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# Conceptual Distinction between the Critical $p$ Value and the Type I Error Rate in Permutation Testing: Author Response to Peer Comments

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Richard Anderson responds to comments regarding his target article *Conceptual Distinction between the Critical  $p$  Value and the Type I Error Rate in Permutation Testing*.

Key words: Statistics, null hypothesis, non-parametric, permutation test, exchangeability; Type I error; validity.

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### Response

Some of the replies to my article, *Conceptual Distinction between the Critical  $p$  Value and the Type I Error Rate in Permutation Testing*, have focused on what is called an *exchangeability requirement*, and on the question of whether previous evaluations of permutation test validity

have violated exchangeability. It should be clarified that the aim was not to critique previous analyses on grounds of exchangeability violation: The purpose was to address exchangeability as a characteristic of how the permutation test's null hypothesis is formulated. No claims were advanced concerning the idea that exchangeability is an *assumption* to be met or violated by a given dataset. Instead, the central thesis was that when a significance criterion is adopted, for example 0.05, for rejecting the null hypothesis of random coupling of data points to condition labels, that 0.05 is not a Type I error probability.

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Richard Anderson is an Associate Professor of Psychology in the Department of Psychology. His research interests include topics in judgment, decision-making, reasoning, memory, statistical cognition, and statistical methods. He teaches courses in cognition, statistics, and research methods and holds memberships in the Psychonomic Society and the Cognitive Science Society. Email him at: randers@bgsu.edu.

## RICHARD ANDERSON RESPONSE TO PEER COMMENTS

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