

Modern Meta-Analysis in Instructed Second Language Acquisition Research

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Introduction

The publication of the now-classic [Norris and Ortega \(2000\)](#) heralded the advent of systematic research reviews in the field of Instructed Second Language Acquisition (ISLA) research. However, one of the main criticisms raised in this oft-cited meta-analysis was that “effects of instruction may only be short-lived at best” (p. 488). To overcome this lack of evidence on long-term effects, many instructed L2 acquisition researchers have tended to extend post-testing their study groups beyond the immediate post-experimental observations (Norouzian, under review). Naturally, such an extension of post-testing occasions for multiple study groups leads to a complex form of research design known as mixed repeated measures (MRM).

Modern Meta-Analysis in Instructed Second Language Acquisition Research (MMISLAR) is a multi-phase project intended to provide a unified framework for the meta-analysis of common, yet complex MRM research designs employed in the domain of ISLA research. Achieving such a unified framework is critical to the validity of meta-analytic studies carried out in the area of ISLA research. Because without such a framework, systematic research reviews on the same literature could lead to inconsistent or even misleading results mainly due to the disparate meta-analytic strategies and decisions adopted by various ISLA researchers.

In what follows, the phases of the proposed project will describe the required steps to achieving the unified approach promoted in the present summary. Presented next are some of the major theoretical as well as practical benefits of MMISLAR for ISLA research. Finally, a timetable to achieve the goals described in each phase of the project is provided.

Phases of the project

- 1- Finding a standardized mean difference effect size that simultaneously measures change over time and across groups (d interaction or *dint* for short).
- 2- Studying the statistical properties of *dint* so that this new effect size can become the basis of modern meta-analysis in ISLA research.
- 3- Applying Bayesian inference to estimating any number *dints* from a single ISLA study.
- 4- Addressing the problem of “*effect size dependence*” the simplest form of which arises when a single study produces multiple effect sizes (e.g., *dints*).
- 5- Meta-analyzing adjusted effect sizes from phase 4 so to estimate short- and long-term effects (up to 3 post-tests) or to meta-analytically track change over time for an entire literature.
- 6- Facilitating advanced analysis of mixed moderating variables. First, complex studies that do not, in their entirety, fit within any one specified moderator category are broken down

into relevant and irrelevant parts. Then, each relevant part from such studies contributes to its corresponding moderator category. Thus, no information is wasted by simply creating vague (e.g., “others”, “miscellaneous”) categories for features of complex studies. Second, the method allows examination of a mix of moderators (e.g., proficiency and feedback type) simultaneously to assess a theoretical argument (e.g., “direct” [feedback type] feedback has a positive effect on beginning [proficiency] writers’ accuracy).

- 7- Reducing researcher work to only an initial data collection.
- 8- Developing a comprehensive software package to enable practical implementation of modern meta-analysis in ISLA research for a wide audience of users.
- 9- Drafting a manuscript on the applications of MMISLA in ISLA research.
- 10- Submitting the manuscript for the publication to a premier L2 journal.

Major benefits of the project

- 1- Directly answering the main questions in ISLA research consistent with the frequently employed MRM designs in the domain of ISLA.
- 2- Unifying disparate meta-analytic practices currently used to meta-analyze subdomains of ISLA research.
- 3- Removing the restriction of “number of primary studies”. Theoretically, MMISLA can be carried out with a minimum of two studies.
- 4- Reducing human involvement so to minimize error in the process of meta-analyzing complex MRM designs used in ISLA research.
- 5- Ease of use by directly meta-analyzing the raw EXCEL sheet.

Project timetable

Phase No.	Phase Description	Proposed Timeframe	Notes
1	Finding a <i>dint</i> effect size	1 month	<i>d</i> -family effect size
2	Deriving statistical properties of <i>dint</i>	2 months	Deriving likelihood
3	Bayesian estimation of <i>dint</i>	1 month	
4	Addressing effect size dependence	1 month	
5	Meta-analyzing adjusted <i>dints</i> from phase 4 to estimate short- and long-term effects	1 month	
6	Facilitating analysis of moderating variables	1 month	
7	Developing a comprehensive software package	1 month	Creating interconnected R programs

8	Reducing researcher work to only an initial data collection	1 month	Interfacing EXCEL and R
9	Drafting the manuscript	2 months	
10	Publishing the manuscript	Determined by the review process	

References

Norouzian, R. (under review). Sample size planning in quantitative L2 research: A pragmatic approach.

Norris, J. M., & Ortega, L. (2000). Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language Learning*, 50(3), 417-528.