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Inference, Not Dilution in the Dilution Effect

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Abstract: When asked to combine two pieces of evidence, one diagnostic and one non-diagnostic, people show a dilution effect: the addition of non-diagnostic evidence dilutes the overall strength of the evidence. This non-normative effect has been found in a variety of tasks and has been taken as evidence that people inappropriately combine information. We investigated the dilution effect using simple perceptual stimuli but unlike in previous work we asked participants to judge likelihoods ratios, allowing us to assess not just ordinal relationship between judgments but also whether each individual judgment was accurate. We found the dilution effect, but surprisingly it was not due to inaccurate combination of diagnostic and non-diagnostic information. People were accurate at judging diagnostic evidence combined with non-diagnostic evidence, but overestimated the strength of diagnostic evidence alone. We explain this within-participants dilution effect as the result of inference about missing features rather than incorrect combination of information.