The Role of the Web in National Health Surveys

Mick P. Couper

Survey Research Center, University of Michigan and
Joint Program in Survey Methodology, University of Maryland

Overview of Presentation

- Why the interest in Internet or Web surveys
- Potential sources of error in Web surveys
- Sampling and recruitment for Web surveys
  - Non-probability methods
  - Probability-based methods
- Selection biases
  - Noncoverage and nonresponse
  - Efforts to correct for selection biases
- Two case studies
- Web surveys for national health statistics
- Summary and discussion

Internet or Web Surveys

- Since the development of the Web in the early 1990s, researchers have been interested in online surveys
  - Initial interest and widespread adoption by market researchers and academics
  - Increasing interest more recently from NSOs
- Two recent trends behind increasing interest
  - Rising costs of traditional survey modes
  - Decreasing response rates to traditional survey modes
- Can Web surveys be used for inference to general populations?
- To answer this question, we must
  - Understand the sources of errors in Web survey
  - Understand how respondents are recruited or selected for Web surveys

Inferential Challenges for Web Surveys of the General Population

- Sampling
  - No complete lists of e-mail addresses exist
  - No random-digit-dial (RDD) method for generating samples exists
  - Some other method is needed for sampling and inviting sample members
- Coverage
  - Not everyone has access to the Internet, and those who do differ from those who don't on many key variables (the digital divide)
- Nonresponse
  - Response rates to Web surveys are typically no better than other modes, and often very low
  - Concern that those who respond are different than those who don't respond
- Measurement
  - The answers people may give on Web surveys may differ from that in other modes

So Why Bother?

- Web surveys are significantly cheaper than other modes of data collection
  - Especially interviewer-administered modes
- Web surveys are often faster than other modes
  - Especially face-to-face surveys
- Increasing evidence that data quality in Web surveys is not worse than other modes, and may even be better
  - Especially compared to telephone
  - Especially for sensitive questions (including many health-related variables)

Selecting Samples for Web Surveys

Selecting Participants for Web Surveys

Non-probability methods	Probability-based methods
Open, unrestricted survey	Intercept survey
Volunteer, opt-in panel	List-based sample
River sampling	Web option in mixed-mode survey
Respondent-driven sampling	FTF/Phone/Mail recruitment, Web users only
Using social media for recruitment	FTF/Phone/Mail recruitment, provide Web access

See: Couper (2000)

Non-Probability Selection Methods

- A variety of methods have been developed
- All involve some form of self selection
- All assume Internet access/use
  - That is, all assume complete coverage of the population or no coverage error (I return to this later)
- All have their uses

Open Unrestricted Surveys

- A form of convenience sampling
- Open invitation on portals, frequently-visited Web sites, or dedicated “survey” or experiment sites
- Few or no access restrictions – “ballot stuffing”
- Advantage of recruiting people with certain characteristics, interests, etc., relatively cheaply
  - Often used in health and medical research (see Couper, 2007)
- But raise serious inferential concerns

Opt-In or Access Panels

- Probably the most prevalent survey method in marketing and social research today
  - There are scores of panels in all countries with large numbers of Internet users
- Widespread use on market research; increasingly used in academic research; generally shunned by NSOs
- Panel members recruited using a variety of non-probability methods
- Researchers can purchase samples from these panels, or have vendors conduct surveys for them

See: Callegaro et al. (2014)

Benefits of Opt-in or Access Panels

- Consist of very large numbers (sometimes millions) of potentially willing respondents
  - Large samples in very short time
- Very fast
  - Data collection proceeds swiftly
  - Data immediately available for analysis in digital form
- Pre-screened on key variables
  - Permits targeting of specific groups of interest
- Relatively cheap (compared to traditional survey methods)
- Vendors can often take care of survey design and administration (at a price)
  - Little or no survey expertise needed

Drawbacks of Opt-in or Access Panels

- The panels themselves are non-probability samples, even though individual studies may use probability sampling of panel members
- Nonresponse is a big concern
  - Rates of response to individual surveys often in the single digits
- Also concerns about panel saturation, inattentive or fraudulent respondents, and measurement reliability
- Expensive relative to open access strategies

The AAPOR Task Force

- In 2010, the American Association for Public Opinion Research (AAPOR) released its Task Force report on online panels
- Task force included members from academia, government, and industry (including panel vendors)
- Report available at www.aapor.org
- Provides a detailed review of online panels in the U.S.
- Key recommendations follow

Selected AAPOR Recommendations

- Researchers should avoid nonprobability online panels when a key research objective is to accurately estimate population values …claims of “representativeness” should be avoided when using these sample sources
- There are times when a nonprobability online panel is an appropriate choice
- There are significant differences in the composition and practices of individual panels that can affect survey results
- Panel vendors must disclose their methods

When and How to Use Access Panels

- Despite their limitations, access panels have many advantages
  - Cheap, quick, rich measurement opportunities
- Notion of “fitness for use” or “fitness for purpose”
  - Panels have their use, but should be used carefully and appropriately
- Some examples
  - Pretesting of survey instruments
  - Testing of new concepts or theories
  - Exploratory research on low-incidence populations
  - Experiments (where volunteer bias is not a concern)
  - Trend analysis (assuming stable population)
  - Correlational analysis (but selection bias still a concern)
- Use in combination with other methods

River Sampling

- Developed in response to criticisms that access panel members are over-surveyed and are survey "professionals"
  - Recruit using banner ads, pop-up ads, etc.
  - Participants agree to do a survey, rather than join a panel
  - Typically asked some brief profile questions then directed to an appropriate survey
- None of the companies using river sampling report click-through rates or other details of the selection process
- No evidence that river samples are better than panels
  - Suffer from the same recruitment and inferential problems

Respondent Driven Sampling (RDS)

- Originally developed as a way to recruit rare and hidden populations (e.g., HIV populations, drug users, etc.), using offline social networks
- RDS is a chain referral sampling technique
  - Based on Markov theory which requires a number of key assumptions to be met to produce unbiased population estimates
- Several researchers are exploring online RDS methods
  - E.g., Wejnert & Heckathorn (2008), Schonlau & Kapteyn (2011), Mavletova (2011), Toepoel (2011)
- General conclusion so far is that assumptions of RDS are hard to meet online, and that recruitment does not meet expectations
- May be useful for rare and hidden populations, but not for general populations

RDS examples

Using Social Media for Recruitment

- Great interest in using social media to replace survey methods
  - Mining existing content using Web analytics, text mining, and other tools (so-called “big data”)
- Others exploring social media as a recruitment tool for more traditional survey research
  - Focus here is on the latter

See: Couper (2013)

Social Media Recruitment

- May 2015 monthly active users:
  - Facebook: 1.44 billion worldwide
    - "If Facebook was a country," it would be the largest country in the world, exceeding China (1.40 billion) and India (1.28 billion)
  - Twitter: 302 million worldwide
- Social media companies do not provide access to list of registered users as a sampling frame
- Recruitment relies on word of mouth (WoM) and social networks
  - Equivalent of snowball sampling
- Recent Facebook examples:
  - Toepoel (2011), Bhutta (2012), Chu & Snider (2013), Fenner et al. (2012), Lohse (2013), Nelson et al. (2014)

Summary on Social Media Recruitment

- Social media sites are not a sampling frame for surveys
- May be relatively cheap and fast to recruit samples with selected characteristics
- Users of social media sites may not be representative of the broader population
- Those who click on the links may not be representative of users of the site

Other Approaches

- Google Consumer Surveys
  - Idea of “survey wall” –users answer 1-2 questions in order to gain access to online content
  - Use post-stratification based on age, gender, and location derived from IP address and ad cookie
  - Keeter and Christian (2012) evaluation
- Amazon’s Mechanical Turk
  - Online “crowdsourcing” platform for mechanical work
  - Requestors create human intelligence tasks (HITs) and specify amount to be paid for task
  - Registered users (“Turkers”) complete the tasks
  - Evaluations of MTurk
- Xbox survey
  - See Wang et al. (2015)

Another AAPOR Task Force

- In 2013, AAPOR released its Task Force report on non-probability surveys
- Report available at www.aapor.org; see also Baker et al. (2013)
- Provides a detailed review of different types of non-probability surveys
- Selected recommendations follow

Selected AAPOR Recommendations

- Unlike probability sampling, there is no single framework that adequately encompasses all of non-probability sampling
- it useful to think of the different non-probability sample approaches as falling on a continuum of expected accuracy of the estimates
- If non-probability samples are to gain wider acceptance among survey researchers there must be a more coherent framework and accompanying set of measures for evaluating their quality
- Non-probability samples may be appropriate for making statistical inferences, but the validity of the inferences rests on the appropriateness of the assumptions underlying the model and how deviations from those assumptions affect the specific estimates

Summary on Non-Probability Approaches

- Vary in the cost and effort required to obtain a sample of reasonable size
- Vary in the extent to which these can be demographically balanced
- Vary in the extent of selection bias, which is often unknown
- Offer a relatively inexpensive way to get a large number of people to respond to a survey
  - But large number ≠ accuracy
- Useful for many purposes (fitness for use)
- Risky for inference to general populations when a high degree of accuracy is needed

Probability-Based Methods

Probability-Based Approaches

- Probability-based methods are necessary but not sufficient for unbiased design-based inference
  - Coverage, nonresponse, measurement error, etc. may still affect results
- We examine several approaches in turn
  - Online intercept surveys
  - List-based samples
  - Mixed-mode surveys
  - Probability-based panels

Online Intercept Surveys

- Targets visitors to one or more Web sites
- Inference is to users of that Web site
- Systematic sample typically used – every *n*-th visit (note: not visitor)
- No problem of coverage, because the population is, by definition, active Web users
- Biggest problem is nonresponse
- Also problem of timing – when to intercept

Example: Cybersex

Example: NLM

List-Based Samples

- Surveys of groups with high coverage or known coverage properties, e.g.:
  - College students
  - Members of professional associations
  - Subscribers to online services
  - People registered on a particular Web site
- List or frame permits variety of sampling strategies
  - Typically contains e-mail addresses
  - Or mailed invitation
- Nonresponse is a key concern

Web Surveys in a Mixed-Mode World

- Many survey organizations are exploring mixed-mode designs, for 3 reasons:
  - Lack of universal Internet coverage
  - Lack of information on Internet access (or an e-mail address) on the frame
  - Low response rates for Internet surveys relative to other modes
- Two types of mixed-mode designs for cross-sectional surveys
  - Concurrent mixed-mode surveys, e.g., mail survey with an Internet option (now common in censuses)
  - Sequential mixed-mode surveys, e.g., start with Internet, then switch to mail, telephone, and/or face-to-face
- We discuss response rate effects later

Probability-Based Panels

- Use probability-based methods to recruit panel members
  - E.g., RDD telephone survey
  - Mail survey using address-based sampling (ABS)
  - Mixed-mode recruitment based on population register
- Three broad approaches
  - Restrict sample to Internet users only
  - Use mixed-mode (mail and Web survey) methods
  - Provide Internet access to some or all panelists
- Several countries have – or are exploring – such panels
  - USA, Netherlands, France, Germany, Norway, Sweden, UK, etc.

Summary on Probability-Based Panels

- Recruitment and retention is very expensive relative to self-selected samples, but improves representation
- Recruitment response rates are relatively low – potential for nonresponse bias
- Number of surveys and length severely restricted to maintain panel quality
- Providing Internet access is costly but may improve representation of panel relative to Internet-only approaches

Selection Biases in Web Surveys

Coverage Error

- Coverage error is concerned with the systematic exclusion of certain people based on the method used
- Function of the rate of noncoverage and the difference between the covered and non-covered on the variable of interest
  - Coverage error is specific to a statistic or estimate
  - May be high for some estimates but low for others, even within the same survey
- Coverage error related to the “digital divide”
  - Those without access to the Internet are different from those with access

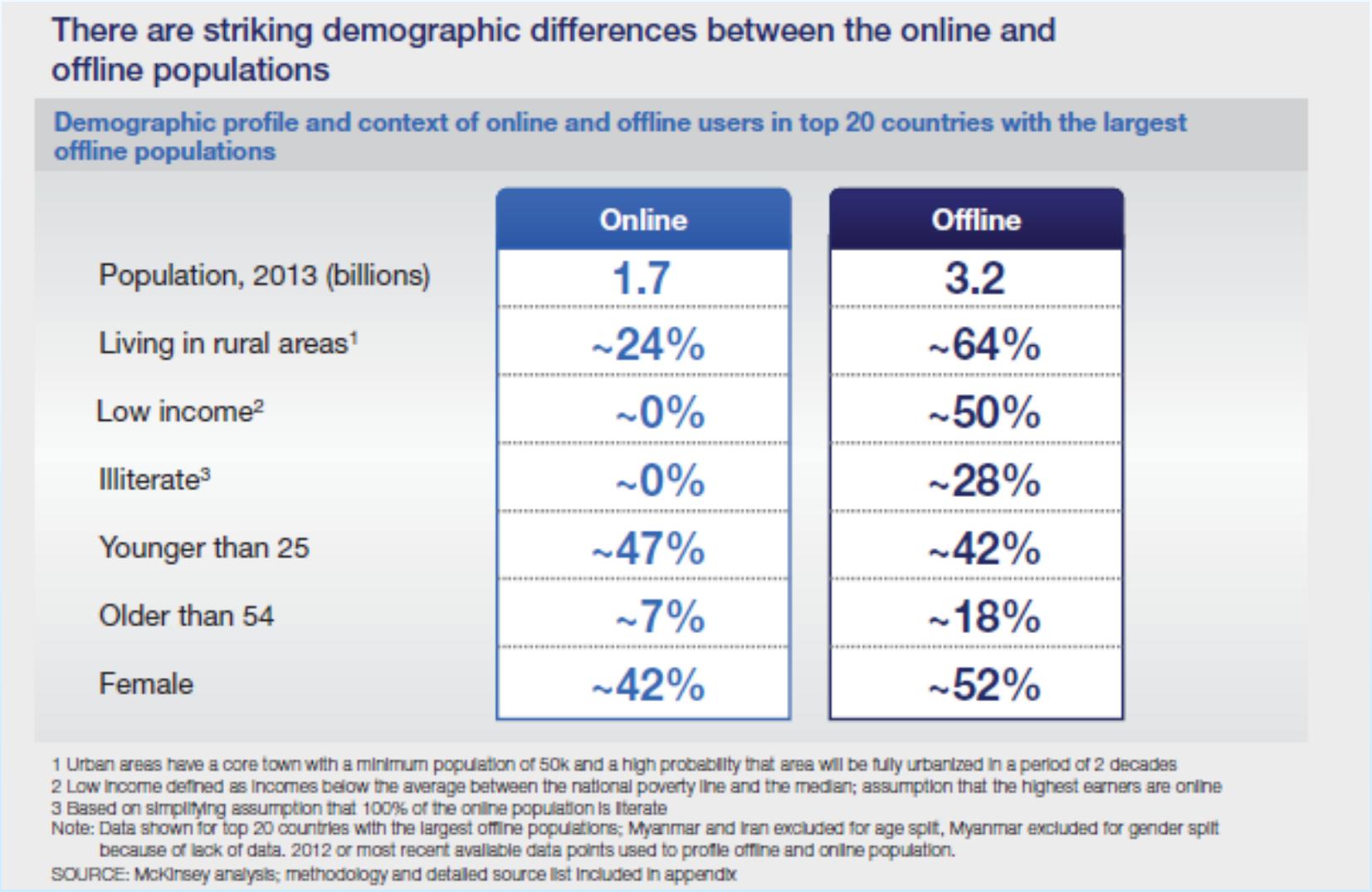
Internet Coverage Rates

- ACS 2013
  - 74.4% of U.S. households have Internet access (73.4% with high speed access)
  - 79.0% of persons live in households with Internet
- Pew:
  - 84% of American adults have access to the Internet in 2015 (same % in 2013)
- NHIS?

Differences Between Those Online and Those Not Online

- Data from several countries suggests that as Internet penetration increases, the digital divide among different demographic groups does not disappear
  - See next slide
- In the US, differences by gender largely gone, but big differences by race, education, income, and age still exist
  - See following slides
- Controlling for demographic differences, there are other differences between Internet users and non-users in terms of behaviors, attitudes, etc.

Coverage Error



There are striking demographic differences between the online and offline populations

Demographic profile and context of online and offline users in top 20 countries with the largest offline populations

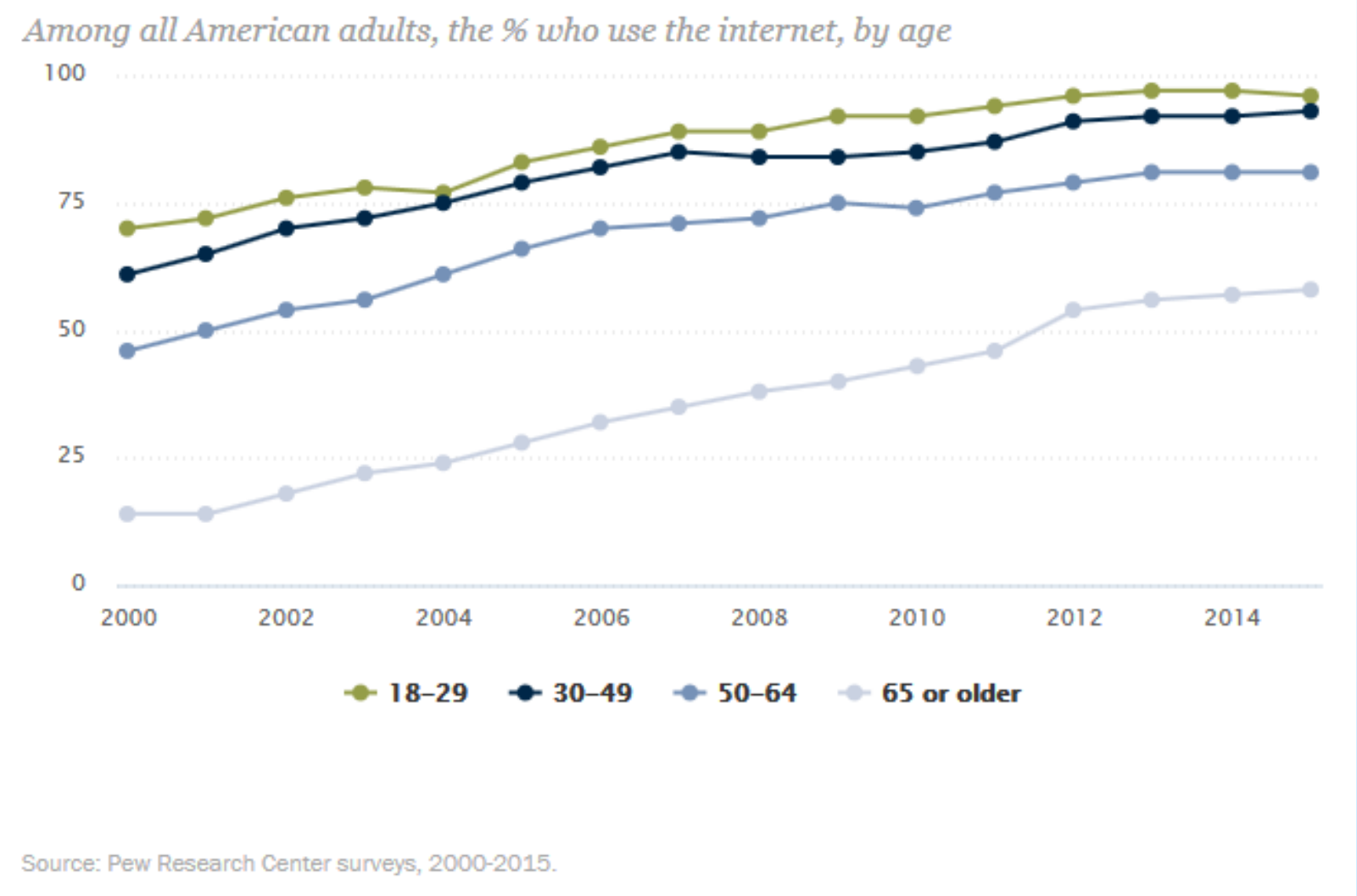
	Online	Offline
Population, 2013 (billions)	1.7	3.2
Living in rural areas[1]	~24%	~64%
Low income[2]	~0%	~50%
Illiterate[3]	~0%	~28%
Younger than 25	~47%	~42%
Older than 54	~7%	~18%
Female	~42%	~52%

1 Urban areas have a core town with a minimum population of 50k and a high probability that area will be fully urbanized in a period of 2 decades
2 Low income defined as incomes below the average between the national poverty line and the median; assumption that the highest earners are online
3 Based on simplifying assumption that 100% of the online population is literate
Note: Data shown for top 20 countries with the largest offline populations; Myanmar and Iran excluded for age split, Myanmar excluded for gender split because of lack of data. 2012 or most recent available data points used to profile offline and online population.
SOURCE: McKinsey analysis; methodology and detailed source list included in appendix

Source: http://www.mckinsey.com/client_service/high_tech/latest_thinking

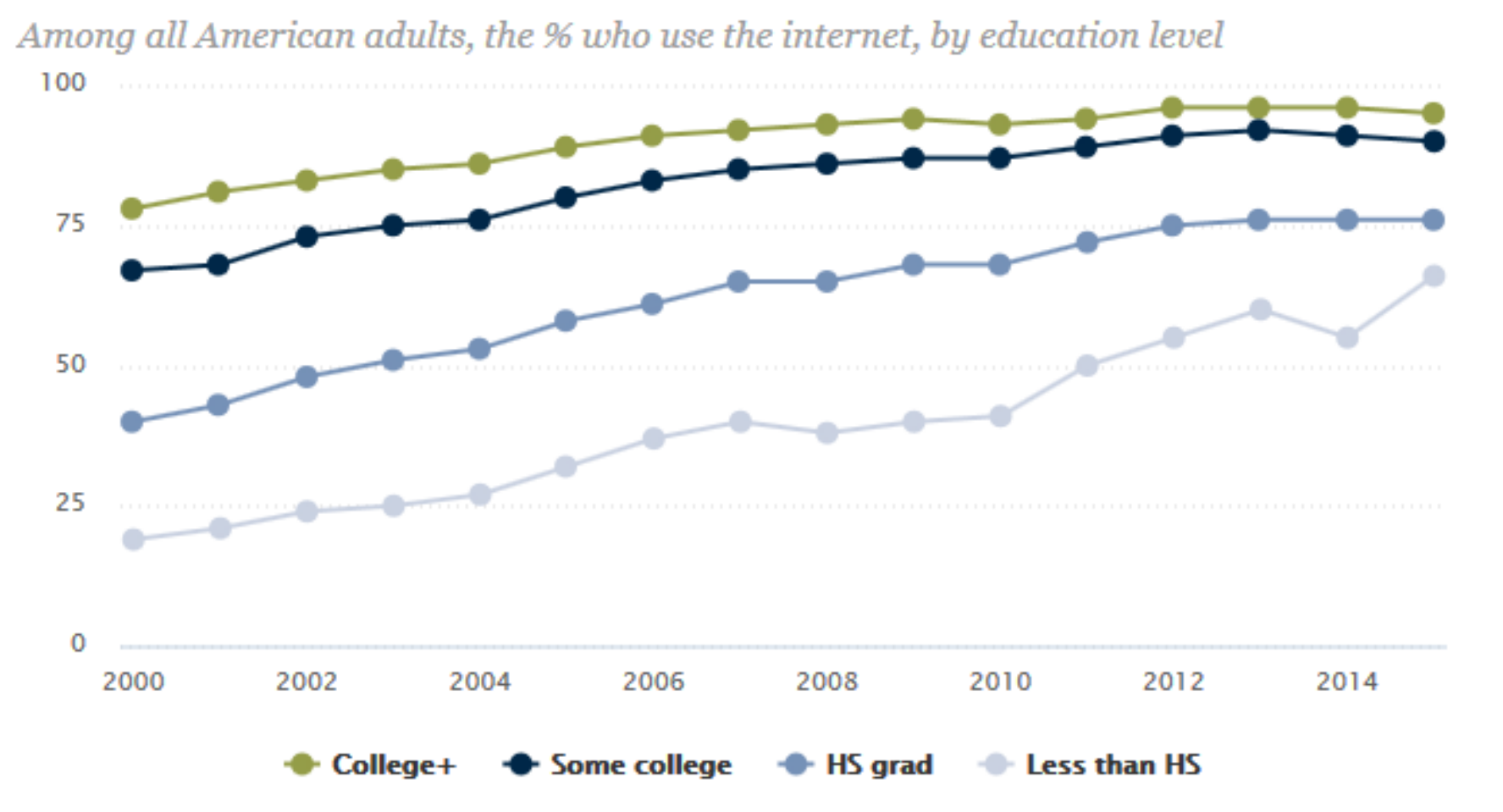
Report: “Offline and Falling Behind” (October 2014)

Internet Access by Age, USA



Source: http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/

Internet Access by Education, USA



Source: http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/

Summary on Coverage Error

- Even if samples of Internet users can be identified and selected, significant disparities still exist
  - Bigger for some topics than others
- Weighting and propensity adjustments reduce (in some cases) but do not eliminate these differences
  - See later
- Using samples of Internet users to generalize to the general population is risky

Nonresponse Error

- Function of both the nonresponse rate and of the difference between respondents and nonrespondents, on the variables of interest

$$B(\bar{y}_r) = \bar{y}_r - \bar{y}_n = (\frac{m}{n})(\bar{y}_r - \bar{y}_{nr}) \text{ or } B(\bar{y}_r) = \left(\frac{\sigma_{y\rho}}{\bar{\rho}} \right)$$

- The focus of attention is often on rates because little information exists on differences between respondents and nonrespondents

Response Rates in Web Surveys

- Two meta-analyses of response rates in Web surveys compared to other modes (mostly mail) show Web survey response rates to be significantly, by an average of 11 percentage points
  - Lozar Manfreda, Bosnjak, Haas, & Vehovar (2008)
  - Shih and Fan (2008)
- Evidence from intercept surveys and open-access surveys show extremely low response rates (often in single digits)
- Low – and declining – response rates in opt-panels
- Probability-based panels suffer from nonresponse at several stages of the process, but covariates can be measured

Response Rates in Mixed-Mode Surveys

- Mail with Web option:
  - Medway & Fulton (2012): Meta-analysis of 19 experimental comparisons found that providing a Web option in a mail survey has significantly lower response rates OR=.87) than mail only
- Sequential mixed-mode designs starting with Web:
  - Response rate results still quite mixed
  - Benefit may lie in cost, speed of response, and data quality – rather than increased response rates or reduced nonresponse bias

Summary on Nonresponse Error

- As with coverage error, low response rates are not a guarantee of bias, but may increase the risk of bias
- Low response rates increase recruitment costs and affect precision of estimates (effective sample size)
- Nonresponse error is specific to a statistic or estimate, not a characteristic of a survey
  - Some statistics may be subject to bias while others in the same survey may not
- No evidence that Web surveys reduce nonresponse bias relative to other methods

Comparisons of Results

- Some comparisons show large differences between non-probability and probability-based estimates
- Other comparisons show few differences
- Concern about file-drawer effect
  - Proponents of alternative methods may trumpet their successes and hide their failures
  - The absence of evidence is not evidence of an absence of effects
  - Need independent evaluation of differences
- Selected examples follow

Comparisons of Results

- Selected comparisons of results:
  - Vonk, Willems and van Ossenbruggen (2006): compared 19 different Dutch panels to Statistics Netherlands data
  - Yeager et al. (2011): compared 7 non-probability panels to a probability panel and RDD telephone survey
  - Cassese et al. (2012): compare socially-mediated Internet surveys to MTurk and American National Election Studies
  - Pasek and Krosnick (2011): compared an opt-in Internet and RDD tracking survey on attitudes to US Census
  - Schnorf et al. (2014): compared 6 different surveys on privacy attitudes
- For additional examples, see Callegaro et al. (2014)

Measurement Error

- The good news is that – conditional on response – the quality of data obtained in Web surveys is at least as good as other modes
  - Better control of skips and missing data than mail
  - Ability to deliver complex instruments
  - Reduced social desirability effects relative to interviewer-administered surveys
  - New measurement tools possible
- Web surveys combine the advantages of self-administration with that of computerization

What About Mobile Web?

- Many are skipping traditional (desktop, laptop) connections in favor of mobile devices (tablets and smartphones)
  - So-called “mobile-only” or “mobile-mostly” users
- Research evidence on mobile Web
  - Proportion choosing to use mobile devices to complete Web surveys significantly lower than penetration rate
  - Response rates significantly lower than regular Web when randomized to device
  - Breakoff rates significantly higher for mobile Web
  - Consent rates for passive measurement (e.g., GPS) or installation of apps a concern
- But, condition on completion, few differences in measurement between mobile Web and PC Web
- Much work still to be done to realize the promise of mobile Web

Summary on Inference and Web Surveys

- Inference is about risk
- Risk should be proportionate to the investment (time and effort) and to the intended use of the data (the claims one makes)
  - E.g., different for official statistics, market research surveys, dissertation projects, etc.
  - Fitness for use / purpose
- Risks may differ for different statistics, both within and between surveys
- Selection bias is not the only threat to inference

Correcting for Selection Biases

Correcting for Selection Biases

- Probability-based surveys
  - Often separate steps
    - Correcting for unequal probabilities of selection (design weights or base weights)
    - Correcting for nonresponse error (often using the inverse of the response rate)
    - Correcting for coverage error (often through post-stratification)
  - These can use different auxiliary variables at each step
- Non-probability surveys
  - Adjustment usually done in a single step
  - Control totals from census, register, or survey data
  - Often involve only demographic variables

Approaches to Correcting for Selection Bias

- Four key approaches:
  - Post-stratification or weighting class adjustments
  - Raking or rim weighting
  - Generalized regression (GREG) modeling
  - Propensity score adjustment (PSA)
- Each approach uses auxiliary variables, although the way they are used differs between methods
- All are based on a missing at random (MAR) or conditional ignorability assumption
  - That is, all methods use implicit or explicit models

Auxiliary Variables

- Necessary features of auxiliary variables:
  - They must be measured in the survey
  - Their population distribution must be known
  - They must produce homogenous strata or groups
- For auxiliary variables to be useful (i.e., to reduce bias), they must be:
  - Related to the propensity to respond (or be selected into the sample)
  - Related to the key variables of interest
- Many adjustment schemes focus on the first condition, ignoring the second condition
- Bias and variance is reduced if both conditions hold

See: Bethlehem (2010)

Adjustments in Practice

- A review of various adjustment approaches for Web surveys* reached the following conclusions:
  - The adjustments remove only part of the bias
  - The adjustments sometimes increase the biases relative to unadjusted estimates
  - The relative biases that are left after adjustment are often substantial
  - There are large differences across variables, with the adjustments sometimes removing the biases and other times making them much worse
- In addition, the adjustments often increase the variance of estimates

*Tourangeau, Conrad, & Couper (2013)

Summary on Adjustment Methods

- Potential for selection bias inherent in most non-probability methods creates the risk that the distribution of the important covariates in the sample will differ from those in the population and to such an extent that inferences are potentially misleading
- To be of value non-probability samples must rely on some form of statistical adjustment to manage or minimize that risk
- Effectiveness of adjustments depends on the identification of the proper set of covariates, their availability and quality
- The integrity of any non-probability method depends on how well it solves this fundamental problem
  - Increasingly true for probability-based surveys too
  - Also true for “Big Data”

General Summary on Web Survey Inference

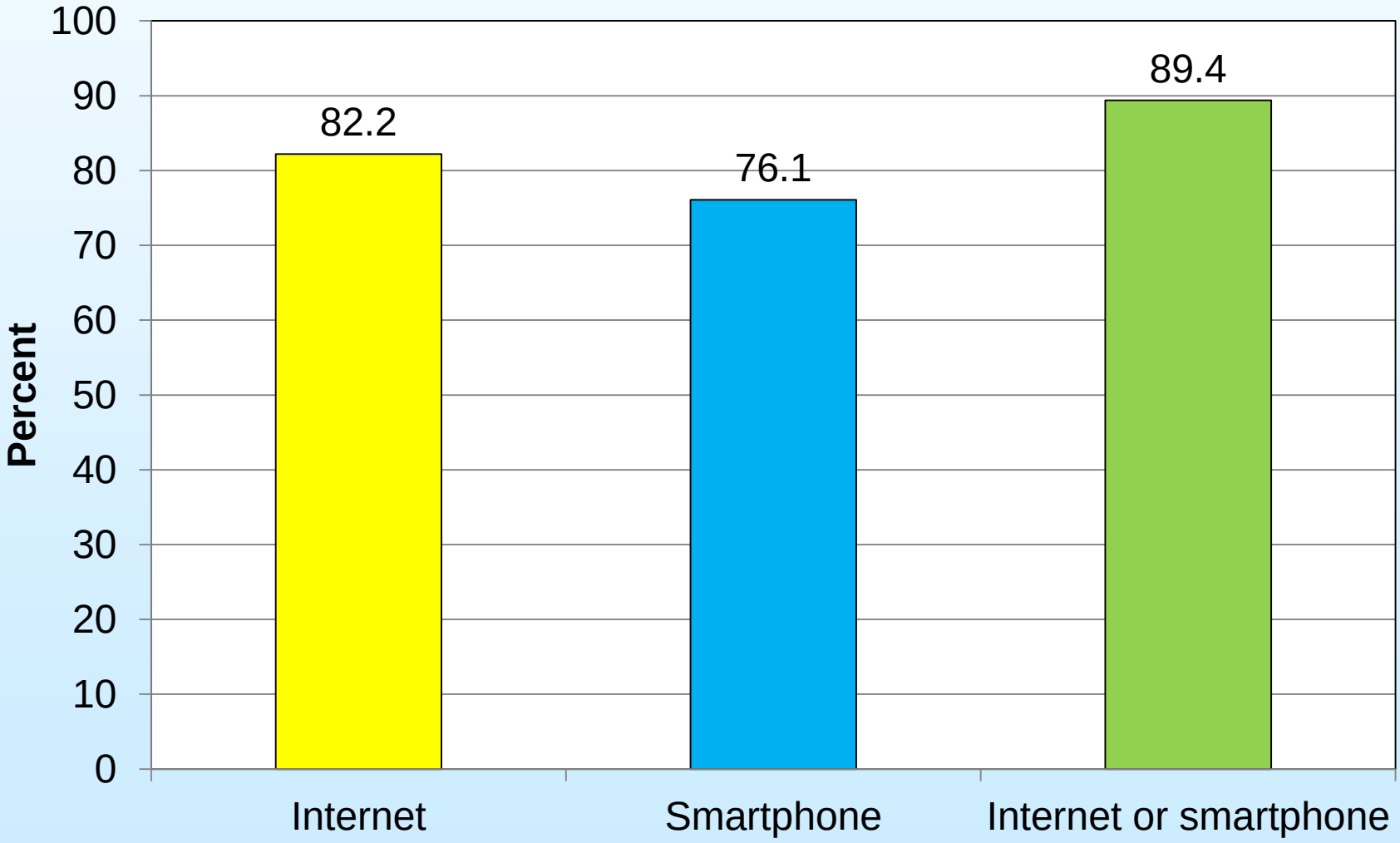
- There are many different ways to conduct Web surveys
- There are coverage, sampling, and nonresponse challenges for Web surveys
  - This is especially true of Web surveys of the general population
  - Statistical adjustments do not always solve these problems
- Web surveys have a place in the survey researcher's toolkit, alongside other methods
  - They do not solve the problems facing surveys
- We should use them appropriately and be open about their limitations

Case Studies

Case Study 1: NSFG

- Early results presented at AAPOR 2015; paper to be presented at FCSM 2015
- We added two debriefing questions to the end of the NSFG interview
  - Does [the] R[espondent] have Internet access (via computer or other device)?
  - Does [the] R[espondent] have a smartphone (with apps and Internet capabilities)?
- We analyzed data from 2 years of NSFG, from September 2012 to August 2014
  - Total of 10,322 interviews

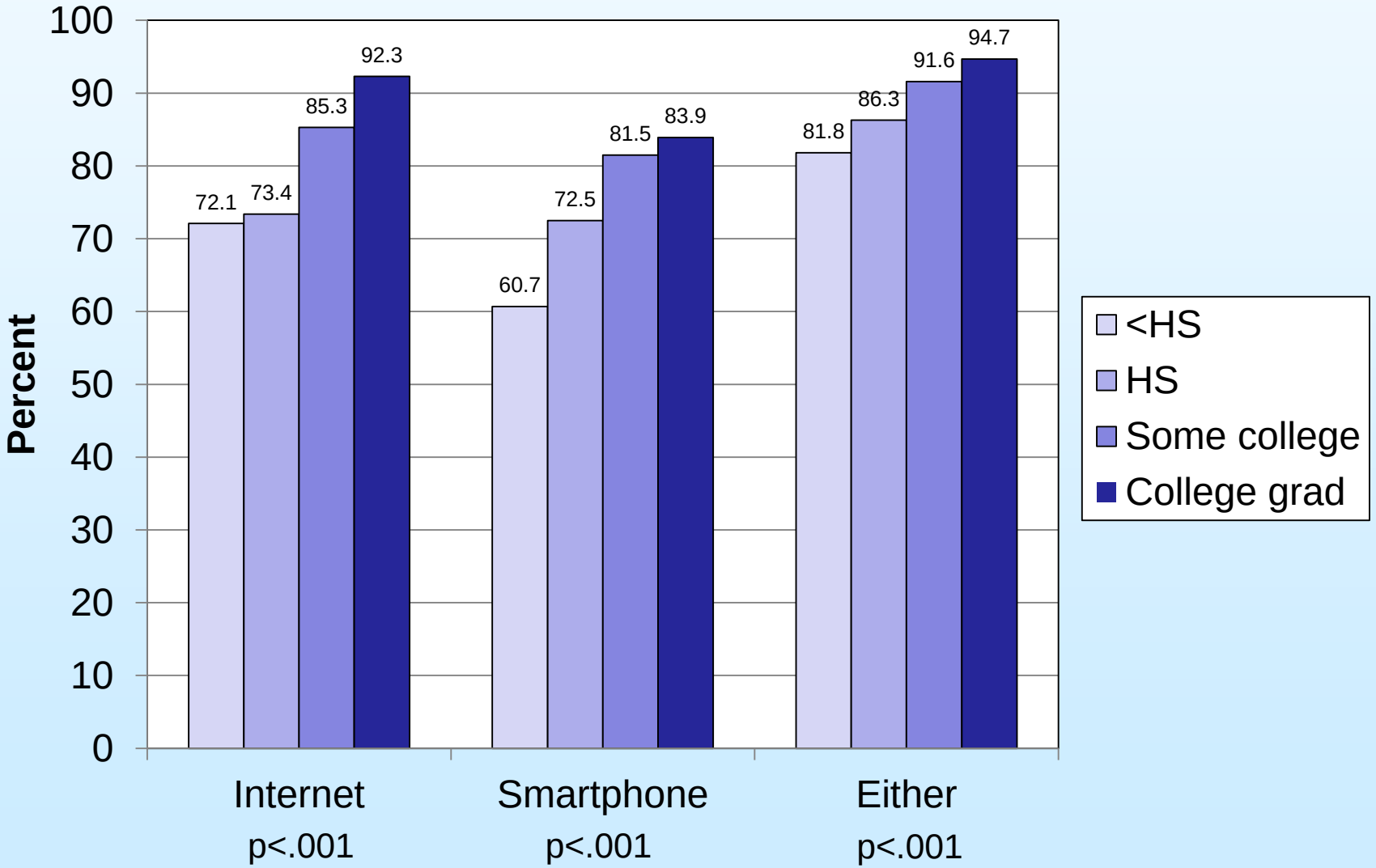
Overall Coverage Rates



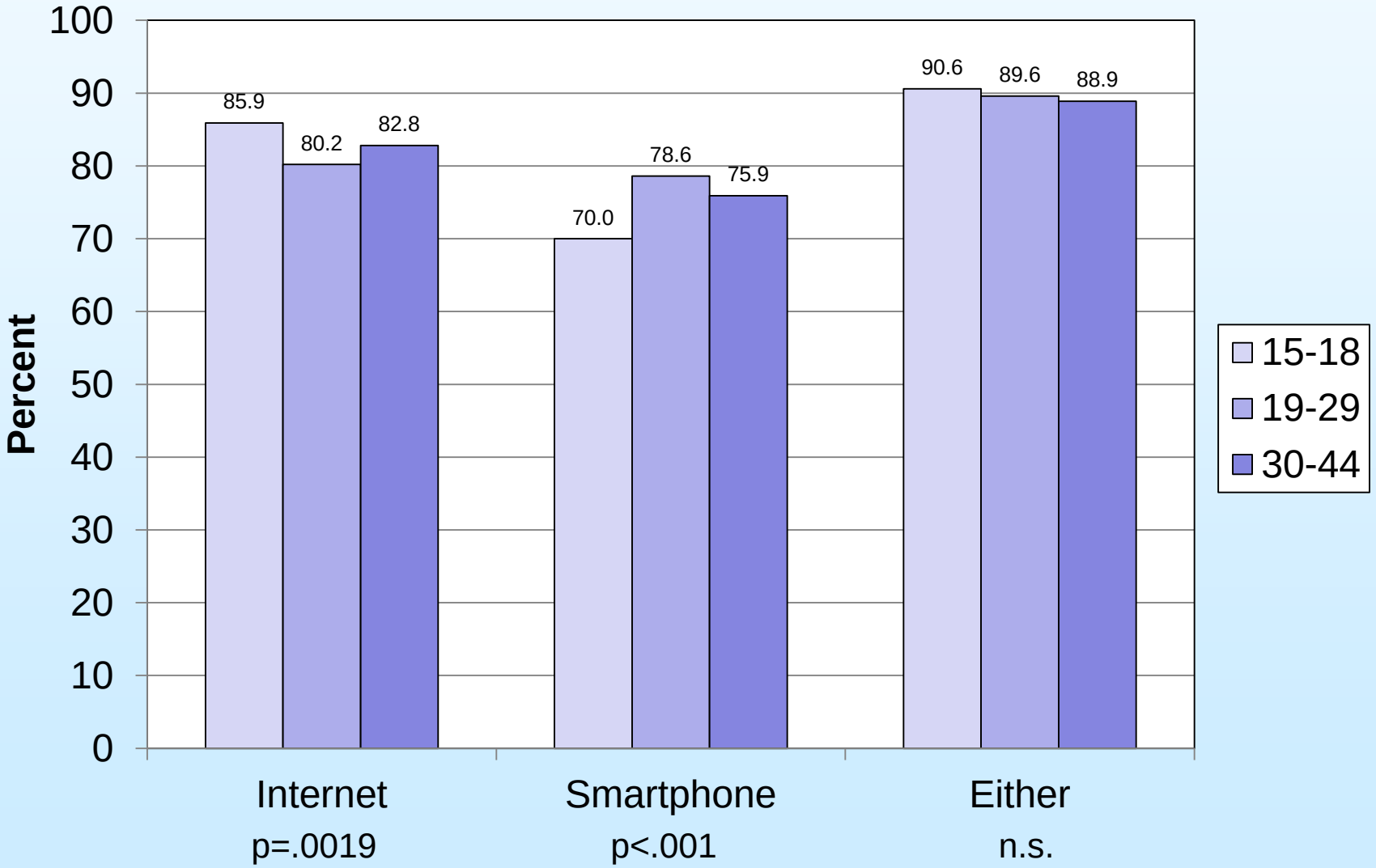
Demographic Correlates of Internet Access

- We find significant differences (p<.01) for all 3 coverage indicators for:
  - Education (see next slide)
  - Income
  - Work status
- Age (see later) and marital status differ significantly for Internet and smartphone coverage separately, but not for both together
- Race/ethnicity is significant (p=.01) for Internet coverage, but not for the other two variables
- No significant differences for gender, region, urbanicity, and presence of children in HH

Coverage Rates by Education



Coverage Rates by Age Category



Discussion of Demographic Differences

- We see a strong coverage gradient for both education and income; also those with a job significantly more likely to have access
- Blacks and Hispanics have lower Internet access than whites, but blacks have higher smartphone access; the overall coverage rate does not differ by race/ethnicity
- Younger people have higher Internet coverage, but lower smartphone coverage; the net coverage rate does not differ by age

Summary of Results

- Overall coverage rates are relatively high
- Including smartphones increases Internet coverage
- However, there are still significant demographic differences in coverage (Internet access)
- Some substantive variables of importance to NSFG have different coverage rates, even after controlling for demographic differences
- But others show few effects

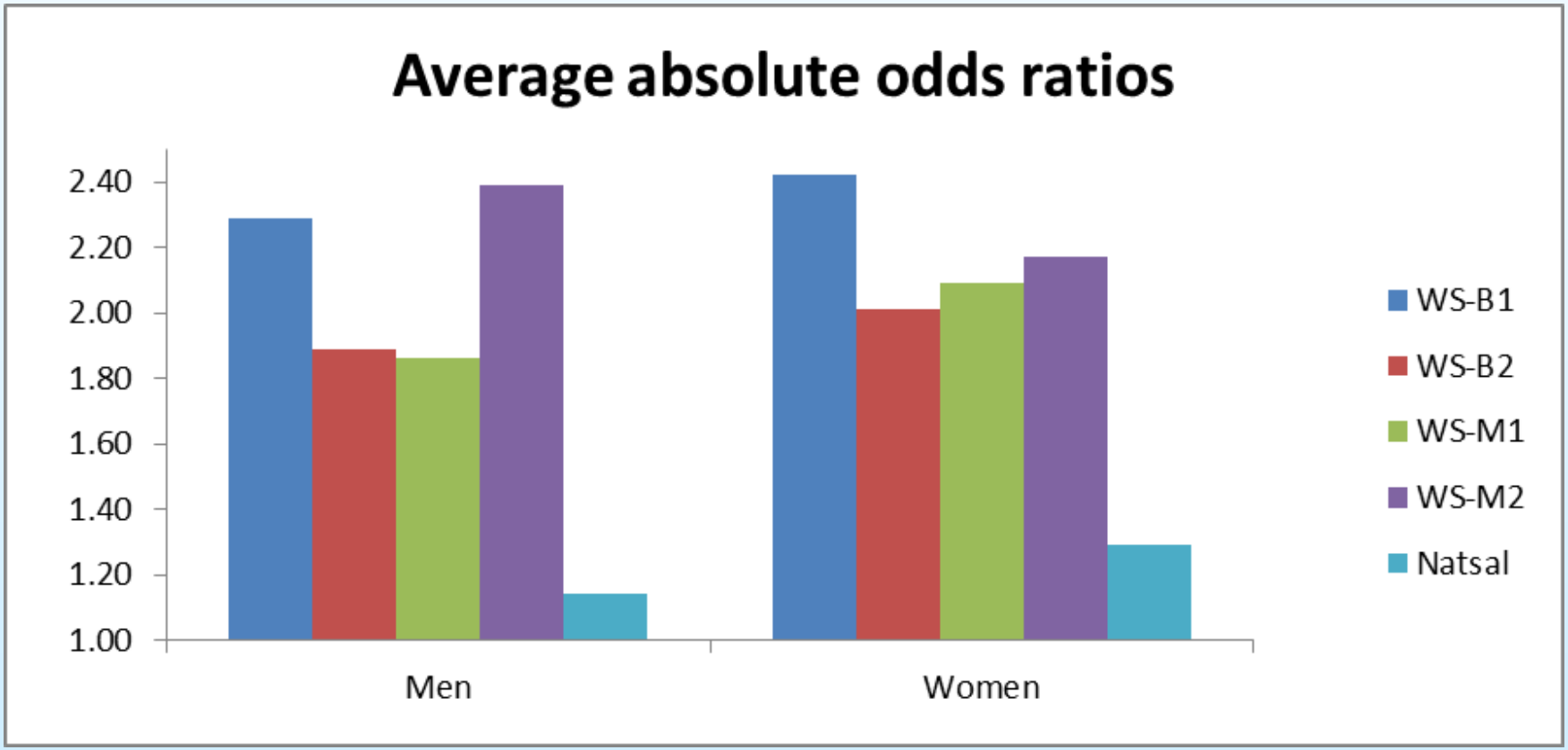
Case Study 2: Natsal-3

- National Survey of Sexual Attitudes & Lifestyles (Natsal)
  - Area probability sample of British general population
  - 3rd round conducted in 2010
  - 15,000 respondents aged 16-74 (oversample of 18-44)
  - Face-to-face interviews using CAPI and CASI
  - 55-minute interview
- Two methodological studies
  - Compared estimates from 4 non-probability Web panels
  - Follow-up survey of subset of Natsal-3 respondents to examine measurement error

Natsal-3 Study 1

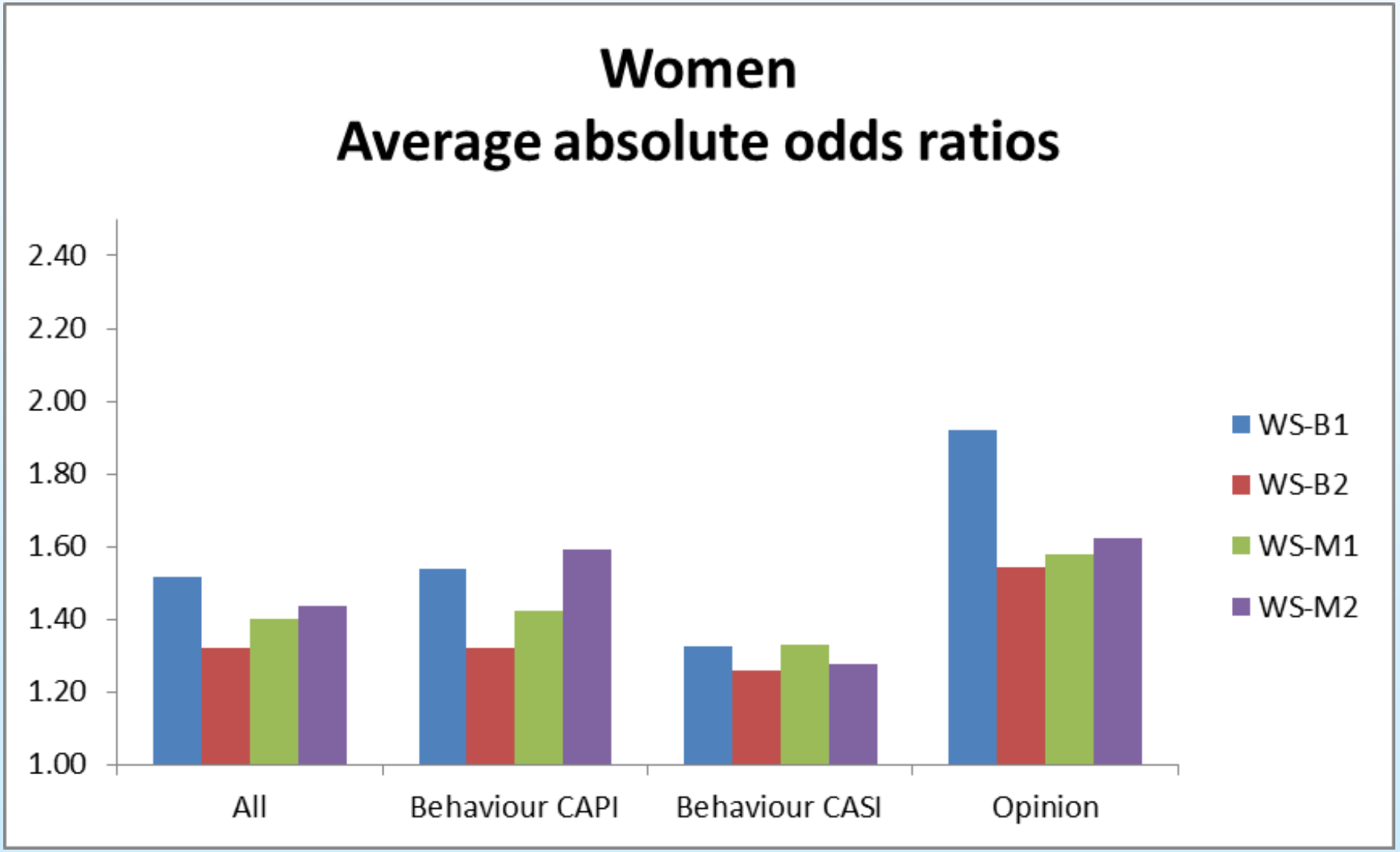
- Erens et al. (2014, *Journal of Medical Internet Research*)
- 4 Web surveys by 3 market research companies, each possessing a large Web panel:
  - 2 with ‘basic’ quota controls
  - 2 with ‘modified’ quota controls, using additional variables related to key estimates
- About 2,000 respondents per panel

Average Absolute Odds Ratios for Demographics Compared to Benchmarks*

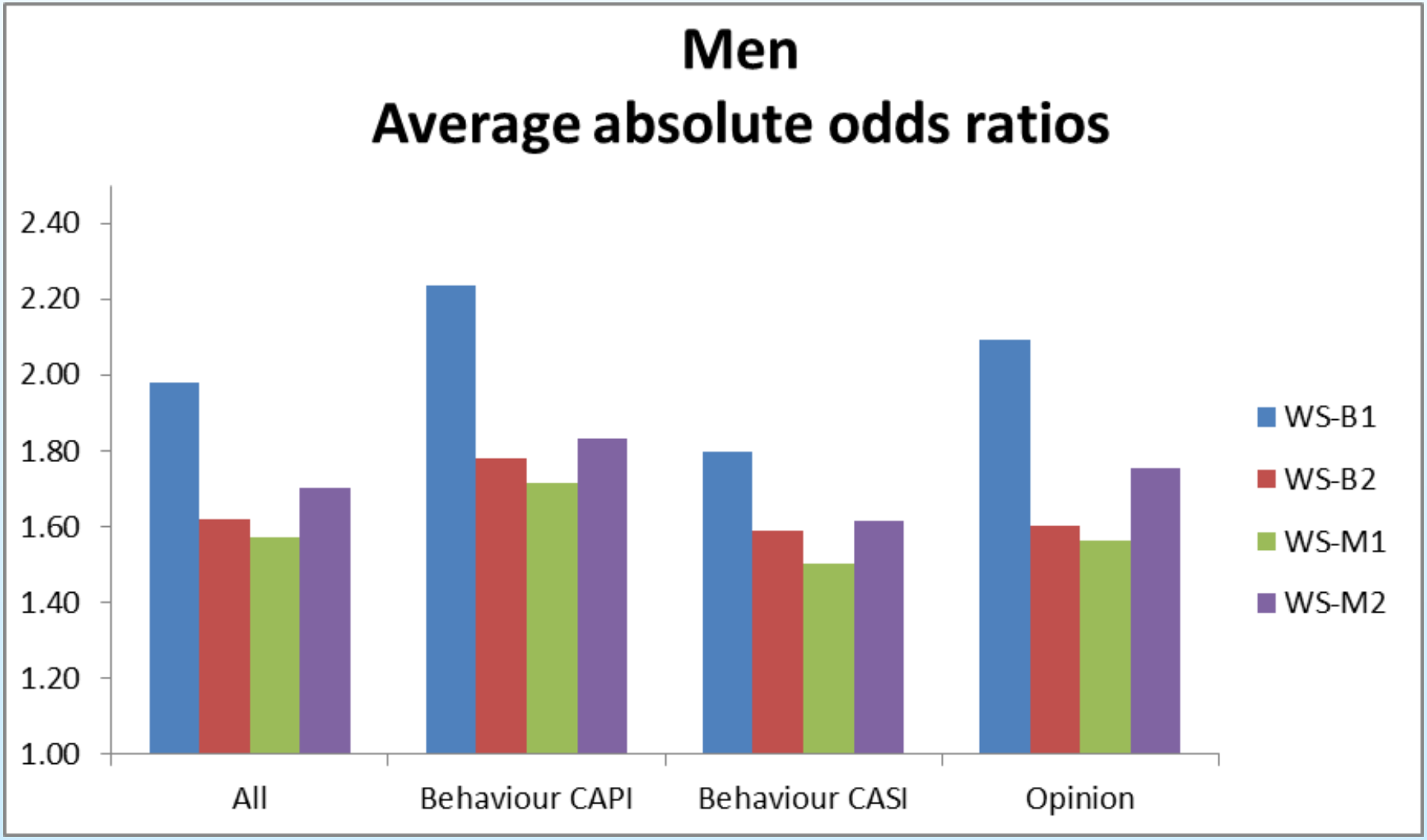


* Benchmarks: 2011 UK Census; 2011 ONS Integrated Household Survey; 2010 ONS National Travel Survey

Average Absolute ORs for Web Surveys Compared to Natsal-3: Women



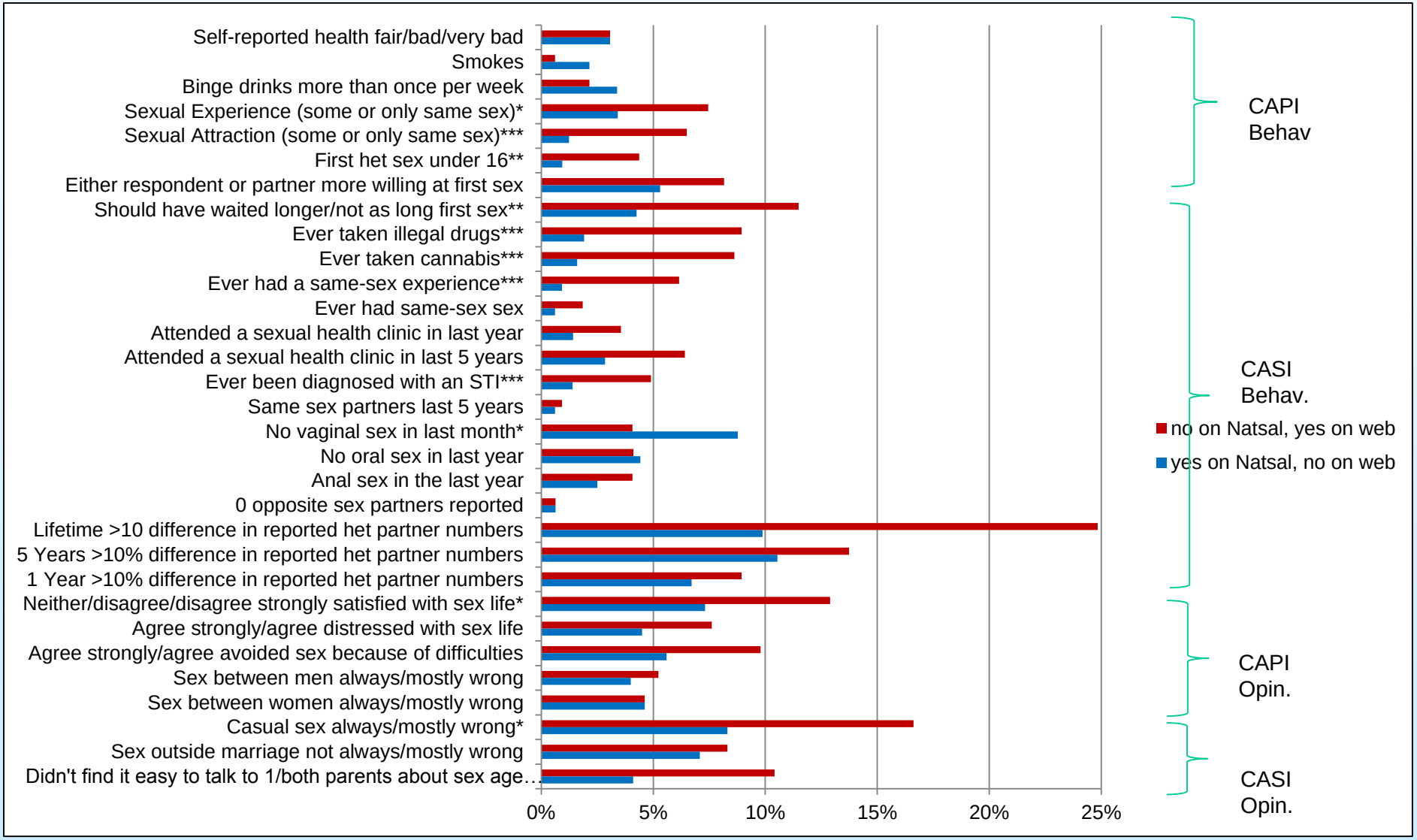
Average Absolute ORs for Web Surveys Compared to Natsal-3: Men



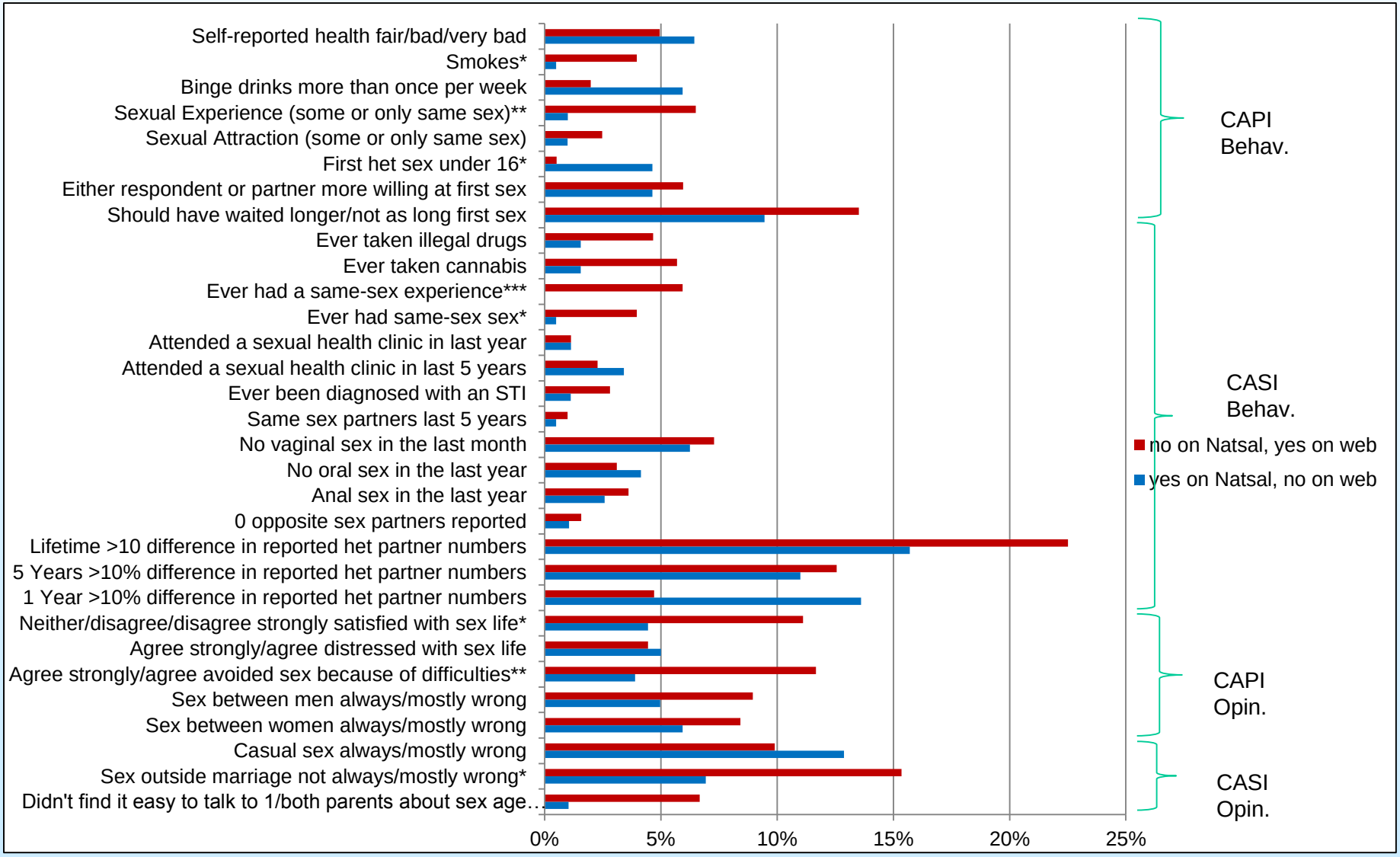
Natsal-3 Study 2

- Erens et al. (2015, paper presented at ESRA)
- Follow-up Web survey 1-2 months after CAPI/CASI interview containing subset of Natsal-3 items
- Of 2,440 respondents invited, 527 completed the Web survey (21.6%)
- Of 31 attitude and behavior items examined, significant mode effects were found for 9 for men and 12 for women
  - Generally high levels of consistency between modes
  - More reporting of sensitive information and less socially desirable responding on the Web
  - See following slides

Change in Responses: Women



Change in Responses: Men



Summary of Natsal-3 Studies

- Study 1:
  - Even large panels had difficulty meeting some quotas
  - Natsal-3 much closer to demographic benchmarks than all Web surveys
  - Between 60% and 75% of key estimates in each of 4 Web surveys were significantly different from Natsal-3
- Study 2:
  - Among those who responded to follow-up survey, few differences in reported attitudes and behavior
  - Differences found suggest more sensitive behavior reported in Web survey

Web for National Health Surveys and Research Opportunities

Uses of Web Surveys by National Statistical Offices

- Increasingly used in business or establishment surveys
  - Replacing or supplementing mail surveys
- Increasingly used in population censuses
  - Supplementing mail surveys (e.g., ACS)
- Non-probability panels used for social research where accuracy not as critical and funds are limited, or for development and testing
- Probability-based panels being considered as alternative to national telephone surveys
- NSOs exploring Web surveys as part of mixed-mode strategy
- Have replaced many types of surveys, but unlikely to replace large-scale general population surveys conducted by NSOs

Research Opportunities at NCHS 1

- BRFSS and SLAITS
  - Telephone surveys most at risk
  - Web surveys may have more to offer in terms of state/local data calibrated to good national data
  - After early research on mixed-mode design in BRFSS in the mid-2000s, not much action
- Other large telephone surveys, especially involving a lot of screening (e.g., National Immunization Survey) also seem ripe for exploration of Web options

Research Opportunities at NCHS 2

- For the past several years, NHIS has been collecting data on Internet access and use
  - Can be used to explore coverage errors related to a variety of health measures
  - NHIS can be used as benchmark to evaluate effectiveness of alternative approaches
- NHIS also solicits e-mail addresses of sample adults
  - Useful for follow-up surveys
- Can NSFG serve a similar role?

Research Opportunities at NCHS 3

- NHANES
  - Possibility for follow-up surveys, e.g., National Youth Fitness Survey (NNYFS)
- National Health Care Surveys
  - Establishment or provider surveys
  - Internet penetration likely higher, so coverage less of a concern
  - Current surveys often by mail, so more similar modes
  - Web to replace or supplement mail surveys (sequential mixed-mode designs)

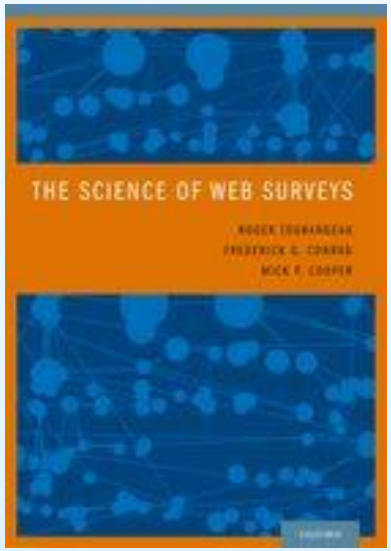
Summary Remarks

- Web surveys are not perfect, but nor are other modes of data collection
  - All methods have strengths and weaknesses
- Given the challenges facing traditional surveys, we must continue to explore alternatives
- Web surveys – both probability-based and non-probability – have a role to play in health research
  - Supplement, enhance, and extend – rather than replace – existing methods

Questions and Comments?

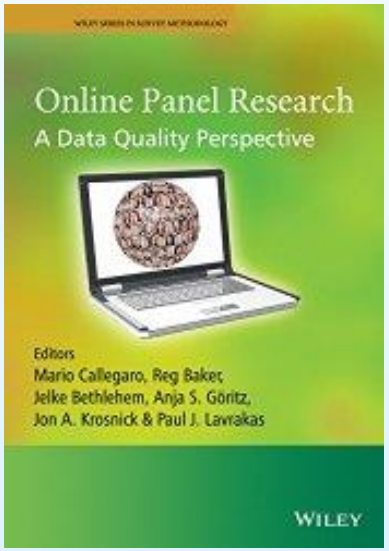
For more information on studies cited here,
and on Web surveys in general, visit
www.WebSM.org

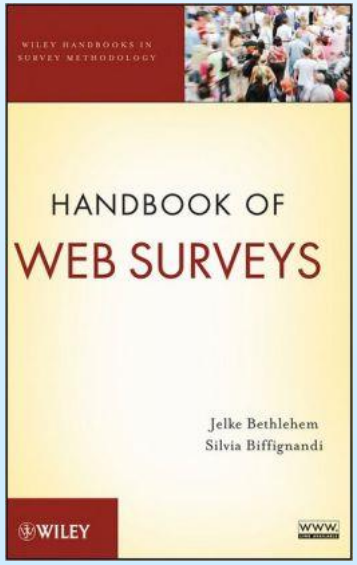
Recent Books on Web Surveys

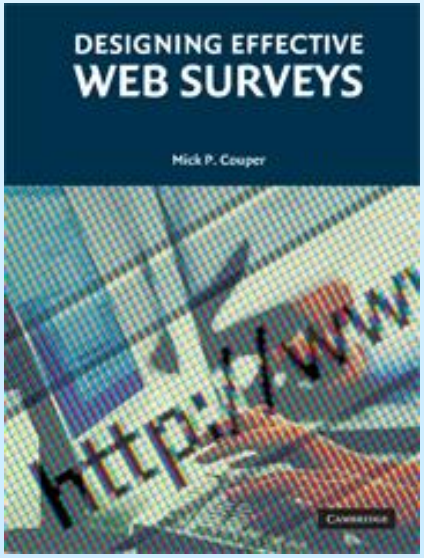


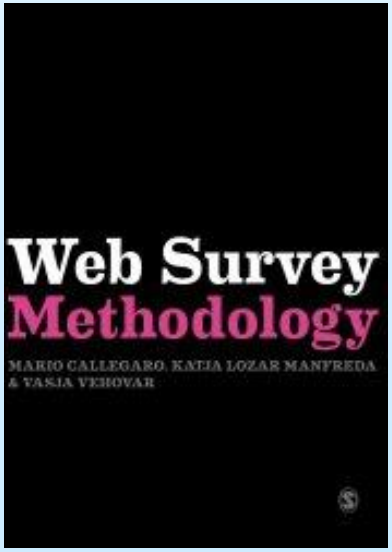
Also see:

www.WebSM.org









Selected References 1

- Baker, R., Blumberg, S.J., Brick, J.M., Couper, M.P., Courtright, M., Dennis, J.M., Dillman, D., Frankel, M.R., Garland, P., Groves, R.M., Kennedy, C., Krosnick, J., Lavrakas, P.J., Lee, S., Link, M., Piekarski, L., Rao, K., Thomas, R.K., & Zahs, D. (2010), "Research Synthesis: AAPOR Report on Online Panels." *Public Opinion Quarterly*, 74 (4): 711-781.
- Baker, R.P., Brick, J.M., Bates, N.A., Battaglia, M., Couper, M.P., Dever, J.A., Gile, K.J., & Tourangeau, R., (2013), "Summary Report of the AAPOR Task Force on Non-Probability Sampling." *Journal of Survey Statistics and Methodology*, 1 (2): 90-143.
- Berinsky, A.J, Huber, G.A., & Lenz, G.S. (2012), "Evaluating Online Labor Markets for Experimental Research: Amazon.com's Mechanical Turk." *Political Analysis*, 20 (3): 351-368.
- Bethlehem, J. (2010), "Selection Bias in Web Surveys." *International Statistical Review*, 78 (2): 161-188.
- Bethlehem, J., & Biffignandi, S. (2012), *Handbook of Web Surveys*. New York: Wiley.
- Bhutta, C.B. (2012), "Not by the Book: Facebook as a Sampling Frame." *Sociological Methods and Research*, 41 (1): 57-88.
- Burkill, S., Copas, A., Couper, M.P., Clifton, S., Prah, P., Datta, J., Conrad, F., Johnson, A., Wellings, K., & Erens, B. (2015), "Using the Web to Collect Data on Sensitive Behaviours: An Experiment Looking at Mode Effects on the Third British National Survey of Sexual Attitudes and Lifestyles (Natsal-3)." Paper presented at the European Survey Research Association Conference, Reykjavik, Iceland, July.
- Callegaro, M., Baker, R., Bethlehem, J., Göritz, A., Krosnick, J.A., & Lavrakas, P.J. (Eds.) (2014), *Online Panel Research: A Data Quality Perspective*. New York: Wiley.

Selected References 2

- Callegaro, M., Lozar Manfred, K., & Vehohar, V. (2015), *Web Survey Methodology*. Los Angeles: Sage.
- Couper, M.P. (2000), "Web Surveys: A Review of Issues and Approaches." *Public Opinion Quarterly*, 64 (4), 464-494.
- Couper, M.P. (2007), "Issues of Representation in eHealth Research (With a Focus on Web Surveys)." *American Journal of Preventive Medicine*, 32 (5): S83-S89.
- Couper, M.P. (2008), *Designing Effective Web Surveys*. New York: Cambridge University Press.
- Couper, M.P. (2013), "Is the Sky Falling? New Technology, Changing Media, and the Future of Surveys." *Survey Research Methods*, 7 (3): 145-156.
- Dever, J.A., Rafferty, A., & Valliant, R. (2008), "Internet Surveys: Can Statistical Adjustments Eliminate Coverage Bias?" *Survey Research Methods*, 2 (2): 47-62.
- Erens, B., Burkill, S., Couper, M.P., Conrad, F.G., Clifton, S., Tanton, C., Phelps, A., Datta, J., Mercer, C.H., Sonnenberg, P., Prah, P., Mitchell, K.R., Wellings, K., Johnson, A.M., & Copas, A.J. (2014), "Nonprobability Web Surveys to Measure Sexual Behaviors and Attitudes in the General Population: A Comparison with a Probability Sample Interview Survey." *Journal of Medical Internet Research*, 16 (12): e276.
- Keeter, S., & Christian, L.M. (2012), "A Comparison of Results from Surveys by the Pew Research Center and Google Consumer Surveys." Washington, DC: Pew Research Center.
- Lee, S., & Valliant, R. (2009), "Estimation for Volunteer Panel Web Surveys Using Propensity Score Adjustment and Calibration Adjustment." *Sociological Methods and Research*, 37 (3): 319-343.

Selected References 3

- Little, R.J.A., & Rubin, D.A. (20020, *Statistical Analysis with Missing Data, 2nd ed*. New York: Wiley.
- Lozar Manfreda, K., Bosnjak, M., Berzelak, J., Haas, I., & Vehovar, V. (2008), "Web Surveys Versus Other Survey Modes; A Meta-Analysis Comparing Response Rates." *International Journal of Market Research*, 50 (1): 79-104.
- Medway, R., & Fulton, J. (2012), "When More Gets You Less: a Meta-Analysis of the Effect of Concurrent Web Options on Mail Survey Response Rates." *Public Opinion Quarterly*, 76 (4): 733-746.
- Nelson, E.J., Hughes, J., Oakes, J.M., Pankow, J.S., & Kulasingam, S. L. (2014), "Estimation of Geographic Variation in Human Papillomavirus Vaccine Uptake in Men and Women: An Online Survey Using Facebook Recruitment." *Journal of Medical Internet Research*, 16 (9): e198, doi: 10.2196/jmir.3506.
- Schonlau, M., van Soest, A., Kapteyn, A., & Couper, M.P. (2009), "Selection Bias in Web Surveys and the Use of Propensity Scores." *Sociological Methods and Research*, 37 (3): 291-318.
- Shih, T.-H., & Fan, X. (2008), "Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis." *Field Methods*, 20 (3): 249–271.
- Tourangeau, R., Conrad, F.G., & Couper, M.P. (2013), *The Science of Web Surveys*. New York: Oxford University Press.
- Wang, W., Rothschild, D., Goel, S., & Gelman, A. (2015), "Forecasting Elections with Non-Representative Polls." *International Journal of Forecasting*, 31 (3): 980-991.