Nonresponse Bias Mitigation Strategies

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Focus

- Nonresponse bias, not response rates
- Emphasis on selected findings and more recent developments

1. Study design features
   - Level of effort
   - Mode
   - Incentives
2. Strategies during data collection
   - Responsive Design
   - Adaptive Survey Design
3. Postsurvey adjustments
   - Modeling approach
   - Auxiliary information

Study Design Features: Level of effort

- Curtin, Presser, and Singer (2000)
  - 1-2 vs. 3+; 1-5 vs. 6+
- Numerous studies following Curtin, Presser, and Singer (2000)
  - In general, little if any relationship between effort and survey estimates
  - Keeter et al. (2000), with an experimental design, an exception
- Lin and Schaeffer (1995)
  - Nonresponse bias could even be in the opposite direction (we return to this under adjustment)
- Yet, level of effort measured as contact attempts has risen over time (e.g., Curtin, Presser, and Singer, 2000; 2005)

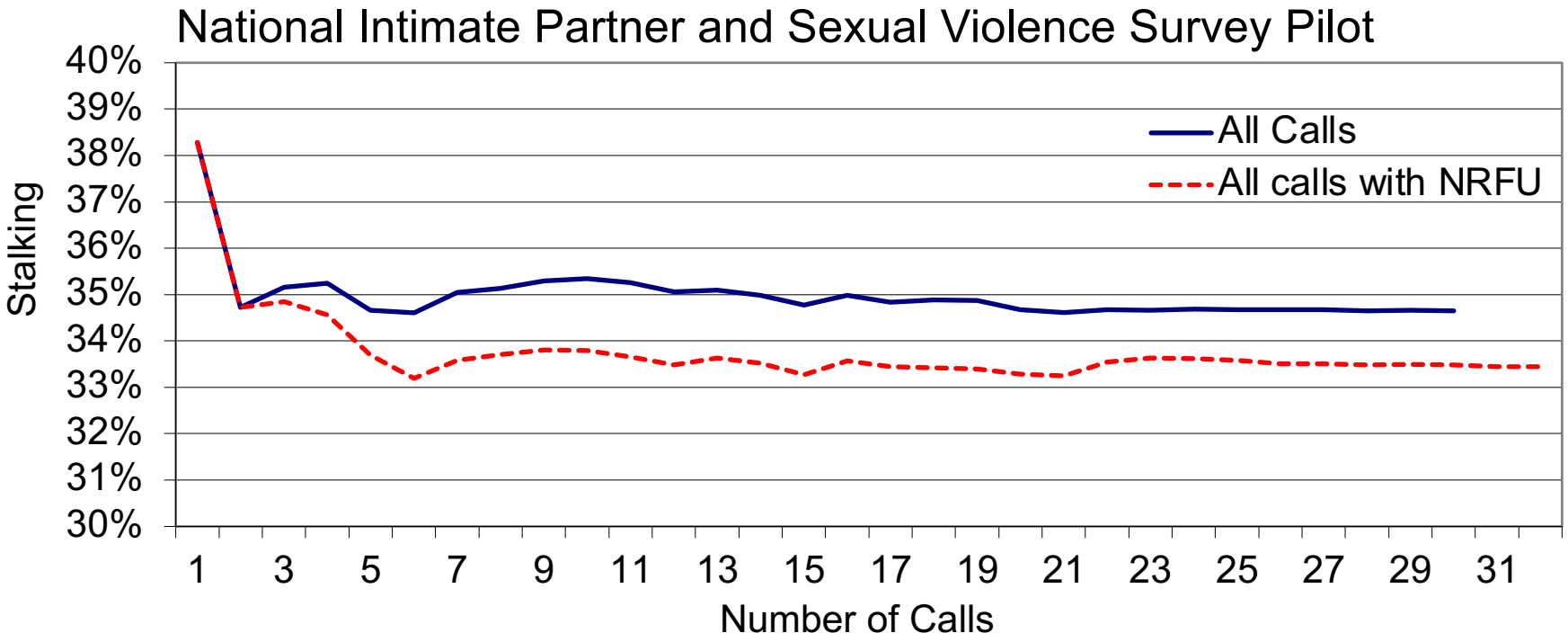
Survey Design Features: Mode of Data Collection

- A very expansive topic, but two key points with regard to nonresponse bias:
  - Modes vary in resulting nonresponse bias (e.g., Rothbaum and Bee, 2021, CPS ASEC)
  - Modes that reduce nonresponse bias may induce greater measurement bias for some estimates (e.g., Sakshaug, Yan, and Tourangeau, 2010)
  - Designs with multiple modes rarely include random assignment to allow estimation of mode-specific errors

Survey Design Features: Incentives

- Leverage-salience theory and related experiments to produce nonresponse (Groves, Singer, and Corning, 2000; Groves, Presser, and Dipko, 2004; Groves et al., 2006)
  - Those who are less interested or involved in the topic are less likely to participate
  - Monetary incentives are particularly effective for these groups of individuals

Survey Design Features: Level of Effort and Incentives



Source: Peytchev, Baxter, and Carley-Baxter, 2009

Strategies During Data Collection

- Heterogeneity
  - Leverage-salience theory (Groves, Singer, and Corning, 2000)
- Responsive Design (Groves and Heeringa, 2006)
  - Multiple phases and multiple protocols
  - Error-sensitive indicators play a central role
- Adaptive Survey Design (Wagner, 2008; Schouten, Peytchev, and Wagner, 2017)
  - Tailoring or protocols at the individual level
  - Often involve models to assign protocols to sample members during data collection

Strategies During Data Collection: Dutch Labor Force Survey

Strata

- Registered unemployed
- 65+ households without employment
- Young household members without employment
- Non-western without employment
- Western without employment
- Young household member and employed
- Non-western and employed
- Western and employed
- Large households

Modes

- Web
- Telephone
- Face to Face

- Only mode vs. follow-up mode

- Standard vs. extended effort (contact attempts)

Source: Calinescu and Schouten, 2015

Strategies During Data Collection: Dutch Labor Force Survey

Estimated response propensities by mode and stratum

	Stratum								
	1	2	3	4	5	6	7	8	9
W	23.2%	23.6%	15.5%	10.8%	27.9%	27.7%	17.5%	36.7%	22.4%
TS	12.2%	31.4%	8.5%	4.7%	19.7%	13.3%	7.2%	18.1%	21.2%
TE	20.8%	41.3%	15.2%	8.6%	31.1%	23.8%	14.3%	33.3%	37.5%
F	43.5%	53.5%	42.2%	34.1%	45.1%	45.3%	35.9%	46.7%	54.6%
FE	52.4%	58.3%	51.0%	41.2%	51.2%	54.9%	46.0%	56.8%	61.4%
W→TS	28.3%	41.0%	20.2%	13.9%	36.3%	34.0%	20.8%	44.5%	23.1%
W→TE	32.8%	48.4%	23.8%	17.5%	42.1%	41.1%	25.8%	52.1%	24.4%
W→FS	46.3%	57.7%	38.6%	32.7%	50.0%	51.0%	39.3%	58.9%	50.0%
W→FE	49.8%	58.3%	43.4%	36.6%	52.6%	54.7%	44.3%	62.0%	54.2%

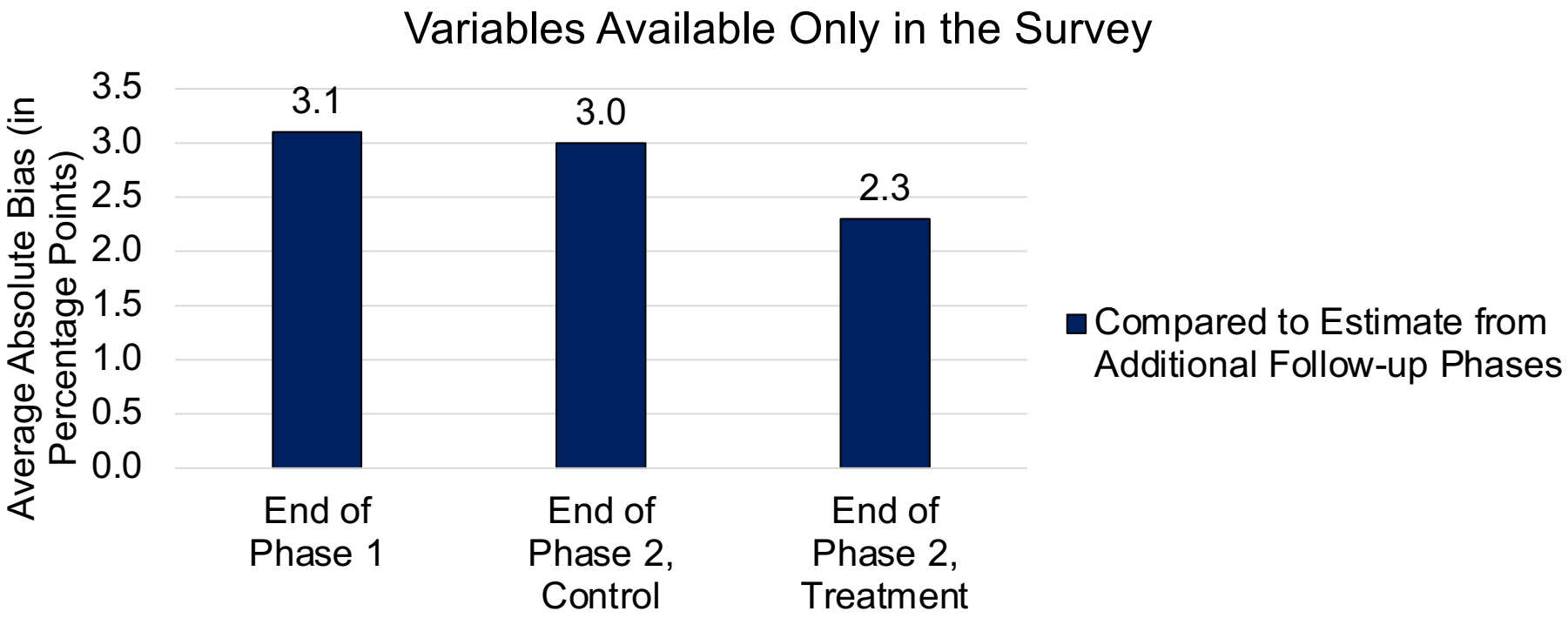
"W", "T" and "F" refer to Web, telephone and face-to-face; "S" and "E" refer to standard and extended effort. The strata are based on age, size of the household, number of registered unemployment and ethnicity.

Source: Calinescu and Schouten, 2015

Strategies During Data Collection: High School Longitudinal Study of 2009 (HSLS:09) 2013 Update

- Concept of Bias Propensity (Peytchev, Pratt, and Duprey, 2020)
  - Exclude paradata that are strong predictors only of nonresponse
  - Include demographic and substantive variables of interest
  - Allows identification of nonrespondents who contribute to nonresponse bias
- Intervene on underrepresented sample members based on the bias propensity
  - Prepaid $5 incentive
- Evaluate nonresponse bias reduction
  - Frame and prior round data
  - Additional phases of data collection

Strategies During Data Collection: HSLS:09 2013 Update



Source: Peytchev, Pratt, and Duprey, 2020

Postsurvey Adjustments

- Relatively small gains from alternative statistical approaches and estimation methods
  - Machine learning, e.g., tree-based methods (for reducing nonresponse bias)
    - Some can lead to increase in variance without a commensurate reduction in bias
  - Replication-based variance estimation methods (for reducing variance estimates)
  - It would have to be a very rudimentary statistical method to find a substantial improvement
- Substantial gains are possible from additional auxiliary information
  - A shift in approach from demographic characteristics to substantive variables
    - Designed paradata (Groves and Heeringa, 2006)
    - Data from other surveys, at lesser risk of nonresponse bias
    - Administrative data

Postsurvey Adjustments: Observations in Several Studies

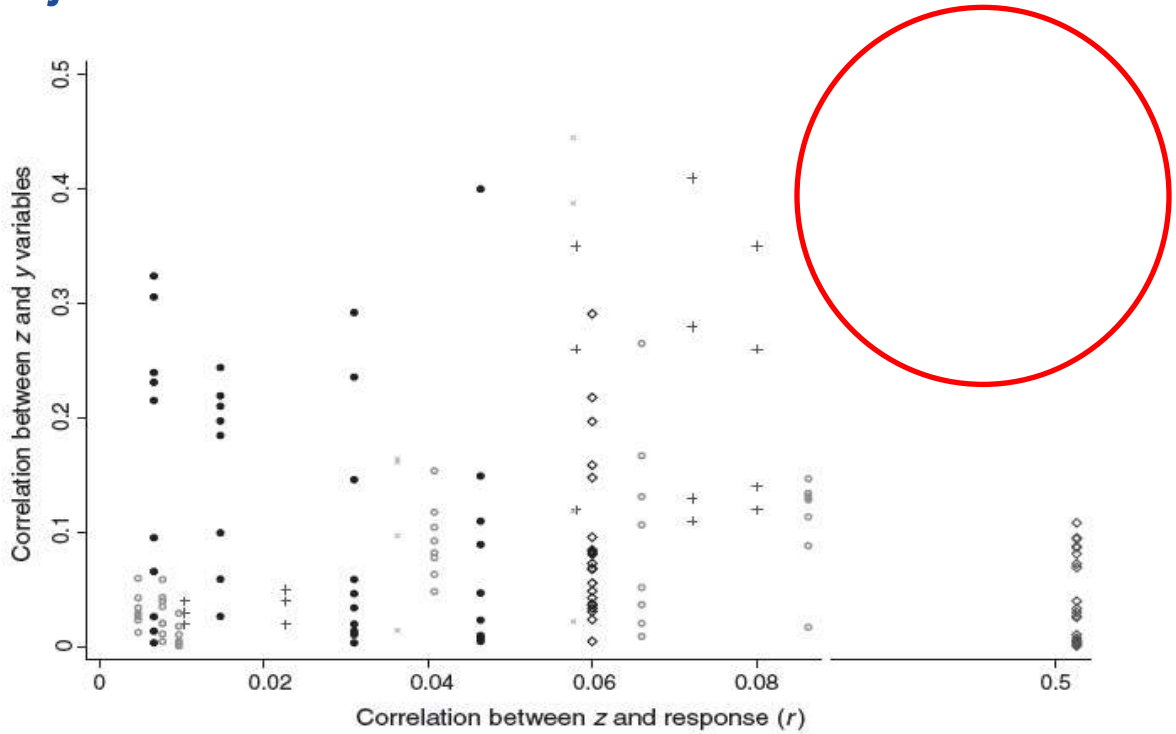


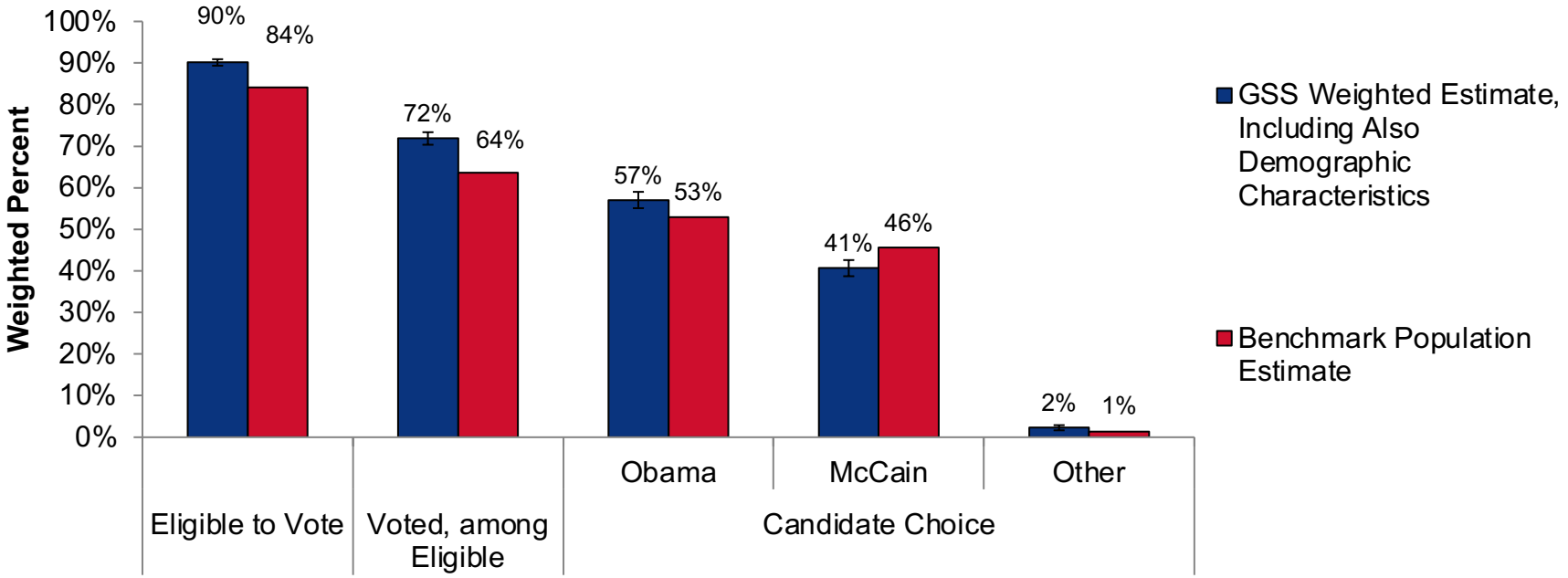
Fig. 1. Relationship between the correlation of z- and y-variables and correlation of z and response in five surveys (all correlations are shown as absolute values): +, UMTRI; ×, MEPS; ○, ESS; ◇, ANES; ●, NSFG

Kreuter et al. (2010). Using proxy measures and other correlates of survey outcomes to adjust for non-response: examples from multiple surveys. *JRSS-A.*

Postsurvey Adjustments

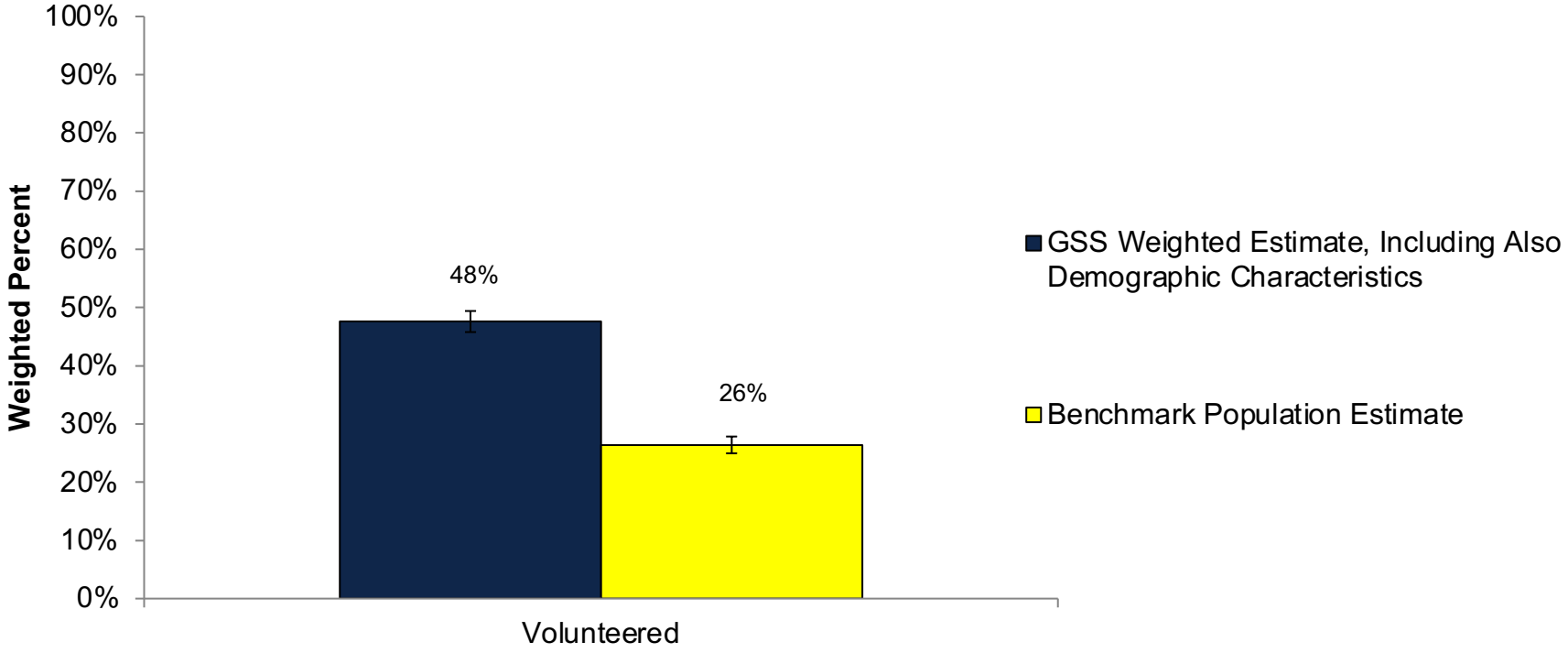
- Auxiliary variables informed by social science
  - Civic duty
    - Political participation is strongly related to survey participation
  - Altruism
    - Charitable activities are strongly related to survey participation

Postsurvey Adjustments: General Social Survey



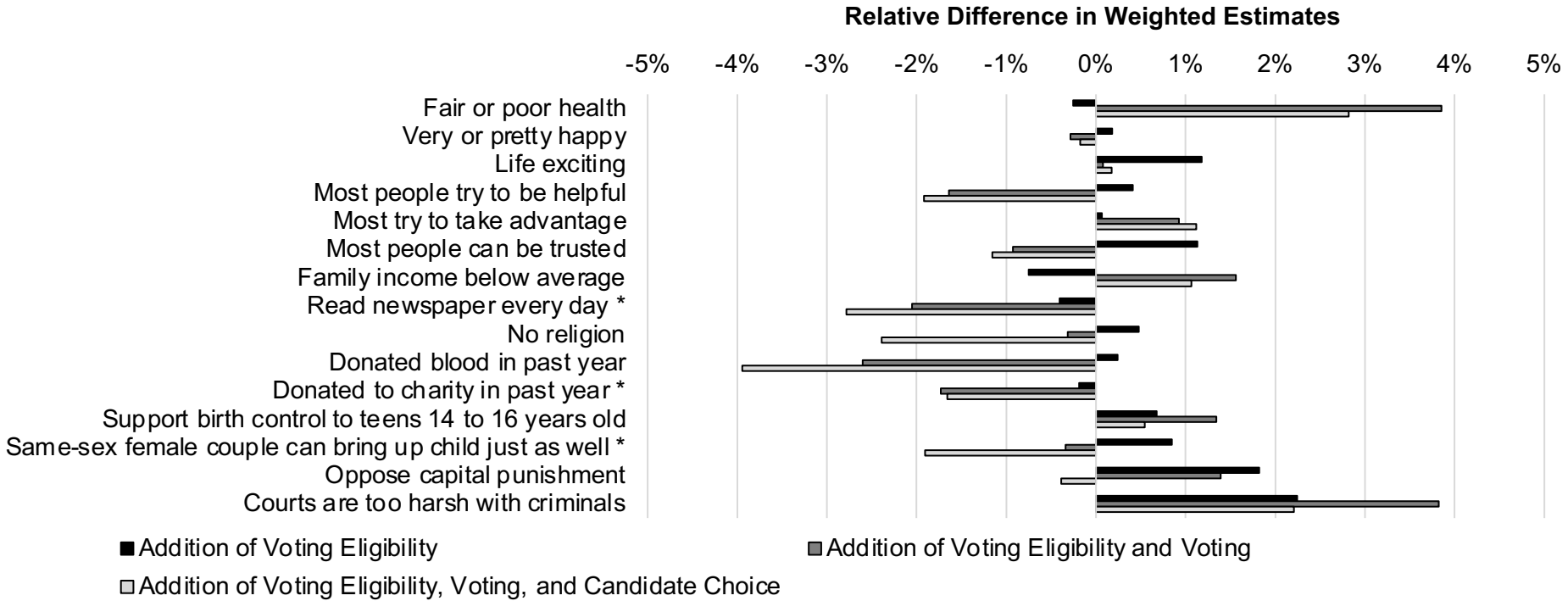
Source: Peytchev, Presser, and Zhang, 2018

Postsurvey Adjustments: General Social Survey



Source: Peytchev, Presser, and Zhang, 2018

Postsurvey Adjustments: GSS—Voting and Preference



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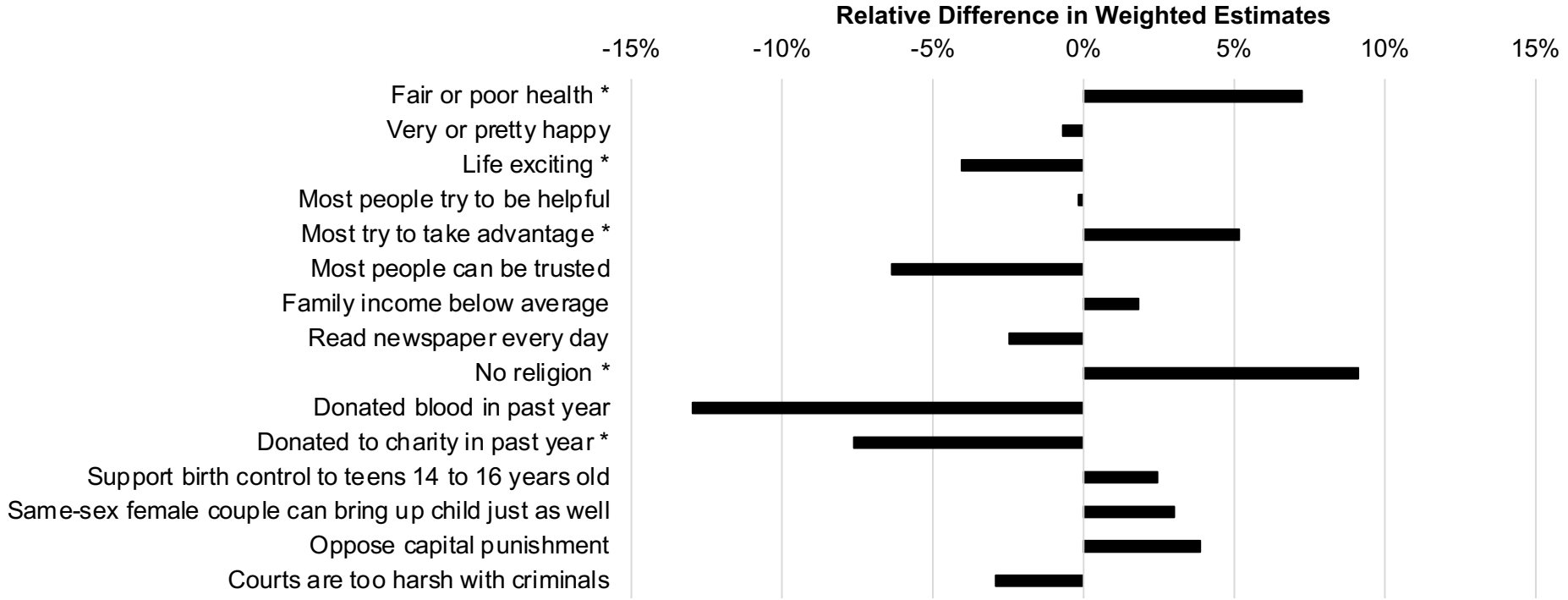
Postsurvey Adjustments: GSS—Voting and Preference



Source: Peytchev, Presser, and Zhang, 2018

Summary Remarks

- NRB is a counterfactual that is difficult to study
  - Contributes to a focus on response rates
- We usually know what design features can reduce NRB
  - But it often involves tradeoff with other sources of survey error
- We can have much smarter data collection
  - Added effort that needs to be planned
  - Requires statistical expertise
- Postsurvey adjustments
  - Over-emphasis of statical methods
  - Relying on demographic characteristics alone may be insufficient
  - Needed variables related to both nonresponse and survey variables of interest

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