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# The Influence of Individual Differences on the Role of Information Quantity in Statistical Inferences

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It has been argued on statistical grounds that population correlations ( $\rho$ ) are more readily detected given a small number of paired stimuli ( $N_s$ ) than given a large  $N_s$  (e.g., Kareev, Lieberman, & Lev, 1997). Kareev, et al. (1997, Experiment 1) tested this claim with a prediction task in which participants used a binary cue to predict a binary outcome. The researchers derived subjective correlations ( $\rho'$ ) by computing the correlation between the cues and participants' predicted outcomes. Using working memory capacity (WMC) as an indirect measure of  $N_s$ ,  $\rho'$  was found to be more extreme for participants with low WMC than for those with high WMC, and found to decrease with  $N_s$ .

Anderson, Doherty, and Gilkey (2006) manipulated  $N_s$  directly. The stimuli varied on two binary dimensions, and were drawn randomly from a population in which the correlation between the two stimulus dimensions was fixed. Participants used the samples to estimate population frequencies for various combinations of the dimension levels; the researchers computed  $\rho'$  from participants' estimates. Contrary to Kareev et al. (1997, Experiment 1),  $\rho'$  decreased with  $N_s$ , and WMC had no effect.

## Rationale and Method

Previously, the task used to assess  $\rho'$  has tended to vary across experiments, with the potential for extraneous, between-study differences to impact the results. Therefore, the present study was designed to assess effects of task,  $N_s$ , and WMC on  $\rho'$  within a single experiment that included a prediction task, a frequency estimation task, and a rating task (see Clement, Mercier, & Pasto, 2002) in which  $\rho'$  was assessed via a -100 to 100 scale. Participants ( $N = 107$ ) saw sequences of 3, 6, 12, or 24 stimulus pairs consisting of pictures of brown or white envelopes containing a cash or credit card payment. Each stimulus sample was drawn randomly from a population in which  $\rho$  between envelope color and payment was 0, .4, or .8. Each participant's WMC was assessed at end of the experimental session, using a digit span task.

## Results and Discussion

WMC was dichotomized via a median split. In the prediction task there was an  $N_s \times$  WMC interaction,  $F(1, 36) = 8.81, p = .005$ , and there was a positive effect of  $N_s$  on  $\rho'$  for participants with high WMC,  $F(1, 17) = 14.54, p = .011$ , but not for those with low WMC. Also in the prediction task, the mean  $\rho'$  tended to be greater for those with high WMC than for those with low WMC, but only when  $\rho$  was .4,  $t(36) = 2.78, p = .009$ . Both results are inconsistent with the theory of small sample advantages. Similarly, in the rating task, there was an  $N_s \times$  WMC interaction,  $F(1, 32) = 19.37, p < .001$ ; the effect of  $N_s$  on  $\rho'$  was positive when WMC was high,  $F(1, 14) = 4.87, p = .044$ , and negative when WMC was low,  $F(1, 18) = 8.38, p = .010$ .

The findings contrast with those of Kareev et al. (1997, Experiment 1). Overall, the study provided a direct comparison of the effects of  $N_s$  in three different correlation judgment tasks, demonstrated a small sample advantage for the rating task only, and demonstrated the importance of individual differences in WMC.

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