

Naomi Martinez Gutierrez, Jordana DeSouza, Nataly Beribisky, Udi Alter, Linda Farmus, Eric Tu, Stephanie Bell and Robert Cribbie

Whenever researchers test multiple hypotheses, the risk that one or more hypotheses might be falsely supported (i.e., Type I errors) increases with the number of hypotheses evaluated (i.e., the multiplicity problem). Because most studies evaluate multiple hypotheses, the risk that at least one hypothesis is a Type I error appears substantial. However, it is necessary to evaluate how consistently multiplicity control is applied to understand the merit of multiplicity control in psychological research. Thus, the purpose of this research is to investigate these researcher practices in the psychological literature.

1 OBJECTIVES

We sought to understand the multiplicity control practices of researchers as part of an effort to improve multiplicity control recommendations

2 METHOD

We reviewed N = 250 empirical articles published in 2021 from ten high impact journals: Journal of Abnormal Psychology (JAP); Neuropsychology; Clinical Psychological Science (CPS); Journal of Cross-Cultural Psychology (JCCP); Developmental Psychology (DP); Journal of Educational Psychology (JEP); Health Psychology (HP); Industrial and Organizational Psychology: Perspectives on Science and Practice (IOP:PSP); Journal of Personality and Social Psychology (JPSP); and Psychology of Sport and Exercise (PSE)

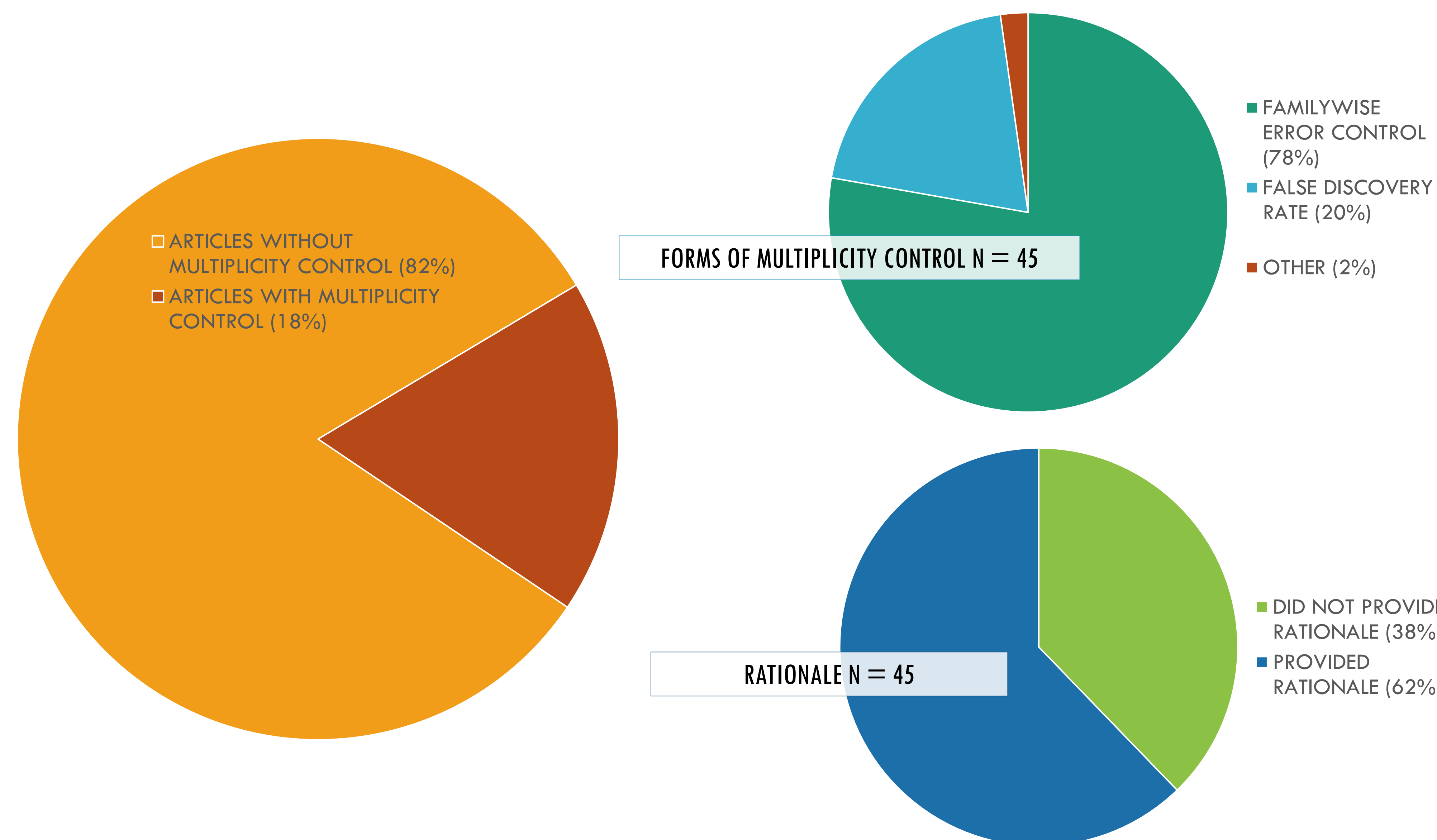
CODING AND CLASSIFICATION

- Descriptive statistics: sample size; analysis family (e.g., correlation); number of null hypotheses
- Nature of the null hypotheses: confirmatory vs exploratory; omnibus vs post hoc
- Nature of multiplicity control (if adopted):

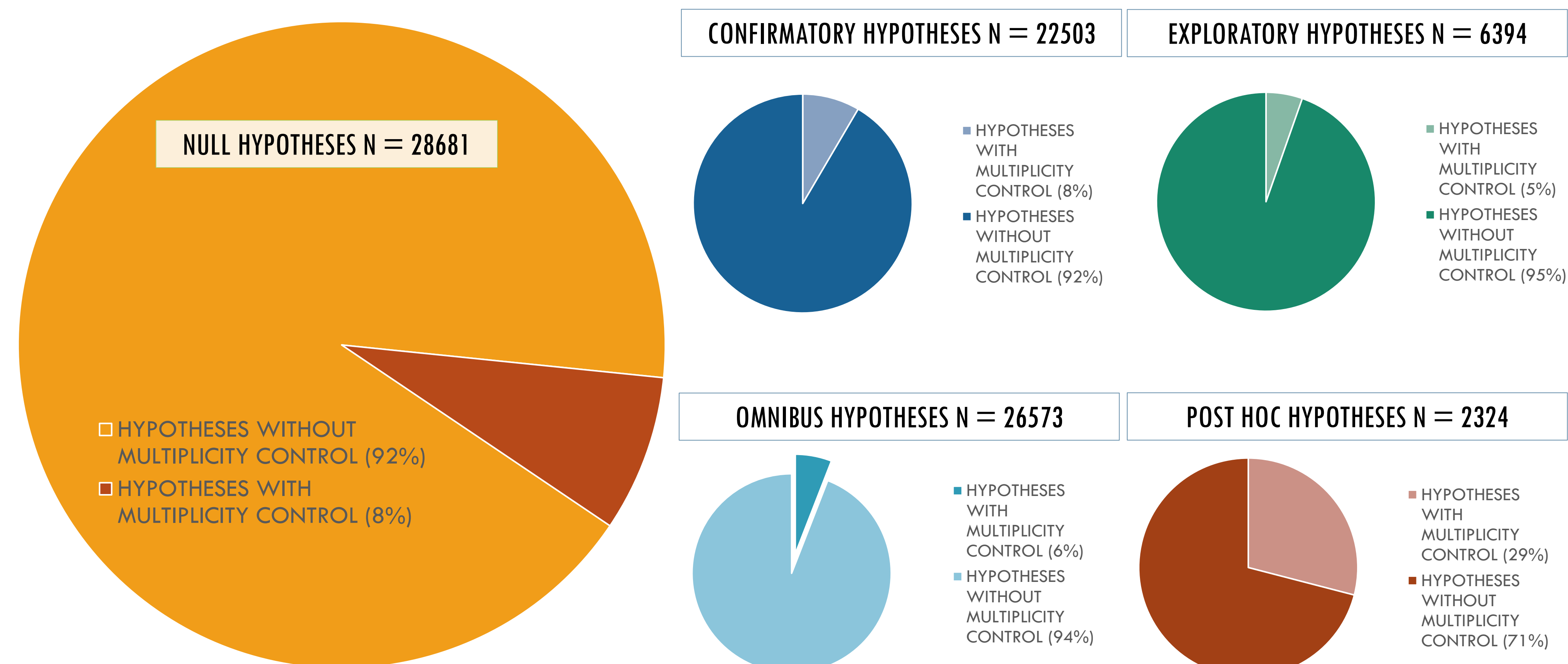
FORM	Familywise error control (FEC) False discovery rate (FDR) Other
PROCEDURE	FEC: E.g., Bonferroni; Tukey; Holm; Hochberg FDR: E.g., Benjamini-Hochberg; Benjamini-Yekutieli
RATIONALE	Rationale for imposing or not imposing multiplicity control

3 RESULTS

ARTICLES EMPLOYING MULTIPLICITY CONTROL



NULL HYPOTHESES EMPLOYING MULTIPLICITY CONTROL



4 FURTHER RESULTS

- Of the articles that used FEC, most used the Bonferroni procedure (26; 74%), followed by Holm (3; 9%) and Tukey (3; 9%)
- Of the articles that used FDR, authors only used the original Benjamini-Hochberg procedure

JOURNAL	% OF ARTICLES WITH ANY MC	% OF HYPOTHESES WITH MC
JAP	32	15
Neuropsychology	36	18
CPS	24	16
JCCP	8	5.7
DP	16	10
JEP	28	6.8
HP	4	0.11
IOP:PSP	0	0
JPSP	20	7.2
PSE	12	5.4

5 CONCLUSIONS

- Most researchers do not employ multiplicity control
- Researchers use multiplicity control inconsistently
- Compared to exploratory hypotheses, confirmatory hypotheses had a higher rate of multiplicity control
- Compared to omnibus hypotheses, post hoc hypotheses had a higher rate of multiplicity control
- Familywise error control is the most often used form of multiplicity control (particularly Bonferroni)
- Many researchers provide a rationale for their use of multiplicity control
- Given these results, a more thorough investigation into multiplicity control is warranted

