Case-to-Case Generalizability in Mixed-Methods Research: Assessing the Role of Bias and Uncertainty in Quantitative-Qualitative Research Designs

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Abstract

Recurring concerns over interpretation, representation, and replication in qualitative studies have sparked debates about the use of non-probability based data in social science research. One solution has been to conduct a mixed-methods study, where nationally or locally representative probability-based (quantitative) data are leveraged to answer some aspect of a research question, while non-probability (qualitative) data are employed to illuminate the mechanisms that explain the research question in greater detail. Few studies have quantified the bias and uncertainty in research findings when epistemologically different methodologies are combined to answer the same question. This paper assesses the prevalence of bias and the range of uncertainty in a mixed-methods study when the research design is replicated under the same internal and external conditions. Bayesian hierarchical models are estimated using simulated and real-world data to illustrate how combining probability and non-probability based observations is problematic for case-to-case transfer generalizability in social science research.
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Introduction and Statement of the Problem

Studies that incorporate quantitative and ethnographic data have risen in prevalence and prominence over the last two decades, so much so that “Mixed-Methods Research” has apparently become a “thing” (Hesse-Biber 2015). The reification of Mixed-Methods Research (“MMR”) as a distinctive form of 21st century social science can be readily observed by the proliferation of special journal issues and symposia dedicated to questions of quantitative-qualitative integration. Furthermore, a growing literature grapples with how to define, classify and conduct MMR, resulting in the emergence of dedicated MMR journals (e.g., Franzosi 2012; Small 2011; Tashakkori & Teddlie 2003a). These formalization processes have transformed MMR from an eclectic set of research approaches premised on the “synergy” of using multiple methodologies to study the social world into a methodology unto itself and a concept now so well-recognized to serve as a keyword in database searches (Hesse-Biber 2015). MMR proceeds largely on the philosophical basis of “pragmatism,” which, as described by Tashakkori and Teddlie (2003), provides a framework for deploying a range of methods based on the research question at hand in an attempt to get beyond the “paradigm wars” (see also Onwuegbuzie, Johnson & Collins 2009). The classic pragmatist paradigm of social science research entailed an experimentally fallibilist methodological orientation that privileged close, detailed observation of everyday experience and focused on the use-value of research for moral and political purposes (e.g., Dewey 1938; Addams 1902/2002; Pierce 1992/1999; see Tavory & Timmermans 2013). As extended to MMR, pragmatism serves as the contemporary rationale for selecting a set of methods deemed most likely to yield useful findings.
However, recent debates in the punishment and inequality literature have raised old and new questions about interpretation, representation, and replication in qualitative studies that incorporate quantitative data to inform and contextualize research findings. For instance, Goffman’s (2014) study -- of young, African-American men entangled in the institutional webs of the criminal justice and health care systems -- weds ethnographic observations with household-based survey data to illustrate how crime, surveillance, mass incarceration, and social inequality affect life in inner city neighborhoods. Consequently, her research also breathed new life into unsettled discourses on validity, replication, and generalizability in scholarship that mixes qualitative and quantitative methods (Cohen 2015; Duneier 2004, 2006; Goffman 2014; Katz 1997; Klinenberg 2002, 2004, 2006; Lubet 2015; Ralph 2015; Rios 2015; Sánchez-Jankowski 2002; Sharkey 2015; Venkatesh 2013; Wacquant 2002; Wilson 2014). Scholars have made a number of critiques of this work, ranging from the non-representativeness of research subjects selected for study (Sharkey 2015) to the use of household-based survey data collected in an anomalous social setting that does not match household data from the American Community Survey (Cohen 2015).

Despite the elision of these aforementioned concerns, research suggests that the experiences of Goffman’s particular research subjects, in fact, may be “generalized to other experiences in that specific context,” via case-to-case transfer – that is, if the contexts match between cases (Lucas 2016: 13). Indeed, Firestone (1993: 18) contends that “case-to-case transfer goes particularly well with qualitative research” but that many researchers find this analytical method especially unsatisfying “partly because it is unconventional, partly because the responsibility (and rewards) of drawing broader implications from a study are shifted to others, and partly because the researcher's influence over the use of study findings is so clearly limited.”
Can case-to-case transfer salvage generalizability issues in qualitative and mixed-methods research? If so, how often can experiences be generalized to other cases that exist within similar contexts? These questions motivate our work.

Although case-to-case transfer may provide a solution to problems of generalizability in mixed-methods studies, there are two potential issues that need to be considered: bias and uncertainty. Specifically, the analytical approach of case-to-case transfer makes two critical assumptions in drawing inferences between cases: 1) that the prevalence of bias within cases is the same across cases and 2) that the range of uncertainty between cases is the same. Both of these presuppositions have gone unacknowledged in the literature, and neither has been subjected to empirical scrutiny. The bias introduced by non-probabilistic case selection is uncontested (Small 2009; Lucas 2014). However, the bias and uncertainty associated with failure to account for the distribution of narratives and the number of observations necessary to reach “saturation” -- traditionally defined as completed fieldwork -- has largely remained unnoticed in qualitative research. Sykes, Verma, and Hancock (2016) show that when qualitative and quantitative samples are not drawn from the same underlying population distribution, but are mixed in a concurrent sampling design, a great deal of bias exists in mixed-method findings. Whether the results and experiences from a mixed-methods study can be generalized to other similar cases, even when they may share common contexts, then, depends on whether latent sources and quantities of bias and uncertainty – which are usually unknown to researchers – are in fact the same across cases.

In this paper, we assess the prevalence of bias and the range of uncertainty in a mixed-methods study when the research design is replicated under the same internal and external conditions, but where different sources of error are known and vary between cases. Our findings
have significant importance for understanding the conditions wherein matched case-contexts could, theoretically, allow for generalizability using case-to-case transfer in quantitative-qualitative research designs.

**Proposed Data and Methods**

Growth in mass incarceration over the last four decades has now become a major public policy concern, with more than 2.6 million children exposed to parental incarcerated during 2012 (Sykes and Pettit 2014). Quantitative data on race, poverty, and parental incarceration are obtained from the National Survey of Children’s Health (NSCH), 2011-2012 to interrogate how racial inequality in parental incarceration is associated with a set of synthetic (or hypothetical) experiences that emerge from simulated field observations. The NSCH asked parents a variety of questions about child health, child-parent relationships, and social background characteristics. Interviewers completed 95,677 child-level interviews, with the number of interviews ranging from over 1,800 to 2,200 per state. Weighted estimates represent the social experiences of all non-institutionalized minors in the United States.

Quantitative data from the NSCH are supplemented with synthetic data from Monte Carlo (MC) simulations. First, we use MC methods to simulate the process of “saturation” by setting a hypothetical number of interviews or field observations qualitative researchers may require to achieve stability in their findings with respect to coded experiences. We define case saturation as the number of observations made by the time researchers exit the field, or when researchers believe that they have achieved a saturated knowledge about their case and its experiences. Each MC simulation will draw a sample of size 95,677 (one for each child in the NSCH) from a Poisson distribution with a mean of four. Second, we will code those experiences across each respondent-interview (or respondent-observation) in order to make meaning of the
experiences. We will replicate the process of saturation and code the themes 1000 times, effectively creating 1000 mixed-methods datasets that contain the same quantitative data and the same distributional properties from qualitative research; however, the number of observations for saturation within a particular respondent-case will be allowed to vary between mixed-method datasets.

Additionally, we follow Sykes, Verma, and Hancock’s (2016) approach to estimating bias in mixed-methods research. They show that if the underlying population distribution in quantitative and qualitative strands of the study are different, the cases will have different sampling weights that produce considerable bias in estimates when combined in the study. We extend their work in two ways. First, we rely on Bayesian methods to incorporate levels of uncertainty in the qualitative research. Because uncertainty can hail from multiple sources in ethnographic research, we include three priors that account for sampling, researcher, and respondent error. Although the distributional properties of case saturation for the 1000 mixed-method datasets will be the same, the uncertainty associated with any one source of error within a mixed-method dataset will be allowed to vary because there are often differences in findings when studies are replicated.

Second, Lucas (2016) states that ethnographers could sample time and then collect data on the experiences occurring at that moment. Interestingly, Sykes, Verma, and Hancock (2016) simulate the number of times the researcher made observations in the field before exiting, and then they code the most prevalent experiential theme across all times for a case before estimating the relationship between parental incarceration and the observational experience. Lucas (2016: 13), however, indicates that time is “the vessel that contains the experience,” making time “akin to cluster sampling.” To test the feasibility of case-to-case transfer, we use Bayesian hierarchical
models to estimate the posterior distributions of our mixed-method models. In this framework, experiences are nested in the time-to-saturation, which is nested in particular respondent-cases. We explore cross-level interactions between case contexts and case experience, while measuring how the propagation of uncertainty from multiple sources within a case can matter for making generalizability claims between cases. We conclude by estimating the fraction of replications that contain the same covariate values across simulations, highlighting the frequency with which experiences within a case can be generalized to other cases with similar contexts.

**Summary**

This paper proposes to assess the prevalence of bias and the range of uncertainty in a mixed-methods study when the research design is replicated under the same internal and external conditions, but where researcher and respondent error can interact to affect case-to-case transfer generalizability. Parental incarceration is used as a heuristic to understand how findings from mixed-methods social inequality research may be understood as explanations sufficient to inform policy interventions—whether or not they are offered as such, and regardless of their scientific validity. In light of the practical stakes of “getting the science right” in an era of mass incarceration (and, increasingly, an era of attempted reform) (see Pager in Phelps & Pager 2016:185), transparency about the extent of bias and the range of uncertainty that may exist in mixed-methods research findings is crucial for crafting appropriate social policy. This methodological approach is especially important if the creation of social policy is predicated on consistent inferences that are transferred from one case to another.
References


Mixed Methods Research • Combination of quantitative and qualitative methods: Integration of data and/or results (not 2 separate studies) • A longstanding practice in research, e.g., evaluation studies • Recently conceptualized in terms of mixed methods studies: First handbook in 2003.

4. INTRODUCTION. Mixed Methods Research • The purpose of mixing methods: o Better understand quantitative results, or o Generalize qualitative findings, or o Corroborate qualitative and quantitative data. • Guidance on designing, conducting and reporting mixed methods studies, but no consensus (yet) on how to approach issues in mixing qualitative and quantitative approaches to research.

Issues in Mixing Qualitative and Quantitative Approaches to Research. Pat Bazeley Research Support P/L, Bowral, Australia pat@researchsupport.com.au Presented at: 1st. Mixed methods researchers, in bringing together the benefits of both qualitative and quantitative approaches to research, often claim greater validity of results as a reason for their methodological choices, but without adequate consideration of the issues involved such validity may be more imagined than real.

Keywords: Evidence-based nursing Generalization Methods Qualitative research.

ABSTRACT. Qualitative researchers seldom worry explicitly about the issue of generalizability. The goal of most qualitative studies is to provide a rich, contextualized understanding of human experience through the intensive study of particular cases. Qualitative researchers do not all agree, however, about the importance or attainability of generalizability. Case-to-case transfer, which involves the use of findings from an inquiry to a completely different group of people or setting, is more widely referred to as transferability (Lincoln and Guba, 1985), but has also been called reader generalizability (Misco, 2007). Transferability is most often discussed as a collaborative enterprise. By mixing both quantitative and qualitative research and data, the researcher gains in breadth and depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself. One of the most advantageous characteristics of conducting mixed methods research is the possibility of triangulation, i.e., the use of several means (methods, data sources and researchers) to examine the same phenomenon. Usually, qualitative research is more suitable to build theory, while quantitative research provides a better way of testing theories. When one wants to generalize findings from qualitative research. Advantages. The use of mixed method research provides a number of advantages, namely...