



Nonresponse trends in American Time Use Survey: 2004-2016

Zeping Tao & Z. Tuba Suzer-Gurtekin
Surveys of Consumers (SCA)
University of Michigan



Introduction

- Using rich sampling frame information to test impact of nonresponse correlates
 - Sampling frame: respondents that have completed the final CPS interview
 - American Time Use Survey (ATUS) is a nationwide telephone survey
 - ATUS official released response rate is 57.3% in 2004 and 43.0% in 2018
- Literature tested nonresponse hypotheses
 - Abraham et al. (2006) on ATUS 2004 data:
 - Little support for the hypothesis that busy people have lower response propensity
 - Considerable support for the hypothesis that people who are strongly integrated into communities have higher response propensity



What causes the nonresponse bias?

- Hypothesis of being busy (“busyness”)
 - Being busy and not busy leads to different time use pattern and it can affect one’s contactability and cooperation. (Groves and Couper 1998)
 - 2 other empirical studies found little support for this hypothesis (Robinson 1999; Pääkkönen 1999)
- Hypothesis of social integration/isolation
 - Those who are strongly integrated into the communities would be easier to contact and be more likely to cooperate with survey requests; vice versa. (Groves and Couper 1998)
 - Different levels of social integration also leads to different time allocation to individual and social activities

Data and method

Response outcome measures

- Response outcome category developed in Abraham et al. (2006)
- Base weight (sampling weight without nonresponse adjustment) available in 2004 - 2016

Table 1. Sample Disposition, 2004 American Time Use Survey

Sample Disposition Code	Unweighted <i>N</i>	Unweighted %	Weighted %
Official Category			
Complete or sufficient partial	13,973	54.6	56.1
Refusal	4,705	18.4	18.4
Noncontact	1,827	7.1	6.5
Other noninterviews	1,932	7.5	8.2
Unknown eligibility	3,175	12.4	10.9
Total eligible sample	25,612	100.0	100.0
Not eligible	1,392	—	—
Total	27,004	—	—
Regrouped Category			
(C) Complete or sufficient partial	13,973	52.0	53.2
(R) Refusal	4,705	17.5	17.5
(NC-1) Contact not attempted	2,895	10.8	11.5
(NC-2) Inadequate contact information	3,175	11.8	10.3
(NC-3) Unsuccessful contact attempt	1,827	6.8	6.2
(O) Other nonresponse	321	1.2	1.4
Total eligible sample	26,896	100.0	100.0
(NE) Not eligible	108	—	—
Total	27,004	—	—



Response outcome measures

AAPOR response rate RR2

$$RR2 = \frac{C}{C + R + NC + O + UE}$$

AAPOR contact rate CON1

$$CON1 = \frac{C + R + O}{C + R + NC + O + UE}$$

AAPOR contact rate COOP2

$$COOP2 = \frac{C}{C + R + O}$$

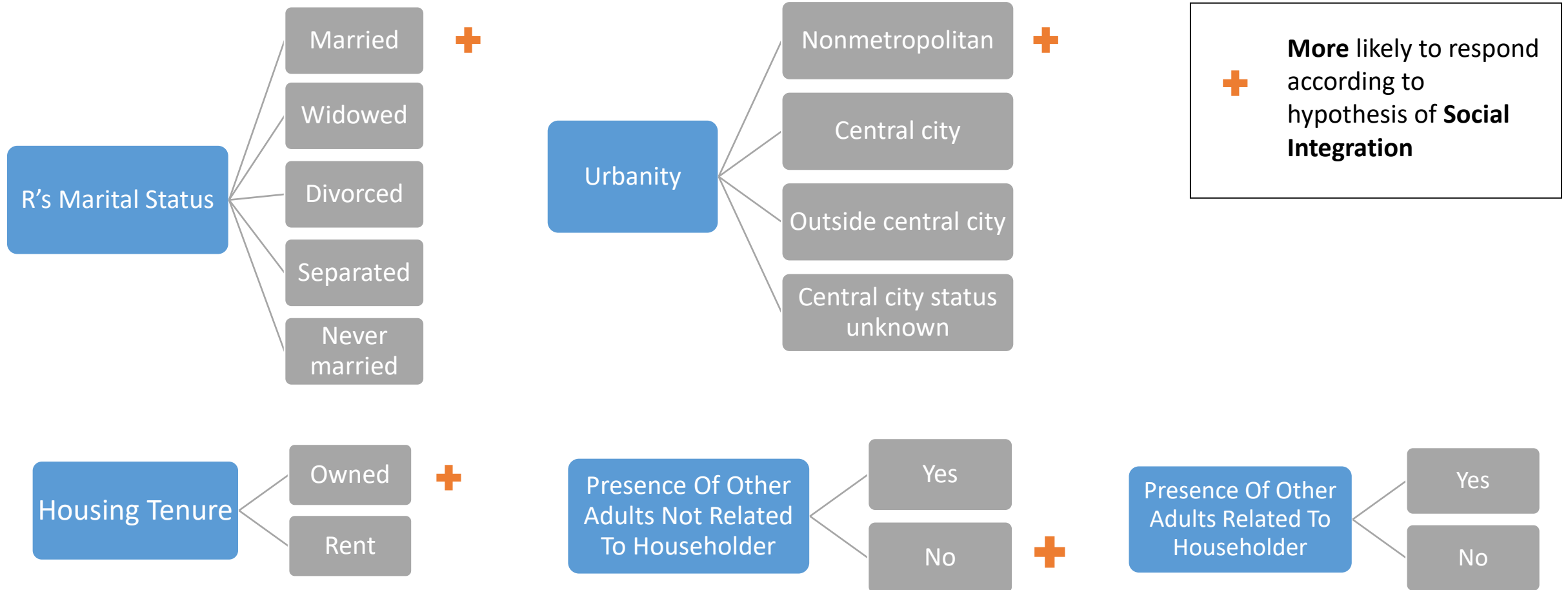
AAPOR refusal rate REF1

$$REF1 = \frac{R}{C + R + NC + O + UE}$$

Note that there are no UE (unknown eligibility) cases in the ATUS sampling frame under the developed categorization

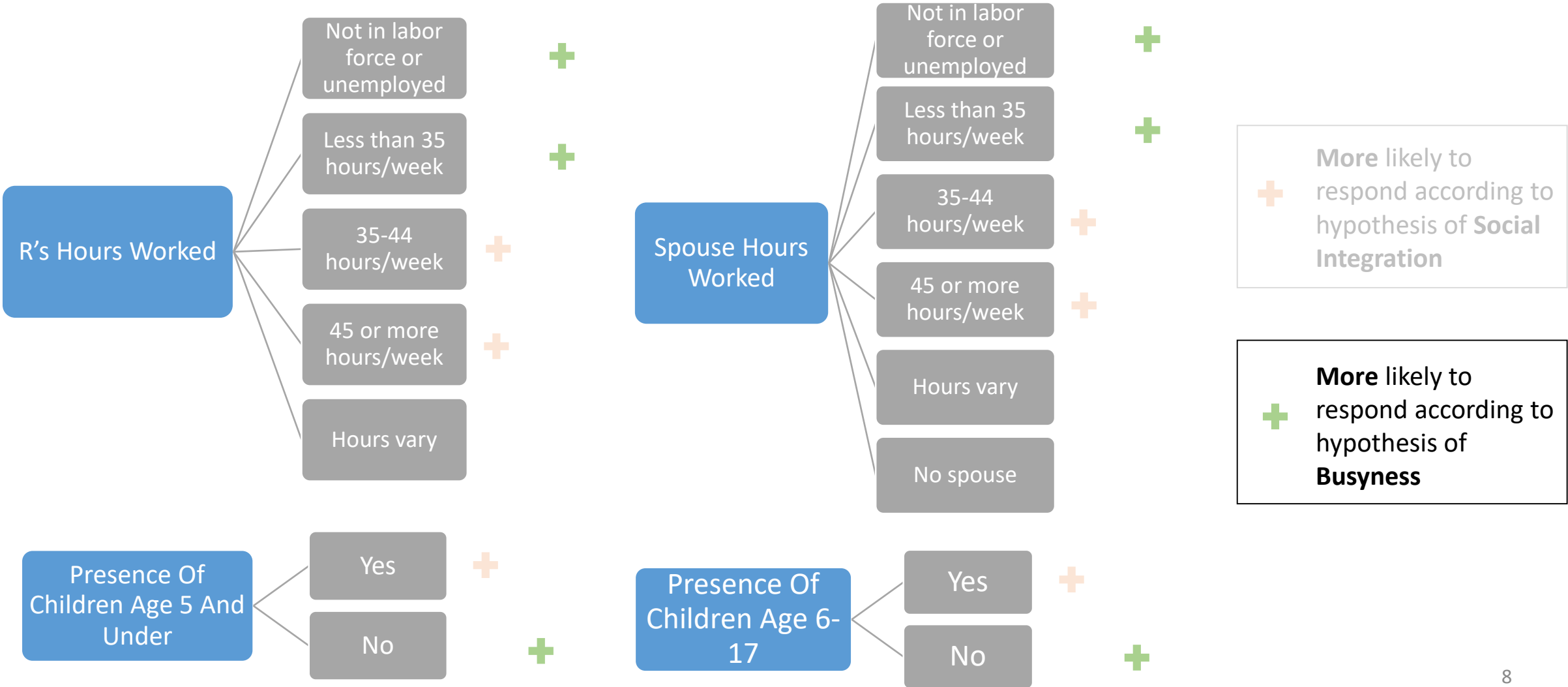


Sampling Frame Variables Proxy for Social Integration



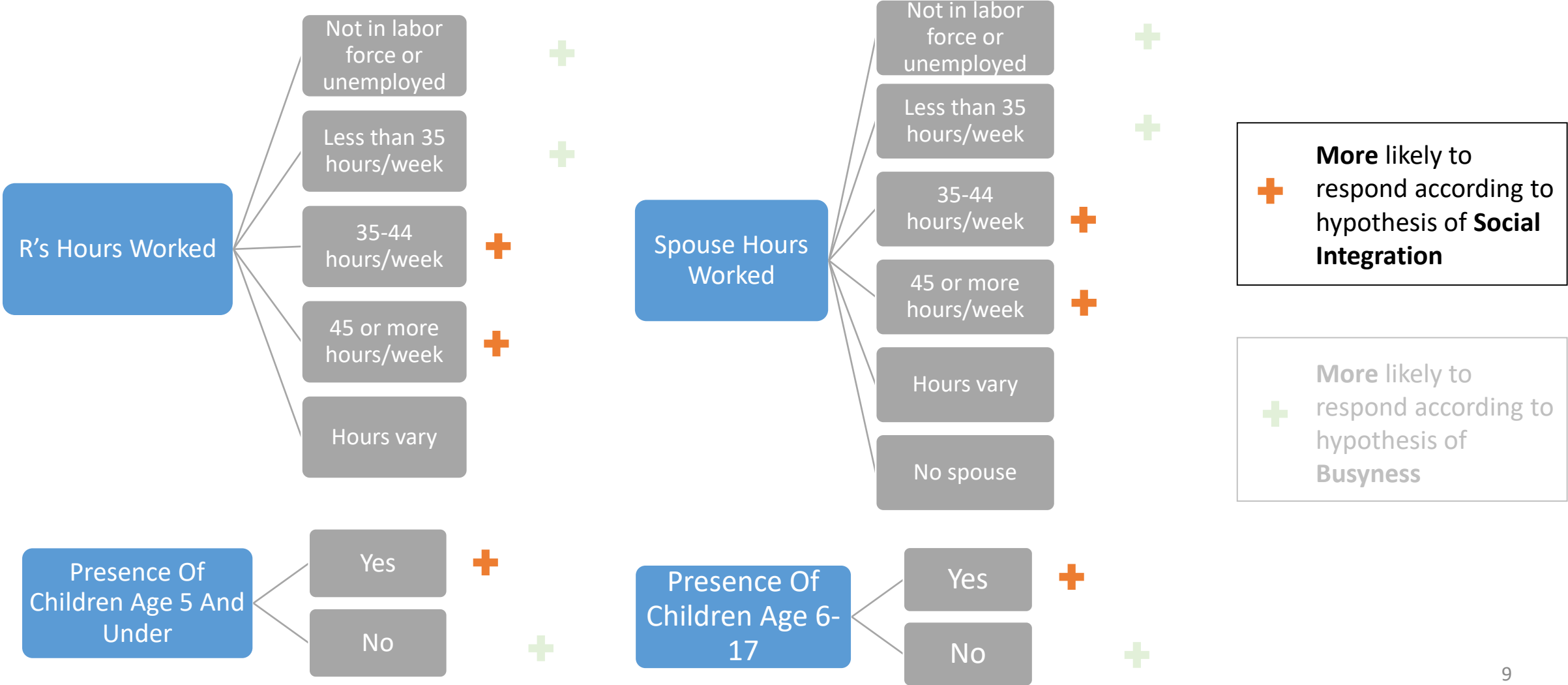


Sampling Frame Variables Proxy for Both Busyness and Social Integration





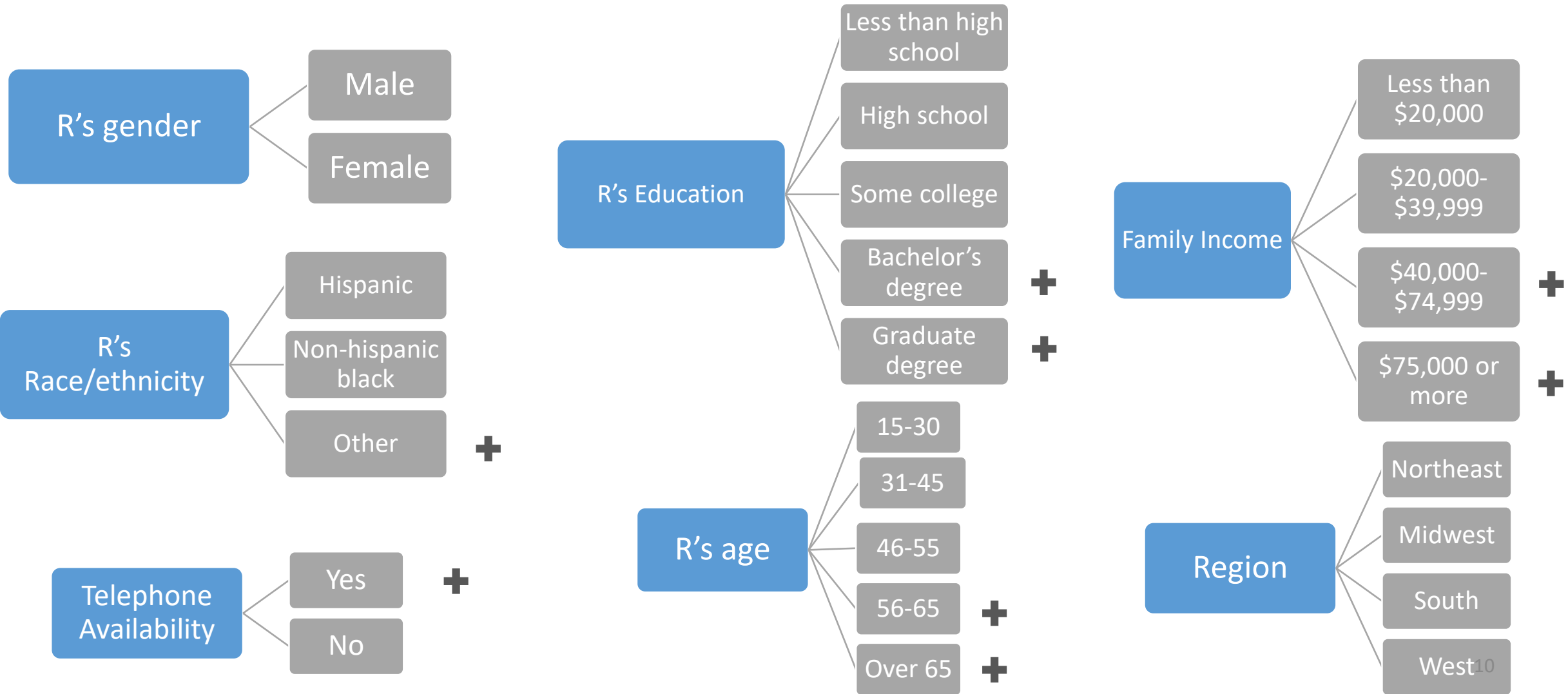
Sampling Frame Variables Proxy for Both **Busyness** and Social Integration





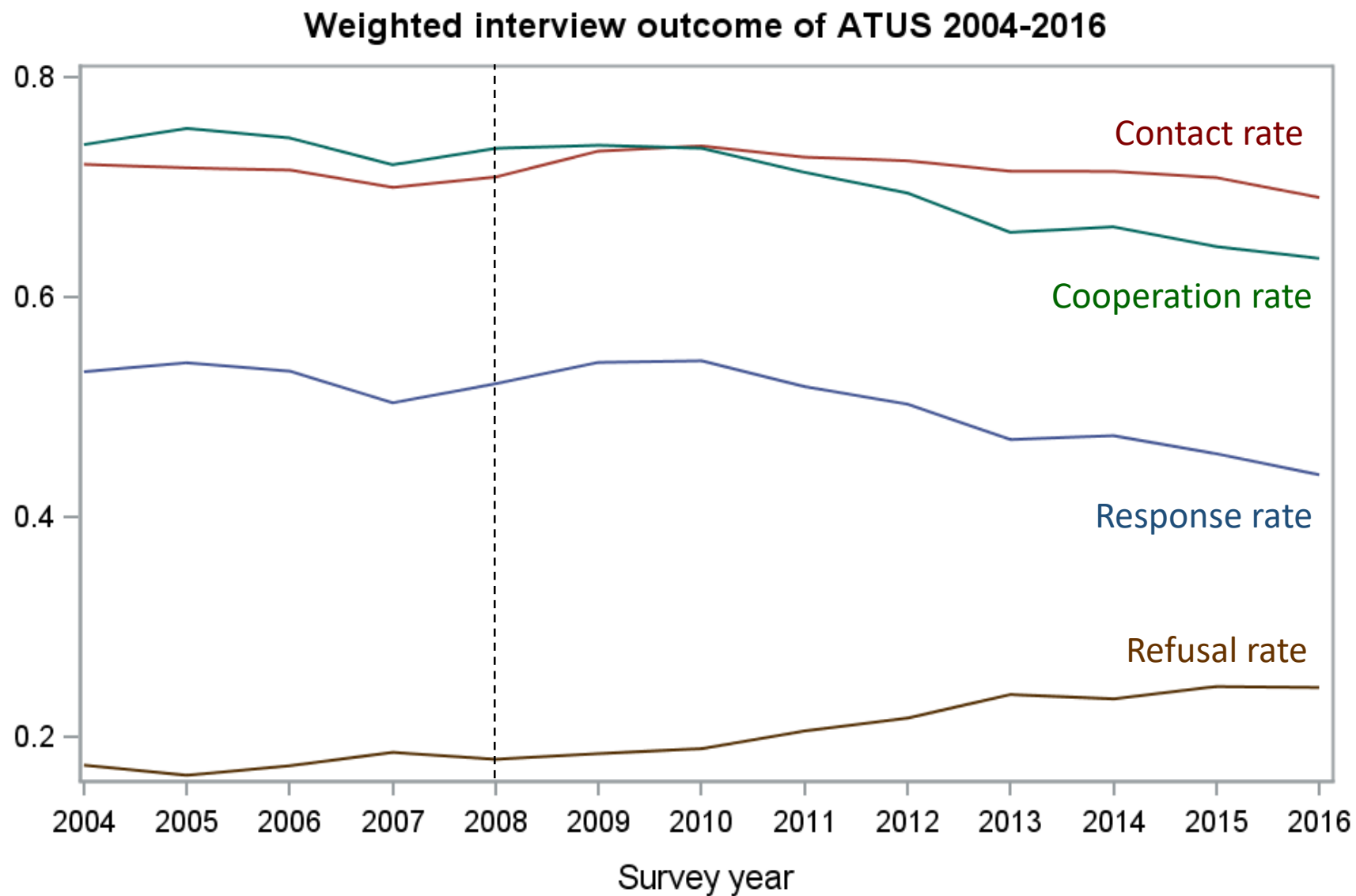
Sampling Frame Variables Proxy for Potential Influences

+ Potentially more likely to respond



Results

Overall trend



Comparing 2004, 2008 and 2016

Table: Weighted response, contact, cooperation rate and refusal rate in different years and their differences

		2004 and 2008			2008 and 2016		
		2004	2008	Difference	2008	2016	Difference
Response rate	Estimate	53.2%	52.1%	-1.1%	52.1%	43.9%	-8.3%
	Standard Error	0.003	0.004	0.005	0.004	0.004	0.005
Contact rate	Estimate	72.1%	70.9%	-1.1%	70.9%	69.1%	-1.9%
	Standard Error	0.003	0.004	0.005	0.004	0.004	0.005
Cooperation rate	Estimate	73.9%	73.5%	-0.3%	73.5%	63.5%	-10.0%
	Standard Error	0.004	0.004	0.005	0.004	0.004	0.006
Refusal rate	Estimate	17.5%	18.0%	0.5%	18.0%	24.5%	6.5%
	Standard Error	0.003	0.003	0.004	0.003	0.003	0.004

Differences shown in boldface are statistically significant with p-value <0.05



Testing the social integration and busyness controlling for period

- Logistic Model:

$$\ln(\text{odds of Response outcome}) = \beta_0 + \beta_1 \text{Year} + \beta_2 \text{Factor}$$

- Most of the proxies are statistically significant at the direction that show **considerable support** for the hypothesis of social integration
- and **little support** for the hypothesis of busyness in both periods as we expected,
- Except...



Presence of children

	Presence of children age 5 and under
	Presence of children age 6-17

Reference level	Compared level	Response outcome	2004-2008	2009-2016
No	Yes	Response rate	-0.15	-0.24
		Contact rate	-0.27	-0.34
No	Yes	Response rate	-0.07	-0.23
		Contact rate	-0.07	-0.23

All estimates here are significant with a p-value < 0.05

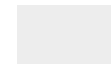
- In both periods, we find household with children tend not to respond and are harder to be contact
- Abraham et al.(2006) find no significant effect for presence of younger children and positive effect for presence of older children
- 9 studies (1959-1994) examining response or cooperation found positive effects of the presence of children in the household (Groves and Couper 1998: 138)



Work hours



Respondent's hours worked



Spouse hours worked

		2004-2008				2009-2016			
Reference level	Compared level	Response rate	Contact rate	Cooperation rate	Refusal rate	Response rate	Contact rate	Cooperation rate	Refusal rate
35-44 hours/week	NILF or unemployed	0.06	0.12	-0.03	0.04	0.01	0.08	-0.06	0.06
35-44 hours/week	NILF or unemployed	0.06	0.06	0.05	-0.04	0.09	0.19	0.01	0.03

Estimates colored in red are insignificant with p-value > 0.05

Estimates in black boldface significant with a p-value < 0.05



Other interesting results: from period 2004-2008 to period 2009-2016

- Married vs. Divorced (reference level)
 - From 0.26 to 0.13 estimating change of log-odds of response rate
- Nonmetropolitan vs. Central city (reference level)
 - From 0.39 to 0.24 estimating change of log-odds of response rate
 - From 0.26 to 0.05 estimating change of log-odds of cooperation rate



Conclusion and Discussion

- Response pattern in terms of social integration and busyness has changed
 - Presence of children and work hours
 - More design and adjustment revisions. For example,
 - Reexamine the nonresponse adjustment in ATUS today
- Limitations:
 - What effect does the ATUS recruitment has on its nonresponse pattern?
 - Exclude CPS nonrespondents and drop-offs at CPS 8th interview
 - Refusal because of survey fatigue



Future research and publication plan

- Influence of change in telephone usage and ownership
 - Increasing number of scam robocalls
 - Increase rate of cell-phone-only household
- Incorporate Surveys of Consumers (SCA) data

Reference

- Abraham, K. G., Maitland, A., & Bianchi, S. M. (2006). Nonresponse in the American time use Survey: Who is missing from the data and how much does it matter?. *International Journal of Public Opinion Quarterly*, 70(5), 676-703.
- Bureau of Labor Statistics. (2019). American Time Use Survey user's guide: Understanding ATUS 2003 to 2018.
- Brick, J. M., & Williams, D. (2013). Explaining rising nonresponse rates in cross-sectional surveys. *The ANNALS of the American academy of political and social science*, 645(1), 36-59.
- Curtin, R., Presser, S., & Singer, E. (2000). The effects of response rate changes on the index of consumer sentiment. *Public opinion quarterly*, 64(4), 413-428.
- Curtin, R., Presser, S., & Singer, E. (2005). Changes in telephone survey nonresponse over the past quarter century. *Public opinion quarterly*, 69(1), 87-98.
- Groves, R. M., & Couper, M. P. (1998). *Nonresponse in household interview surveys*. John Wiley & Sons.
- Ingen, E. V., Stoop, I., & Breedveld, K. (2009). Nonresponse in the Dutch time use survey: Strategies for response enhancement and bias reduction. *Field Methods*, 21(1), 69-90.
- Zuzanek, J. (1998). Non-Response in Time-use Surveys: Do the Two Ends Meet?. *Loisir et Société/Society and Leisure*, 21(2), 547-549.



Thanks to

surveys^{of}consumers
UNIVERSITY OF MICHIGAN



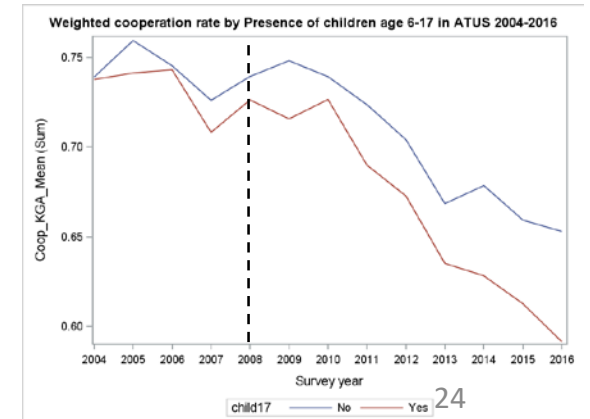
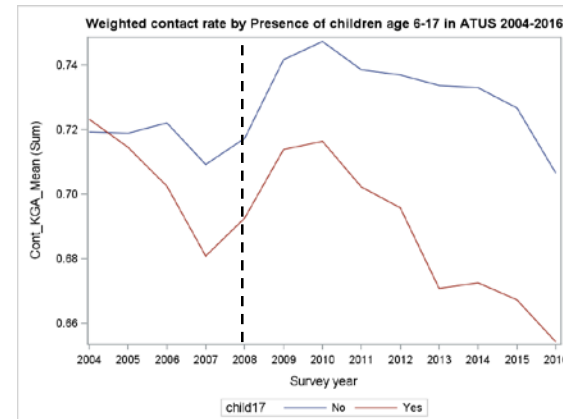
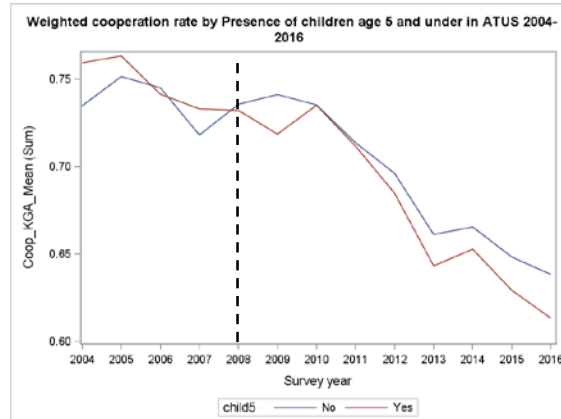
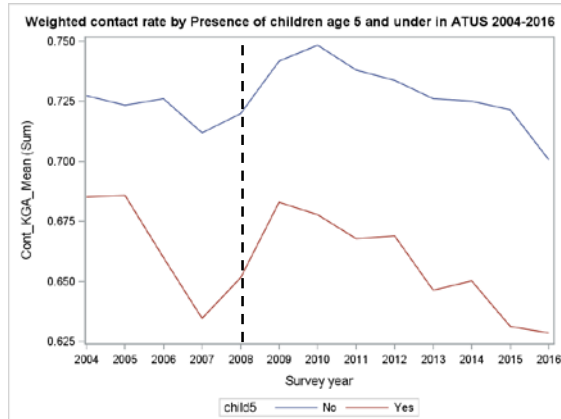
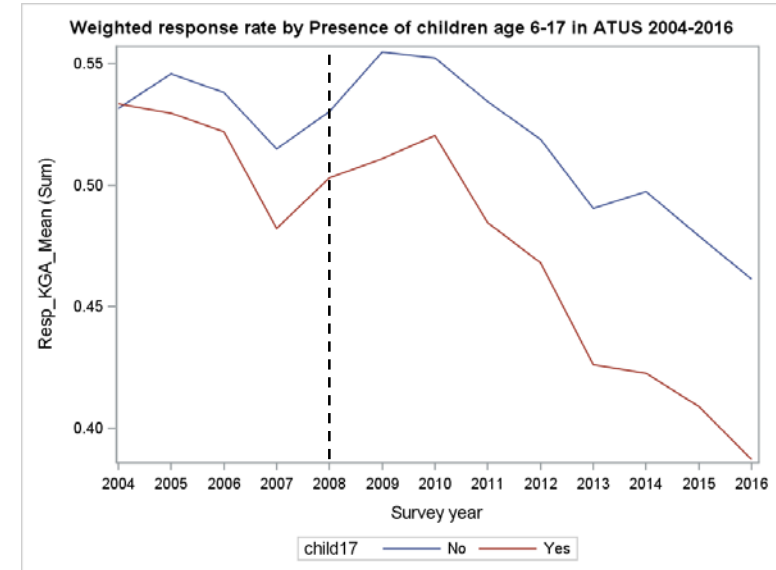
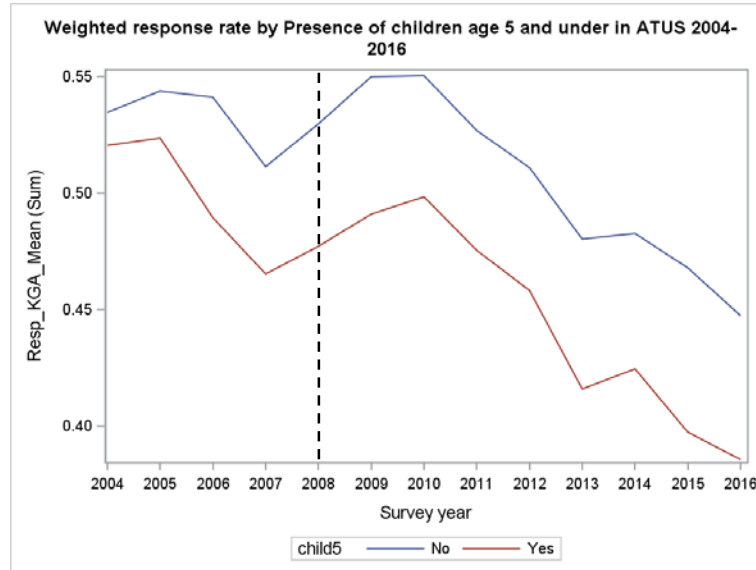
M | INSTITUTE FOR SOCIAL RESEARCH
MICHIGAN PROGRAM IN SURVEY METHODOLOGY
UNIVERSITY OF MICHIGAN

An aerial photograph of a rugged coastline. The left side of the image shows dark, jagged rocks meeting a sandy beach. The ocean is a vibrant turquoise color, with white foam from breaking waves visible along the shoreline. The text "Thank You!" is centered in the middle of the image in a white, sans-serif font.

Thank You!

zepingt@umich.edu

Changes in terms of presence of children in the graph





Estimates of effects of the factor on response rates, contact rates, cooperation rates and refusal rates

Factor	Level of class	2004-2008				2009-2016			
		Response rate	Contact rate	Cooperation rate	Refusal rate	Response rate	Contact rate	Cooperation rate	Refusal rate
R's marital status ("Divorced" as reference level)	Married	0.26	0.45	-0.01	0.10	0.13	0.33	-0.07	0.15
	Never married	-0.25	-0.38	0.02	-0.20	-0.37	-0.45	-0.17	-0.04
	Separated	-0.34	-0.42	-0.12	-0.21	-0.36	-0.44	-0.16	-0.08
	Widowed	0.06	0.21	-0.11	0.07	0.09	0.25	-0.07	0.11
Housing Tenure ("Owned" as REFER)	Rent	-0.62	-0.90	-0.09	-0.37	-0.55	-0.79	-0.14	-0.23
Urbanity ("Balance of MSA" as REF)	Central City	-0.24	-0.33	-0.07	-0.14	-0.15	-0.29	0.02	-0.16
	Nonmetropolitan	0.15	0.07	0.19	-0.11	0.09	0.08	0.07	-0.02
	Other metropolitan	0.08	0.03	0.11	-0.06	0.06	0.01	0.09	-0.06
Presence of other adults not related to householder	Yes	-0.55	-0.77	-0.08	-0.23	-0.45	-0.64	-0.11	-0.17
Presence of other adults related to householder	Yes	-0.31	-0.37	-0.15	-0.07	-0.37	-0.44	-0.20	-0.01
Race/ethnicity ("Hispanic" as REF)	Non-Hispanic black	-0.21	-0.08	-0.32	0.28	-0.04	0.06	-0.15	0.19
	Other	0.45	0.72	-0.04	0.34	0.43	0.67	0.05	0.24
Presence of children age 5 and under	Yes	-0.15	-0.27	0.05	-0.16	-0.24	-0.34	-0.06	-0.09
Presence of children age 6-17	Yes	-0.07	-0.07	-0.05	0.02	-0.23	-0.23	-0.17	0.06
R's hours worked ("35-44 hours/week" as REF)	45 or more hours/week	0.29	0.24	0.26	-0.13	0.24	0.27	0.15	-0.03
	Hours vary	0.09	0.09	0.07	-0.03	-0.04	0.00	-0.07	0.07
	Less than 35 hours/week	0.26	0.28	0.16	-0.04	0.12	0.10	0.10	-0.05
	NILF or unemployed	0.06	0.12	-0.03	0.04	0.01	0.08	-0.06	0.06
Spouse hours worked ("35-44 hours/week" as REF)	45 or more hours/week	0.30	0.24	0.30	-0.19	0.24	0.23	0.20	-0.10
	Hours vary	0.11	0.17	0.03	0.03	0.05	0.08	0.03	0.01
	Less than 35 hours/week	0.14	0.17	0.08	-0.02	0.22	0.25	0.15	-0.07
	NILF or unemployed	0.06	0.06	0.05	-0.04	0.09	0.19	0.01	0.03
	No spouse	-0.34	-0.61	0.05	-0.24	-0.29	-0.49	-0.01	-0.17



Parameter estimates of effects of the factor on response rates, contact rates, cooperation rates and refusal rates (proxies for potential influence)

Variable	Level of class	2004-2008				2009-2016			
		Response rate	Contact rate	Cooperation rate	Refusal rate	Response rate	Contact rate	Cooperation rate	Refusal rate
R's age ("18-34" as REF)	31-45	0.24	0.41	-0.07	0.22	0.27	0.34	0.10	0.06
	46-55	0.50	0.82	-0.03	0.31	0.47	0.64	0.14	0.14
	56-65	0.69	1.12	0.03	0.33	0.75	1.05	0.27	0.13
	Over 65	0.52	0.93	-0.09	0.36	0.70	1.05	0.20	0.18
R's education ("Bachelor's degree" as REF)	Graduate degree	0.29	0.34	0.19	-0.07	0.27	0.29	0.19	-0.10
	High school	-0.47	-0.42	-0.38	0.20	-0.47	-0.41	-0.40	0.20
	Less than high school	-0.55	-0.58	-0.37	0.04	-0.61	-0.60	-0.45	0.13
	Some college	-0.26	-0.29	-0.15	0.08	-0.30	-0.28	-0.23	0.13
Family income ("20,000-\$39,999" as REF)	\$40,000-\$74,999	0.20	0.23	0.10	0.01	0.15	0.18	0.07	0.01
	\$75,000 or more	0.39	0.48	0.18	0.03	0.34	0.43	0.16	0.03
	Less than \$20,000	-0.26	-0.33	-0.08	-0.10	-0.15	-0.17	-0.07	-0.03
Telephone availability	Yes	0.82	1.25	-0.25	0.88	0.70	1.13	-0.16	0.68
Region ("Midwest" as REF)	Northeast	-0.24	-0.16	-0.26	0.14	-0.22	-0.15	-0.22	0.13
	South	-0.26	-0.37	-0.05	-0.08	-0.21	-0.29	-0.08	-0.03
	West	-0.18	-0.21	-0.11	-0.05	-0.21	-0.27	-0.10	-0.04
R's sex ("Female" as REF)	Male	-0.13	-0.16	-0.06	0.01	-0.11	-0.10	-0.08	0.04

Estimates shown in boldface are statistically significant at the 0.05 significance level