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Edgar A. Pessemier; Albert C. Bemmaor; Dominique M. Hanssens

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Willingness to Supply Human Body Parts: Some Empirical Results

EDGAR A. PESSEMIER
ALBERT C. BEMMAOR
DOMINIQUE M. HANSENS*

Despite the serious shortage of human body parts for transplantation purposes, little research has been done to provide guidance for action. Based on sample data, this pilot study examines the demographic and attitudinal characteristics of potential donors. The results have direct relevance for programs to increase the supply of body parts.

Advances in medical science and associated technologies have increased the demand for non-regenerative body parts such as kidneys, and regenerative body parts, most notably blood. Like other rapid advances in science and technology, practice moved to new ground not adequately covered by existing legal and ethical standards. Furthermore, the dramatic life-and-death issues that arise in individual cases encourage publicity and emotional discussion. These properties of the subject increase its social importance and the need for a stronger empirical foundation for social policy. The results of the research reported here provide guidance for actions designed to increase the supply of human body parts.

EXPLORATION OF THE PROBLEM AREA

An unsigned article by Dale Oesterle provides an excellent introduction to the problem (Oesterle 1974). Although this lengthy review focuses principally on the legal status of the sale of human body parts, it raises a variety of interesting questions about the characteristics of the individuals who supply parts and the incentives which might reduce the shortages of some parts. In particular, various forms of financial rewards are discussed, including some favorable and unfavorable consequences of stronger incentives.

* Edgar A. Pessemier is Professor of Management and Albert C. Bemmaor is a Doctoral Candidate in Marketing at the Krannert Graduate School of Management, Purdue University, West Lafayette, IN 47907. Dominique M. Hanssens is Assistant Professor, Graduate School of Management, University of California, Los Angeles, CA 90024. The authors gratefully acknowledge the comments of two anonymous reviewers. In addition, they wish to thank Glen Jarboe, Robert Leone, Ranaan Lipshitz, and Peter Wilton who participated in the formative stages of the study.

Numerous additional facets of the supply and demand of body parts were identified by a subsequent, wide-ranging literature review. Extended focus-group discussions held with a group drawn from the medical, legal, and religious communities and a group of potential lay donors provided further insights. These varied activities identified a number of related issues such as the legal and medical definition of death, technological progress in designing artificial parts, the various actions by private and government agencies to encourage living and cadaver donations, the trends and current states of imbalance between supply and demand for various parts, and the highly emotional characteristics of the problem. Although many of these questions cannot be examined by survey methods, some aspects of the individual's willingness to supply body parts are amenable to study by a relatively simple questionnaire.

PRELIMINARY RESEARCH DESIGN

The exploratory efforts just discussed and a number of works in attitude and moral philosophy suggested possible factors influencing an individual's decision to supply body parts. For example, Robinson and Shaver's compilation of attitude measures contains a number of instruments that measure attitudes which may influence willingness to donate (Robinson and Shaver 1969). Also, the active 1976 debates about the value of life and the wisdom of artificially extending life offered additional motives (Dyck 1976). Other studies have focused on philanthropy, particularly donation of time and money (Morgan, Dye, and Hybels 1977).

To examine the elements which contribute to willingness-to-supply body parts, individual willingness must be scaled. Therefore, the first step in the research

involved selecting ten questions to define an associated Guttman scale.¹ The second step involved the selection and definition of the independent attitudinal constructs. A variety of possibilities were discussed and ultimately a dozen multiple question constructs were selected. The two sets of questions covering both the dependent and independent variables appeared in the instrument which was pretested in the spring of 1976 with several small groups of students.

The results of this test were encouraging, indicating subjects could cope with the subject matter and identify with the principal issues. The work also identified several ways to improve the structure of the questionnaire and the wording of questions. Because of the tentative nature of the instrument and the undesirably narrow demographic profile of the small sample of respondents, findings are not reported here. Instead, attention is focused on the follow-up study.

DESIGN OF THE FIELD SURVEY

In the fall of 1976, a mail survey was prepared which contained a cover letter explaining the objectives of the research and the nature of the attached questionnaire, a three page questionnaire, and a stamped return envelope. (The main questions are presented in Appendix A.) These materials were sent to a sample of 1500 telephone subscribers residing in small northern Indiana communities. A systematic random sampling procedure was used, mainly to simplify clerical work (Sudman 1976). Small northern Indiana communities were selected since apparently no important promotional action to increase donation had been carried out by hospitals or other institutions in this area.

About 33 percent of the questionnaires were returned and 25 percent were usable, i.e., received from medically able to donate respondents. This high attrition rate may be explained by the highly emotional and personal nature of the topic. However, numerous respondents commented on the interesting nature of the subject. This generally high level of interest is reassuring since it indicates respondents were devoting substantial care and attention to completing the questionnaire (Ferber 1948-49).

As shown in Table 1, the mean level of education of the respondent is significantly higher than that of the county population. Since the findings indicate a positive relationship between education and willingness-to-donate, the less-willing segments of the population are underrepresented in the analysis reported here. Furthermore, the average age of the respondent is higher than that of the population, as is average in-

come. Again, the findings reported show that the latter two variables are significantly related to the level of willingness-to-donate, one negatively and one positively. Finally, women are generally more willing-to-donate than men and they are slightly overrepresented in the data used in the analysis. Note, however, that no effort has been made to predict levels of willingness for a larger population of potential donors.

The questionnaire contained a demographic section which included the above variables plus occupation. The remaining section contained 50 semantic differential variables. Although they were mixed in the questionnaire, ten questions were designed to yield a Guttman scale for willingness-to-donate and the remaining 40 questions, 4 per construct, were intended to develop the ten attitude scales. The latter attitudinal scales and the demographic variables serve as independent predictors of willingness-to-donate. Verbal descriptions of the independent attitude constructs are as follows:

1. Liberalism vs. conservatism (modern vs. traditional value system)
2. High vs. low religiosity
3. High vs. low concern about illness and the problems of aging
4. High vs. low interest in physical attractiveness
5. High vs. low concern about life-continuity (the treatment of a cadaver and afterlife)
6. High vs. low value placed on charitable feelings
7. High vs. low importance of leadership and personal influence
8. High vs. low importance of family values
9. Quality-of-life vs. equality-of-life²
10. High vs. low importance of money (used in separate tests as noted later)

The questionnaire contained four sets of randomly ordered questions associated with willingness-to-donate which were asked with and without a monetary incentive (four questions from the dependent variable set and four from construct 10). By comparing each individual's responses to each pair of questions, the effect of a monetary incentive can be examined.

At this point, it is useful to summarize the principal study hypotheses:

- H1:** Willingness-to-donate is scalable in one dimension.

¹ The Guttman scaling method permits an analyst to determine the degree to which a construct such as "willingness-to-donate" forms a unidimensional scale. Both items and subjects can be located along the same scale (Nie et al. 1975 and Torgerson 1957).

² At the quality-of-life extreme, life is valuable only to the extent that it is productive and enjoyable. At the equality of life extreme, all life is equally valuable regardless of the conditions under which it continues (see Dyck 1976).

TABLE 1
DEMOGRAPHIC PROFILES OF RESPONDENTS AND COUNTY POPULATION

Variable	Category	Sample percentage	Category	County population percentage
Marital status	Married	84.9		
	Not married	15.1		
Number of dependents	0	24.4		
	1	19.9		
	2	15.1		
	3	18.0		
	4	13.3		
	5 and more	8.5		
	Unknown	.8		
Education	Grade school	1.3	Less than five school years completed	1.6 ^a
	Some high school	5.8		
	High school graduate	41.4	Four years of high school or more	67.7
	Some college	24.9		
	Undergraduate	14.3	Four years of college or more	20.6
	Advanced	11.7		
	Unknown	.5		
Age	Less than 30	18.3	Less than 18	25.6 ^b
	30-39	29.7	18-24	26.5
	40-49	21.0	25-34	16.3
	50-59	15.6	35-49	12.9
	More than 60	14.9	50 and more	18.7
	Unknown	.5		
Income	Less than 10K	16.7	8-10K	7.8 ^b
	10-15K	22.0	10-15K	22.7
	15-20K	27.1	15-25K	32.0
	20-25K	15.1	More than 25K	11.8
	More than 25K	18.0		
	Unknown	1.1		
Sex	Male	43.8	Male	49.1 ^c
	Female	55.4	Female	50.9
	Unknown	.8		
	Base	377		

^a Source: U.S. Dept. of Commerce, Bureau of the Census, County and City Data Book 1972—Miscellaneous categories excluded (see references).

^b Source: Sales and Marketing Management 1977 (see references).

^c Source: Indiana State Board of Health 1976 (see references).

H2: Willingness-to-donate will differ significantly across various demographic classes.

H3: Willingness-to-donate will be significantly increased by a monetary incentive.

H4: The demographic profile of individuals who will respond to monetary incentives will differ significantly from the profile of individuals who will not respond.

H5: The attitude constructs described in Table 1 will predict willingness-to-donate.

Results relating to each of these hypotheses are reported in the following sections of this paper.

Before turning to the analysis, it is worth noting that the sample is necessarily one of volunteer sub-

jects dealing with an emotion loaded subject. As Rosenthal & Rosnow (1975) have pointed out, volunteer subjects tend to have a high need for social approval. This characteristic is particularly noteworthy when considering the degree to which the findings are likely to predict decisions to actually supply body parts. How the need for approval operates in the survey response setting as compared to the decision setting is not easy to evaluate.

THE DEPENDENT VARIABLE

Hypothesis **H1** relating to the willingness-to-donate variable is examined first. The method used is Guttman scale analysis, which allows a determination of whether or not the responses of subjects form a unidimensional

TABLE 2
 FACTOR ANALYSIS WITH VARIMAX ROTATION—10 WILLINGNESS-TO-DONATE VARIABLES^a

Variable and factor descriptions	Factor loadings		
	Factor 1	Factor 2	Factor 3
<i>Blood, skin, marrow</i>			
I would be willing to donate <i>blood</i> at least once every two months	[.3807] ^b	.1646	.2009
If I witnessed a traffic accident, I would not be willing to donate <i>blood</i> to a victim	[-.4244]	-.0304	-.1503
If needed, I am willing to give <i>blood</i> to a relative or close friend	[.6339]	.0988	.0517
I would give a piece of my <i>skin</i> to a relative who has been seriously burnt	[.4556]	.1405	.1356
If necessary, I would donate some <i>bone marrow</i> to be extracted from my breastbone to a relative	[.5377]	.3440	.2681
<i>Death donation</i>			
I am willing to donate both my eyes to a stranger upon my <i>death</i>	.1412	[.7944]	.2946
I am willing to arrange an agreement to donate my heart or any other vital organ for use after my <i>death</i>	.2410	[.7582]	.1664
<i>Kidney donation</i>			
I would never donate one of my <i>kidneys</i> to someone outside of my family, not even to a close friend	-.1669	-.2544	[-.6770]
If needed, I would donate one of my <i>kidneys</i> to a stranger at this very moment	.1641	.1486	[.6584]
If at this moment I learned that a relative desperately needed a <i>kidney</i> to survive, I would not donate one of mine	-.3814	-.1596	[-.5272]
Explained Variance per Factor	36.9%	12.2%	10.2%
Cumulative	36.9	49.1	59.3

^a 377 respondents.

^b [] indicates the highest loading in each row.

scale. This procedure is based on the analysis of response patterns to the set of items and is fully described in Torgerson (1958). Several attempts were made to maximize the coefficient of reproducibility (the proportion of responses which can be correctly reproduced) by altering the cutoff points (minimum rating for passing a given item). However, the results show that the ten items do not make up a unidimensional scale.³ Hence **H1** is rejected and the attention shifts to a multidimensional analysis of the data. It was decided to use factor analysis in an attempt to distinguish the multiple dimensions of the willingness-to-donate construct. The results of this factor analysis are listed in Table 2.

Three separate aspects of willingness-to-donate appear sufficiently distinct to indicate the need for three

³ These results correspond to the selection of "agree slightly" or "disagree slightly" (depending on the form of the item—positive or negative) as cutoff points. The coefficient of reproducibility (proportion of responses to the items that can be correctly reproduced) equals .83. The minimum marginal reproducibility (lowest coefficient of reproducibility that occur given the nature of the scale) equals .73. Hence, the percent improvement, i.e., the improvement that is achieved over the minimum, equals .10. Finally, the coefficient of scalability (percent improvement divided by (1-Minimum marginal reproducibility)) equals .36. The minimum acceptable results, as defined by Nie et al. (1975), are .9 and .6 for the coefficient of reproducibility and the coefficient of scalability respectively. Hence, the hypothesis of unidimensionality is rejected.

separate dependent variables: *blood, skin and marrow donation, death (cadaver) donation, and kidney donation*. In each case, an average sum score can be computed for the appropriate individual variables (a standard deviation score is used for each subject response). These sum-score variables for the three types of willingness-to-donate are used as dependent variables throughout the following analysis. (The correlations among these sum-score variables are greater than .4 and less than .5; all correlations are significant at the .001 level.)

DEMOGRAPHIC ANALYSIS OF WILLINGNESS-TO-DONATE

The effects of demographic characteristics on the three types of willingness-to-donate are examined by analysis of variance. As Table 3 indicates, with the exception of number of dependents, all other demographic characteristics significantly influence some type of willingness-to-donate.

The influence of age is particularly pronounced and general, the influence of sex and income is less general, and the influence of education is limited to death donations.

The analysis of variance findings about the effect of demographic characteristics on willingness can be extended. Figure A indicates the direction and magni-

tude of sex, age, and income effects. It shows that willingness is highest among middle-aged respondents and lowest among older respondents. Also, the tendency of women to be more willing than men to donate can be observed in this figure. In addition it clearly shows that willingness rises as income rises. The pronounced interaction of age and income is also visible. Overall, the rank order of the three types of willingness measures tends to change from population to population. In general, subjects seem less willing to donate a kidney than to donate at death or to donate regenerative materials. In any event, more donation prone populations can be located. Middle-age females with incomes over \$10,000 should be most responsive. Therefore, hypothesis H2 cannot be rejected. Significant differences between various demographic groups exist and may have applied value.

Nevertheless, these findings must be viewed with caution. For example, male college students have always been important contributors to blood drives. Furthermore, a substantially higher proportion of males than females have donated transplant tissues and organs (Murray and Barnes 1968). Also, a report by Simmons, Fulton, and Fulton (1972) on the signers of kidney donor cards indicate that a higher proportion of younger (under age 30) signers were found than in a similar population of nonsigners. On the other hand, Murray and Barnes reported mean ages for organ donors that clearly highlighted the importance of the 30-49 age group. Also, the Simmons, Fulton, and Fulton study found card signers were female, more educated, and more likely to have higher incomes. In short, the evidence from various related studies support the importance of demographic characteristics and in many respects parallel the substantive

TABLE 3
DEMOGRAPHIC VARIABLES POTENTIALLY INFLUENCING THE WILLINGNESS TO DONATE A BODY PART

Type of donation	Significance of differences by respondent type				
	Sex	Age	Income	Edu- cation	Number of dependents
Blood, skin, marrow	.521 ^a	.000	.007	.791	.482
At death	.138	.022	.007	.052	.404
Kidney	.017	.009	.576	.579	.649

^a A difference as large as the one observed would be expected to occur by chance with probability .521; significance tested by ANOVA F tests.

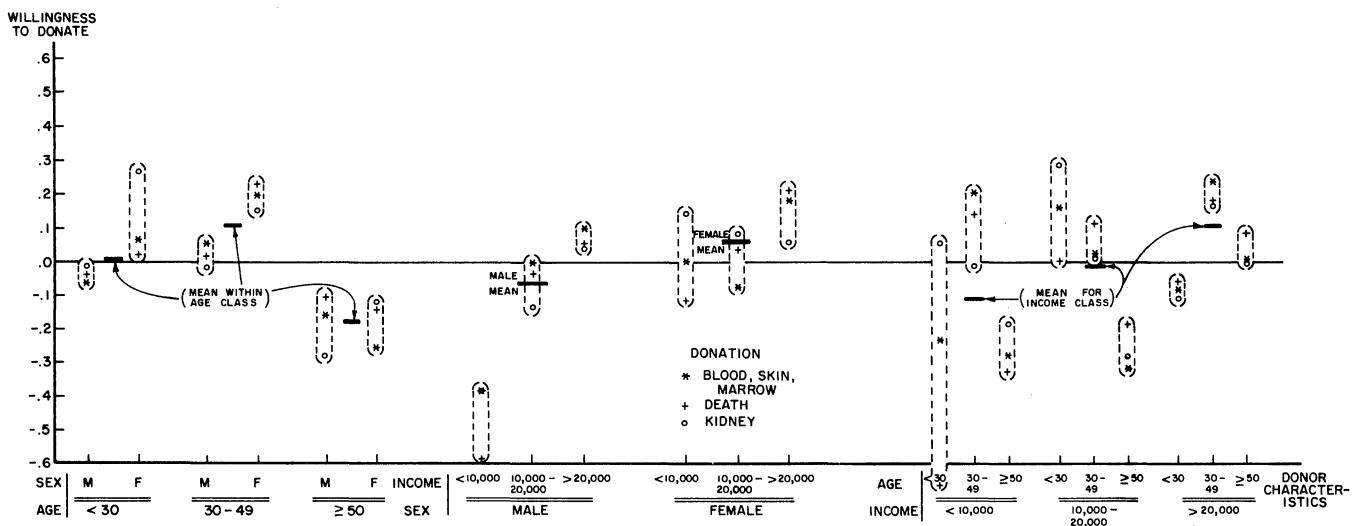
findings reported here. Important differences are apparent which call for further study.

These differences underline an aspect of the problem that did not yield to the survey method employed in this study. Health statistics indicate that almost half of the transplantable tissue and organ donations are made by individuals who are related to the recipient (Murray and Barnes 1968). Survey methods cannot create a realistic family medical crisis calling for a body part. Perhaps no contrived environment can elicit a response which would reflect real behavior under those conditions. Because the emotional impact of family need is so great, an effort to develop a suitable research approach should not be abandoned without a struggle.

THE INFLUENCE OF MONETARY INCENTIVES

As noted earlier, four pairs of questions were included which asked about willingness-to-donate with

FIGURE A
EFFECT OF DEMOGRAPHIC CHARACTERISTICS ON THREE WILLINGNESS-TO-DONATE MEASURES^a



^a The average of the standard deviation scores for the questions making up each construct.

TABLE 4
EFFECT OF MONETARY INCENTIVES ON
WILLINGNESS TO DONATE

Effect of monetary incentive on response	Percentage of respondents influenced by monetary incentives			
	Blood	Dead parts: eyes only	Dead parts	Kidney
More willing	9.2	10.6	11.5	29.4
No change	23.6	38.4	34.9	36.8
Less willing	67.2	51.0	53.6	33.8
Total	100.0	100.0	100.0	100.0
Base	360	359	364	367

and without a financial incentive. By examining changes in willingness responses, the effect of a payment for "donation" can be assessed. Table 4 indicates the proportion of the sample who indicated a higher, lower, or no change in willingness when an incentive was offered.

It is particularly interesting to note that monetary incentives substantially *reduce* the overall (stated) willingness-to-donate in all four types of "donations." However, subjects who are more prone to "donate" when offered a financial incentive represent about 10 percent of the sample, except for the case of kidney "donation" in which they are 29 percent of the sample. The increase in proportion for kidney "donation" as compared to the proportion for other "donations" is significant at the .05 level.

Given the segmentation by effect of monetary incentive shown in Table 4, it would be desirable to identify the kinds of individuals who are more and less willing-to-"donate" when payment is offered. Unfortunately, these groups cannot be successfully differentiated on the basis of their demographic characteristics. Therefore, hypothesis H4 must be rejected.

ANALYSIS OF THE ATTITUDINAL CONSTRUCTS

Besides the monetary incentive variables, nine attitudinal constructs were employed in the research design. In the survey instrument, each construct is represented by four questions appearing in random order. After discussing how each construct is scaled, the influence of these variables on willingness-to-donate body parts will be examined.

Scaling the Independent Variables

The objective of the scaling phase is to compute nine scores for each respondent that reflect his/her attitude level on each of the constructs. A factor analysis of the 36 questions proved to be disappointing (the determinant of the covariance matrix was near zero), casting doubt on the reliability of factor scores. Therefore, a simpler scaling method was adopted (Ehren-

berg and Goodhardt 1976). First the matrix of partial correlations between the 36 questions was examined. In most cases, the within construct correlations between questions were relatively high for the four questions in each of the original constructs. The variables with substantial within-construct correlations were selected and an average within-construct standard deviation score was computed for each respondent on each construct. Twenty-five of the original 36 questions were retained.

The Influence of Attitude Constructs on Willingness-to-Donate

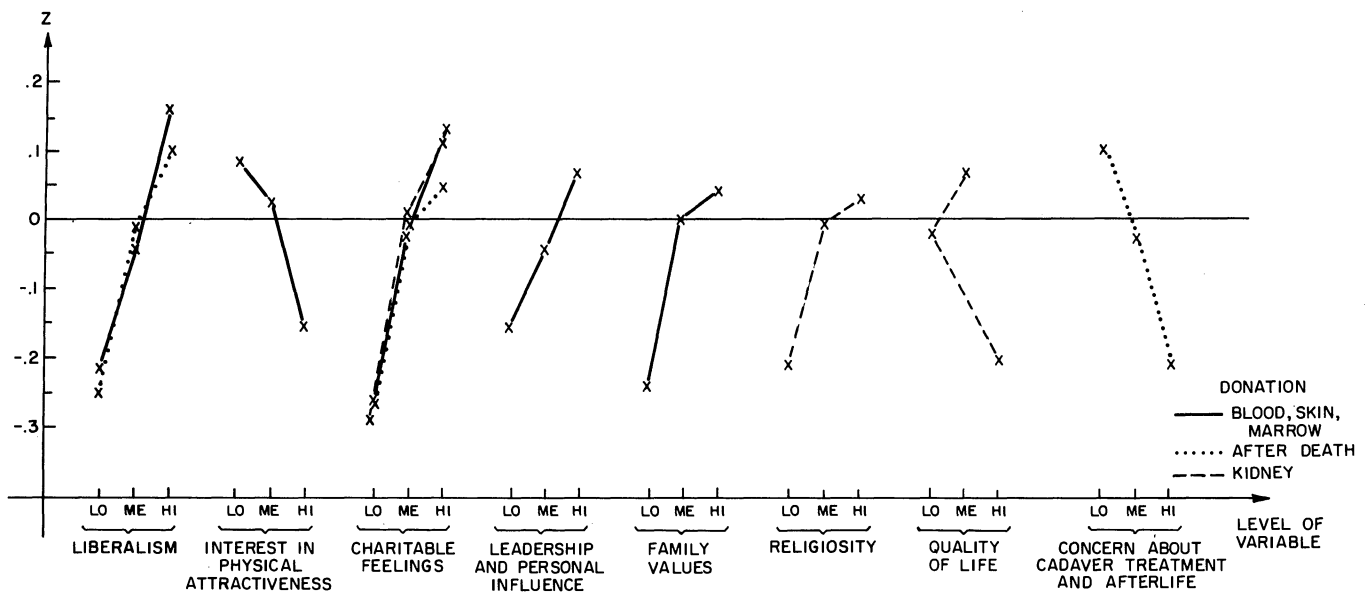
The empirical verification of hypothesis H5 requires measuring the statistical relationship between the three aspects of willingness-to-donate and the nine attitude constructs. For this type of research assignment,

TABLE 5
ONE-WAY ANOVA OF WILLINGNESS-TO-DONATE ACROSS
GROUPS WITH HIGH, MEDIUM, AND LOW SCORES
ON ATTITUDE CONSTRUCTS

Attitude constructs		Willingness-to-donate variables ^a			Number in each sub-group
		Blood, skin, marrow	Dead parts	Kidneys	
Liberalism:	LO	-.171	-.199		115
	ME	-.015	.037		144
	HI	.184	.149		118
Religiosity:	LO			-.176	86
	ME			.035	136
	HI			.067	155
Aging values:	LO				146
	ME				38
	HI				193
Interest in physical attractiveness:	LO	.061			109
	ME	.039			154
	HI	-.112			114
Life continuity:	LO		.160		89
	ME		.032		161
	HI		-.153		127
Charitable feelings:	LO	-.218	-.203	-.246	103
	ME	.011	.052	.048	144
	HI	.160	.103	.142	130
Leadership and personal influence:	LO	-.108			108
	ME	-.001			155
	HI	.104			114
Family values:	LO	-.186			92
	ME	.042			146
	HI	.079			139
Quality-of-life:	LO			-.003	94
	ME			.104	172
	HI			-.159	111

^a Group means are shown for the low (LO), medium (ME), and high (HI) scoring group on the attitude construct only where the *F* probability is less than 0.10.

FIGURE B
ATTITUDE CONSTRUCTS SIGNIFICANTLY ASSOCIATED WITH THREE WILLINGNESS-TO-DONATE MEASURES
PROFILES FOR ALL THREE TYPES OF DONATIONS



multiple regression analysis is the most widely used method. However, the regression model assumed that the data basis is *homogeneous*, i.e. the parameter vector β in the general linear model,

$$y = X\beta + u$$

is the same for all individuals in the sample. Several Chow tests for parameter homogeneity were performed on the various demographic categories and revealed that the data basis is very heterogeneous (Chow 1960). Alternatively, one could divide the sample in homogeneous subgroups and perform an analysis of covariance (see, e.g., Johnston 1972), but the size of these subgroups would be too small for meaningful statistical analysis. Therefore, it was decided to use a simple one-way analysis of variance (ANOVA), which yields less information than the other two methods, but which is more reliable under the circumstances.

The ANOVA is performed on three levels of each attitude construct: a low subgroup (z -score ≤ -0.4), a middle subgroup ($-0.4 \leq z$ -score ≤ 0.4) and a high subgroup (z -score ≥ 0.4), where 0.4 is the standard deviation score which divides a normal population in approximately three equal segments. The findings of the ANOVA are summarized in Table 5. Note that for each cell in the table an F -test is performed to determine whether the observed differences in group means are statistically significant. In eleven out of twenty-seven cases the answer is affirmative, i.e., the attitude construct has a significant effect on willingness-to-donate. The strongest construct appears to be "charitable feelings," which has a positive relationship with all dependent variables. With the exception of "aging values," all hypothesized constructs are related to at least one dependent variable. Graphic profiles of the effect of

each attitudinal variable on willingness-to-donate appear in Figure B.

Several conclusions about the effect of attitudes on the three willingness variables can be summarized by looking at the spread in the mean levels of willingness between groups with high and low levels of each independent attitude construct (see the figures in parenthesis):

1. Potential donors of nonvital parts (blood, skin, and bone marrow) attach great importance to charitable feelings (.38) and family values (.27), but also tend to have liberal ideas (.36) and perceive themselves as opinion leaders (.21). Furthermore, a strong interest in physical appearance may reduce willingness (.17).
2. Potential donation after death appears to be an act of charity (.31). The positive influence of liberal ideas (.35) and strong resistance based on concerns about cadaver treatment and afterlife can be observed (.31).
3. Potential kidney donation is related to charitable attitudes (.39) and to a lesser degree to religiosity (.24). Those who have adopted the "quality-of-life" concept are less willing to donate (.26).

OVERALL EXPLANATORY POWERS AND THE APPLIED VALUE OF WILLINGNESS-TO-DONATE SEGMENTS

In the foregoing sections, willingness-to-donate has been analyzed from two perspectives—the demographic and attitudinal characteristics of potential donors. In this section, the overall predictive power of

selected sets of independent (predictor) variables is examined from the same points of view. Effective demographic predictor sets can be used to locate more willing-to-donate segments of the population. Effective attitudinal predictor sets can be used to identify the beliefs and values which encourage greater willingness-to-donate.

In a marketing framework, these two kinds of analysis are directed towards identifying target market segments and ways to favorably communicate with potential buyers and users (Pessemier 1977). To increase the supply of various types of body parts, the tasks are very similar—pleas can be more effective if they are directed to individuals who are more prone to donate, and/or efforts are made to change attitudes which will most favorably influence willingness-to-donate. Multiple Classification Analysis (MCA) results appear in Table 6 (Andrews et al. 1973). This technique is more convenient to use than dummy variable regression since there is no need to recode the predictor variables into sets of dummy variables. Since the coefficients for all categories are obtained and expressed as deviations from the mean, the results bear directly on the problem of developing effective segmentation—communication strategies designed to increase the supply of different body parts.

In the case of the demographic analysis, three variables, sex, age, and income explain about 5 percent of the variance in each of the three dependent variables. Although this is hardly an impressive result, it is not surprising. A wide variety of similar attitude studies indicate that individual variability is high, especially within broadly defined demographic groups. On the other hand, the mean differences across such groups is often high enough to strongly support a segmentation strategy (Bass, Tigert, and Lonsdale 1968).

The column in Table 6, labeled "High group added effectiveness," indicates the degree to which the most willing group differs from the general population. For

example, about 5 percent of the population are found in the highest willingness-to-donate groups. By definition, half of the individuals in this group are expected to have a willingness level above the group's predicted level. Since real donations are assumed to be a monotone function of the respondents' willingness scores, these individuals are clearly the most prone to donate. If the distributions of scores are normal, the highest willing-to-donate group for blood, skin, and marrow has a 47 percent higher proportion of these highly prone individuals than the population at large. The same relative effectiveness for death donations and kidney donation are 39 and 34 percent. These results lead to a demographic segmentation strategy designed to elicit donations from the most willing individuals.

Similar but somewhat stronger associations can be observed for attitudinal predictors. The differential willingness across the high and low groups is greater for attitudinal predictors than for demographic predictors. Here, however, the implications of the results for the development of an approach to increasing the supply of body parts appear quite different from the preceding case. The constructs which directly influence the level of willingness can be used as appeals in a communication strategy. Hence, the campaign need not be directed at a small segment as before, but at a sizable fraction of the population. As a result, favorable attitude changes and increased willingness levels might be induced among large numbers of potential donors. Although greater increases should come from some groups, the diversity of individual willingness patterns indicate increased donations are expected from all demographic segments.

Finally, the demographic and attitudinal predictors are combined in three regression analyses, one for each type of willingness. As Table 7 indicates, a modest shrinkage in explanatory power is observed when the results are compared to the sum of the separate analyses shown in Table 6. Both separate and combined

TABLE 6
MCA ANALYSIS OF INDEPENDENT VARIABLES PREDICTIVE ABILITY

Predictors	Dependent variable	Population predictor willingness variables			R^2 ^b	Predicted group willingness score ^c		High group added effectiveness
		\bar{X}	σ	Employed ^a		Highest	Lowest	
Demographic	Blood, skin and marrow	.00	.641	4-6	.074	.26	-.33	+47% ^d
	Death donation	.00	.907	4-6	.048	.33	-.52	+39%
	Kidney donation	.00	.791	4-6	.043	.25	-.34	+34%
Attitudinal	Blood, skin and marrow	.00	.641	1,4,6-8	.137	.46	-.72	+112%
	Death donation	.00	.907	1,5,6	.054	.47	-.58	+66%
	Kidney donation	.00	.791	2,6,9	.059	.28	-.34	+38%

^a See Tables 1 and 5 for definitions of variables. There are two or three splits per variable.

^b The percentage of variance explained by the MCA analysis.

^c Mean standard deviation scores among the highest and lowest willingness groups defined in the MCA analysis. Each group represented about 5 percent of the population.

^d Read: The percentage of respondents with a higher standard deviation score than .26 is 47 percent higher in the highly prone group than in the total sample.

analyses show that attitudinal variables are important predictors, increasing the observed R^2 for demographic variables by 47 to 124 percent.

SUMMARY AND FUTURE OPPORTUNITIES

The research into the willingness of individuals to "donate" body parts reported here demonstrated that:

1. Willingness-to-donate is a psychological construct that must be decomposed into a number of aspects, which can be measured by survey methods.
2. Demographic and attitudinal variables are associated with each measured aspect of willingness-to-donate and the "explanatory" relationships vary across the three dependent variables (aspects of willingness).
3. The effects of monetary incentives are predominantly negative but a nontrivial proportion of potential donors are positively influenced by monetary incentives.
4. Demographic groups that are significantly more and less prone to supply body parts can be identified for each type of body part donation examined here.
5. Specific attitude profiles are significantly associated with an individual's proneness to supply each type of body parts.

One of the main problems using this study to predict willingness-to-donate for the more general population is the nonresponse bias (see for example, Ferber 1948-49; Ford and Zeisel 1949; Rosenthal and Rosnow 1975; Rubin 1977). As mentioned previously, the respondents were in general more educated, older, and had a higher income than the county average. Also, the female population was overrepresented. However, since this analysis is aimed at describing the characteristics of potential donors rather than providing information about the general population, the problem of sample representativeness is not vital. Direct implications about a communication strategy could be drawn from this analysis.

Although it is reasonable to assume that donations are a monotone function of measured willingness, the absence of data relating actual donation to prior measures of willingness-to-donate limits the applied value of the results reported here. In addition, policy issues cannot be properly analyzed in the absence of data on the social and personal values of body parts, the associated costs, and a detailed examination of the role of legal and medical practice on supply and demand. We hope that this study, the importance of the problem, and the need for further insight into related social issues

TABLE 7
COMBINED REGRESSION ANALYSIS OF DEMOGRAPHIC AND ATTITUDINAL PREDICTORS^a

Willingness to donate	Total R^2	Significance F level
Blood	.166	.000
Death	.086	.001
Kidney	.063	.010

^a Coding similar to the MCA analyses in Table 6.
NOTE: Due to limitations in the available MCA computer program, the combined analysis was performed by dummy variable regression.

will encourage continued research into the problem of providing an appropriate supply of human body parts.

APPENDIX

Main Questions Used in the Study

Disagree very much
 ↓
 Disagree on the whole
 ↓
 Disagree a little
 ↓
 Agree a little
 ↓
 Agree on the whole
 ↓
 Agree very much
 ↓
 123456

A. Items measuring willingness-to-donate.

1. I would be willing to donate blood to a blood bank at least once every two months.
2. If I witnessed a traffic accident, I would not be willing to donate blood to a victim.
3. If needed, I am willing to give blood to a relative or close friend.
4. I would give a piece of my skin to a relative who has been seriously burnt.
5. If necessary, I would donate some bone marrow to be extracted from my breastbone to a relative.
6. I am willing to donate both of my eyes to a stranger upon my death.
7. I am willing to sign an agreement to donate my heart or any other vital organ for use after my death.
8. I would never donate one of my kidneys to someone outside of my family, not even to a close friend.
9. If needed, I would donate one of my kidneys to a stranger at this very moment.
10. If at this moment I learned that a relative desperately needed a kidney to survive I would not donate mine.

B. *Items measuring the effect of monetary incentives.*⁴

11. I would give blood more often if I were paid a good price for it.
12. I would be willing to supply my organs for transplantation upon my death if I were paid a good price for them today.
13. I would be willing to donate both of my eyes to a stranger upon my death if I were paid a good price for them today.
14. I would be willing to give one of my kidneys if I were paid a good price for it.

C. *Selected Questions on the Attitude Constructs*

1. Every woman should be free to have an abortion.
2. I do not believe in a God.
3. The thought of growing old is depressing.
4. Physically attractive people impress me with their appearance.
5. There is nothing sacred about a dead body.
6. One of the greatest satisfactions in life comes from doing things for others.
7. I try to impress people with my leadership ability.
8. There are more important values in my life than to have a happy family life.
9. Babies who are born seriously retarded such as Mongoloids should be allowed to live.

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⁴ In order to assess the effect of monetary incentives, item 11 was paired with item 1, item 12 with item 7, item 13 with item 6, and item 14 with item 9.