Nonresponse Error, Measurement Error, and Mode of Data Collection: Tradeoffs in a Multi-Mode Survey

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Background: Research Q1

- Many studies compare the relative contributions of ME and NR error, often finding that ME > NR (Biemer, 2001; Schaeffer et al., 1991)
- Comparisons of ME and NR error on sensitive questions has been sparse due to lack of validation data
- Sensitive questions may be perceived as asking about socially desirable or undesirable traits
- **Do different types of sensitive items yield different contributions of ME and NR error?**

Background: Research Q2

- Several researchers have expressed concerns that efforts to reduce NR error may increase ME
  - Cannell and Fowler, 1963; Bollinger and David, 2001
- Opposite concern for mode switch studies
- Switching from an interviewer-administered mode (CAPI, CATI) to a self-administered mode (IVR, Web) can reduce ME (Kreuter et al., 2008)
- Yet, 20-40% of units drop out during mode switch (Tourangeau et al., 2002; Fricker et al., 2005)
- **Do efforts to reduce ME increase NR error?**

Background: Research Q3

- Basic notion that reluctant respondents are especially prone to survey “satisficing” (Krosnick, 1991, 1998)
- Some evidence that hard-to-persuade or hard-to-contact respondents are more likely to give satisficing answers (Fricker, 2007; Triplett et al., 1996; Yan et al., 2004)
  - Studies limited by use of indirect indicators of satisficing; lack of validation data
- **Does the level of effort needed to get the case produce a tradeoff between NR and ME, such that harder-to-interview cases provide less accurate data?**

Specific Research Questions

- What is the relative contribution of ME and NR error to the overall error in survey estimates of sensitive items?
- Does NR bias offset reductions in ME due to cases who drop out during the switch from a interviewer-administered mode to a self-administered mode of data collection?
- Does the level of effort needed to get the case also produce a tradeoff between ME and NR error, such that harder-to-interview cases provide less accurate data?

Study of UMD Alumni (’89-’02)

- Data collection period: Jul-Aug, 2005
- CATI initial mode of contact
  - N = 7,535 telephone numbers fielded; RR1: 31.9%
- Brief telephone screener
- Screener respondents (N=1,501) randomly assigned to CATI, IVR, or Web for main iw
- N=1,107 started main iw
  - CATI: N=329; IVR: N=410; Web: N=368
- Dropout during mode switch: 26.2% (N=394)
  - CATI: 2.7%; IVR: 21.8%; Web: 42.4%

Survey Estimates of Interest

- R's asked about their academic record and alumni involvement
- Socially undesirable items
  - GPA < 2.5 (recoded), at least one D/F, ever dropped a class
- Socially desirable items
  - GPA > 3.5 (recoded), graduates with honors, ever donated to UMD, donated last year, member of alumni association
- Neutral items
  - GPA, age (screener item), years since graduation

Nonresponse Bias

Characteristic	Noncontact (N=4038)	Refusal (N=1996)	Mode Switch Dropout (N=394)	Item Missing (N=17 - 138)
Undesirable				
GPA < 2.5	-0.4	-1.2	-1.5	-0.1
Rec'd D or F	-0.2	-1.4	0.1	-0.4
Dropped class	-1.2	-0.4	-0.6	-0.6
Desirable				
GPA > 3.5	0.9	1.4	0.5	0.6
Honors	0.5	1.4	0.6	0.4
Ever donate	5.6	7.1	2.0	0.6
Donate last year	3.1	3.5	0.3	0.3
Alumni member	2.7	4.7	1.4	0.0
Neutral				
GPA	0.01	0.03	0.01	0.01
Age (screener)	0.54	0.65	-0.06	-0.05
Yrs since degree	0.24	0.31	0.04	0.00

Nonresponse and Measurement Bias

Characteristic	Total NR Bias	Measurement Bias
Undesirable		
GPA < 2.5	-3.2	**-7.9**
Rec'd D or F	1.9	**15.2**
Dropped class	2.8	**20.2**
Desirable		
GPA > 3.5	**3.4**	1.1
Honors	2.9	**4.9**
Ever donate	**15.3**	0.8
Donate last year	**7.2**	1.4
Alumni member	**8.8**	7.3
Neutral		
GPA	0.06	**0.10**
Age (screener)	**1.08**	0.17
Yrs since degree	**0.59**	0.06

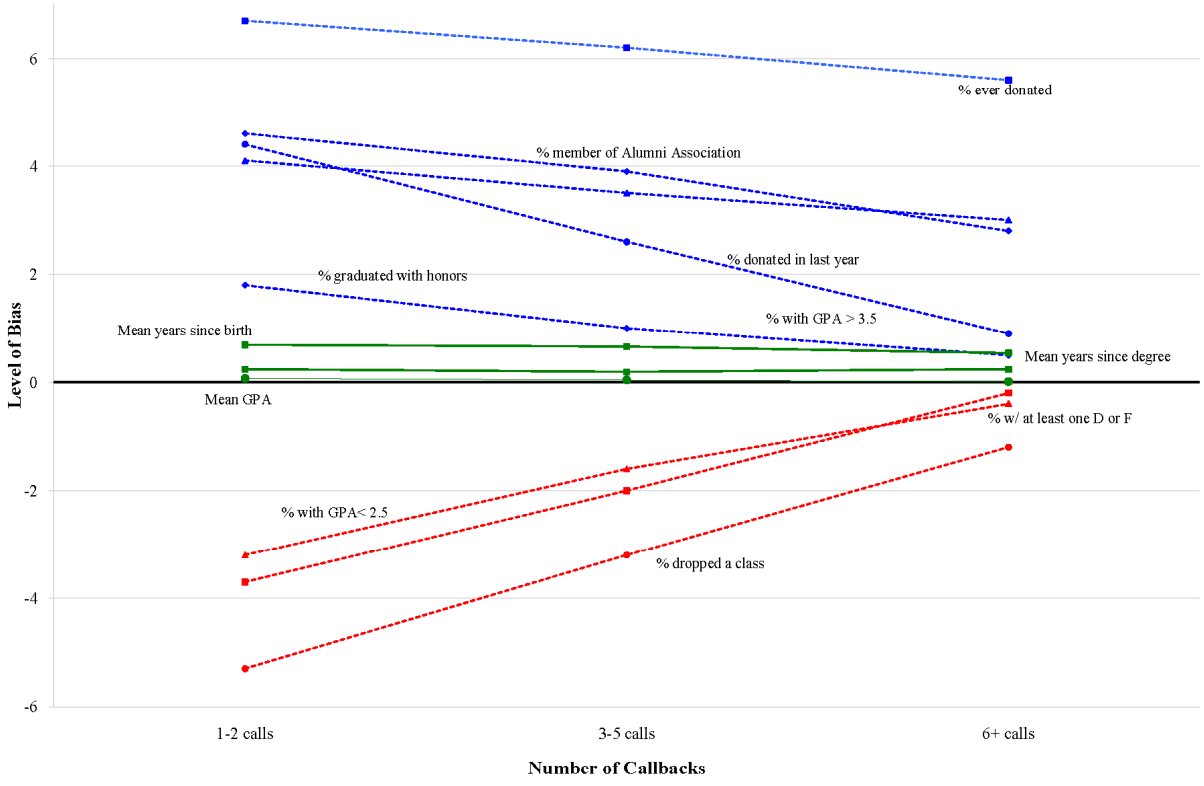
Total Bias After Mode Switch

Characteristic	CATI	IVR	Web
Undesirable			
GPA < 2.5	-8.7	-8.5	**-9.8**
Rec'd D or F	-19.4	-14.6	-11.8
Dropped class	-21.3	-20.7	-20.3
Desirable			
GPA > 3.5	1.7	-1.2	**3.8**
Honors	4.6	4.6	**6.6**
Ever donate	2.3	**3.6**	**2.7**
Donate last year	3.7	0.8	1.3
Alumni member	9.0	7.5	**9.4**
Neutral			
GPA	0.11	0.09	**0.12**
Yrs since degree	0.04	**0.30**	0.04

Bias Estimates by Call Effort

Characteristic	Noncontact			Refusal			Measurement		
	1-2 calls	3-5 calls	6+ calls	1-2 calls	3-5 calls	6+ calls	1-2 calls	3-5 calls	6+ calls
Undesirable									
GPA < 2.5	-3.2	-1.6	-0.4	-0.9	-2.1	-2.8	-7.6	-7.2	-7.8
Rec'd D or F	-3.7	-2.0	-0.2	1.3	0.3	-1.7	-15.2	-15.7	-15.2
Dropped class	-5.3	-3.2	-1.2	-2.4	-1.7	-1.5	-18.5	-19.2	-20.2
Desirable									
GPA > 3.5	4.4	2.6	0.9	1.5	1.8	2.4	0.6	0.9	1.1
Honors	1.8	1.0	0.5	2.9	2.4	2.4	5.1	5.3	4.9
Ever donate	6.7	6.2	5.6	9.5	10.0	9.7	-1.1	0.4	0.8
Donate last year	4.1	3.5	3.0	3.7	3.6	4.1	0.8	2.7	1.4
Alumni member	4.6	3.9	2.8	6.3	6.3	6.1	7.0	7.0	7.2
Neutral									
GPA	0.07	0.04	0.01	0.03	0.03	0.05	0.09	0.10	0.10
Age	0.69	0.66	0.54	1.03	1.03	0.55	0.38	0.23	0.17
Yrs since degree	0.24	0.19	0.24	0.52	0.52	0.35	0.20	0.09	0.06

Noncontact Bias by Call Effort



Conclusions

- In general, ME > NR for socially undesirable items, and NR > ME for socially desirable items
  - Effects of one form of error reinforced rather than cancelled the effects of the other form
- Switching respondents to IVR or Web may reduce measurement error, but may also increase overall error due to dropouts
- Additional callbacks reduced one form of nonresponse error (the bias due to noncontacts) but had a less consistent relation to other forms of NR error or to ME

Limitations

- Sample of alumni at a single university
- Patterns may not hold for highly sensitive items (e.g., illicit drug use)
- Main focus on bias rather than variance
- Relatively small sample sizes for each mode group

Thank You!

- All references cited in this presentation are available upon request
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