

Randomized Trials With Non-Compliance

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Randomized Trials With NonCompliance

- Tx group (compliance status observed)
 - Compliers
 - Noncompliers
- Control group (compliance status unobserved)
 - Compliers
 - NonCompliers

Compliers and Noncompliers are typically not randomly equivalent subgroups.

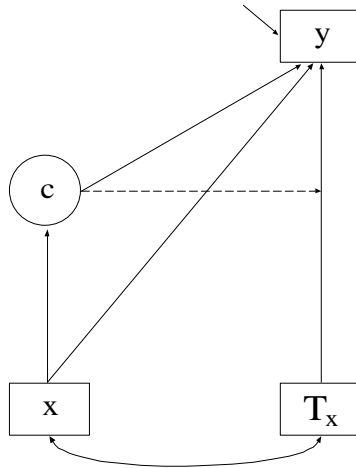
Four approaches to estimating treatment effects:

1. Tx versus Control (Intent-To-Treat; ITT)
2. Tx Compliers versus Control (Per Protocol)
3. Tx Compliers versus Tx NonCompliers + Control (As-Treated)
4. Mixture analysis (Complier Average Causal Effect; CACE):
 - Tx Compliers versus Control Compliers
 - Tx NonCompliers versus Control NonCompliers

CACE: Little & Yau (1998) in Psychological Methods

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Randomized Trials with NonCompliance: Complier Average Causal Effect (CACE) Estimation



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TRAINING DATA

Training data can be used when latent class membership is known for certain individuals in the sample.

Training data must include one variable for each latent class. Each individual receives a value of 0 or 1 for each class variable. A zero indicates that the individual is not allowed to be in the class. A one indicates that the individual is allowed to be in the class.

CACE Application

With CACE models, there are two classes, compliers and noncompliers. The treatment group has known class membership. The control group does not. Therefore, the training data is as follows:

	Class 1 Compliers	Class 2 Non-Compliers
Control Group	1	1
Treatment Group Compliers	1	0
Treatment Group NonCompliers	0	1

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JOBS Data

The JOBS data are from a Michigan University Prevention Research Center study of interventions aimed at preventing poor mental health of unemployed workers and promoting high quality of reemployment. The intervention consisted of five half-day training seminars that focused on problem solving, decision making group processes, and learning and practicing job search skills. The control group received a booklet briefly describing job search methods and tips. Respondents were recruited from the Michigan Employment Security Commission. After a series of screening procedures, 1801 were randomly assigned to treatment and control conditions. Of the 1249 in the treatment group, only 54% participated in the treatment.

The variables collected in the study include depression scores and outcome measures related to reemployment. Background variables include demographic and psychosocial variables.

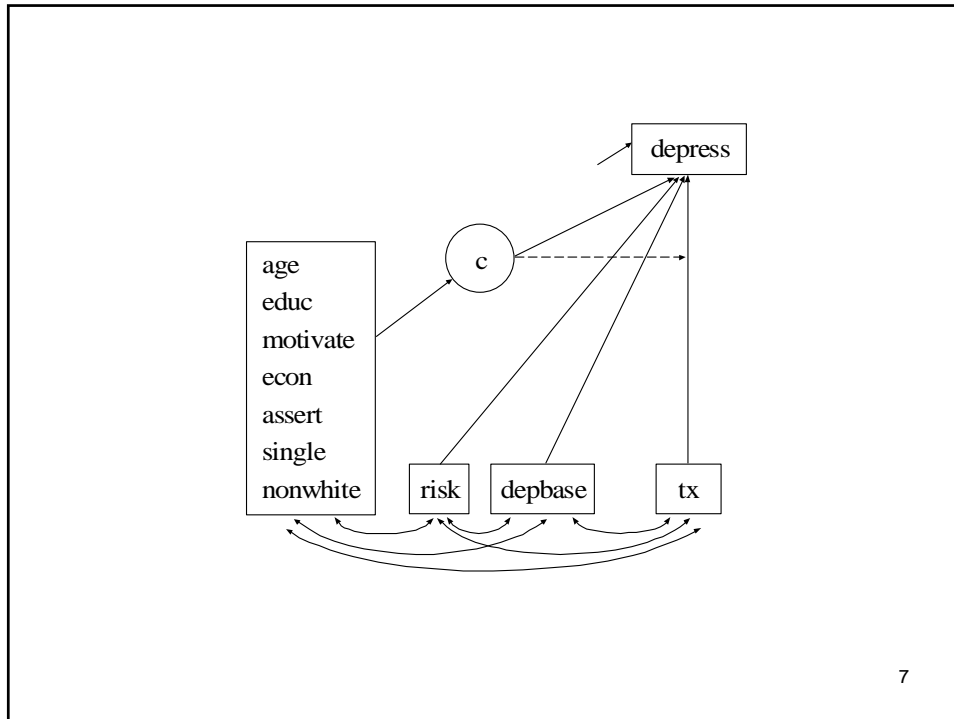
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JOBS Data (Continued)

Data for the analysis include the outcome variable of depression and the background variables of treatment status, age, education, marital status, SES, ethnicity, a risk score for depression, a pre-intervention depression score, a measure of motivation to participate, and a measure of assertiveness. A subset of 502 individuals classified as having high-risk of depression were analyzed.

The analysis replicates that of Little and Yau (1998).

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Input For Complier Average Causal Effect (CACE) Model

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TITLE:          Complier Average Causal Effect (CACE) estimation in a
                 randomized trial.

DATA:           FILE IS wjobs.dat;

VARIABLE:      NAMES ARE depress risk Tx depbase age motivate educ assert
                 single econ nonwhite x10 c1 c2;

USEV ARE depress risk Tx depbase age motivate educ assert
                 single econ nonwhite c1-c2;

CLASSES = c(2);
TRAINING = c1-c2;

ANALYSIS:      TYPE = MIXTURE;

MODEL:         %OVERALL%

                 depress ON Tx risk depbase;
                 c#1 ON age educ motivate econ assert single nonwhite;
                 %C#2%           !c#2 is the noncomplier class (noshows)

                 [depress];

                 depress ON Tx@0;

OUTPUT:        TECH8;

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Output Excerpts Complier Average Causal Effect (CACE) Model

Tests Of Model Fit

Loglikelihood

HO Value -729.414

Information Criteria

Number of Free Parameters	14
Akaike (AIC)	1486.828
Bayesian (BIC)	1545.888
Sample-Size Adjusted BIC	1501.451
(n* = (n + 2) / 24)	
Entropy	0.727

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Output Excerpts Complier Average Causal Effect (CACE) Model (Continued)

Model Results

FINAL CLASS COUNTS AND PROPORTIONS OF TOTAL SAMPLE SIZE

Class 1	271.93488	0.54170
Class 2	230.06512	0.45830

CLASSIFICATION OF INDIVIDUALS BASED ON THEIR MOST LIKELY CLASS MEMBERSHIP

Class Counts and Proportions

Class 1	278	0.55378
Class 2	224	0.44622

Average Class Probabilities by Class

	1	2
Class 1	0.900	0.100
Class 2	0.097	0.903

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**Output Excerpts Complier Average Causal Effect
(CACE) Model (Continued)**

Model Results (Continued)

	Estimates	S.E.	Est./S.E.
Class 1			
Depress ON			
TX	-.310	.130	-2.378
RISK	.912	.247	3.685
DEPBASE	-1.463	.181	-8.077
Residual Variances			
DEPRESS	.506	.037	13.742
Intercepts			
DEPRESS	1.812	.299	6.068

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**Output Excerpts Complier Average Causal Effect
(CACE) Model (Continued)**

Model Results (Continued)

	Estimates	S.E.	Est./S.E.
Class 2			
Depress ON			
TX	.000	.000	.000
RISK	.912	.247	3.685
DEPBASE	-1.463	.181	-8.077
Residual Variances			
DEPRESS	.506	.037	13.742
Intercepts			
DEPRESS	1.633	.273	5.977

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Output Excerpts Complier Average Causal Effect (CACE) Model (Continued)

Model Results (Continued)

LATENT CLASS REGRESSION MODEL PART

C#1	ON			
AGE		.079	.015	5.184
EDUC		.300	.068	4.390
MOTIVATE		.667	.157	4.243
ECON		-.159	.152	-1.045
ASSERT		-.376	.143	-2.631
SINGLE		.540	.283	1.908
NONWHITE		-.499	.317	-1.571
Intercepts				
C#1		-8.740	1.590	-5.498

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Further Readings On CACE

- Angrist, J.D., Imbens, G.W., Rubin, D.B. (1996). Identification of causal effects using instrumental variables. Journal of the American Statistical Association, 91, 444-445.
- Jo, B. (2002). Estimation of intervention effects with noncompliance: Alternative model specifications. Journal of Educational and Behavioral Statistics, 27, 385-409.
- Jo, B. (2002). Statistical power in randomized intervention studies with noncompliance. Psychological Methods, 7, 178-193.
- Little, R.J. & Yau, L.H.Y. (1998). Statistical techniques for analyzing data from prevention trials: treatment of no-shows using Rubin's causal model. Psychological Methods, 3, 147-159.

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