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# Evidence for Poisson processes in change detection

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Comparisons between two stimuli (e.g., "which stimulus was louder?") and change detection ("same or different?") are often assumed to operate on the same decision basis. In the Gaussian signal detection theory, each of the two stimuli to be compared is transformed into a number, and the comparison is then made between these two numbers. If both stimuli are well above absolute threshold, the numbers to be compared have to be large, which motivates the use of normal distributions. The present study tests this assumption by measuring same-different ROC curves for the detection of small changes in the intensity of sinusoids. In contrast to previous studies, change detection was measured not only when the possible direction of change was a priori unknown, but also in two conditions where changes had a fixed direction. The obtained ROCs are asymmetric. This points to Poisson processes with low means. Moreover, the sensitivity to increments was significantly higher than the sensitivity to decrements. The results put into question the Gaussian theory of sensory comparisons and change detection.