



# ELABORATED EVALUATION OF MODE EFFECTS IN MIXED MODE DATA

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# Introduction



- different sample members choose different modes
- mode effects:
  - ◆ selection effect:  
different mode, different respondents  
*makes MM attractive*
  - ◆ measurement effect:  
different mode, different measurement  
*e.g. social desirability, primacy and recency effects, acquiescence, ...*

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- differences between groups
  - ◆ = different respondents?
  - ◆ = different measurement?



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- differences between groups
  - ◆ = different respondents?
  - ◆ = different measurement?
  
- solution: compare MM data with comparable single-mode data

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- European Social Survey (ESS), 2008, 4<sup>th</sup> wave
- FTF = expensive

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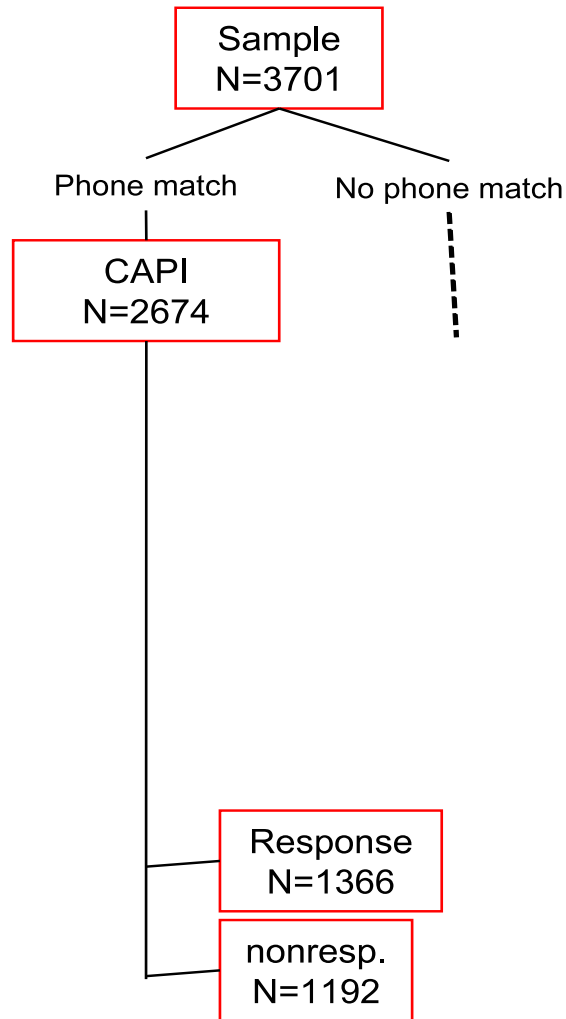
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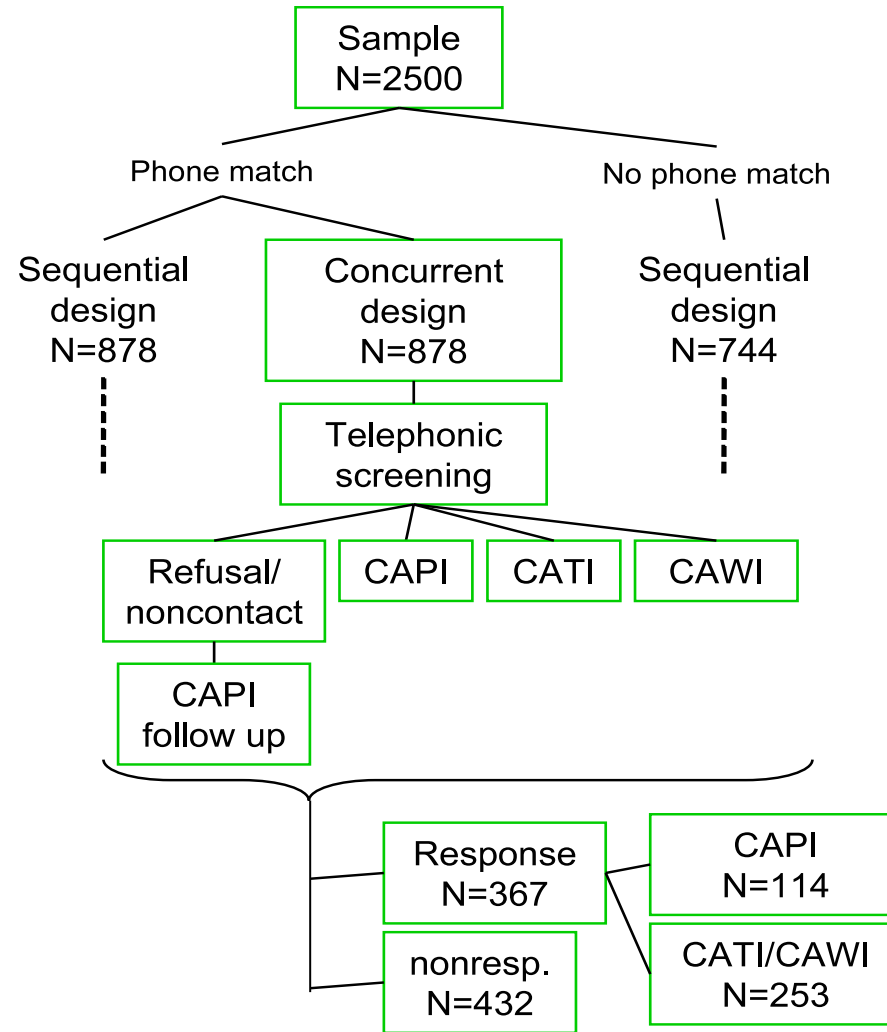
- European Social Survey (ESS), 2008, 4<sup>th</sup> wave
- FTF = expensive
- ⇒ MMDC experiment
  - ◆ the Netherlands
  - ◆ costs ↓?
  - ◆ equal data quality?

## ESS round 4



RR=53.40%

## MM experiment



RR=45.93%

# Comparability assumption

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- comparability?
  - ◆ response rates
  - ◆ socio-demographic comparison



- political Interest
  - ◆ 1=not at all interested  
2=hardly interested  
3=quite interested  
4=very interested
  - ◆ expectations:
    - social desirability bias
    - nonrespondents less interested
  - ◆ two versions:
    - FTF:  $I_p \sim \text{Multin}(\pi_p)$
    - Tel./Web:  $I_{wt} \sim \text{Multin}(\pi_{wt})$

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- further we define  $M$ 
  - ◆ the mode a respondent 'chooses'
  - ◆ 0= CATI or CAWI, 1=CAPI
  - ◆  $M \sim b(\tau)$

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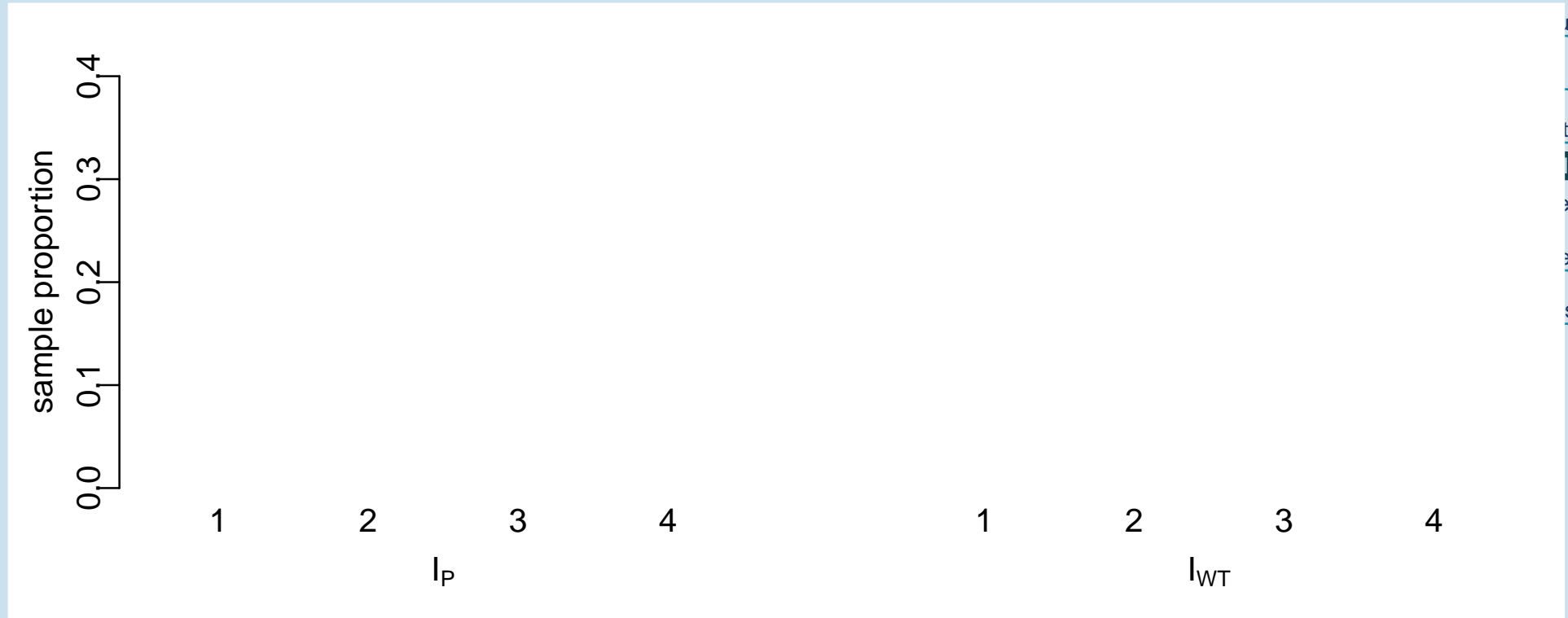
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# Effect calculation



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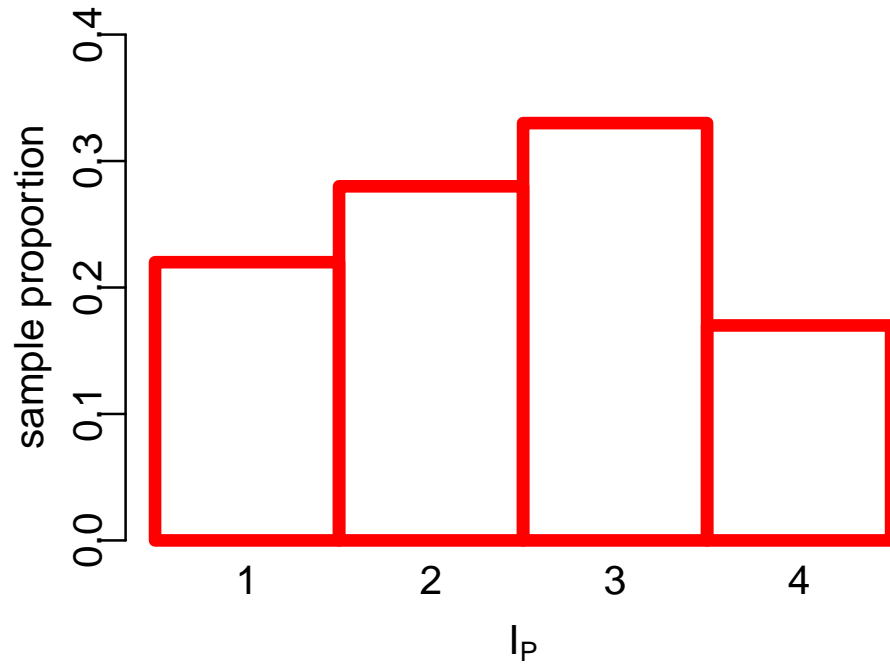
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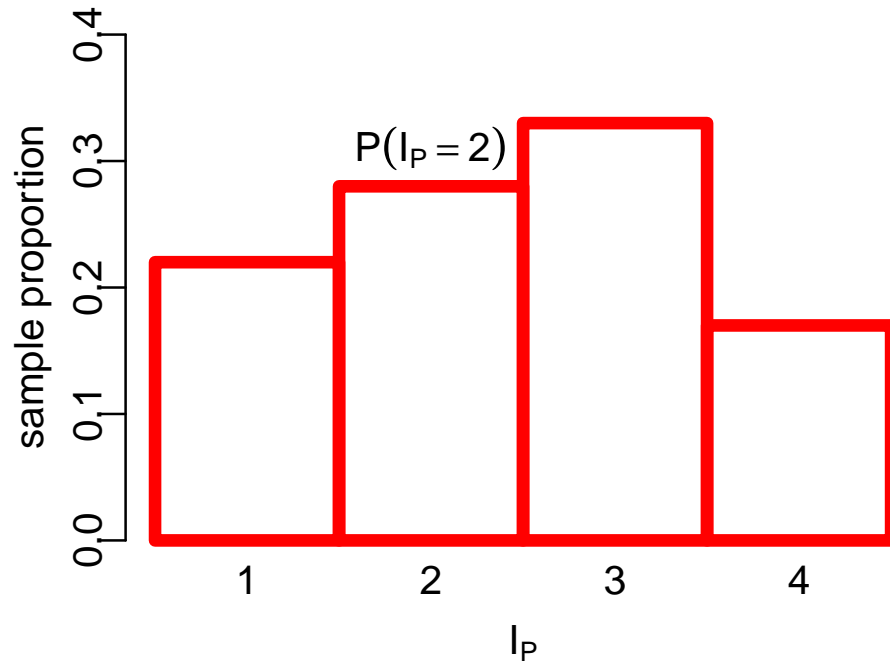


# Effect calculation

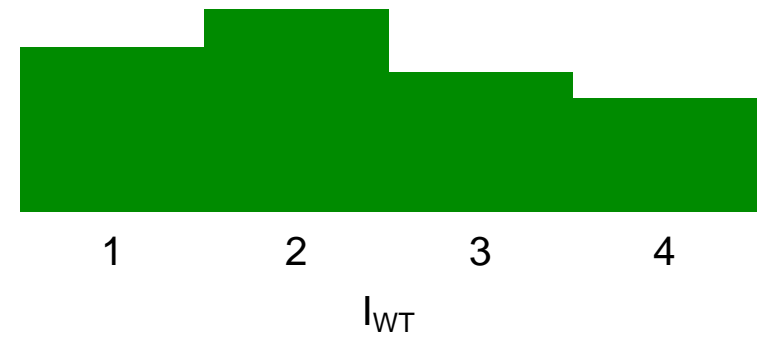
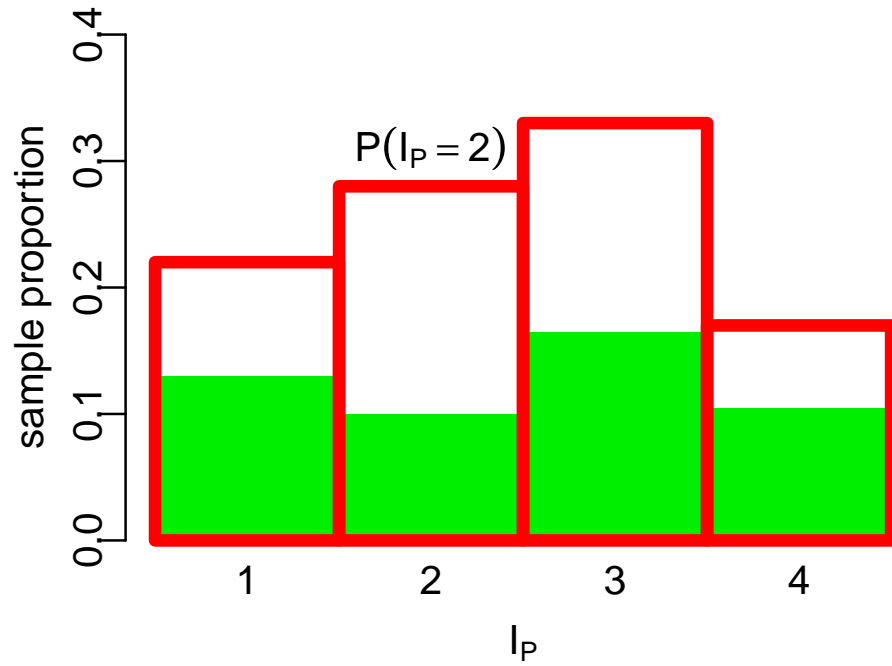




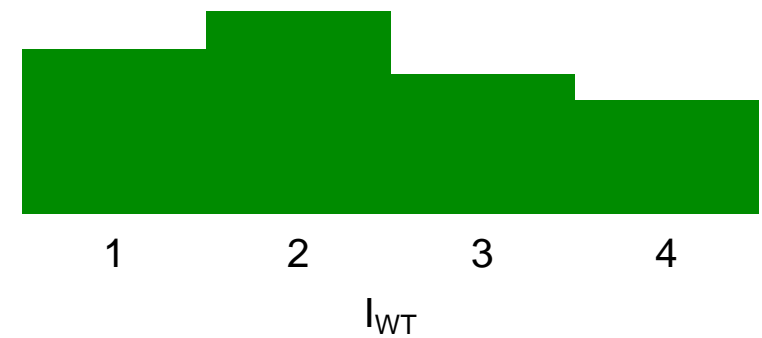
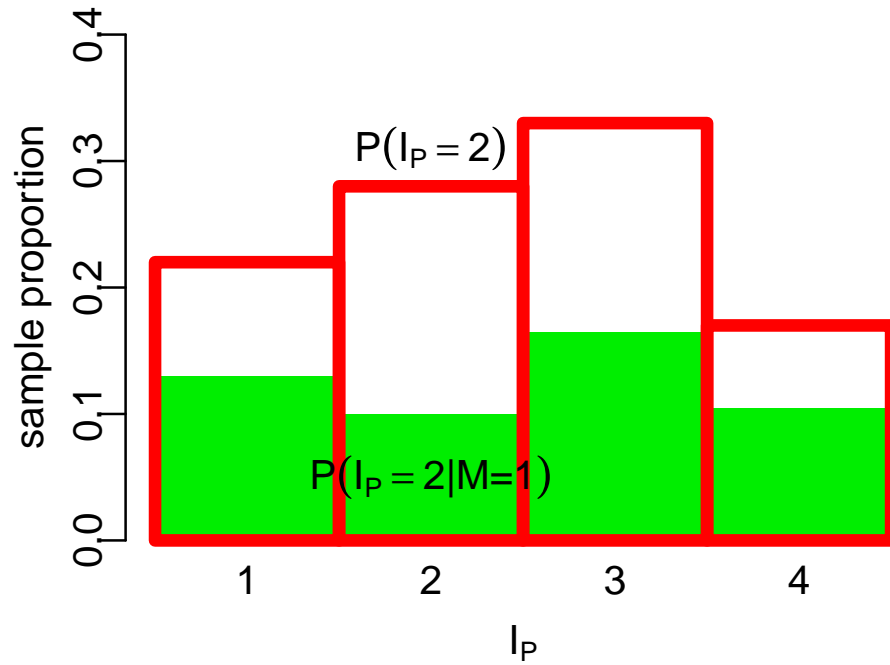
# Effect calculation



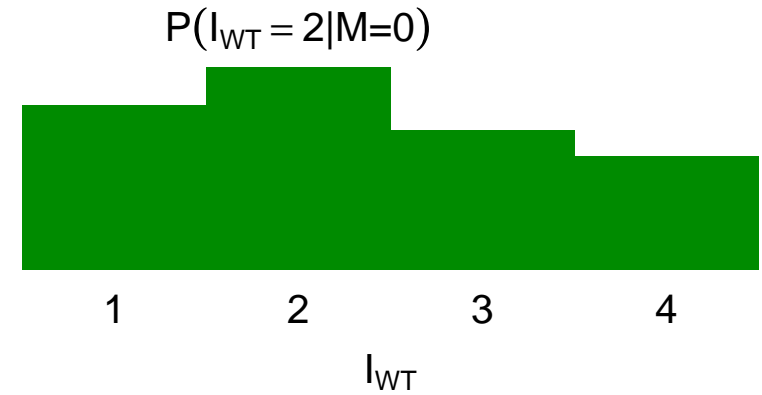
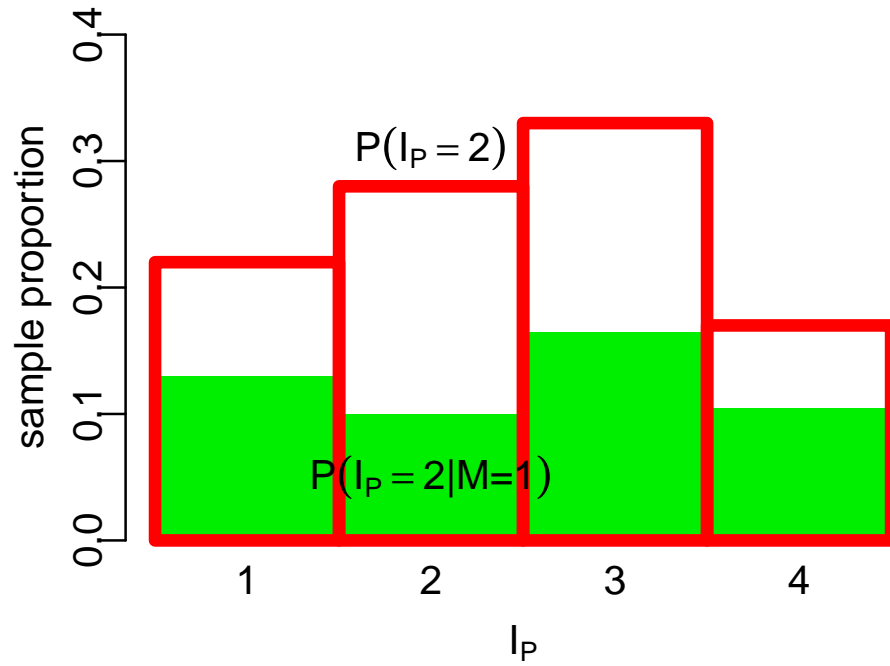
# Effect calculation



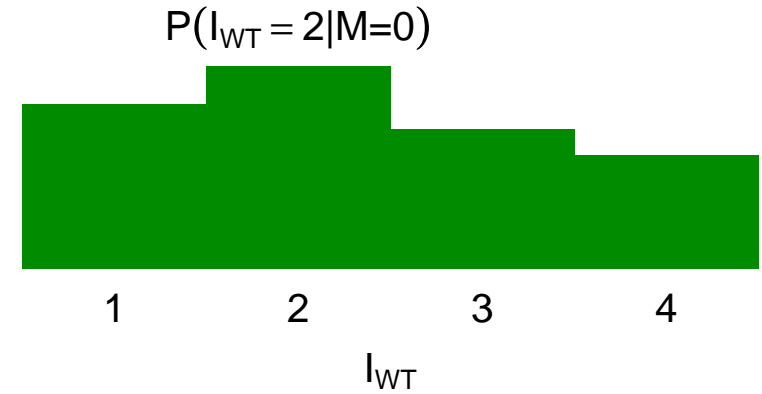
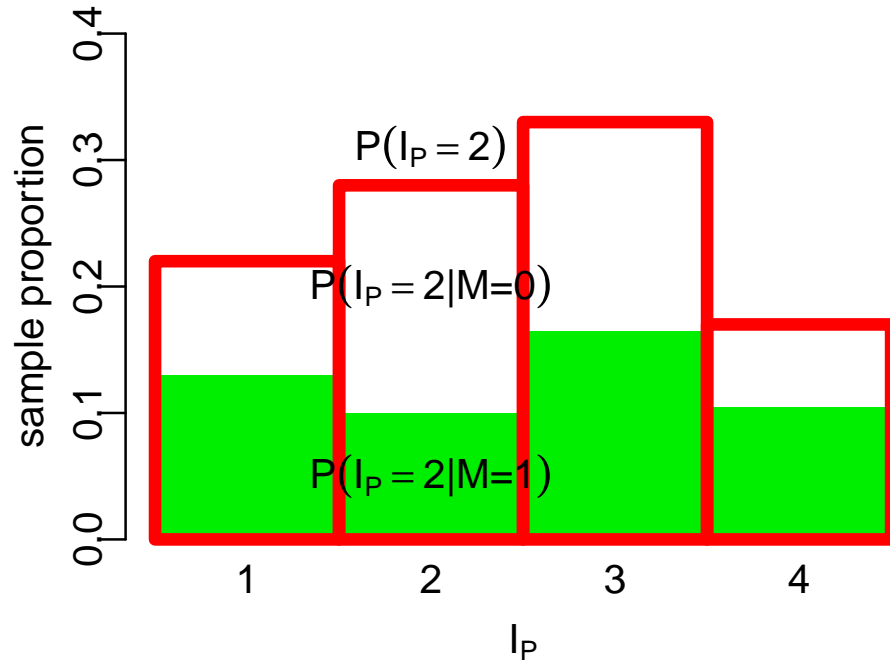
# Effect calculation



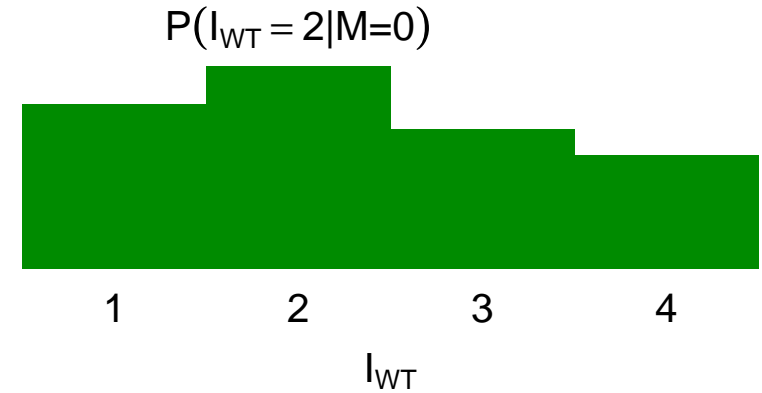
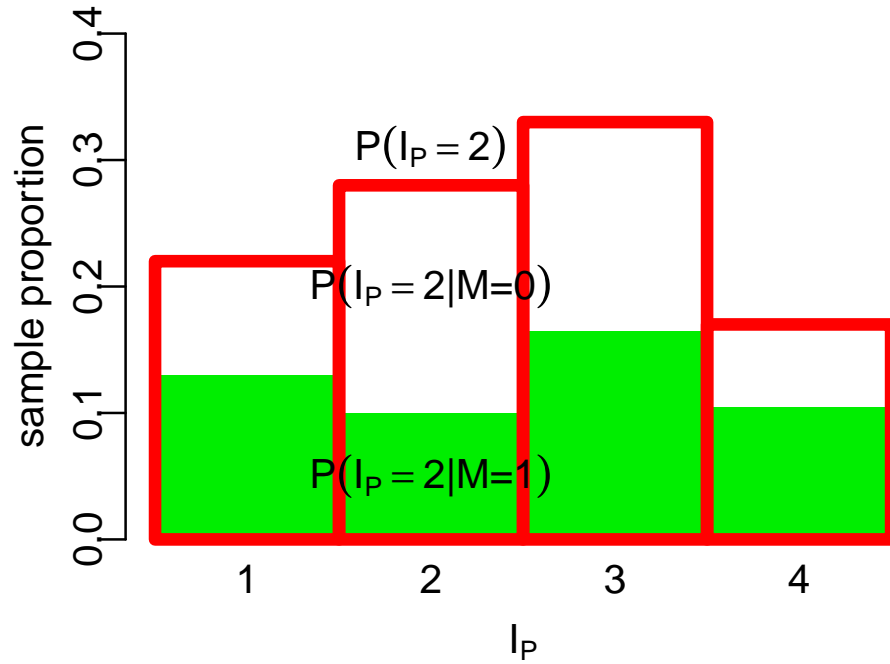
# Effect calculation



# Effect calculation

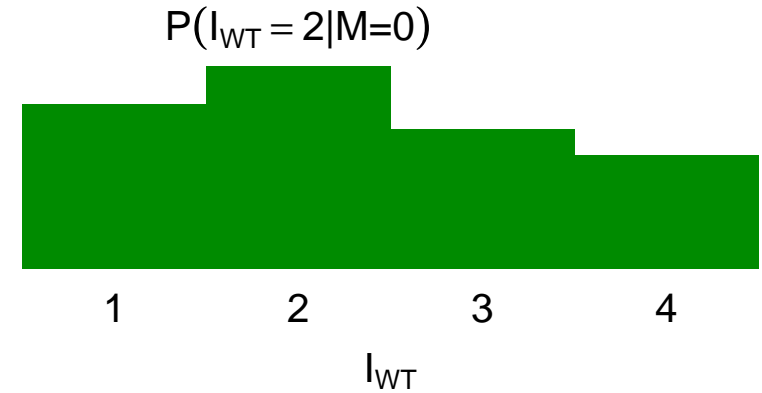
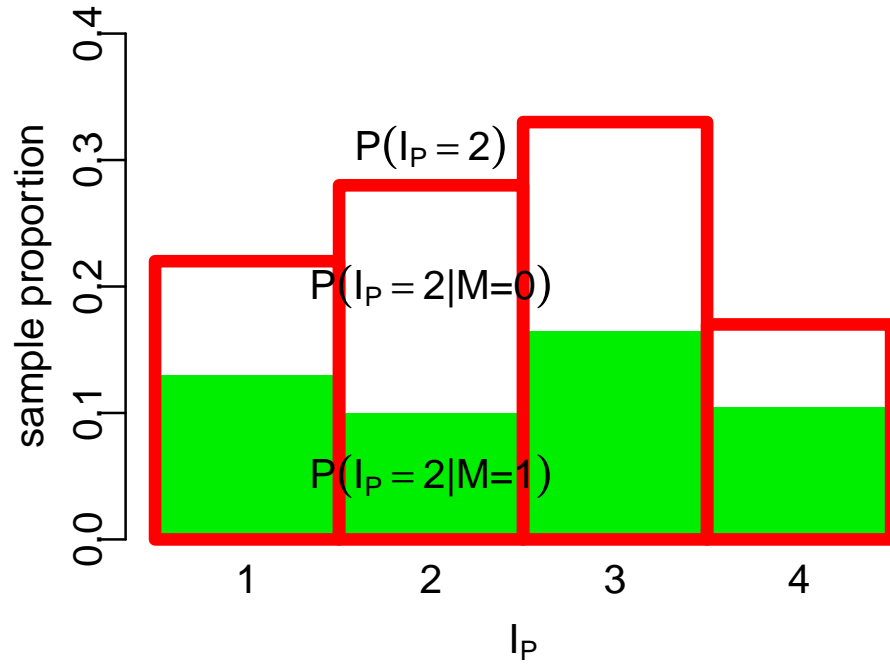


# Effect calculation



selection effect =  $P(I_p|M = 1)$  -  $P(I_p|M = 0)$

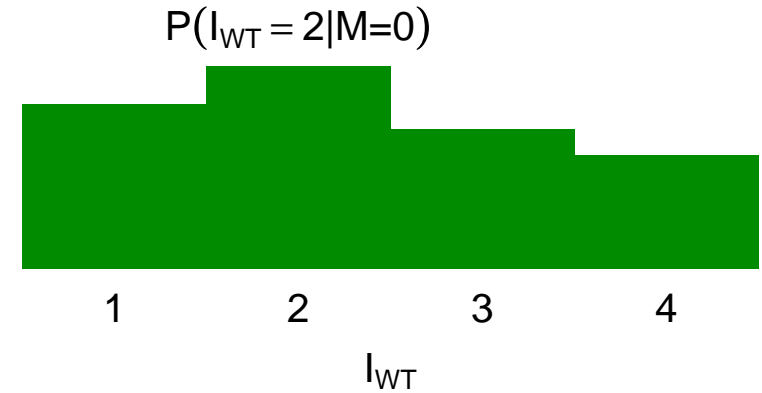
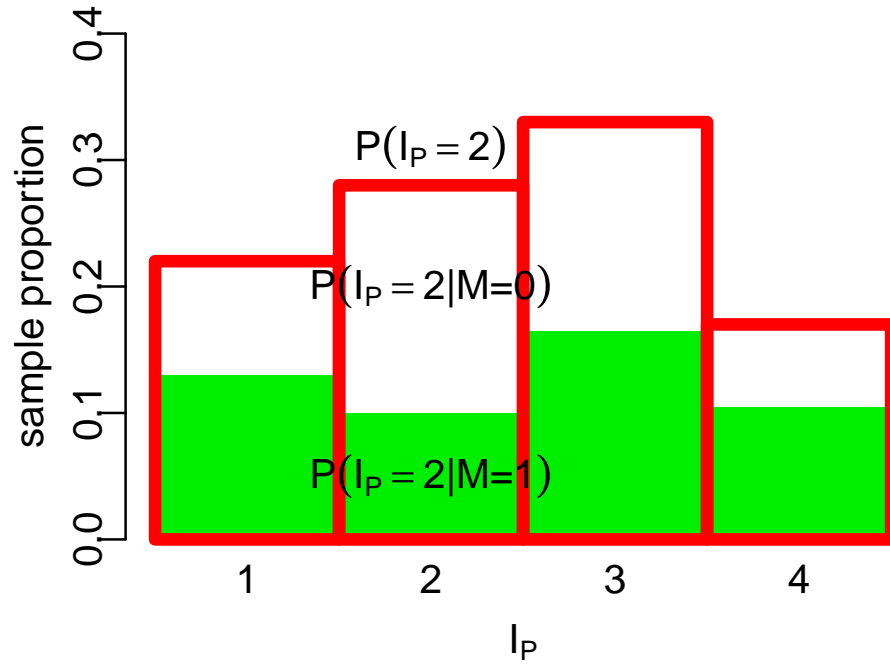
# Effect calculation



selection effect =  $P(I_p|M=1) - P(I_p|M=0)$

measurement effect =  $P(I_{wt}|M=0) - P(I_p|M=0)$

# Effect calculation



selection effect =  $P(I_p | M = 1) - P(I_p | M = 0)$

measurement effect =  $P(I_{wt} | M = 0) - P(I_p | M = 0)$

$$P(I_p | M = 0) = P(I_p) \frac{1}{P(M=0)} - P(I_p | M = 1) \frac{P(M=1)}{P(M=0)}$$



$$\text{selection effect} = P(I_p | M = 1) - P(I_p | M = 0)$$

$$\text{measurement effect} = P(I_{wt} | M = 0) - P(I_p | M = 0)$$

$$P(I_p | M = 0) = P(I_p) \frac{1}{P(M=0)} - P(I_p | M = 1) \frac{P(M=1)}{P(M=0)}$$

- bayesian approach

- $p(\theta | y) = \frac{p(y | \theta)p(\theta)}{p(y)}$

- simulation of 10.000 values

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# Results



# Graphs of simulations

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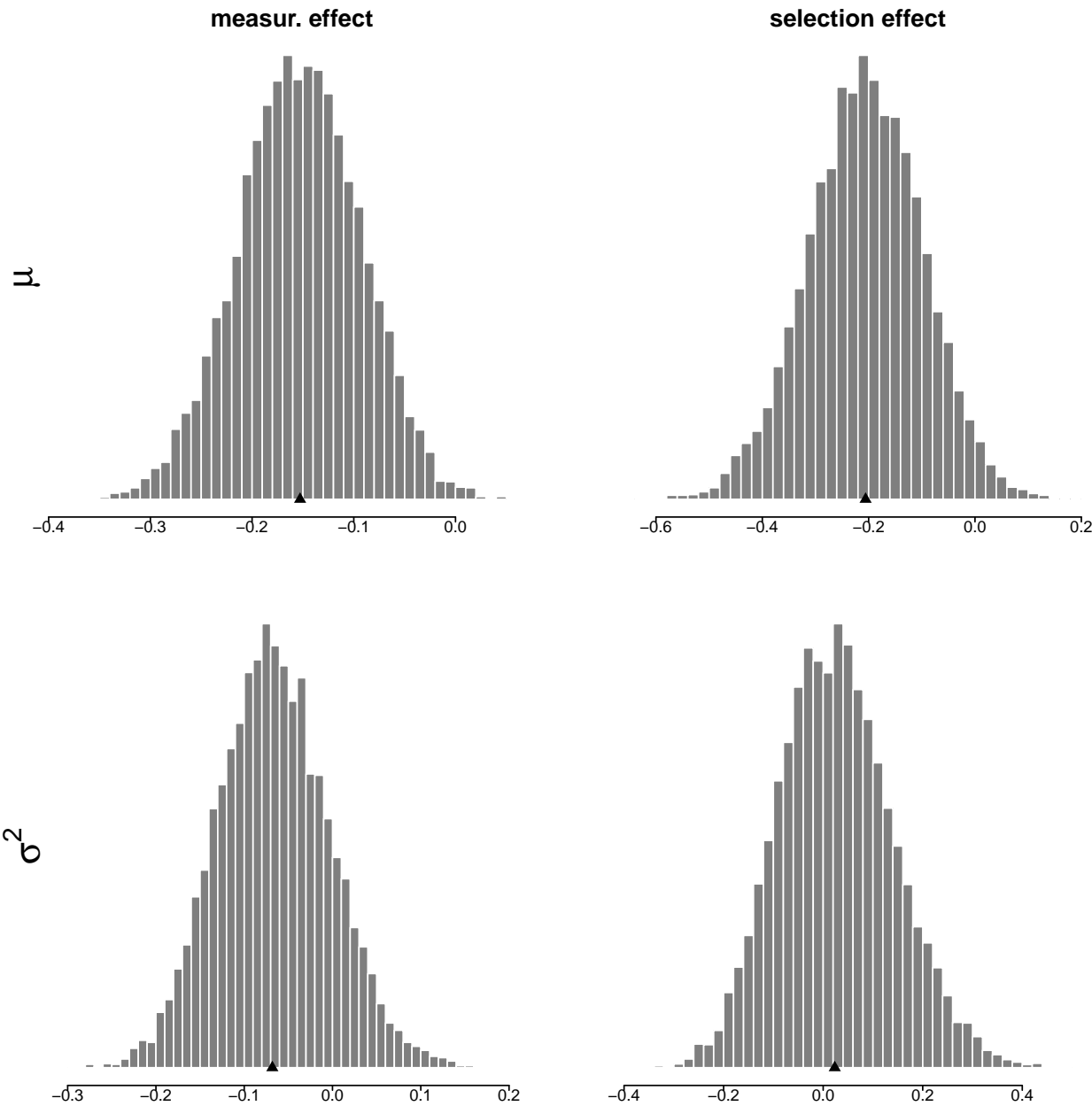
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	median	95% confidence interval		p*
		2,5 percentile	97,5 percentile	
<b>MEASUREMENT EFFECT</b>				
P(not at all interested)	-0,029	-0,068	0,014	0,087
P(hardly interested)	0,179	0,106	0,253	0,000
P(quite interested)	-0,119	-0,198	-0,040	0,002
P(very interested)	-0,032	-0,074	0,015	0,081
mean	-0,153	-0,273	-0,038	0,005
variance	-0,068	-0,187	0,063	0,150
<b>SELECTION EFFECT</b>				
P(not at all interested)	0,032	-0,041	0,131	0,219
P(hardly interested)	0,083	-0,033	0,218	0,086
P(quite interested)	-0,070	-0,205	0,068	0,158
P(very interested)	-0,054	-0,111	0,027	0,086
mean	-0,206	-0,425	0,001	0,026
variance	0,023	-0,185	0,271	0,425

based on 10.000 simulations

[\*] The probability p refers to the number of simulations with a measurement effect/selection effect smaller than zero ( $P(\text{sim} < 0)$ ) for positive median values, or larger than zero ( $P(\text{sim} > 0)$ ) for negative median values.

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- measurement effects

$$(\pi_{wt}|M = 0) - (\pi_p|M = 0)$$

- comparability assumption?

- ◆ bias?

- ◆ mode-preference, mode-acceptance?



- measurement effects

$$(\pi_{wt}|M = 0) - (\pi_p|M = 0)$$

- comparability assumption?

- ◆ bias?

- ◆ mode-preference, mode-acceptance?

- interpretation?

Web and telephone confounded

→ use maximum 2 modes

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- MMDC: include small comparative group
- simulate respondents' values  
≈ multiple imputation
- power?