



# An Independent Analysis of the Nielsen Meter and Diary Nonresponse Bias Studies:

## A Presentation to the Council for Research Excellence

Robert M. Groves and Ashley Bowers, University of Michigan  
Frauke Kreuter and Carolina Casas-Cordero, University of Maryland  
Peter Miller, Northwestern University

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# Motivation

- Response rates in decline
- Concern that failing to obtain data from households → nonresponse bias in Nielsen viewing estimates
  - Depends on whether nonrespondents are different from respondents on viewing measures
- But little known about viewing of *nonrespondents*
- Need for a special follow-up survey
  - CRE Nonresponse Bias (NRB) Study, Meter and Diary – 2006-2009



# Study Overview and Design

Role of UMI-UMD Team

Timeline and Deliverables

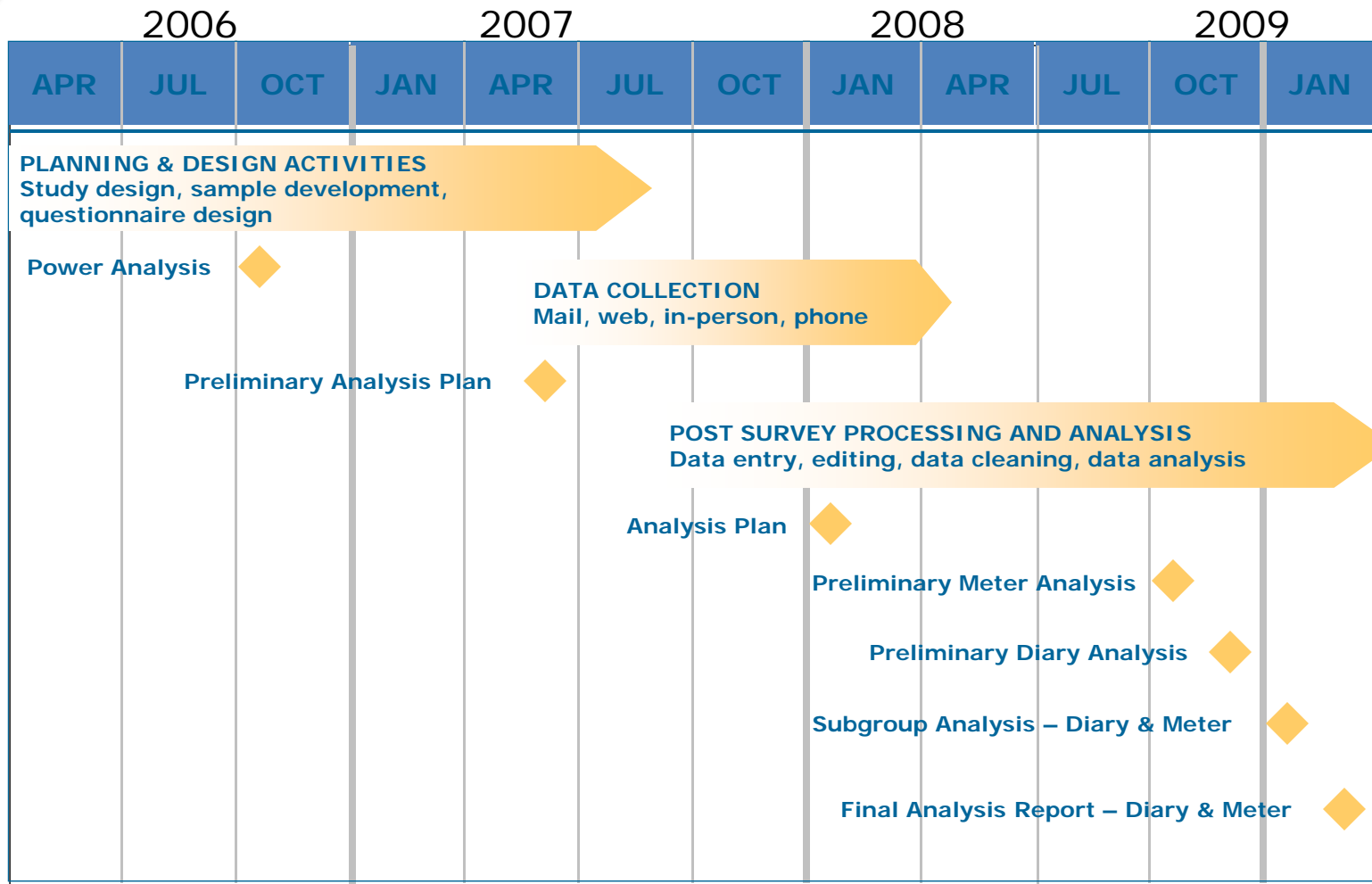
Study Design – Diary & Meter



# Role of UMI-UMD Team

- Consulted on design and implementation issues in the NRB Study
  - Power analysis
  - Sample design
  - Questionnaire development
  - Data collection forms development and procedures
- Observed the training of data collection staff
- Held extensive discussions with Nielsen during the data processing and analysis planning phases
- Replicated Nielsen analyses
- Conducted independent analysis of nonresponse bias in viewing estimates (based on NRB data)

# Study Timeline & Deliverables



# Study Design - Meter

- Sample – 2,300 Basics (Apr – Sept '07)
- Questionnaire
  - 100-item questionnaire booklet
  - Target respondent: Head of household
- Data Collection – Mail, web, & face-to-face
  - Dates: June 2007 – April 2008
  - Response rates (see table below)

NRB Strata	NRB Sample	NRB Respondents	Unweighted RR (1)	Weighted RR (2)
Cooperators	1,000	945	94.50	95.02
Refusers	1,300	813	62.54	62.44
<b>Total</b>	<b>2,300</b>	<b>1,758</b>	<b>76.43</b>	<b>77.81</b>

Notes: (1) Unweighted response rates reflect the ratio (NRB respondents/NRB sample) for each strata. (2) The Weighted response rate weights each case by its corresponding selection probability. See Appendix A of the Meter Report for additional detail.

# Study Design - Diary

- Sample – 9,000 Mailables and Unmailables (Nov '06, Feb '07 cycles)
- Questionnaire
  - 100-item questionnaire booklet
  - Target respondent: Head of household
- Data Collection – Mail, web, face-to-face, & telephone
  - Dates: June 2007 – May 2008
  - Response rates (see next slide)

# The 11 Diary Strata

Mailing Status	NRB Strata		Number of Cases		Response Rates		
	Intab Status	Call Status	NRB Sample	NRB Respondents	Unweighted (1)	Weighted (2)	
Intab	Mailable	Intab	Accepting	500	474	98.80	93.94
	Mailable	Intab	Refusing	1,000	909	90.90	91.61
	Mailable	Intab	Noncontacted	500	461	92.20	92.92
NonIntab	Mailable	NoGood	Accepting	1,000	856	85.60	85.46
	Mailable	NoGood	Refusing	1,000	670	67.00	66.30
	Mailable	NoGood	Noncontacted	1,000	756	75.60	76.57
	Mailable	NoReturn	Accepting	500	409	81.80	82.69
	Mailable	NoReturn	Refusing	1,000	751	75.10	75.51
	Mailable	NoReturn	Noncontacted	500	364	72.80	74.84
	UnMailable	-	Refusing	1,000	272	27.20	26.75
	UnMailable	-	NonContacted	1,000	62	6.20	5.35
	<b>Total</b>			<b>9,000</b>	<b>5,984</b>	<b>66.49</b>	<b>59.91</b>

Notes: (1) Unweighted response rates reflect the ratio (NRB respondents/NRB sample) for each strata. (2) The Weighted response rate weights each case by its corresponding selection probability. See Appendix A of the Diary Report for additional detail.





# Analysis Results

Analysis Overview

Analysis Findings

Nonresponse Bias in NRB Study Estimates


# Analysis Overview – Four Main Questions

*Question 1:* Do Cooperators/Intabs differ in their TV viewing from Refusers/NonIntabs?

- Dayparts
- Station viewing

*Question 2:* Do any differences lead to nonresponse bias in TV viewing estimates (based on NRB questionnaire)?

- Dayparts
- Station viewing



# Analysis Overview – Four Main Questions (2)

*Question 3:* Are there differences between Cooperators/Intabs and Refusers/NonIntabs on TV Viewing correlates?

- Demographic and geographic characteristics
- TV equipment
- TV attitudes and behavior patterns

*Question 4:* Can differences on TV viewing correlates be used to reduce nonresponse bias in Nielsen viewing estimates?

- Using Nielsen's current poststratification adjustment
- Using additional variables not included in current adjustment



# Analysis Results

*Question 1:*

Do Cooperators/Intabs differ in their TV viewing from Refusers/NonIntabs?

**Result 1: Household Viewing by Daypart Similar, Except for 8-11pm (Meter), 11pm-2am (Diary)**

**Table 1. Percent of Households Watching TV Yesterday by Daypart, Meter and Diary.**

	Meter			Diary		
Daypart	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
5am-9am	41.9 (2.05)	45.8 (2.07)	0.11	46.5 (1.66)	48.6 (2.78)	0.51
9am-4pm	56.1 (1.66)	56.3 (1.78)	0.94	57.1 (2.24)	58.4 (2.65)	0.71
4pm-8pm	67.4 (2.07)	69.7 (1.86)	0.46	76.0 (1.41)	71.8 (2.45)	0.12
8pm-11pm	71.2 (1.42)	76.2 (1.35)	<b>0.04</b>	82.4 (1.94)	77.5 (1.57)	0.07
11pm-2am	39.3 (1.62)	39.7 (2.17)	0.89	32.8 (2.39)	39.1 (2.01)	<b>0.04</b>
2am-5am	10.2 (1.15)	12.3 (1.34)	0.18	7.5 (1.13)	11.6 (1.74)	0.07
12am-12am	91.5 (0.89)	90.1 (1.10)	0.41	93.6 (1.08)	93.2 (0.65)	0.79

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,650 Meter cases and ~5,660 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

**Result 2: Person Viewing by Daypart Similar, Except for 4-8pm and 11pm-2am (Diary)**

**Table 2. Percent of Persons Watching TV Yesterday by Daypart, Meter and Diary.**

	Meter			Diary		
Daypart	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
5am-9am	30.8 (1.84)	30.9 (1.51)	0.98	33.6 (1.63)	34.5 (2.06)	0.70
9am-4pm	41.2 (1.88)	36.1 (2.65)	0.15	41.9 (1.94)	38.7 (1.89)	0.16
4pm-8pm	55.8 (1.82)	55.0 (2.43)	0.80	63.4 (1.62)	56.3 (1.74)	<b>0.01</b>
8pm-11pm	65.4 (1.42)	66.7 (1.78)	0.52	71.2 (1.99)	68.5 (1.32)	0.30
11pm-2am	29.9 (1.60)	31.5 (2.15)	0.60	22.7 (1.85)	29.7 (2.17)	<b>0.02</b>
2am-5am	7.0 (0.70)	7.5 (1.25)	0.74	4.9 (0.77)	7.4 (1.85)	0.18
12am-12am	86.4 (1.49)	83.9 (1.62)	0.23	89.1 (1.37)	88.8 (0.81)	0.87

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,650 Meter cases and ~5,660 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

**Result 3: No Differences in Viewing of Broadcast Stations for Meter, But Differences for Diary**

**Table 3. Percent of Persons Watching Broadcast Stations Daily or Weekly, Meter and Diary.**

Station	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
ABC	70.3 (1.54)	73.7 (1.64)	0.19	75.5 (1.75)	73.2 (1.77)	0.35
CBS	68.7 (1.45)	73.2 (1.92)	0.12	76.9 (1.40)	71.6 (2.06)	<b>0.02</b>
FOX	68.4 (1.46)	72.7 (1.51)	0.11	72.9 (1.37)	70.7 (1.94)	0.30
NBC	71.2 (1.39)	73.3 (1.99)	0.38	79.4 (1.12)	72.8 (2.23)	<b>0.01</b>
UNIVISION	7.6 (0.77)	6.7 (1.03)	0.52	3.1 (0.54)	5.7 (0.76)	<b>0.00</b>

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,650 Meter cases and ~5,660 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

**Result 4: Large Majority of Non-Broadcast Stations Show No Difference, Refusers More Likely to View Some Stations (Meter, Diary)**

**Table 4. Percent of Persons Watching Non-Broadcast Stations Daily or Weekly, Meter and Diary.**

Station	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
A&E	36.2 (1.54)	35.5 (2.14)	0.75	35.2 (2.03)	32.8 (2.39)	0.45
AMC	23.4 (1.58)	27.1 (2.67)	0.15	23.7 (1.57)	22.6 (1.87)	0.65
BET	11.3 (1.48)	12.5 (1.55)	0.52	4.9 (0.93)	11.7 (1.05)	<b>0.00</b>
CARTOON	20.3 (1.83)	23.1 (1.71)	0.24	15.0 (1.43)	22.2 (1.79)	<b>0.01</b>
CNN	37.7 (2.01)	45.2 (2.33)	<b>0.00</b>	41.8 (2.39)	40.5 (2.31)	0.72
ESPN	38.2 (2.18)	41.0 (2.48)	0.34	39.4 (1.58)	43.2 (2.49)	0.11
HBO	17.4 (1.62)	27.9 (1.92)	<b>0.00</b>	15.8 (1.32)	27.8 (1.95)	<b>0.00</b>
MTV	15.5 (1.27)	19.1 (1.87)	0.09	12.6 (1.22)	16.8 (1.26)	<b>0.02</b>
TLC	34.0 (1.73)	33.2 (2.40)	0.80	37.1 (2.42)	35.4 (1.59)	0.56
TNT	49.4 (1.76)	47.0 (2.07)	0.39	46.0 (1.45)	50.0 (3.42)	0.25
USA	47.4 (2.34)	43.0 (1.98)	0.17	44.1 (1.08)	46.8 (2.46)	0.35

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,360 Meter cases and ~4,900 Diary cases with cable or satellite service. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.



# Sensitivity Analyses

- Different estimation samples
  - All respondents, UMI/UMD case base, Nielsen case base
- By Diary strata
  - Mailables, Unmailables
  - Intabs, NoGoods, NoReturns
- Alternative Coding of Frequency of Station Viewing
  - Daily, Daily/Weekly, Daily/Weekly/Monthly
- Alternative Coding of No Response Values (Don't Know, Refused, No Answer)
  - Not Viewing, Missing

*Results: No widespread changes to results for Meter or Diary - some isolated differences. Different viewing patterns when break NonIntabs into NoGoods and NoReturns (Diary).*

# Summary

- Overall, few differences between Cooperators/Intabs and Refusers/NonIntabs on TV viewing measures
  - Dayparts:
    - NonIntabs more likely to view 11pm-2am (Diary)
    - NonIntabs less likely to view 4pm-8pm (Diary)
  - Broadcast Station Viewing Differences:
    - NonIntabs less likely to view CBS, NBC (Diary)
    - NonIntabs more likely to view UNIVISION (Diary)
  - Non-Broadcast Station Viewing - Refusers/NonIntabs more likely to view:
    - CNN, HBO (Meter)
    - BET, CARTOON, HBO, MTV (Diary)



# Analysis Results

*Question 2:*

Do any differences lead to nonresponse bias in viewing estimates (based on NRB questionnaire)?

**Result 5: Three Meter Viewing Estimates Show Evidence of Nonresponse Bias,  
Evidence of Bias in 10 Diary Estimates**

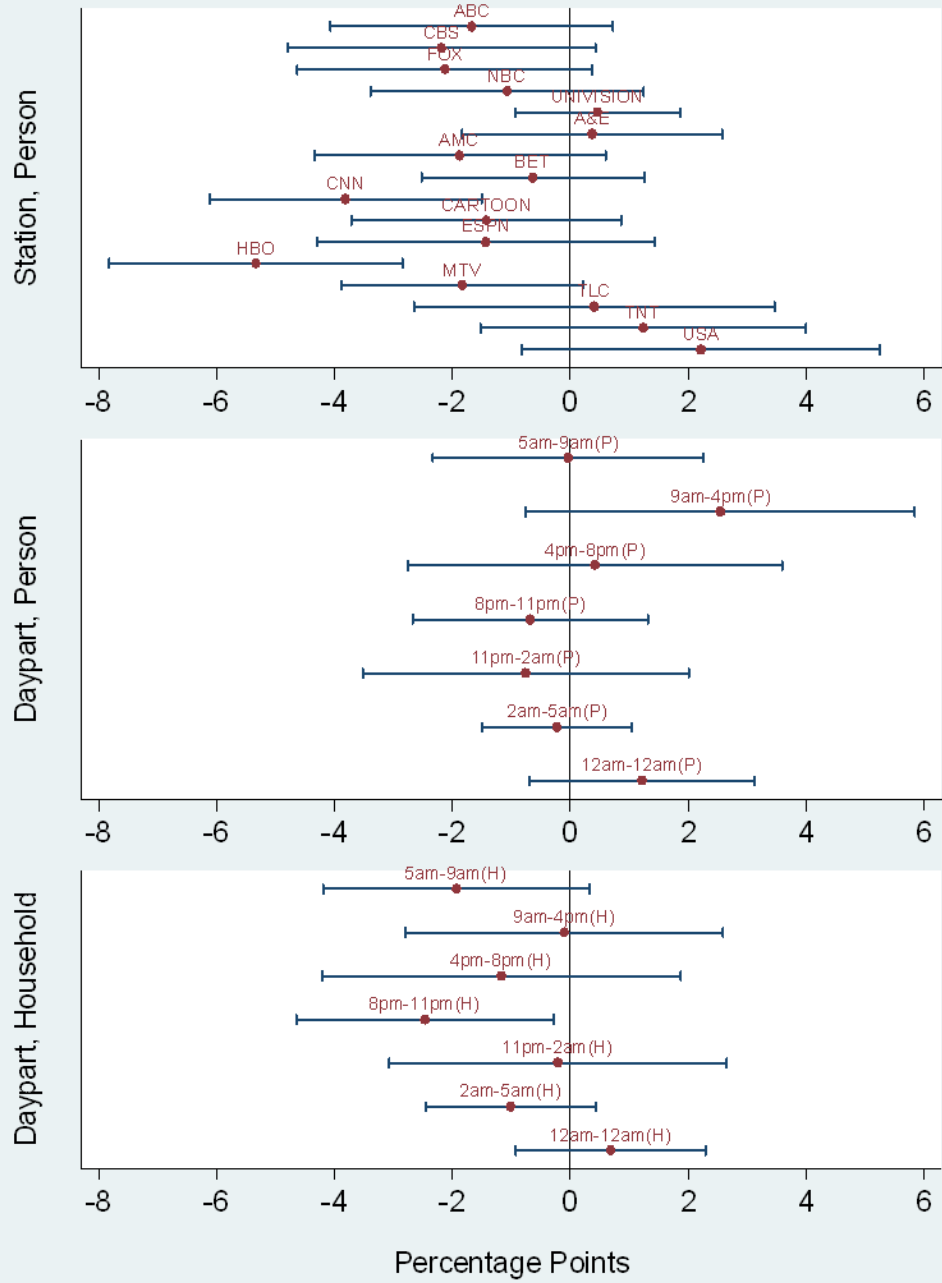
**Table 5. Estimates of Nonresponse Bias in Viewing Estimates, Meter and Diary.**

Daypart/Station	Meter				Diary			
	% Coop	% Total	Bias (Coop-Total)	P-value	% Intab	% Total	Bias (Intab - Total)	P-value
8pm-11pm (HH)	71.2	73.7	-2.5 (1.11)	<b>0.03</b>	--	--	--	--
11pm-2am (HH)	--	--	--	--	32.8	37.4	-4.6 (2.16)	<b>0.03</b>
4pm-8pm (P)	--	--	--	--	63.5	58.2	5.3 (1.85)	<b>0.00</b>
11pm-2am (P)	--	--	--	--	22.7	27.9	-5.2 (2.01)	<b>0.01</b>
CBS	--	--	--	--	77.0	73.0	4.0 (1.56)	<b>0.01</b>
NBC	--	--	--	--	79.4	74.5	4.9 (1.77)	<b>0.01</b>
UNIVISION	--	--	--	--	3.1	5.0	-1.9 (0.53)	<b>0.00</b>
CARTOON	--	--	--	--	15.0	20.3	-5.3 (1.83)	<b>0.00</b>
CNN	37.7	41.5	-3.8 (1.18)	<b>0.00</b>	--	--	--	--
MTV	--	--	--	--	12.6	15.7	-3.1 (1.19)	<b>0.01</b>
BET	--	--	--	--	4.9	9.9	-5.0 (0.96)	<b>0.00</b>
HBO	17.4	22.7	-5.3 (1.27)	<b>0.00</b>	15.9	24.6	-8.7 (1.67)	<b>0.00</b>

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

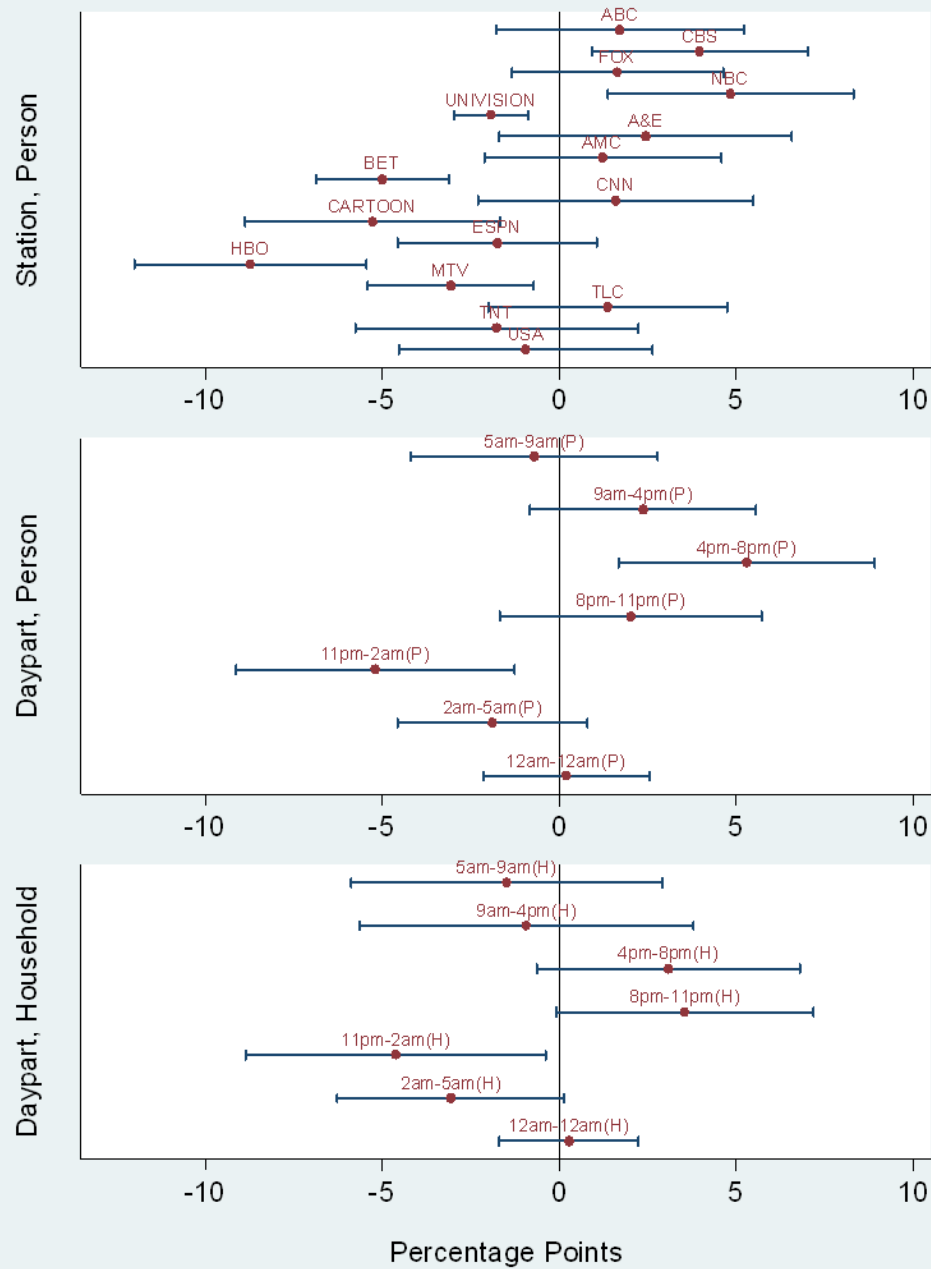
NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,360-1,650 Meter cases and ~4,900-5,660 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

Figure 1. Estimates of Nonresponse Bias in Viewing Estimates, Meter.



SOURCE: UMI-UMD Meter Nonresponse Bias Study Report (March 2009).

Figure 2. Estimates of Nonresponse Bias in Viewing Estimates, Diary.



SOURCE: UMI-UMD Diary Nonresponse Bias Study Report (May 2009).

# Sensitivity Analyses

- Different bias estimators
  - Bias:  $\text{Cooperator} - \text{Total}$
  - Relative Bias:  $(\text{Cooperator} - \text{Total})/\text{Total}$
  - Ratio:  $\text{Cooperator}/\text{Total}$

*Results: Same results obtained using different estimators for Meter and Diary.*



# Analysis Results

*Question 3:*

Are there differences between Cooperators/Intabs and Refusers/NonIntabs on TV viewing correlates?



**Result 6: Income and HH Size Differences for Meter; HH Size, Children and Owner/Renter Differences for Diary**

**Table 6. Household Demographic Characteristics, Meter and Diary.**

Demographic variable	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
Has Child < 18	37.6 (2.39)	41.0 (2.10)	0.26	31.1 (1.96)	43.3 (2.34)	<b>0.00</b>
Has Child < 6	15.7 (1.47)	19.0 (2.07)	0.20	11.6 (1.08)	18.0 (2.37)	<b>0.01</b>
HH Income < \$40K	40.3 (1.94)	32.8 (1.89)	<b>0.01</b>	38.4 (2.04)	32.4 (2.33)	0.06
Owns housing unit	75.9 (1.54)	77.7 (1.94)	0.49	89.2 (1.21)	83.2 (1.60)	<b>0.00</b>
<i>Household Size:</i>						
1 HH member	23.2 (1.78)	18.7 (1.95)	<b>0.05</b>	19.3 (1.37)	16.0 (1.55)	<b>0.00</b>
2 HH members	33.3 (1.86)	30.1 (1.71)		42.2 (2.20)	32.4 (1.94)	
3+ HH members	43.5 (1.95)	51.3 (2.21)		38.4 (1.77)	51.7 (1.67)	

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,520-1,630 Meter cases and ~4,840-5,580 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

## Result 7: Geographic Differences for Both Meter and Diary

**Table 7. Geographic Characteristics, Meter and Diary.**

Geographic variable	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
<i>County Size:</i>						
A	30.4 (0.89)	43.9 (1.63)	<b>0.00</b>	10.6 (1.47)	11.4 (1.78)	0.90
B	33.9 (0.67)	24.7 (1.51)		41.7 (1.99)	42.8 (2.72)	
C	17.2 (0.76)	15.5 (1.37)		23.9 (1.52)	22.1 (1.73)	
D	18.5 (1.01)	15.9 (1.37)		23.9 (1.48)	23.7 (1.96)	
<i>Territory:</i>						
Northeast	15.9 (0.53)	23.5 (1.21)	<b>0.00</b>	11.8 (1.17)	9.3 (1.04)	<b>0.01</b>
East Central	16.0 (0.65)	12.4 (0.92)		17.5 (1.36)	14.1 (1.75)	
West Central	17.8 (0.57)	15.4 (1.09)		25.2 (1.80)	17.9 (1.72)	
Southeast	21.1 (0.62)	21.5 (1.38)		22.4 (1.57)	28.5 (2.90)	
Southwest	11.8 (0.58)	9.5 (0.93)		8.7 (0.83)	12.8 (1.69)	
Pacific	17.4 (0.64)	17.7 (1.29)		14.5 (1.41)	17.3 (2.27)	

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on 1,652 Meter cases and 5,664 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

**Result 8: Diary NonIntabs More Likely to be Black, Younger; Meter Cooperators and Refusers Similar on Respondent Demographics**

**Table 8. Respondent Demographic Characteristics, Meter and Diary.**

Demographic variable	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
Male	41.9 (1.36)	41.0 (2.27)	0.75	36.4 (1.85)	42.4 (2.69)	0.12
Hispanic	11.7 (0.81)	9.0 (1.13)	0.08	5.0 (1.06)	8.4 (1.30)	0.07
Race Black	11.6 (1.30)	14.5 (2.07)	0.26	5.1 (0.85)	10.6 (1.48)	<b>0.00</b>
Non-Hispanic, Non-Black	77.2 (1.42)	77.8 (2.25)	0.81	90.8 (1.18)	81.8 (1.79)	<b>0.00</b>
Age:						
<= 34 years	14.4 (1.39)	18.3 (1.91)	0.33	8.9 (1.20)	19.1 (3.36)	<b>0.00</b>
35-49 years	33.4 (1.70)	31.7 (2.22)		29.5 (1.34)	31.6 (1.76)	
50-64 years	29.9 (1.82)	29.1 (1.87)		31.8 (1.70)	32.4 (2.25)	
>= 65 years	22.3 (1.66)	21.0 (1.71)		29.9 (1.66)	17.0 (1.64)	
Education:						
Less than High School	10.2 (1.14)	8.4 (0.87)	0.27	5.5 (0.93)	10.4 (1.09)	0.12
High School Diploma	22.4 (1.45)	25.0 (1.89)		27.1 (2.28)	23.6 (1.36)	
Some College	27.9 (1.48)	24.5 (2.09)		22.8 (1.52)	22.1 (2.28)	
Associate/Bachelor	25.0 (1.31)	27.9 (1.96)		31.1 (1.33)	32.0 (3.06)	
Graduate/Professional	14.5 (1.42)	14.2 (1.45)		13.6 (1.56)	11.9 (1.81)	

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,600 Meter cases and ~5,400 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

## Result 9: Refusers/NonIntabs Generally More Heavily Invested in TV Equipment

**Table 9. Percent of Households with TV Equipment, Meter and Diary.**

TV Equipment variable	Meter			Diary		
	% Coop	% Ref	P-value	% Intab	% NonIntab	P-value
Has Big Screen	22.6 (1.44)	41.2 (1.87)	<b>0.00</b>	30.7 (1.50)	39.3 (2.76)	<b>0.03</b>
Has Cable	61.9 (1.82)	69.1 (1.68)	<b>0.00</b>	65.3 (1.91)	56.2 (2.39)	<b>0.01</b>
Has Digital Cable	48.5 (1.84)	60.4 (2.25)	<b>0.00</b>	43.5 (2.97)	58.4 (2.76)	<b>0.00</b>
Has Satellite	24.7 (1.49)	28.5 (2.22)	0.18	29.1 (1.57)	35.6 (2.59)	<b>0.04</b>
Has DVD	88.2 (1.33)	85.3 (1.25)	0.06	87.1 (1.13)	88.7 (1.32)	0.31
Has DVR	9.7 (1.22)	20.1 (1.77)	<b>0.00</b>	16.7 (0.96)	25.5 (3.69)	<b>0.03</b>
Has DVR provided through cable/satellite	15.1 (1.54)	26.3 (1.95)	<b>0.00</b>	22.9 (1.35)	34.1 (4.10)	<b>0.01</b>
Has computer	76.7 (1.54)	76.9 (2.09)	0.93	74.4 (1.68)	81.4 (1.35)	<b>0.00</b>
Has high speed Internet	72.9 (1.81)	75.3 (2.09)	0.30	68.2 (1.86)	73.3 (2.03)	<b>0.05</b>
Can watch TV over Internet	63.6 (2.60)	69.5 (2.60)	0.15	64.7 (2.83)	76.2 (2.56)	<b>0.01</b>
Has 3+ TVs	46.1 (2.27)	60.2 (2.24)	<b>0.00</b>	56.3 (1.59)	62.3 (2.70)	0.10

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~900-1,650 Meter cases and ~3,500-5,660 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

## Result 10: Refusers/NonIntabs Report More Complex TV Viewing Behavior

**Table 10. Mean Score on TV Behavior and Attitudes, Meter and Diary.**

TV Behavior and Attitude variables	Meter			Diary		
	Coop Mean	Ref Mean	P-value	Intab Mean	NonIntab Mean	P-value
HH won't miss watching TV for 1 week (=5)	2.28 (0.04)	2.23 (0.06)	0.51	2.35 (0.04)	2.26 (0.06)	0.25
TV only on when someone watching (=7)	5.01 (0.07)	4.67 (0.10)	<b>0.01</b>	5.08 (0.08)	4.62 (0.08)	<b>0.00</b>
HH watches TV in groups at night (=1)	0.55 (0.01)	0.59 (0.02)	0.15	0.59 (0.02)	0.65 (0.01)	<b>0.01</b>
Has moved TV equipment around house last 30 days (=1)	0.10 (0.01)	0.10 (0.01)	0.93	0.07 (0.01)	0.08 (0.01)	0.46
Has had visitors watching TV last 30 days (=1)	0.53 (0.02)	0.63 (0.02)	<b>0.00</b>	0.56 (0.02)	0.64 (0.02)	<b>0.02</b>
Has had visitors bringing TV equipment to home last 30 days (=1)	0.02 (0.00)	0.04 (0.01)	<b>0.03</b>	0.03 (0.01)	0.03 (0.01)	0.95
Person doesn't plan TV in advance (=7)	3.55 (0.07)	3.76 (0.10)	<b>0.04</b>	3.29 (0.08)	3.50 (0.10)	0.06
Person watches whatever is on TV (=7)	3.12 (0.06)	3.20 (0.09)	0.32	2.90 (0.08)	3.06 (0.08)	0.06
Person does other things while watching TV (=7)	4.08 (0.06)	3.83 (0.07)	<b>0.01</b>	4.16 (0.09)	3.99 (0.10)	0.26
Person switches between several programs (=7)	3.19 (0.08)	3.28 (0.09)	0.43	2.82 (0.08)	2.96 (0.11)	0.21
Person unlikely to turn TV on for company (=4)	2.68 (0.05)	2.46 (0.04)	<b>0.00</b>	2.68 (0.04)	2.57 (0.06)	0.21
Person won't miss watching TV for 1 week (=5)	2.64 (0.04)	2.58 (0.06)	0.43	2.69 (0.05)	2.64 (0.06)	0.60

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).  
 NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,600 Meter cases and ~5,500 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.

**Result 11: NonIntabs Spend Less Time at Home, More Time on Internet and Radio**

**Table 11. Mean Hours of Leisure Activity and Time Spent at Home, Meter and Diary.**

Leisure Activity and At Home Hours	Meter			Diary		
	Coop Mean	Ref Mean	P-value	Intab Mean	NonIntab Mean	P-value
Personal hrs on Internet at Home per day	2.17 (0.14)	2.36 (0.21)	0.43	1.80 (0.13)	2.38 (0.14)	<b>0.01</b>
Personal hrs reading paper newspaper per day	1.20 (0.08)	1.21 (0.07)	0.96	1.27 (0.06)	1.09 (0.08)	0.08
Personal hrs reading paper magazines per day	0.83 (0.05)	0.88 (0.07)	0.51	0.82 (0.04)	0.99 (0.08)	0.08
Personal hrs listening to radio per day	2.78 (0.13)	2.38 (0.13)	<b>0.01</b>	2.44 (0.18)	3.00 (0.14)	<b>0.03</b>
Personal hrs spent at home Mon-Fri, per day	9.52 (0.16)	9.71 (0.23)	0.53	9.77 (0.20)	9.14 (0.20)	<b>0.02</b>
Personal hrs spent at home most recent Sat	9.16 (0.19)	9.59 (0.21)	0.13	9.72 (0.15)	8.86 (0.21)	<b>0.01</b>
Personal hrs spent at home most recent Sun	9.80 (0.15)	10.18 (0.26)	0.24	10.00 (0.20)	10.03 (0.27)	0.93
Personal hrs spent at home yesterday	8.73 (0.17)	9.15 (0.19)	0.10	9.54 (0.23)	8.41 (0.17)	<b>0.00</b>

SOURCE: UMI-UMD Meter CRE Nonresponse Bias Study Report (March 2009), UMI-UMD Diary CRE Nonresponse Bias Study Report (March 2009).

NOTE: Standard errors are shown in parentheses. Analyses are based on ~1,600 Meter cases and ~5,400 Diary cases. Estimates have been weighted to correct for: (1) unequal probabilities of selection in the original Nielsen Meter/Diary and Nonresponse Bias Study samples, and (2) differences in response rates across the Nonresponse Bias Study strata. Standard errors were calculated using jackknife variance estimation with 20 replicates.



# Summary

- Cooperators/Intabs and Refusers/NonIntabs differ on some demographics and geographic characteristics:
  - Demographic Characteristics:
    - Household Size, Income (Meter)
    - Household Size, Presence of Children, Owner/Renter, Race, Age of HOH (Diary)
  - Geographic Characteristics:
    - Territory, County Size (Meter)
    - Territory (Diary)



## Summary (2)

- Cooperators/Intabs and Refusers/NonIntabs differ on some TV viewing correlates:
  - TV Equipment:
    - Including Big Screen, Digital Cable, DVR (Meter, Diary)
  - TV Behavior and Attitudes:
    - Including TV On Always, Visitors Watching TV (Meter, Diary)
  - Leisure Time and Time at Home:
    - NonIntabs less time at home, more time on Internet and radio (Diary)





# Analysis Results

*Question 4: Can differences on TV viewing correlates be used to reduce nonresponse bias in viewing estimates?*



# Evaluating Approaches to Reduce NR Bias: Method

- Re-visited viewing estimates with evidence of nonresponse bias (Question 2)
- Ran series of logistic regression models to evaluate approaches to remove nonresponse bias
  - Outcome variable: Viewing measure
  - Predictor variables:
    - Intab/Cooperator status
    - Nielsen poststratification adjustment
    - Selected TV viewing correlates (Question 3)
    - Interaction terms – Intab/Cooperator status and viewing correlates
- See reports and appendices for additional detail

# Evaluating Approaches to Reduce NR Bias: Results

- *Result 1:* Adding Nielsen NRB poststratification adjustment appears to remove nonresponse bias in viewing estimate for
  - CNN (Meter)
  - Person Viewing 11pm-2am (Diary), CARTOON (Diary)
- *Result 2:* Adding Nielsen NRB poststratification adjustment does not remove nonresponse bias, but it can be removed using additional TV viewing correlates for
  - HBO (Diary)

# Evaluating Approaches to Reduce NR Bias: Results (2)

- *Result 3:* Neither Nielsen NRB poststratification adjustment nor additional measures appear to remove nonresponse bias in viewing estimate for
  - HBO (Meter)
  - CBS, NBC, UNIVISION, BET (Diary)
- *Result 4:* Nonresponse adjustment procedures in general may be unable to remove nonresponse bias in NRB viewing estimates for
  - Household Viewing 8-11pm (Meter)
  - CBS, NBC, UNIVISION (Diary)

# Nonresponse Bias in NRB Study Itself

- Concern about potential nonresponse bias in NRB Study
- Obtained Census block level demographic variables on NRB Study respondents and nonrespondents
  - % of Households – 1-Person
  - % of Households – Black
- *Result:* Cooperator/Refuser and Intab/NonIntab differences on Census variables generally hold when NRB Study nonrespondents included
- Lends confidence to NRB Study findings, but Census information limited
- Other sources of error (e.g., measurement error)

# Overview Judgments

- NRB Study was a state-of-the-art implementation of a study of nonresponse bias
- For large set of Diary and Meter viewing estimates, little evidence of nonresponse bias
- However, some NRB viewing estimates appear to suffer from nonresponse bias (under-estimates in Meter, both under and over-estimates in Diary); biases robust to alternative ways of estimating them
- Current Nielsen adjustment procedures able to reduce nonresponse bias in some NRB viewing estimates, but traditional adjustments ineffective for others.



# Appendix: Viewing Questions from the NRB Study

# Yesterday – HH Viewing Question (Table 1)

27. Now, please take a moment to think about yesterday, that is from 12:00 A.M. midnight that day until 12:00 A.M. midnight last night. Including all of the TV sets in your house, during which time periods of the 24 hours yesterday was at least one of them turned on, with someone watching either live or pre-recorded television programming? **PLEASE INDICATE THIS BY PUTTING AN “X” IN THE SPACE TO THE LEFT OF THOSE TIME PERIODS. IF ANY OF THE PROGRAMMING BEING WATCHED WAS PRE-RECORDED (SUCH AS PLAYING BACK SOMETHING THAT WAS RECORDED EARLIER ON A VCR OR DVR) PLEASE CIRCLE THE “P-R” NEXT TO WHERE YOU PLACE THE “X”.**

Yesterday					
	P-R	12:00 am – 12:59 am		P-R	12:00 pm – 12:59 pm
	P-R	1:00 am – 1:59 am		P-R	1:00 pm – 1:59 pm
	P-R	2:00 am – 2:59 am		P-R	2:00 pm – 2:59 pm
	P-R	3:00 am – 3:59 am		P-R	3:00 pm – 3:59 pm
	P-R	4:00 am – 4:59 am		P-R	4:00 pm – 4:59 pm
	P-R	5:00 am – 5:59 am		P-R	5:00 pm – 5:59 pm
	P-R	6:00 am – 6:59 am		P-R	6:00 pm – 6:59 pm
	P-R	7:00 am – 7:59 am		P-R	7:00 pm – 7:59 pm
	P-R	8:00 am – 8:59 am		P-R	8:00 pm – 8:59 pm
	P-R	9:00 am – 9:59 am		P-R	9:00 pm – 9:59 pm
	P-R	10:00 am – 10:59 am		P-R	10:00 pm – 10:59 pm
	P-R	11:00 am – 11:59 am		P-R	11:00 pm – 11:59 pm






# Yesterday – Respondent Viewing Question (Table 2)

30. Please think about what you were doing yesterday, that is from 12:00 A.M. midnight on that day until 12:00 A.M. midnight last night when you were watching either live or pre-recorded television programming in your house. **PLEASE INDICATE THIS BY PUTTING AN “X” IN THE SPACE TO THE LEFT OF THOSE TIME PERIODS. IF ANY OF THE PROGRAMMING BEING WATCHED WAS PRE-RECORDED (SUCH AS PLAYING BACK SOMETHING THAT WAS RECORDED EARLIER ON A VCR OR DVR) PLEASE CIRCLE THE “P-R” NEXT TO WHERE YOU PLACE THE “X”.**

Yesterday					
	P-R	12:00 am – 12:59 am		P-R	12:00 pm – 12:59 pm
	P-R	1:00 am – 1:59 am		P-R	1:00 pm – 1:59 pm
	P-R	2:00 am – 2:59 am		P-R	2:00 pm – 2:59 pm
	P-R	3:00 am – 3:59 am		P-R	3:00 pm – 3:59 pm
	P-R	4:00 am – 4:59 am		P-R	4:00 pm – 4:59 pm
	P-R	5:00 am – 5:59 am		P-R	5:00 pm – 5:59 pm
	P-R	6:00 am – 6:59 am		P-R	6:00 pm – 6:59 pm
	P-R	7:00 am – 7:59 am		P-R	7:00 pm – 7:59 pm
	P-R	8:00 am – 8:59 am		P-R	8:00 pm – 8:59 pm
	P-R	9:00 am – 9:59 am		P-R	9:00 pm – 9:59 pm
	P-R	10:00 am – 10:59 am		P-R	10:00 pm – 10:59 pm
	P-R	11:00 am – 11:59 am		P-R	11:00 pm – 11:59 pm






# Station Viewing Question (Tables 3 & 4) – Part 1

31. Below is a list of television channels that you may receive in your house. **FOR EACH ONE, PLEASE INDICATE HOW FREQUENTLY YOU PERSONALLY WATCH PROGRAMMING CARRIED ON THEM – DAILY, WEEKLY, MONTHLY OR LESS THAN MONTHLY – BY PLACING AN “X” IN THE APPROPRIATE COLUMN BELOW. IF YOUR HOUSEHOLD DOES NOT RECEIVE ONE OF THE CHANNELS, PLEASE MARK “DO NOT RECEIVE” COLUMN.**

		Daily	Weekly	Monthly	Less than Monthly	Do Not Receive
	ABC					
	CBS					
	FOX					
	NBC					
	UNI					
	A&E					
	AMC					
	BET					
	CNN					
	CARTOON					
	ESPN					

# Station Viewing Question (Tables 3 & 4) – Part 2

31. Below is a list of television channels that you may receive in your house. **FOR EACH ONE, PLEASE INDICATE HOW FREQUENTLY YOU PERSONALLY WATCH PROGRAMMING CARRIED ON THEM – DAILY, WEEKLY, MONTHLY OR LESS THAN MONTHLY – BY PLACING AN “X” IN THE APPROPRIATE COLUMN BELOW. IF YOUR HOUSEHOLD DOES NOT RECEIVE ONE OF THE CHANNELS, PLEASE MARK “DO NOT RECEIVE” COLUMN.**

		Daily	Weekly	Monthly	Less than Monthly	Do Not Receive
	HBO					
	MTV					
	TLC					
	TNT					
	USA					
Other Channel (please specify):						
Other Channel (please specify):						
Other Channel (please specify):						