4. C. Conesa *et al.*, , *Transplant. Proc.* **35**,1276 (2003).
5. R. W. Gimbel, M. A. Strosberg, S. E. Lehrman, E. Gefenas, F. Taft, *Progr. Transplant.* **13**, 17 (2003).
6. R. H. Thaler, C. Sunstein, *Univ. Chicago Law Rev.*, in press.
7. C. Camerer, S. Issacharoff, G. Loewenstein, T. O'Donoghue, M. Rabin, *Univ. Penn. Law Rev.* **151**, 2111 (2003).
8. M. Clay, W. Block, *J. Soc. Polit. Econ. Stud.* **27**, 227 (2002).
9. J. Harris, C. Erin, *BMJ* **325**, 114 (2002).
10. C. E. Harris, S. P. Alcorn, *Issues Law Med.* **3**, 213 (2001).
11. D. Josefson, *BMJ* **324**, 1541 (2002).
12. J. Harris, *J. Med. Ethics* **29**, 303 (2003).
13. J. S. Wolf, E. M. Servino, H. N. Nathan, *Transplant. Proc.* **29**, 1477 (1997).
14. J. W. Payne, J. R. Bettman, E. J. Johnson, *Annu. Rev. Psychol.* **43**, 87 (1992).
15. P. Slovic, *Am. Psychol.* **50**, 364 (1995).
16. D. Kahneman, A. Tversky, Eds., *Choices, Values, and Frames* (Cambridge Univ. Press, Cambridge, 2000).
17. J. Baron, I. Ritov, *Org. Behav. Hum. Decision Processes* **59**, 475 (1994).
18. W. Samuelson, R. Zeckhauser, *J. Risk Uncertainty* **1**, 7 (1988).
19. A. Tversky, D. Kahneman, *Q. J. Econ.* **106**(4), 1039 (1991).
20. E. J. Johnson, J. Hershey, J. Meszaros, H. Kunreuther, *J. Risk Uncertainty* **7**, 35 (1993).
21. S. Bellman, E. J. Johnson, G. L. Lohse, *Commun. ACM* (*Assoc. Comput. Machin.*) **44**, 25 (February 2001).
22. E. J. Johnson, S. Bellman, G. L. Lohse, *Marketing Lett.* **13**, 5 (February 2002).
23. B. C. Madrian, D. Shea, *Q. J. Econ.* **116**(1), 1149 (2001).
24. Methods and details of analysis are available as supporting material on *Science* online.
25. H. Gäbel, "Donor and Non-Donor Registries in Europe" (on behalf of the committee of experts on the Organizational Aspects of Co-operation in Organ Transplantation of the Council of Europe, Brussels, 2002).
26. M. C. Oz *et al.*, *J. Heart Lung Transplant.* **22**, 389 (2003).
27. We used a times series analysis to account for possible changes in transplant technology and infrastructure, as well as the effects of continuing public education campaigns.
28. An alternative advocated by the American Medical Association (*30*) is mandated choice, which imposes the cost of making an active decision on all. This practice is currently employed in the state of Virginia, but, consistent with the constructive preferences perspective, about 24% of the first million Virginians asked said they were undecided (*31*).
29. A. L. Caplan, *JAMA* **272**, 1708 (1994).
30. American Medical Association, "Strategies for cadaveric organ procurement: Mandated choice and presumed consent" (American Medical Association, Chicago, 1993).
31. A. C. Klassen, D. K. Klassen, *Ann. Intern. Med.* **125**, 70 (1996).

32. This research has been supported by the Columbia University Center for Decision Science and the Columbia Business School Center for Excellence in E-Business. We thank L. Roels for providing the data on actual donation rates.

Supporting Online Material

www.sciencemag.org/cgi/content/full/302/5649/1338/DC1