A test of the diffusion model explanation for the worst performance rule using preregistration and blinding

ID 4214266
Author(s) Dutilh, Gilles; Vandekerckhove, Joachim; Ly, Alexander; Matzke, Dora; Pedroni, Andreas; Frey, Renato; Rieskamp, Jörg; Wagenmakers, Eric-Jan
Author(s) at UniBasel Rieskamp, Jörg ; Dutilh, Gilles ; Pedroni, Andreas ; Frey, Renato ;
Year 2017
Title A test of the diffusion model explanation for the worst performance rule using preregistration and blinding
Journal Attention Perception & Psychophysics
Volume 79
Number 3
Pages / **Article-Number** 713-725
Keywords response time model; preregistration; predictions; intelligence; reaction-time variability; individual-differences; bayes factors; memory; iq; intelligence; distributions; hypotheses; working; matlab
People with higher IQ scores also tend to perform better on elementary cognitive-perceptual tasks, such as deciding quickly whether an arrow points to the left or the right Jensen (2006). The worst performance rule (WPR) finesses this relation by stating that the association between IQ and elementary-task performance is most pronounced when this performance is summarized by people's slowest responses. Previous research has shown that the WPR can be accounted for in the Ratcliff diffusion model by assuming that the same ability parameter-drift rate-mediates performance in both elementary tasks and higher-level cognitive tasks. Here we aim to test four qualitative predictions concerning the WPR and its diffusion model explanation in terms of drift rate. In the first stage, the diffusion model was fit to data from 916 participants completing a perceptual two-choice task; crucially, the fitting happened after randomly shuffling the key variable, i.e., each participant's score on a working memory capacity test. In the second stage, after all modeling decisions were made, the key variable was unshuffled and the adequacy of the predictions was evaluated by means of confirmatory Bayesian hypothesis tests. By temporarily withholding the mapping of the key predictor, we retain flexibility for proper modeling of the data (e.g., outlier exclusion) while preventing biases from unduly influencing the results. Our results provide evidence against the WPR and suggest that it may be less robust and less ubiquitous than is commonly believed.
Publisher Springer
ISSN/ISBN 1943-3921 ; 1943-393X
edoc-URL http://edoc.unibas.ch/59023/
Full Text on edoc Available;
Digital Object Identifier DOI 10.3758/s13414-017-1304-y
PubMed ID http://www.ncbi.nlm.nih.gov/pubmed/28233280
ISI-Number 000400386900001
Document type (ISI) Article