The University of Texas at Austin
Educational Psychology
College of Education

1912 Speedway, STE 504, Austin, Texas, 78712-1289

Research Statement

Reza Norouzian

Introduction

My research agenda is specifically focused on improving scientific rigor in *experimental and quasi-experimental* research. My publication record within and beyond this domain is strong, consisting of 18 journal articles and book chapters that have been published, accepted, or finalized for submission. In this summary, I first briefly outline my past and current program of research. Then, I will describe my future research plans future research goals. In both sections, I will be referring to relevant projects, publications, and research activities.

Past and current program of research

My methodological research addresses topics ranging from novel methods of *replication research planning* to *effect size estimation*, and *alternative methods of testing scientific hypotheses in experimental and quasi-experimental designs*. My efforts in these areas have been central to a budding '*methodological reform*' movement currently taking place in the field of second language (L2) psychology.

My methodologically driven research follows what I term as the *four-component* approach. Specifically, I aim to describe a common methodological problem in plain language (component 1). Next, I provide a well-grounded solution to the problem (component 2). Then, I apply my solution to actual research studies from the literature (component 3). Finally, I offer a range of freely accessible software tools to enable the practical use of the solution provided (component 4).

As an example, in one of my most cited studies published in *Second Language Research*, I surveyed the *quality* (as opposed to quantity) of application of effects sizes in L2 research and found that despite the progress in terms of quantity of application of effect sizes, effect sizes are still novel concepts in the field, and thus could be misapplied in systematic ways. For example, I discovered that partial eta-squared, as an effect size used in conjunction with AN(C)OVA designs, has been erroneously presented in place of eta-squared effect size in a number of influential journals for over a decade. To remedy this situation, I made field-specific recommendations as to how to prevent such misapplications, but also how to interpret and use effect size in a range of L2 research situations.

I have also been developing a comprehensive set of methods for research planning using confidence intervals, an open-science work published in *Studies in Second Language Acquisition* (also see *this AERA paper*). My goal in this area has been to allow researchers to determine the number of participants required for their intended research studies to achieve a reasonable level of generalization to real-world language learning contexts. Devised to be practical, these methods are highly flexible and adapt themselves based on such realistic factors as time and budget available to the researchers as well as the prior research findings.

I also have spearheaded major open-science projects that empirically examined the **replicability** of published L2 research. In one study published in *Modern Language Journal*, I used over four-hundred findings from the published literature and conducted secondary Bayesian hypothesis testing (BHT) on them to see how the original findings might change in light of the new hypothesis testing method used. Notably, in 64.06% of cases when *p*-values fell between .01 and .05 (i.e., evidence to reject the null), the Bayesian analysis found the evidence in the primary studies to be only at an 'anecdotal' level (i.e., insufficient

evidence to reject the null). I then provided field-wide recommendations regarding the advantages of BHT and offered free online application as well as R programs for researchers desiring to use BHT for various research designs (also see my Bayesian revolution paper in *Language Learning*).

Most recently, the issue of replicability in the context of meta-analyses has been what has sparked my curiosity. While doing a collaborative meta-analysis project, I realized how immensely the replicability of a meta-analysis could be jeopardized, if those assigning the codes (from a coding scheme) to the studies collected from literature, use anything other than *expert judgment* during the coding process. In this new open-science article, I first offer two reliability measures that target specific needs of meta-analysts as regards replicability. That is, replicability itself, but also diagnosis of what weakens it for each moderator considered in a meta-analytic study. Then, I provide flexible R programs that simplify the conduct of the reliability analyses for a meta-analysis. Finally, I demonstrate the use of my program using a variety of actual meta-analytic datasets and place my recommendations (including interpretation guidelines for journals) within the wider context of methodological reform.

Future research directions

Moving forward, my research remains applied while getting narrower in focus especially with respect to simulation studies. I plan to delve deeper into the dependent effect sizes in meta-analysis. Specifically, I intend to compare the performance of the current methods of dealing with dependent effect sizes (e.g., sandwich estimators) with multi-level models that are often used to deal with dependent effect sizes. Along the same lines, I am also interested in understanding how prior specification on the variance components in Bayesian multilevel models would compare with the above methods in terms of bias in overall effect size estimation as well as the shrinkage estimates.

A second form of methodological research I will be focusing on is "software" research. More specifically, I am planning to continue publishing on open-source software that I develop to deal with practical methodological problems in various areas such as automated multi-level equation generation, automated dependent effect size computation for longitudinal meta-analyses with/without multiple outcomes, automated adjusted inter-rater reliability for categorical moderators in meta-analyses, and sampling size planning for experimental and quasi-experimental designs via confidence intervals, and many more ideas that I have taken note of for my future publications in this area.

Sincerely,
Reza Norouzian, Ph.D.
Visiting Assistant Professor of Quantitative Methods
Department of Educational Psychology
The University of Texas at Austin
+1 979-422-7052 (cell)
reza.norouzian@austin.utexas.edu