

Principles of Experimental Design for Art Conservation Research

By Terry J. Reedy and Chandra L. Reedy

Preface to the Electronic Edition

Principles of Experimental Design for Art Conservation Research, first published in 1992, was originally written for a very specific purpose—it was a follow up to our 1988 book, *Statistical Analysis in Art Conservation Research*, also published by the J. Paul Getty Trust. In *Statistical Analysis*, we reviewed three hundred twenty papers from the conservation literature published over a five-year period (1980–86), with the intent of reviewing the range of statistical analysis approaches used in this research. However, we came across an unexpected finding— a paucity of published analyses in the field of conservation. Our original intention of re-analyzing a number of published datasets to illustrate a variety of alternative statistical approaches proved unrealistic, as far too many of the conservation research examples we studied did not have experimental designs amenable to statistical analysis.

Principles of Experimental Design was intended to close this gap in the conservation literature by providing an overview of general principles of research design and experimental design using examples applicable to the conservation field. Some of the material is very elementary, such as a discussion of hypothesis testing in research designs, and the ways in which multiple hypotheses can benefit both fundamental and applied research in conservation. Yet at experimental design workshops based on the book, this elementary material has proven to be the most popular resource material for discussion. Many find it useful to review these basic concepts periodically, as a reminder of the benefits of rigor in overall research design. Similarly, workshop participants frequently comment on the usefulness of reviewing the purposes and mechanisms of defining experimental units, controls,



randomization procedures, repeated readings, repeated measurements, and methods for avoiding bias.

Some of the more detailed sections in the book might serve as more specific reference material for those designing certain types of experiments in conservation research. Examples are the chapters on single-object studies, multiple-object (group) studies, conservation treatment trials, and statistical analysis issues. In areas in which case studies from art conservation were scarce or lacking at the time the book was written, illustrative case studies from medical or agricultural research were used. For single-object studies with full experimental design protocols and for treatment trials, in particular, there are still few representative examples in the conservation literature.

If we were to undertake our review today, we would find many more excellent examples and varieties of statistical analyses and clear experimental designs in art conservation literature. Experimental design and statistical analysis are of wider interest to the field of conservation today than they were twenty years ago when we first began our review.

Principles of Experimental Design for Art Conservation Research has served as resource material for many workshops on scientific methodology for conservation treatment selection, sparking many engaging discussions among conservators and conservation scientists including, at workshops held at annual meetings of the American Institute for Conservation, and at workshops at the Library of Congress, the Washington Conservation Guild, the Colonial Williamsburg Foundation, and the Image Permanence Institute at the Rochester Institute of Technology.

Yet, this book was never intended to be the sole source of information on experimental design for the conservation field nor was it intended to be a textbook—the original research and writing were accomplished over a fairly short-term period. Many good textbooks on



experimental design can be found in any university library, and such textbooks cover the subject with much more breadth and depth. Our book, in contrast, was intended to help readers identify the elements of research and experimental design that are most applicable to the work of conservators and conservation scientists, and to visualize how those elements can be applied to daily work in conservation. Since *Principles of Experimental Design for Art Conservation Research* is no longer available in print, we appreciate the Getty Conservation Institute making it available online in PDF format so that it can continue to serve as a resource to conservation students, researchers, and practitioners.

Terry J. Reedy and Chandra L. Reedy

July 2008