*Commentary*

# Dogs Still Do Resemble Their Owners

**Michael M. Roy and Nicholas J.S. Christenfeld**

*University of California, San Diego*

It need not be, in a rational, scientific world, that we should see the case for dogs resembling their owners as stronger than would any other observer of the available data, but it traditionally falls to the original authors to defend their original conclusions (Roy & Christenfeld, 2004), and we do so here. We also present new data, based on a new method, that support our conclusions.

Levine (2005) raised an important issue concerning the nonindependence of ratings in our original study, though we suggest that the implications are not what he indicated. In our study, each dog appeared twice, once as a foil and once as the correct choice. Levine is worried that if the judges operated nonindependently across ratings, refusing, for example, to pick the same dog twice, then the expected value of getting a match right by chance could be very different from the .5 we used in our statistical analyses. However, the effect that concerns him, and that he illustrated with a small example, is attenuated in our study because we had 15, not 3, dogs in each set; because we used not 1 but 14 different presentation orders of dog-owner choices; and because judges' actual behavior turns out to have been largely independent. (It is not logically necessary, nor even strategically advisable, for judges always to avoid picking again a dog they have previously chosen, and judges show little, albeit some, inclination to avoid this.) Although calculating the effect of these factors is mathematically formidable, it is readily examined with a computer simulation. We randomly generated 1,000 orders of dogs, each with 20,000 random "judges." In the simulation, the judges were created to show the same slight tendency to avoid picking the same dog twice as the actual judges in the original study. This simulation suggests that the expected probability of getting a dog right is .5, the probability we used in our study, and that the standard error of this probability is .00005. Thus, the fear that the expected value is different from the value we chose, in either the liberal or the conservative direction, is unrealized.

More subtly, nonindependence can change the distribution of scores under the null hypothesis, without changing their mean. Consider the simplest example of two owners. Nonindependent judges would get both right or both wrong, whereas independent judges, given a separate foil for each match, could get one right and one wrong. Thus, the shape of the distribution, and so the observed significance level, can change from that assumed with independent judges. This effect was attenuated in our experiment because there were 15 dogs, and also because our judges made nearly independent choices. Indeed, the computer simulation indicates that there is no cause for concern: Using the observed level of nonindependence, the simulation yielded effectively the same distribution under the null hypothesis and, therefore, the same significance of the observed effects as in the original report.

Perhaps the strongest evidence, however, comes from fresh data, collected with a different method that avoids the nonindependence issue. We used 24 of the original dog and owner pictures; half the dogs were purebred, and half were not. The pictures were chosen from the original set, excluding pictures with a beach background that distinguished them from the others with a grassy park background. We also excluded two mixed-breed dogs that were close to purebred, and then reduced the number of purebreds to match the dozen nonpurebreds in the sample. For each dog, six potential owners were selected. One was the real owner, and the other five were randomly selected owners of other dogs—other purebreds in the case of a purebred picture, and nonpurebreds otherwise. With this choice of foils, any ability to match dogs with their owners would have to be based on more than just having some idea of whether a particular person was likely to own a purebred. Ninety-six new, naive judges were each shown one of the purebred dog-owners sets and one of the nonpurebred dog-owner sets, in counterbalanced order. They ranked each of the six possible owners in likelihood of being the correct match by placing slips of paper with the numbers 1 through 6 on the possible-owner photographs. No subject saw any dog or owner more than once, and each contributed only one rating to the evaluation of purebreds and one to the evaluation of nonpurebreds.

For the nonpurebreds, the real owner was chosen, on average, in position 3.6, no different from the random-guessing value of 3.5, $t(95) = 0.62$, $p = .54$, effect size $d = -0.06$. For the

Address correspondence to Nicholas J.S. Christenfeld, Department of Psychology, University of California, San Diego, 9500 Gilman Dr., La Jolla, CA 92093-0109; e-mail: nchristenfeld@ucsd.edu.

purebreds, the real owner was picked in position 3.0, which is above chance, $t(95) = 2.61$, $p = .01$, $d = 0.27$. Furthermore, judges did better on their purebred rating than on their nonpurebred rating, $t(95) = 2.21$, $p = .03$, $d = 0.23$.

Using a new technique and new judges with the same set of pictures, we obtained the same result as in our original study. In addition to this confirmation, another recent study (Payne & Jaffe, 2005) has also found resemblance between purebreds and their owners, this time with dogs, owners, and judges from Venezuela.

In short, we suggest the data allow us to answer the question of whether dogs, if purebred, resemble their owners. Dogs do.

## REFERENCES

Levine, D.W. (2005). Do dogs resemble their owners? A reanalysis of Roy and Christenfeld (2004). *Psychological Science*, *16*, 83–84.

Payne, C., & Jaffe, K. (2005). Self seeks like: Many humans choose their dog pets following rules used for assortative mating. *Journal of Ethology*, *23*, 15–18.

Roy, M.M., & Christenfeld, N.J.S. (2004). Do dogs resemble their owners? *Psychological Science*, *15*, 361–363.

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