Reporting Practices of Dropouts in Psychological Research Using a Wait-List Control: Current State and Suggestions for Improvement

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Abstract

Reporting practices regarding dropouts in wait-list control studies hold great importance for the ability to replicate, generalize, and draw conclusions from research. This concern is applicable to all psychological research utilizing wait-list controls, regardless of purpose of research (e.g., treatment outcome). The current study assessed the present state of reporting practices in this type of experimental design and discussed the limitations and implications of the insufficient reporting found. 171 articles from psychology journals utilizing wait-list control design were surveyed regarding the reporting of the number of dropouts from the wait-list control and experimental conditions, characteristics and assessment scores of the dropouts, and total dropouts. Variables that are crucial to interpreting research findings are not consistently reported. Additionally, journal impact factor and year of publication were positively correlated with the adequacy of reporting. Consistencies with previous findings were noted, and suggestions for remedying the reporting inadequacies were discussed. Copyright © 2007 John Wiley & Sons, Ltd.

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Reporting practices of dropouts in psychological research using a wait-list control: current state and suggestions for improvement

Adequate reporting of information is essential to research. The ability to generalize, replicate, and make conclusions is inherently based on the accuracy and inclusion of pertinent information, such as demographics of the sample in comparison to population and methodology (Breslin & Sobell, 1999). Past research (e.g., Ellingstad, Sobell, Sobell, & Planthara, 2002;

Moncrieff & Drummond, 1998) has shown that the reporting of demographics and methodology is inconsistent and generally inadequate. Specifically, research has shown that attrition rates are generally not reported (e.g., Gutmann, Sobell, Prevo, Toll, Gutwein et al., 2004; Sifers, Puddy, Warren, & Roberts, 2002). The present study investigated the reporting practices of dropouts in articles in psychology journals using a wait-list control to 1) discuss empirical limitations and implications resulting from inadequate reporting, 2)

assess the current state of reporting practices in this type of experimental design, including trends over time and by journal impact factor, and 3) offer suggestions to remedy the current deficiency.

Inadequate reporting has implication for validity. Kazdin (2003) summarizes that there are two aspects of methodological quality: internal and external validity. Internal validity is the degree to which a study effectively confirms (or disconfirms) a causal relationship between two variables. External validity is the degree to which the results of a study can be applied to the population of interest or other settings. In the case of dropouts, attrition can bias samples by resulting in treatment and control groups that differ on demographic variables or symptom severity, which inhibits conclusions about the effectiveness of treatment. Furthermore, dropouts can result in samples that are not comparable to the population of interest, limiting generalizability. It is these forms of bias that are being addressed in this article because causal relationships cannot be inferred when comparison groups are systematically biased.

Unfortunately, there is evidence that much research is limited due to concerns regarding validity. Moncrieff and Drummond (1998) surveyed 25 of the most cited alcohol studies and found that external validity was generally poor due to insufficient methodology reporting. Breslin and Sobell (1999) summarized that conclusions based on alcohol absorption studies are difficult to derive because of the lack of detailed methodology reporting. This deficit in reporting exists across sub-disciplines in psychology. Deficits in reporting have been found in smoking cessation trials (Gutmann et al., 2004), drug and alcohol treatment studies (Ellingstad et al., 2002), research in clinical child and pediatric psychology (Sifers et al., 2002), and in research with individuals with mental retardation (Malone & Stoneman, 1995).

As can be seen in this brief summary of reporting methodology research, accurate and inclusive reporting practices are important, yet the degree of reporting in psychological research is inconsistent and generally poor. One aspect of reporting that has been overlooked in wait-list control studies is dropout rate (e.g., Gutmann et al., 2004). Ironically, some research assessing methodology reporting has omitted dropout rate as a variable of inquiry (e.g., Breslin & Sobell, 1999). Knowledge about dropout rates and differences between dropouts and continuers allow for evaluations of the results and

validity of clinical interventions (Sifers et al., 2002), thus they are an important topic for investigation. Studies utilizing a wait-list control condition are especially sensitive to dropout rates (i.e., the goal is to establish the difference between treatment and wait-list groups) and thus are an important area within psychological research to assess.

When attrition rates are unknown, the effectiveness of an intervention cannot be established (Michelson & Marchione, 1991). For example, if the participants in the wait-list control groups have a lower dropout rate compared to participants in the experimental conditions, it may indicate that treatments are potentially aversive. Furthermore, dropouts who differ from continuers may result in treatment and control groups that are somehow dissimilar and thus invalidate between group comparisons or introduce bias, which limits generalizability.

Continuing concerns about reporting methodology, particularly in clinical trials, has resulted in two sets of guidelines for authors. Specifically, the Consolidated Standards of Reporting Trials (CONSORT) was developed in 1996 by researchers, statisticians, and editors concerned about reporting methodology in randomized clinical trials (Moher, Schultz, & Altman, 2001). Editors and other representatives from journals publishing research on HIV extrapolated on these guidelines and produced similar guidelines for non-randomized clinical trials (Des Jarlais et al., 2004). Both sets of guidelines are a response to a failure to improve reporting practices and aim for transparency that allows maximum usefulness of publications of clinical trials. Both sets of guidelines call for increased rigor in reporting of research, which is necessary to advance research in any field. These guidelines clearly are applicable to research in psychology journals and represent appropriate standards for such research.

Despite these considerations, a critical methodology review of investigations in psychology using a wait-list control condition has yet to be done. Due to the validity limitations and ethical implications associated with poor reporting, there is a need to assess the current state of reporting in these types of experimental designs.

Four of the variables being assessed in the current study (number of dropouts from the wait-list control, number of dropouts from the experimental conditions, absence of dropouts, and total number of dropouts) are related to item number 13 from the CONSORT

guidelines requiring reporting of “flow of participants through each stage,” including number “receiving intended treatment” and “completing the study protocol” (Moher et al., 2001). The rationale for this guideline is that when participants are removed from a study (in this case through dropping out), the remaining groups are no longer the same and may differ in important variables such as severity of illness or experience of side effects from treatment. Furthermore, non-random exclusion of participants through dropout may introduce bias. Moreover, knowledge about the number of participants not completing the study allows readers to determine how non-random exclusion might have impacted the results (Moher et al., 2001).

The other four variables of question (demographic characteristics of dropouts, assessment scores of dropouts and wait-list control groups, differences between dropouts and completers, and baseline data from dropouts) are related to item number 15 from the CONSORT guidelines requiring reporting of “baseline demographic and clinical characteristics of each group” (Moher et al., 2001). Knowledge about completers and dropouts in a study enables the reader to judge to what degree the results of a study are relevant to an individual or population. Additionally, it is the attempt of controlled trials, including wait-list control studies, to compare groups that are similar across all dimensions beyond the intervention of interest. This assumption can only be tested if enough information (e.g. baseline assessment, demographics) is available and not clouded by dropouts of unknown characteristics (Moher et al., 2001).

A thorough understanding of the current state of reporting methodology should address differences across time and across journals. One might assume that reporting methodology has improved with time, but past studies (e.g., Gutmann et al., 2004; Sifers et al. 2002; Sobell et al., 2002; Moncrieff & Drummond, 1998) have not found this trend. Furthermore, it should be expected that journals with more rigorous standards will have greater rates of reporting of key information. While being far from a precise measure of rigor, impact factor does provide one quantifiable measure of the prestige of a journal. Hence, there may be a significant relationship between impact factor of a journal and reporting methodology in that journal.

The main hypothesis of this study is that reporting of wait-list control dropouts will be poor. The secondary hypothesis is that, in studies that do report the number of wait-list dropouts, the following data will be

reported poorly: the number of dropouts from the experimental condition, demographic characteristics of dropouts, assessment scores of dropouts, differences between dropouts and completers, and total dropouts. Additionally, the reporting level will be analyzed as a function of year of publication and journal impact factor. We hypothesize that year of publication will not affect the level of reporting, but that impact factor will affect reporting levels. Specifically, it is hypothesized that journals with high impact factors will have higher levels of reporting than journals with low impact factors.

This article focuses on psychology journals for two reasons: 1) there likely are differences across disciplines in reporting methodology that might be obscured by looking at several disciplines at once, and 2) wait-list control is a design that has played an important role in recent trends toward establishing empirical support for psychological treatments. Specifically, CONSORT guidelines have been embraced by medical journals, but, although applicable to research on effectiveness of psychological treatments, such rigorous standards have been slow to be adopted in psychology journals.

Method

Articles included in this survey were found through a PsychInfo search, using “wait list control” in keywords, with no other parameters selected. PsychInfo covers 2,035 journals, including whole journals and individual articles from journals outside of psychology that are considered to have psychological relevance. The database includes articles from the 1800s to the present and is updated weekly resulting in over 2 million records (American Psychological Association, 2006). This makes PsychInfo the most comprehensive database of psychology articles and an appropriate method of locating as many articles as possible that use a wait-list control design and appear in psychology-related journals. This method clearly will not locate every single journal article using a wait-list control design that was published between 1971 and 2004; however, in light of the comprehensiveness of PsychInfo, it likely identified the overwhelming majority. The keyword search strategy was used for its inclusiveness.

This search strategy resulted in 347 hits between January 1971 and December 2004. All articles published in psychology journals (i.e. not journals of other disciplines, not dissertations), offering new research (not reviews), and employing a wait list control

condition were included in the survey, resulting in a sample of 171 articles ranging in publication year from 1971 to 2004 (150 hits were not journal articles and 26 hits were in journals that were not psychology-related). To determine if a journal was to be considered a psychology journal, the four authors rated the scope of each journal that appeared in the PsychInfo search used in this study as either "psychology" or "not psychology" based on the scope of the journal. In order to be considered a psychology journal, three out of the four authors had to rate the journal as having a scope that included "psychology." Excluded journals were: Aids Care, Aids, Dreaming, Deaf Studies and Deaf Education, Geriatric Social Work, Health Education and Research, International Journal of Obesity and Related Metabolic Disorders, Journal of American College Health, Journal of the American Geriatric Society, Journal of the American Medical Association, Journal of Aging and Physical Activity, Journal of Career Development, Journal of Child Neurology, Journal of Head Trauma Rehabilitation, Marriage and Family: A Christian Journal, Nursing Research, Nicotine and Tobacco Research, Research on Social Work Practices, Teaching Learning and Medicine, and Work: a Journal of Prevention, Assessment, and Rehabilitation.

All articles using a wait-list control were included because the concerns about reporting are apropos for all research with wait-list control groups, regardless of the details of the research design. The only articles that were excluded from analyses were those that did not meet the aforementioned criteria. Articles were assessed for the following characteristics of reporting:

- (1) The number of dropouts from the wait-list control – this information indicates whether possible attrition bias should be investigated (i.e., if there is attrition, attrition bias should be ruled out).
- (2) The number of dropouts from the experimental conditions – this information allows for inferences about the type of treatment provided.
- (3) Did they report no dropouts – to prevent confusion, it is necessary to report that there were no dropouts.
- (4) Did they report total dropouts – if the authors did not report any specific information about those who dropped out (e.g., the number who dropped out from the control condition), it is important that they at least report the total number of dropouts. Without this information, it is impossible for a researcher attempting to replicate a study to predict the number of expected dropouts and plan accordingly.
- (5) Demographic characteristics of dropouts (i.e., age and sex) – this information is important because, if there are dropouts, it may be that only people with certain characteristics are dropping out.
- (6) Assessment scores of the dropouts from the wait-list control group – knowledge of the dropout's pre-treatment assessment scores (on variables assessed by the study, including severity of symptoms and any other factors assessed in each study) facilitates comparisons between those who dropped out and those who completed the study.
- (7) Differences between dropouts and completers – this information indicates whether the dropouts represent a specific population that is different than the treatment completers, allowing more informed conclusions about treatment results.
- (8) Were baseline data collected from the dropouts – to prevent confusion, the authors should state if this was not the case and that it, therefore, was impossible to report assessment scores of the dropouts.

Three of the authors coded all articles, and interrater reliability was conducted on 10% of the sample. The impact factor of the journals in which articles included in this study were found using Journal Citation Reports. Most of the journals analyzed published only one to three articles using a wait-list control design with only three journals contributing more than five articles (*Behavior Therapy* had 13, *Behaviour Research and Therapy* had 9, and the *Journal of Consulting and Clinical Psychology* had 22).

Results

Kappa was used to calculate interrater reliability to avoid inflation due to chance. Interrater reliability was satisfactory for almost all variables. Specifically, the results for each variable were: 'the number of dropouts from the wait-list control' $\kappa = .712$, $p = .001$; 'the number of dropouts from the experimental condition' $\kappa = .798$, $p = .000$; 'did they report no dropouts' $\kappa = .644$, $p = .002$; 'did they report total dropouts' $\kappa = .478$, $p = .010$; 'age' $\kappa = .644$, $p = .002$; 'sex' $\kappa = -.050$, $p = .819$ (90.5% agreement); 'assessment scores of the dropouts' $\kappa = -.082$, $p = .619$ (76.2% agreement); 'differences between dropouts and completers' $\kappa = .788$, $p = .000$; 'was

baseline data collected on those who dropped out' $kappa = 1.000$, $p = .000$.

If an article reported having no dropouts, it then necessarily did not report any other variables of interest. As such, including that article into analyses assessing other variables of interest would inaccurately count that article as lacking the variable of interest, thus deflating the final percentage and giving an inaccurate representation of the results. To account for this and avoid producing misleading and inaccurate results, the articles were divided into three subsections: (1) all articles, (2) articles that failed to report an absence of dropouts and did not report lacking baseline data on dropouts, and (3) articles that, in addition to not reporting an absence of dropouts in the study and were not lacking baseline data on dropouts, failed to report the number of dropouts from the control or experimental conditions.

The variables 'did they report no dropouts,' and 'were baseline assessments made on the dropouts'¹ were analyzed by including all articles surveyed (subsection 1) because if there were no dropouts and baseline data was not available, then all other variables of interest would not be possible to report. Separating out articles with these variables reported prevented the inaccurate inclusion of inappropriate articles into the analyses. The variables 'the number of dropouts from the wait-list control,' 'the number of dropouts from the experimental condition,' 'sex of dropouts,' 'age of dropouts,' 'assessment scores of the dropouts,' and 'differences between dropouts and completers' were analyzed using only articles that failed to report an absence of dropouts and did not indicate lacking baseline data on the dropouts (subsection 2). Some articles that did not report the number of control and/or experimental group dropouts did provide other information about the dropouts, and thus the variables 'sex of dropouts,' 'age of dropouts,' 'assessment scores of the dropouts,' and 'differences between dropouts and completers' were analyzed through inclusion of articles that, in addition to not reporting an absence of dropouts in the study and lacking baseline data on dropouts, also failed to report a presence or absence of dropouts from the control or experimental conditions (subsection 3). The variable

'did they report total dropouts' also was included in subsection 3.

The percentages of articles reporting the variables of interest are listed in Table 1. All variables were reported at low levels. The variable reported most frequently was the number of dropouts from the experimental condition, which was reported in 53.9% of the relevant articles. The variable reported least frequently was the age of dropouts, which was reported in 3.9% of articles that reported the presence of dropouts in the experimental or control groups, and 1.4% in articles that did not indicate dropouts from the control or experimental groups.

In order to assess the degree to which a journal's impact factor affects the level of reporting, the researchers collected the impact factor, as published in *Journal Citation Reports*, for each journal in which articles included in this survey were found. Correlation

Table 1. Frequency with which Participant Variables are Reported

Variable	Subsection		
	1 (n = 171)	2 (n = 152)	3 (n = 70)
Number of control dropouts	–	48.7%	–
Number of experimental dropouts	–	53.9%	–
Age of dropouts	–	3.9%	1.4%
Sex of dropouts	–	9.9%	4.3%
Assessment scores of dropouts	–	5.9%	2.9%
Reported difference between dropouts and completers	–	26.3%	11.4%
Total dropouts	–	–	37.1%
No dropouts	8.8%	–	–
Baseline data not available	2.3%	–	–

1 All articles surveyed.

2 Articles that failed to report an absence in dropouts and lacked baseline data on dropouts.

3 Articles that, in addition to not reporting an absence of dropouts and lacking baseline data on dropouts, also failed to report the presence or absence of dropouts from the control or experimental conditions.

¹This variable was calculated using all articles that did indicate an absence of dropouts, but for categorical reasons is included in the 'all article' subsection.

analyses revealed that journal impact factor is significantly positively correlated with reporting of whether there were differences between comparison groups ($r = .238, p = .004$). Figure 1 further depicts the relationship between journal impact factor and level of reporting differences between groups. Correlation analyses revealed that the year in which a study was published is significantly positively correlated with reporting the sex of the dropouts ($r = .182, p = .018$) as well as reporting the total number of dropouts ($r = .18, p = .022$), but

year of publication was significantly negatively correlated with reporting that there were no dropouts ($r = -.179, p = .019$). Figure 2 shows the relationship between year of publication and level of reporting.

Finally, Table 2 displays descriptive information regarding the number of wait-list investigations published each year. As can be seen by the increasing number of wait-list control article published per year, this type of design is becoming more prevalent.

Figure 1. Reporting level and journal impact factor. Only two cases had impact factors greater than 4.59 and were subsequently removed from analyses.

Figure 2. Reporting level and year of publication. Only two cases appeared before 1981 and were subsequently removed from analyses.

Table 2. Year of Publication and Number of Wait-List Control Studies Published

Year	Number of published studies
1971–1975	1
1976–1980	1
1981–1985	8
1986–1990	20
1991–1995	31
1996–2000	50
2001–2004	60

Note. The data in this table is dependent on PsychInfo listings.

Discussion

The reporting of variables of interest was less than adequate and supported the primary hypothesis of this investigation. The number of experimental group dropouts was reported more frequently than the number of wait-list control group dropouts, but both were reported at an inadequate level. Reporting of the demographic characteristics of dropouts also was low. The low reporting of age and gender indicates that many studies make it impossible to determine if there are specific individuals who dropped out of the study, thus making it difficult to determine whether there is a bias in the control group. The low reporting of dropout assessment scores also impairs interpretation by prohibiting inferences about treatment effectiveness.

Reporting of total dropouts was also inadequate. This variable was analyzed by only including articles that did not report the number of control or experimental dropouts. Subsequently, this finding indicates that even when articles do not provide specific information about the number of dropouts from each group, articles also frequently fail to mention at least the total number of dropouts. Also, this variable is itself a liberal assessment of the reporting of dropouts: the total number of dropouts by itself is not sufficient information from which to draw conclusions about the validity and generalizability of the results. Even this minimal standard was met at a low rate.

The infrequent reporting of whether there were differences between dropouts and completers reflects the poor reporting of the other variables of interest. First, many studies did not report whether there were control and/or experimental group dropouts. Second, many studies did not report demographic or assessment score

information about the dropouts. As such, the low reporting of whether there were differences between dropouts and completers is expected.

It is not clear whether researchers are collecting this important data and opting not to report it or if they simply are not collecting such data, but it is clear that data crucial to clearly and ethically representing research results is going unreported. What is perhaps more concerning is that the importance of reporting strategies has been known for a long time, but evidently has not been heeded. Rates of reporting the total number of dropouts and sex of drop outs have increased, but other variable have not and reporting of no dropouts has decreased. Moreover, our data reveal that the wait-list control design is becoming more frequent, and as such, the results from this study indicate the necessity of disseminating the current state of reporting practices in order to reverse this trend.

Finally, the data show that high journal impact factor has a positive effect on the reporting of whether there were differences between dropouts and completers. This is important data to report and providing this data communicates to readers that dropouts and completers did not differ on confounding variables, and therefore, the subsequent comparisons between the experimental and wait-list control group are likely to be valid.

The present finding of a significant relationship impact factor methodology reporting is contrary to previous research investigating citation records and journal quality. Past research (e.g. Bloch & Walter, 2001; West & McIlwaine, 2002) has been quite critical of the use of citation records in particular and impact factors in general. The results from this study, however, indicate that there is at least a small positive relationship between journal impact factor and article quality, as measured by level of reporting differences between dropouts and completers.

The present findings corroborate previous reporting methodology research (e.g., Gutmann et al. 2004; Moncrieff & Drummond, 1998; Sifers et al., 2002; Sobell et al., 2002) demonstrating the inadequacy of reporting methodology. Whereas previous studies have shown poor reporting of methodology in studies without accounting for experimental design, the present study adds to this line of research by targeting attrition rates in a design particularly sensitive to this variable, wait-list control designs. Specifically, the present results indicate that investigations using a wait-list control

design fail to adequately report dropout rates and relevant variables regarding those who dropped out. The poor level of reporting allows the possibility that many published articles have 1) low internal validity, as evidenced through a lack of a demonstration that the groups being compared are sufficiently similar, and 2) poor generalizability, as evidenced through a lack of reporting of dropout demographic characteristics and assessment scores. This suggests poor quality of reporting, which limits advances in the field of psychology. Additionally, a more recent year of publication and higher journal impact factor were found to have small positive effects on the level of reporting of some variables.

This study suffers from some minor limitations. While PsychInfo is an excellent resource, it cannot be said that the search using "wait list control" identified every article in a psychology journal that utilized a wait-list control group. While this is the most expeditious method of finding articles using a wait-list control, it is possible that some articles were overlooked. Also, as one reviewer noted, the present study did not account for purpose of research, such as treatment outcome or not. The present researchers argue, however, that these variables need to be reported regardless of the purpose of the research and, as such, this is not a systemic flaw in the current study. Another limitation is the criteria used to include articles into the study. It may be the case that journals other than 'psychology' journals, such as medical journals, have higher standards of reporting practices. As such, the inadequate reporting identified in the current study is not representative of all research using wait list control designs. It is important to mention that conclusions based on the present data should not be generalized beyond the 'psychology' journals that were sampled.

As did Breslin and Sobell (1999), the present researchers call on the peer review process to enforce strict reporting methodology, thus ensuring that published articles have sufficient internal validity and generalizability. One possible method of accomplishing this is journal editors requesting that authors follow CONSORT (Moher et al., 2001) or TREND (Des Jarlais et al., 2004) guidelines, including reporting information on dropout rates and characteristics of participants who dropout. Authors and reviewers can use the checklist format of these guidelines (selecting the appropriate guideline for a particular study) to write and review manuscripts, respectively. More specifically,

it is suggested that authors of studies using wait-list controls report the number of dropouts from wait-list control and experimental groups (or absence there of), and demographic and assessment information regarding participants who dropout, including significant differences between completers and dropouts (or lack there of). Following these guidelines will heighten methodological rigor, ethical conduct, and the utility of research.

While the current study is a comprehensive review of reporting methodology in wait-list treatment studies from 1971 to 2004, it is suggested that future research expand on the current study by investigating whether the publication of the CONSORT and TREND guidelines has resulted in an improvement in frequency of reporting the nine factors addressed in the current study. A simple way of checking the impact of the CONSORT and TREND guidelines would be to compare the reporting methodology in articles published before the guidelines to articles published after the guidelines. The change in reporting levels would indicate the degree to which the CONSORT and TREND guidelines have impacted the quality of subsequent research. Additionally, future studies also could expand the scope of the current study to include other aspects of the CONSORT and TREND guidelines such as theoretical basis for studies, method of assigning participants to groups, and the reporting of treatment noncompliance.

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