World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

The Influence of Emotion on Numerical Estimation: A Drone Operators' Context

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Abstract : The goal of this study was to test whether and how emotions influence drone operators in estimation skills. The empirical study was run in the context of numerical estimation. Participants saw a two-digit number together with a collection of cars. They had to indicate whether the stimuli collection was larger or smaller than the number. The two-digit numbers ranged from 12 to 27, and collections included 3-36 cars. The presentation of the collections was dynamic (each car moved 30 deg. per second on the right). Half the collections were smaller collections (including fewer than 20 cars), and the other collections were larger collections (i.e., more than 20 cars). Splits between the number of cars in a collection and the two-digit number were either small (± 1 or 2 units; e.g., the collection included 17 cars and the two-digit number was 19) or larger (± 8 or 9 units; e.g., 17 cars and '9'). Half the collections included more items (and half fewer items) than the number indicated by the two-digit number. Before and after each trial, participants saw an image inducing negative emotions (e.g., mutilations) or neutral emotions (e.g., candle) selected from International Affective Picture System (IAPS). At the end of each trial, participants had to say if the second picture was the same as or different from the first. Results showed different effects of emotions on RTs and percent errors. Participants' performance was modulated by emotions. They were slower on negative trials compared to the neutral trials, especially on the most difficult items. They errored more on small-split than on large-split problems. Moreover, participants highly overestimated the number of cars when in a negative emotional state. These findings suggest that emotions influence numerical estimation, that effects of emotion in estimation interact with stimuli characteristics. They have important implications for understanding the role of emotions on estimation skills, and more generally, on how emotions influence cognition.

Keywords : drone operators, emotion, numerical estimation, arithmetic
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020