## Learning outcome

Estimating causal effects is a central aim of quantitative empirical analysis in social sciences. Recently, Conjoint Analysis have gained interest among social scientists to understand and predict people's preferences in a multi-dimensional and multi-choice environment. This course offers an applied introduction to Choice-Based Conjoint, along with hands-on experience in lab sessions.

**By the end of the course, you will:**

1. Have a basic understanding of the structure, logical underpinnings, basic notions, and analytical goals of conjoint analysis.

2. Identify areas of application where conjoint analysis could be successfully implemented.

3. Critically evaluate conjoint experiment applications and understand the advantages/disadvantages compared to more traditional methods.

4. Implement your own conjoint experiment into an (online) survey platform.

5. Understand and be able to apply different techniques to analyse conjoint experiments.

6. Be able to easily visualise the result of a conjoint experiment.

7. Be prepared for more advanced conjoint (and factorial experiments) courses or workshops.

## Contents

**The course is structured around seven key topics:**

1. I present the general idea of conjoint experiments. I introduce the logic underlining conjoint experiments, their development, and the reasons behind their recent popularity in the social and behavioral sciences.
2. I briefly introduce the potential outcome framework at the base of modern causal analysis. In particular, I give an overview of the fundamental problem of causal inference (Holland, 1986) and discuss it within the framework of conjoint analysis.
3. I present different ways to measure individual preferences in a conjoint experiment. The focus will be on Choice-Based Conjoint measurement but we will briefly discuss other measurements (e.g. Rating, Ranking, Combined, and Adaptive).
4. I give an overview of different types of conjoint design, their use, and their limitations. I present and explain the various elements of a conjoint design (alternatives, choice sets, and context) paying particular attention to the design of conjoint alternatives.
5. I focus on the construction of a conjoint experiment. Using a JavaScript/Python program and R, I show how to design simple choice-based design. I also cover more advanced designs with attributes/levels constraints and randomisation.
6. I show a simple workflow to deploy a conjoint design using Qualtrics.
7. I give an overview of different methods to analyse a conjoint experiment. Specifically, I focus on AMCEs, marginal mean and omnibus F-test. We will briefly discuss subgroup differences and visualisation.
8. I will cover more recent advances in conjoint analysis including power analysis and the usage of mixture modelling to discover treatment heterogeneity.

## Methods

The course will present a variety of methods to analyze conjoint data. I focus on AMCEs, marginal mean and omnibus F-test. Robust estimators will be explained and employed to analysis CJ data. I will also discuss subgroup differences and visualisation.  Finite mixture modelling will be briefly disused in the context of subgroup analysis and discover treatment heterogeneity.

This course will use R, which is a free and open-source programming language primarily used for statistics and data analysis. Although you are allowed to use other solutions, we will also use RStudio, which is an easy-to-use interface to R. The design of the conjoint experiments requires the usage of JavaScript/Python program with a graphical interface.

## Literature (if applicable)

**Suggested:**

Imbens, Guido W, and Donald B Rubin (2015).

**Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction**

Cambridge University Press

Chapter 1

Morton, R.B. & Williams, K. (2010)  
***Experimental Political Science and the Study of Causality: From Nature to the Lab***   
Cambridge University Press

Chapters 2 and 7

Kaczmirek, L. (2015)  
**Conducting web surveys: Overview and introduction**  
In Engel, Uwe, et al., eds. Improving survey methods: Lessons from recent research

Routledge

Chapter 13

Knudsen, E., & Johannesson, M. P. (2018)  
[**Beyond the Limits of Survey Experiments: How Conjoint Designs Advance Causal Inference in Political Communication Research**](https://www.tandfonline.com/doi/full/10.1080/10584609.2018.1493009)  
Political Communication, 0(0), 1–13

Hainmueller, J., & Hopkins, D. J. (2015)  
[**The Hidden American Immigration Consensus: A Conjoint Analysis of Attitudes toward Immigrants**](https://onlinelibrary.wiley.com/doi/abs/10.1111/ajps.12138)  
American Journal of Political Science, 59(3), 529–548

Hainmueller, J., Hangartner, D., & Yamamoto, T. (2015)  
[**Validating vignette and conjoint survey experiments against real-world behavior**](https://www.pnas.org/content/112/8/2395)  
Proceedings of the National Academy of Sciences, 112(8), 2395–2400

Horiuchi, Yusaku, Daniel M Smith and Teppei Yamamoto. 2015  
[**Measuring Voters’ Multidimensional Policy Preferences with Conjoint Analysis: Application to Japan’s 2014 Election**](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2627907)  
Available at SSRN 2627907

Leeper, T. J., Hobolt, S. B., & Tilley, J. (2018)  
**Measuring Subgroup Preferences in Conjoint Experiments**   
Political Analysis 55

**Optional**

Strezhnev, A., Hainmueller, J., Hopkins, D. J., & Yamamoto, T. (2013)  
***Conjoint Survey Design Tool: Software Manual***

Toepoel, V. (2016)  
***Doing Surveys Online***, Chapters 6 and 15  
Sage

Callegaro, M., Manfreda, K. L., and Vehovar, V. (2015)  
***Web survey methodology***, Chapters 5, 6 and 7  
Sage

Stefanelli A. & Lukac M. (2020)  
**Subjects, Trials, and Levels: Statistical Power in Conjoint Experiments**Available at [10.31235/osf.io/spkcy](https://doi.org/10.31235/osf.io/spkcy)

Goplerud M., Imai K, Pashley N. (2022)  
**Estimating Heterogeneous Causal Effects of High-Dimensional Treatments: Application to Conjoint Analysis**  
Available at <https://arxiv.org/abs/2201.01357>

## Pre-requisites:

The course assumes intermediate familiarity with the basis of experimental design, survey experiments and regression analysis.

The empirical analysis will be implemented using R. While example datasets and full syntax codes will be provided, intermediate knowledge of R is expected.

You should know how to:

1. read datasets in R
2. work with data frames
3. perform basic data manipulation
4. run basic statistical analyses such as linear or logistic regression.

More advanced knowledge of statistical computing, such as writing functions and loops, is helpful but not essential.

Make sure that your R and Python environments work and that you can run a script before coming to class since we will have no time to resolve technical issues. If you have already collected data, bring it along. If not, you’ll get a toy dataset to play with. Be sure to have installed in R the cjoint and cregg packages together with any other package that you use for data management/cleaning/visualization (e.g. dplyr, ggplot, etc).