



Competing Goals of Responsive Design in a Total Survey Error Framework: Minimization of Cost, Nonresponse Rates, Bias, and Variance

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Responsive Survey Designs

- *Framework* that includes:
 - Planning
 - Active monitoring
 - Changes to survey procedures during data collection
- Objectives are flexible
 - We do not know well what objectives can be achieved
 - We do not know how other aspects of the survey may be compromised when pursuing a particular objective
- Disparate examples
 - Objectives specified, but limited evidence of achieving them
 - Absence of a discussion of the likely interplay between different outcomes due to the implementation of a responsive design

Examples

- Groves and Heeringa (2006), face to face interviewing
 - Fit a logistic regression to identify cases with high response propensity
 - Increase data collection effort for those cases
- Laflamme et al. (2009), telephone interviewing
 - Fit a logistic regression to estimate response propensities
 - Target cases that have high estimated propensities
 - Later, exert more effort on cases with lower likelihood of completion
- Peytchev (2010), telephone interviewing
 - Fit a logistic regression to estimate response propensities
 - Assign better interviewers to low propensity cases to first contact
- Peytchev et al. (2010), face to face interviewing
 - Fit a logistic regression to estimate response propensities
 - Target cases with low estimated propensities

Responsive Survey Designs

- Possible uses include:
 1. Maximize response rates;
 2. Reduce cost (or analogously, increase the number of interviews);
 3. Reduce nonresponse bias;
 4. Reduce variances (increase effective sample size);
 5. Reduce other sources of error.

A Simulated Example

- National Comorbidity Survey-Replication
- Respondents: 1-2 call attempts
- Potential respondents: 3-4 call attempts
- Nonrespondents: 5+ call attempts

- 26% response rate in simulated Phase 1

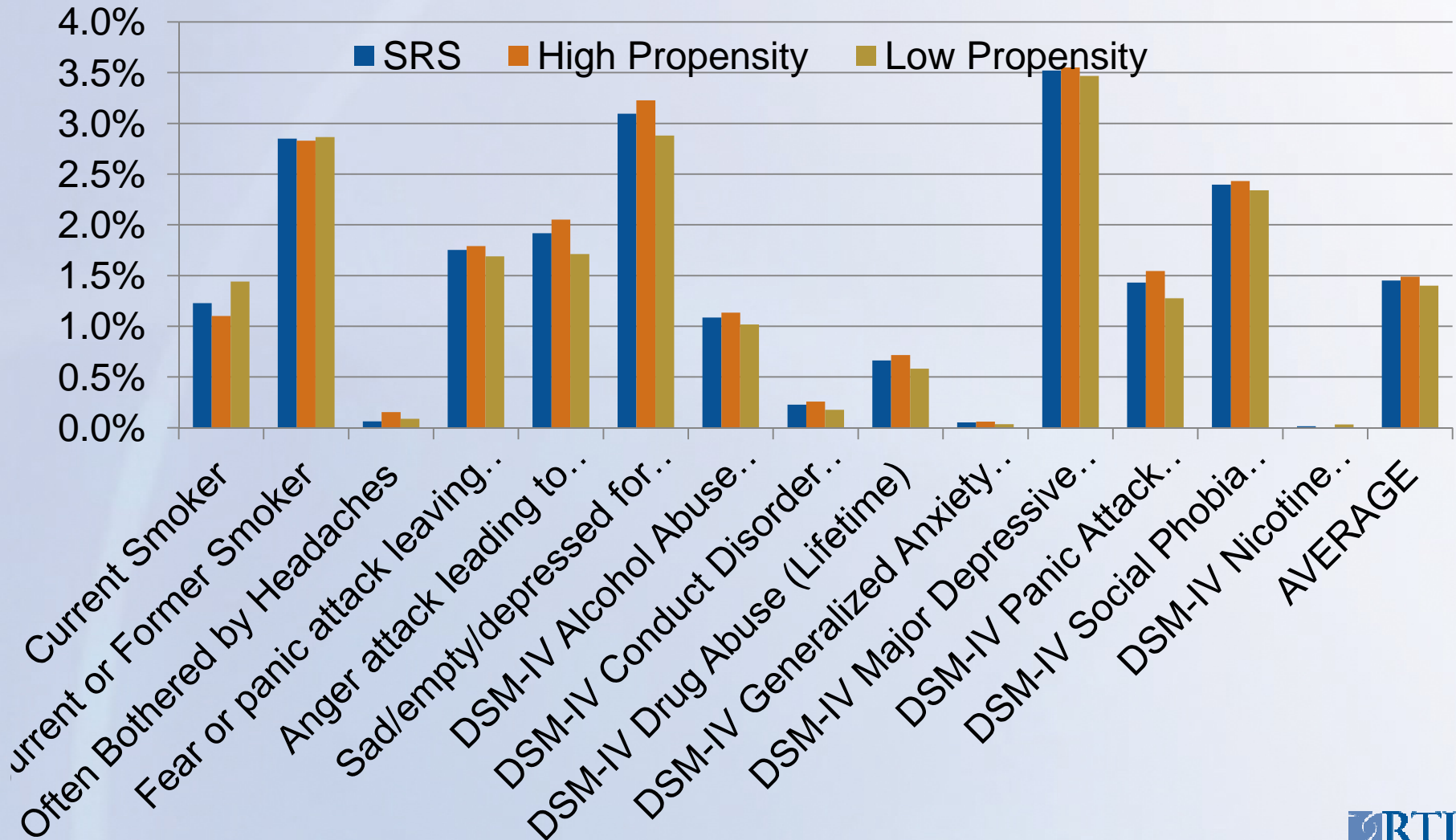
- Fit logistic regression predicting interview
 - Use only demographic variables in the propensity model

Simulation Design Continued

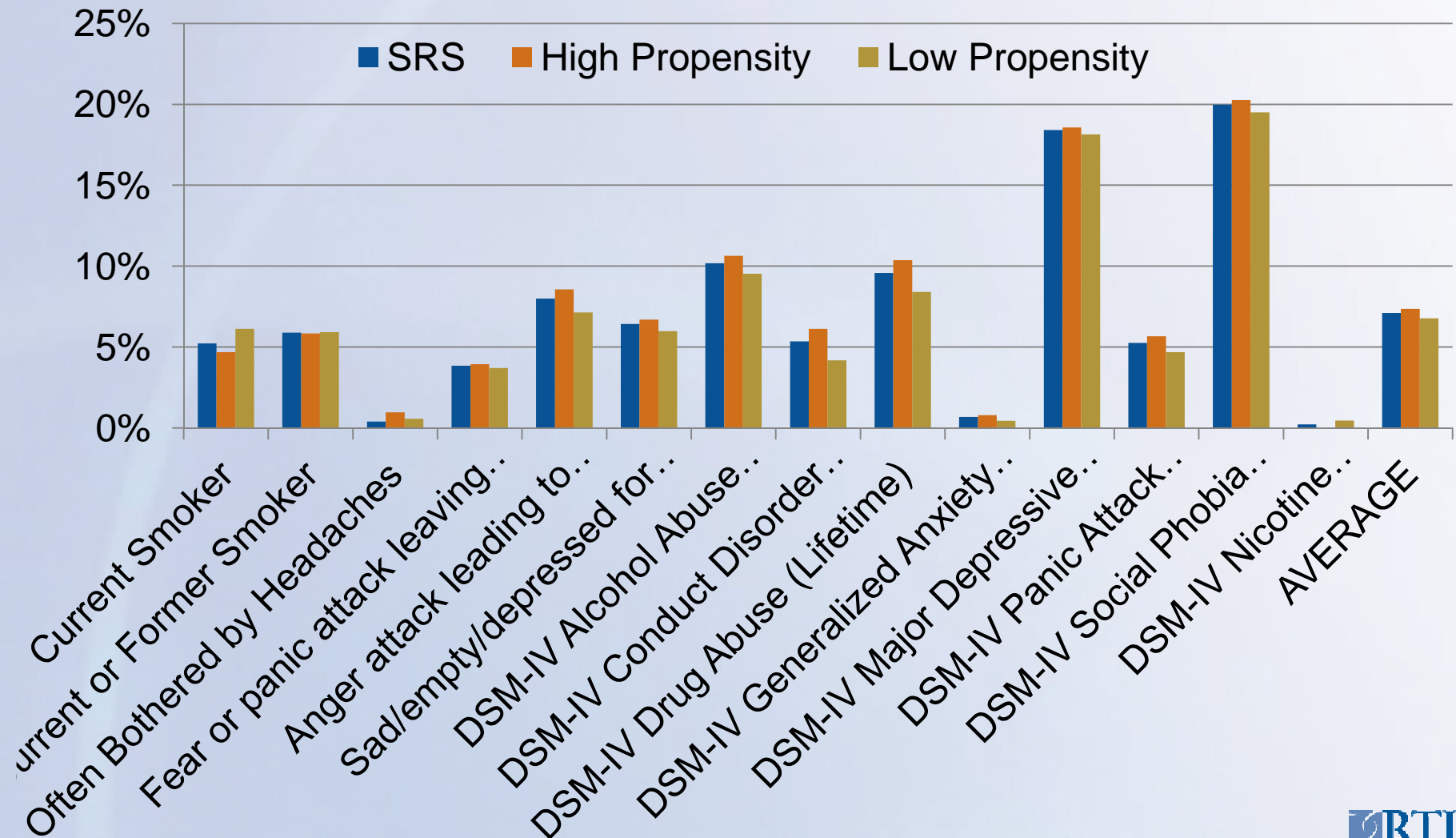
1. Select simple random sample of potential respondents
2. Select sample proportionate to response propensity (high propensity cases oversampled)
3. Select sample inversely proportionate to response propensity (low propensity cases oversampled)

Include these designs in the weighting, as well as a final nonresponse adjustment.

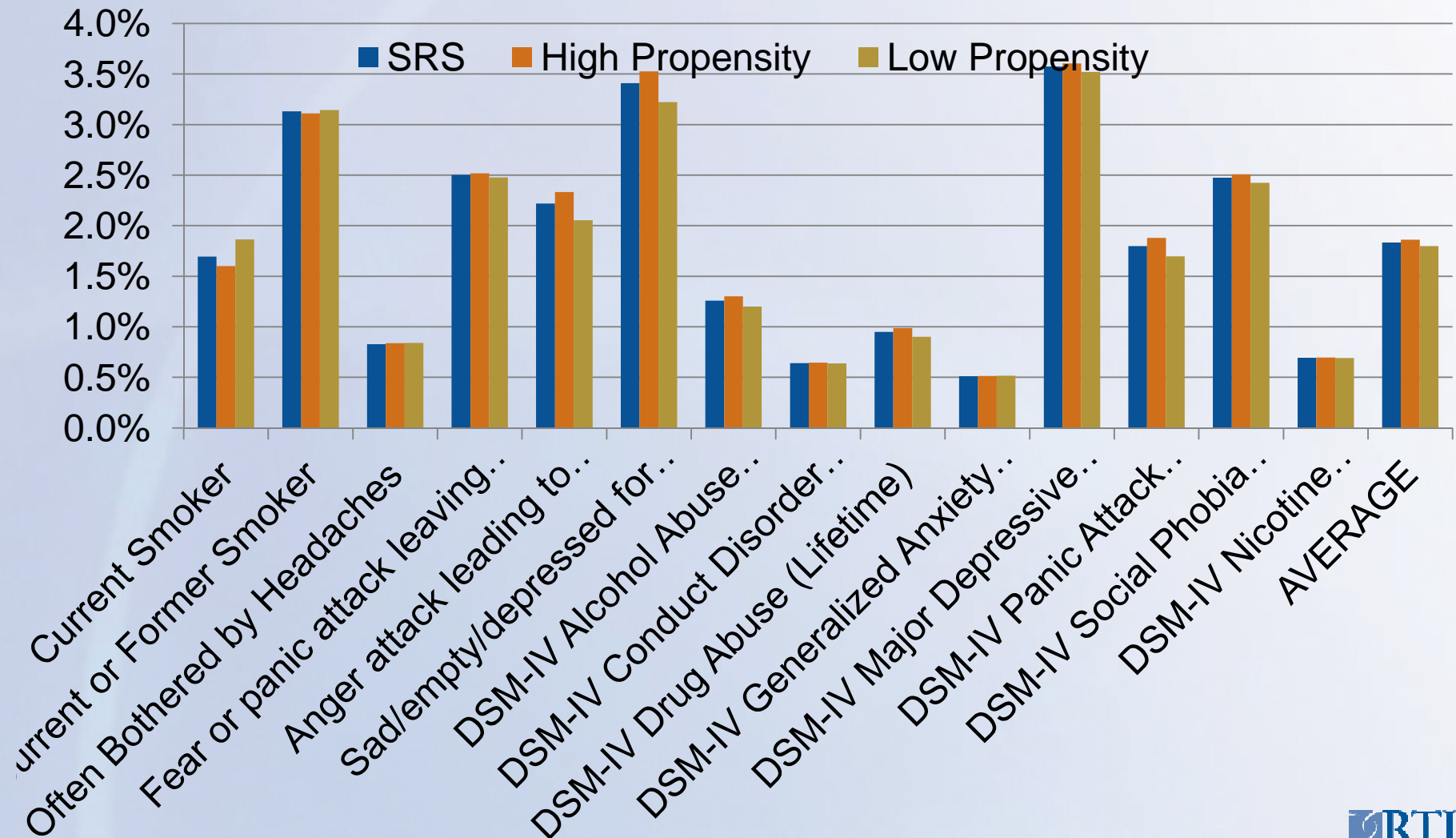
Absolute Bias



Relative Absolute Bias



Root Mean Square Error



Weight Variation (1+L)

- SRS: 1.07
- High Propensity: 1.07
- Low Propensity: 1.08

Summary

- Different design depending on the primary objective:

Cost or unweighted response rate	High propensity cases
Bias reduction and total error (MSE)	Low propensity cases
Variance or weight variation	Simple random sample

- The primary objectives need to be specified in each implementation of a responsive design
- Multiple outcomes need to be evaluated to further responsive design (unintentional side effects and benefits)

Discussion Questions

- What are responsive designs most effective in achieving
- How can we balance the different objectives
- Can existing data be leveraged to accumulate more evidence of the conditions in which responsive designs achieve particular outcomes, faster

- Two specific questions:
 - Should cost reduction be the primary objective of responsive design, or should it be used primarily to improve survey estimates?
 - If improving survey estimates, are responsive designs more capable of reducing the variances of survey estimates as opposed to bias?