

- Animal companions and one-year survival of patients after discharge from a coronary care unit. *Public Health Rep* 95: 307-312; (a) p. 310, (b) p. 309, July-August 1980.
2. Blume, B.: The tie that binds. *Norden News* 57: 20-28 (1982).
  3. Corson, S. A., and Corson, E. O.: Pet animals as nonverbal communication mediators in psychotherapy in institutional settings. *In Ethology and nonverbal communication in mental health*. Pergamon Press, New York, 1980, pp. 83-110.
  4. Kidd, A. H., and Feldmann, B. M.: Pet ownership and self-perception of older people. *Psychol Rep* 48: 867-875 (1981).
  5. Robb, S. S.: Health status correlates of pet ownership in a health-impaired population. Paper presented at the International Conference on the Human/Companion Animal Bond, University of Pennsylvania School of Veterinary Medicine, Philadelphia, October 5-7, 1981.

## 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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## References

1. Katcher, A. H.: Interactions between people and pets. Form and function. *In Interrelations between people and pets*, edited by B. Fogle. Charles C Thomas, Springfield, 1981, pp. 41-67.
2. Katcher, A. H., and Friedmann, E.: Potential value of pet ownership. *Compendium on Continuing Education for the Practicing Veterinarian* 11: 117-121 (1980).
3. Katcher, A. H., and Friedmann, E.: Talking, looking and blood pressure. *In Proceedings of the 1981 International Conference on the Human/Companion Animal Bond*. In press.