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Count me in! On the automaticity of numerosity processing.

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Summary: Extraction of numerosity (i.e., enumeration) is an essential component of mathematical abilities. The current study asked how automatic is the processing of numerosity and whether automatic activation is task dependent. Participants were presented with displays containing a variable number of digits and were asked to pay attention to the number of digits or to their numerical value, in separate blocks. Effects of task were tested with a comparative judgment task and a parity judgment task. In the comparative judgment task, participants had to indicate whether the numerosity or the numerical value of the digits was smaller or larger than 5. In the parity judgment task, participants had to indicate whether this value was odd or even. Irrelevant numerical values modulated performance regardless of task. In contrast, irrelevant numerosities modulated performance only in the comparative judgment task. These results suggest that numerical value is activated automatically, whereas activation of numerosity is modulated by task. We suggest that the differences observed are related to different cognitive and neural mechanisms recruited by these tasks.

Classification: C30 C80 F30

Keywords: cognitive science; cognitive psychology; research; numerosity; task analysis; observation; cognitive processes; numeracy; mathematical aptitude; stroop; subitizing; counting; numerical value; symbolic representation; nonsymbolic representation

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