

**Table 3.1** Quantitative Design Reporting Standards (JARS-Quant) (continued)

<b>Results</b> (continued)
<ul style="list-style-type: none"> <li>– descriptions of each primary and secondary outcome, including the total sample and each subgroup, that includes the number of cases, cell means, standard deviations, and other measures that characterize the data used</li> <li>– inferential statistics, including               <ul style="list-style-type: none"> <li>▷ results of all inferential tests conducted, including exact <i>p</i> values if null hypothesis significance testing (NHST) methods were used, and reporting the minimally sufficient set of statistics (e.g., <i>dfs</i>, mean square [MS] effect, MS error) needed to construct the tests</li> <li>▷ effect-size estimates and confidence intervals on estimates that correspond to each inferential test conducted, when possible</li> <li>▷ clear differentiation between primary hypotheses and their tests–estimates, secondary hypotheses and their tests–estimates, and exploratory hypotheses and their test–estimates</li> </ul> </li> <li>– complex data analyses—for example, structural equation modeling analyses (see Table 7 on the JARS website), hierarchical linear models, factor analysis, multivariate analyses, and so forth, including               <ul style="list-style-type: none"> <li>▷ details of the models estimated</li> <li>▷ associated variance–covariance (or correlation) matrix or matrices</li> <li>▷ identification of the statistical software used to run the analyses (e.g., SAS PROC GLM or the particular R package)</li> </ul> </li> <li>– estimation problems (e.g., failure to converge, bad solution spaces), regression diagnostics, or analytic anomalies that were detected and solutions to those problems</li> <li>– other data analyses performed, including adjusted analyses, if performed, indicating those that were planned and those that were not planned (though not necessarily in the level of detail of primary analyses)</li> <li>• Report any problems with statistical assumptions and/or data distributions that could affect the validity of findings.</li> </ul>
<b>Discussion</b>
<p><b>Support of Original Hypotheses</b></p> <ul style="list-style-type: none"> <li>• Provide a statement of support or nonsupport for all hypotheses, whether primary or secondary, including           <ul style="list-style-type: none"> <li>– distinction by primary and secondary hypotheses</li> <li>– discussion of the implications of exploratory analyses in terms of both substantive findings and error rates that may be uncontrolled</li> </ul> </li> </ul>
<p><b>Similarity of Results</b></p> <ul style="list-style-type: none"> <li>• Discuss similarities and differences between reported results and work of others.</li> </ul>
<p><b>Interpretation</b></p> <ul style="list-style-type: none"> <li>• Provide an interpretation of the results, taking into account           <ul style="list-style-type: none"> <li>– sources of potential bias and threats to internal and statistical validity</li> <li>– imprecision of measurement protocols</li> <li>– overall number of tests or overlap among tests</li> <li>– adequacy of sample sizes and sampling validity</li> </ul> </li> </ul>
<p><b>Generalizability</b></p> <ul style="list-style-type: none"> <li>• Discuss generalizability (external validity) of the findings, taking into account           <ul style="list-style-type: none"> <li>– target population (sampling validity)</li> <li>– other contextual issues (setting, measurement, time; ecological validity)</li> </ul> </li> </ul>
<p><b>Implications</b></p> <ul style="list-style-type: none"> <li>• Discuss implications for future research, programs, or policy.</li> </ul>

**Effect Sizes.** For readers to appreciate the magnitude or importance of a study's findings, it is recommended to include some measure of effect size in the Results section. Effect sizes are statistical estimates; therefore, whenever possible, provide a confidence interval for each effect size reported to indicate the precision of estimation of the effect size. Effect sizes may be expressed in the original units (e.g., mean number of questions answered correctly, kilograms per month for a regression slope) and are most easily understood when reported as such. It is valuable to also report an effect size in some standardized or units-free or scale-free unit (e.g., Cohen's *d* value) or a standardized regression weight. Multiple degree-of-freedom effect-size indicators are less useful than effect-size indicators that decompose multiple degree-of-freedom tests into meaningful one degree-of-freedom effects, particularly when the latter are the results that inform the discussion. The general principle to follow is to provide readers with enough information to assess the magnitude of the observed effect.

**Studies With Experimental Manipulations or Interventions.** In studies reporting the results of experimental manipulations or interventions, clarify whether the analysis was by intent to treat. That is, were all participants assigned to conditions included in the data analysis regardless of whether they actually received the intervention, or were only participants who completed the intervention satisfactorily included? Give a rationale for the choice.

**Ancillary Analyses.** Report any other analyses performed, including subgroup analyses and adjusted analyses, indicating those that were prespecified and those that were exploratory (although not necessarily in the level of detail of primary analyses). Consider putting the detailed results of ancillary analyses in supplemental materials. Discuss the implications, if any, of the ancillary analyses for statistical error rates.

**Baseline Data.** Be sure to provide baseline demographic and/or clinical characteristics of each group.

**Adverse Events.** If interventions were studied, detail all important adverse events (i.e., events with serious consequences) and/or side effects in each intervention group. If none occurred, note this as well.

### 3.8 Quantitative Discussion Standards

After presenting the results, you are in a position to evaluate and interpret their implications, especially with respect to your original hypotheses. In the Discussion section of a quantitative paper, examine, interpret, and qualify the results of your research and draw inferences and conclusions from them. In the case of empirical studies, there should be a tight relationship between the results that are reported and their discussion. Emphasize any theoretical or practical consequences of the results. When the discussion is relatively brief and straightforward, you can combine it with the Results section, creating a section called "Results and Discussion." If a manuscript presents multiple studies, discuss the findings in the order that the studies were presented within the article.

Open the Discussion section with a clear statement of support or nonsupport for all hypotheses, distinguished by primary and secondary hypotheses. In the case of ambiguous outcomes, explain why the results are judged as such.

Discuss the implications of exploratory analyses in terms of both substantive findings and error rates that may be uncontrolled.

Similarities and differences between your results and the work of others (where they exist) should be used to contextualize, confirm, and clarify your conclusions. Do not simply reformulate and repeat points already made; each new statement should contribute to your interpretation and to readers' understanding of the problem.

**Limitations and Strengths.** Your interpretation of the results should take into account (a) sources of potential bias and other threats to internal validity, (b) the imprecision of measures, (c) the overall number of tests and/or overlap among tests, (d) the adequacy of sample sizes and sampling validity, and (e) other limitations or weaknesses of the study. If an intervention or manipulation is involved, discuss whether it was successfully implemented, and note the mechanism by which it was intended to work (i.e., its causal pathways and/or alternative mechanisms). Discuss the fidelity with which the intervention or manipulation was implemented, and describe the barriers that were responsible for any lack of fidelity. Acknowledge the limitations of your research, and address alternative explanations of the results. Discuss the generalizability, or external validity, of the findings. This critical analysis should take into account differences between the target population and the accessed sample. For interventions, discuss characteristics that make them more or less applicable to circumstances not included in the study, what outcomes were measured and how (relative to other measures that might have been used), the length of time to measurement (between the end of the intervention and the measurement of outcomes), incentives, compliance rates, and specific settings involved in the study as well as other contextual issues.

**Study Implications.** End the Discussion section with a reasoned and justifiable commentary on the importance of your findings. This concluding section may be brief, or it may be extensive if it is tightly reasoned, self-contained, and not overstated. In the conclusion, consider returning to a discussion of why the problem is important (as stated in the introduction); what larger issues, meaning those that transcend the particulars of the subfield, might hinge on the findings; and what propositions are confirmed or disconfirmed by the extrapolation of these findings to such overarching issues.

Also consider the following issues:

- What is the theoretical, clinical, or practical significance of the outcomes, and what is the basis for these interpretations?
- If the findings are valid and replicable, what real-life psychological phenomena might be explained or modeled by the results?
- Are applications warranted on the basis of this research?
- What problems remain unresolved or arise anew because of these findings?

The responses to these questions are the core of the contribution of your study and justify why readers both inside and outside your specialty should attend to the findings. Readers should receive clear, unambiguous, and direct answers.

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