Effects of Sampling Ecology on Correlational Judgment

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Introduction
Given the importance of correlation perception for adaptive behavior, it is no surprise that people's estimates of correlation are sensitive to the objective correlations (e.g., Jennings, Amabile, & Ross, 1980). However, theoretical work suggests if people treat sample correlations ($r$) as the best estimates of population correlations ($\rho$) they should tend to produce inflated estimates of $\rho$, especially with small samples (e.g., Anderson, Doherty, Berg, & Friedrich, 2005). In contrast to Kareev, Lieberman, and Lev (1997), the present studies manipulated $n$ in a procedure wherein participants estimated correlations by estimating population frequencies from randomly drawn samples (the estimates would be converted to subjective correlations for analysis). In addition, Experiment 2 included a confidence rating task, as in Clement, Mercier, and Pasto (2002). It was predicted (see Anderson et al., 2005) that estimates of $\rho$, derived from the frequency estimates, would be inflated for smaller relative to larger samples, and that this effect would be greater for higher than for lower levels of objective $\rho$.

Method
On each trial participants saw a sequence of 3, 7, or 15 drawings (one drawing per two seconds). Each drawing was a facial caricature that had narrow or wide shape and a happy or sad expression. Each sequence was selected randomly from a population in which the correlation between facial width and facial expression was 0, .4, .8, -.4, or -.8. After viewing a sequence, participants estimated the frequency of occurrence of two particular combinations of levels of facial width and facial expression, from which the researchers later computed a subjective $\rho$. For example, participants estimated the number of 1000 narrow faces that were happy and the number of 1000 wide faces that were happy. In addition, each trial of Experiment 2 ended with the participant rating his/her confidence in the estimates. Each experiment was a within-participant factorial, with 12 or 6 trials per condition per participant (in Experiments 1 and 2, respectively).

Results and Discussion
Because the positive and negative conditions of $\rho$ were mathematically equivalent, the conditions were combined for purposes of analysis (thus, an estimate was scored as negative only when it was directionally opposite from objective $\rho$). For Experiment 1, the mean subjective $\rho$ increased with objective $\rho$, $F(2, 38) = 43.91, p < .001$, and contrary to predictions, increased with $n$, $F(2, 38) = 4.16, p = .023$. Also, the effect of $n$ was greater for higher levels of objective $\rho$, $F(4, 76) = 3.63, p < .009$. Experiment 2 yielded qualitatively similar results, and also showed that confidence increased with objective $\rho$. The particular relationship between estimation, confidence, and $n$, found by Clement et al. (2002), was not fully replicated. The findings suggest that decision-makers' information processing may substantially alter and reverse some of the informational biases intrinsic to the information ecology.

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References