

letter to the editor

COMMENTS ON "ANIMAL COMPANIONS AND ONE-YEAR SURVIVAL OF PATIENTS AFTER DISCHARGE"

The therapeutic uses of companion animals have received a great deal of attention recently from professionals in the areas of health science, veterinary medicine, psychiatry, and psychology. In the commonly cited study by Friedmann and associates in *Public Health Reports* (1), 92 patients hospitalized in a coronary care unit (CCU) were interviewed so that social affiliation, living situation, and other relevant information could be assessed as contributing to their survival 1 year after discharge from the unit. Pet ownership was included in their social inventory. One year after discharge from the CCU, the survival status of each patient was determined. The authors stated: ". . . it seems that social variables such as pet ownership can add significantly to the variance in survival explained by the severity of the cardiovascular disease" (1a).

The results of this study have been cited by the popular press and by various types of professionals (2-5), who noted the beneficial effects of pet ownership on survival. However, Friedmann and associates suggested that "The apparent effect of pets on survival may not depend on the pets; rather, it may result from differences in personality or social conditions between those who have pets and those who do not" (1a). Although the authors discount such a possibility, the results of their statistical analyses indicate that the effect of pet ownership on survival does result from differences in social condition. This conclusion is based on the following information from their article.

Pet ownership was correlated with

survival ($r = 0.26$, $R^2 = 0.067$, $P < 0.01$). Since pet ownership was independent of severity of cardiovascular disease ($r = 0.035$), both pet ownership and severity of cardiovascular disease contributed significantly to the explained variance in survival, as the authors state. However, when other social factors and employment variables were examined along with severity of cardiovascular disease and pet ownership in discriminating survival status, the role of pet ownership in explaining survival drops dramatically. The standardized discriminant function coefficient is 0.12. Pet ownership is the least important variable of the eight variables examined to discriminate survival status. A standardized discriminant function coefficient of 0.12 does not justify interpretation because of its small contribution to the discriminant function. In other words, when pet ownership is considered along with the other seven variables in discriminating survival status, pet ownership makes a relatively trivial contribution.

The conclusions to be drawn from their analysis would be that in order to predict survival, the most profitable variables to examine would be severity of cardiovascular disease, change in residence, self-support, place of birth, age, and mood. The bivariate relationship between pet ownership and survival is accounted for by one or more of these variables (without the intercorrelation matrix it is impossible to know which). Thus, the beneficial effect of pet ownership does appear to be a statistical artifact produced by differences in social factors between

patients with and without pets. Both professionals and the public should be made aware of the apparent spurious relationship between pet ownership and survival in coronary heart disease patients, at least as indicated in the study by Friedmann and associates.

Finally, Friedmann and associates seem to have erred in reporting their results. They state that the physiological severity index (a measure of the severity of cardiovascular disease) "was correlated significantly with 1-year mortality for all subjects ($r = 0.4185$, $R^2 = 0.235$)" but not with pet ownership ($r = 0.035$, $P < 0.50$) (1b).

The square of 0.4185 is 0.1751, not 0.235. Further, there are inconsistencies between the results of the hierarchical discriminant analysis and the intercorrelations reported in the text. If the correlation between physiological severity and survival is 0.4185, the variance explained by the correlation coefficient and the discriminant function analysis with physiological severity as a single discriminating variable should be identical. Given the "corrected" R^2 value for the physiological index (17.5 percent rather than 21 percent of the variance between survivors and nonsurvivors), the addition of pet ownership in fact adds another 6.0 percent to the explained variance, and together the two variables account for 23.5 percent.

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AUTHORS' REPLY

It is difficult not to feel strongly about pets, either positively or negatively. Undoubtedly, the findings presented in our paper, "Animal Companions and One-Year Survival of Patients Discharged from a Coronary Care Unit," have been exaggerated and overinterpreted in the popular press. We also believe that Dr. Wright and Dr. Moore exaggerate when they dismiss the suggested relationship between pet ownership and survival as a statistical artifact. Pet ownership does have an important independent effect on survival. The findings of a relationship between survival status and pet ownership is demonstrated in the chi-square analysis. The additional correlation and discriminant function analyses

are used to explore this relationship, not to assign causality.

Moore and Wright were correct in pointing out an error in the R^2 for the correlation between physiological severity of heart disease and survival ($r = .4185$, $R^2 = .1751$). We appreciate their noting the differences in r values derived from the discriminant function ($r = .4571$) and correlation ($r = .4185$) analyses of the relationship of these two variables. These analyses were performed with different statistical packages—correlation with SPSS and discriminant analysis with SAS. It would certainly be interesting to investigate why these two packages yield slightly different r values.

As Moore and Wright point out, the amount of variance in survival explained by pet ownership did make a significant contribution to the prediction of survival status. Most importantly, pet ownership made a significant addition to the explained variance when both age and severity of the heart disease were included in the discriminant function. This is particularly important because both survival and pet ownership are negatively correlated with age. In the analysis of a complex correlation matrix, it is almost impossible to discern causal relationships. Certainly the other social and psychological variables are correlated to some extent with pet ownership and with each other. That these interrelationships have some effect on the discrimination is inevitable. Because we found nothing in the correlation analyses to contradict the results of the chi-square analysis, we continue to assert that a social relationship with animals may have some of the same beneficial effects on health as social relationships with human beings.

Since our paper was published, we and other investigators have accumulated evidence that indicates the mechanism through which pets can influence health. There is a large body of data which demonstrate that pets are treated as family members and can fill a wide variety of social roles usually assumed by human beings—roles that have been associated with improved health and morale in other studies (1,2). We also have reported data which suggest that pets can decrease stress, particularly through lowering the sympathetic nervous system response to mild stressors (3). Based on the more recent data and our previous publications, we continue to support the hypothesis that social relationships with pets can positively influence human health.

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