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Assistant Professor Search, Quantitative Social Science Methods

Dear Members of the Search Committee,

I write to express my interest in your call for an Assistant Professor in Quantitative Social Science Methods. I am an Assistant Professor of Instruction in the Department of Political Science at Northwestern University, where I teach courses on statistics, statistical programming, and computational social science and conduct research on quantitative methods and social science research design. I received my PhD in Political Science from the University of Illinois Urbana-Champaign in 2021. My work is published or forthcoming in outlets including the *British Journal of Political Science*, *World Development*, and the *Journal of Experimental Political Science*.

My research agenda focuses on developing tools that researchers can adopt to improve statistical precision before data collection. This is overlooked in the statistics, econometrics, and political methodology literature in favor of identifying unbiased estimators. Implicitly, this literature assumes that one can improve statistical precision by just increasing sample size. This is not feasible in many social science applications due to practical or ethical considerations.

Focusing on the design and analysis of surveys and experiments, this agenda seeks to shape applied research by focusing on cases where one can seemingly improve statistical precision without sacrificing unbiasedness. As I show in my work, this usually implies unforeseen costs in other dimensions.

For example, in "Balancing Precision and Retention in Experimental Design", we discuss how implementing alternatives to the standard experimental design, such as block randomization, may attenuate expected precision gains via explicit or implicit sample loss, a concern that prevents researchers from applying these techniques widely. Through three replications and six reanalyses of previously published experiments in leading political science journals, we show how precision gains from alternative designs can withstand significant degrees of sample loss.

As another example, in a solo-authored publication in the *Journal of Experimental Political Science*, I discuss the unforeseen costs of implementing double list experiments. This is a variant of the list experiment that promises narrower confidence intervals but comes with under-explored questionnaire design complications in the form of carryover design effects, a special kind of question order effect. I introduce parametric and nonparametric statistical tests to diagnose this effect, which in turn facilitate the implementation of a more statistically efficient technique.

One of the core lessons from my research program on statistical precision is that combining different techniques helps overcome their respective limitations. For example, in work in progress, we combine list experiments with questions from the network scale up method (NSUM), a popular technique in the health sciences, to improve the estimation of sensitive attitudes and behaviors. On the one hand, list experiments suffer from low statistical precision. On the other hand, generalizing to a population of interest through NSUM requires assumptions that are untenable in social science applications. By using NSUM questions as auxiliary information to the list experiment, we improve precision without introducing cumbersome assumptions.

My research also influences substantive work on comparative politics and political behavior. In a working paper, we follow on our efforts to incorporate NSUM into social science applications by documenting the prevalence of criminal governance strategies in Uruguay. This is the basis of an European Research Council grant application seeking to understand criminal governance in least-expected contexts from a comparative perspective, which will in turn serve as a platform for further methodological innovation.

As another example, in a manuscript **conditionally accepted** at the *British Journal of Political Science*, we use a survey experiment in Argentina to study gendered differential reactions to policy implementation. Previous work suggests that women face higher scrutiny for their performance in office. However, in the context of the implementation of a food distribution program, we find that voters are only responsive to performance information among men officeholders and tend to ignore performance information when told that an officeholder is a woman. We attribute this result to voters' perception of men politicians as the default category, thus providing no new information on top of performance. In turn, mentioning the gender of a woman politician leads voters to believe that good performance stems from factors beyond the incumbent's control. This has broader implications for research on gender gaps in the evaluation of public officials, since most survey-experimental analysis on the topic fail to account for this informational imbalance.

My teaching focuses on making quantitative methods accessible to diverse audiences through a combination of flexibility and accountability. At Northwestern, I am the central person teaching quantitative methods in the department. I teach the first course in the PhD methods sequence, focusing on probability and statistical inference. I also lead the math camp for incoming political science and sociology students and run the year-long R workshop that introduces cutting-edge statistical programming practices. Later this year, I will teach the undergrad-level introduction to research methods in political science, and a seminar on causal inference and machine learning methods for evidence-informed decision-making.

Before joining Northwestern, I taught data analysis for public policy and public opinion at McMaster and evidence-based policy to address social and political challenges in developing democracies at Tulane. Both courses emphasized experimental and quasi-experimental designs to generate credible evidence. Beyond the classroom, my previous role as the methods editorial assistant for the *American Political Science Review* gave me the opportunity to shape and influence the development and application of cutting-edge methods in the field, a goal that I continue to pursue through service and mentoring.

I am prepared to teach courses on statistics, research design, experiments, causal inference, machine learning, and computational social science. You can find copies of current and future syllabi in my website.

I believe my expertise makes me an excellent fit at CDSP and the broader SciencesPo community. If you have any questions, you can contact me via email or phone.

Sincerely,

Gustavo Diaz
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