Assessment of Participation in
the Southern California Beach Study Panel

Description and Analysis of (1) Participation in Recruitment and Replenishment Surveys,
and (2) Participation and Attrition in Each of Six Bi-Monthly Diary Surveys

Prepared by

The Research Team

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1.   Introduction

This report profiles demographic characteristics for respondents to the recruitment survey, replenishment survey, and each of six bi-monthly diary surveys that cover the time period November 1, 1999 to October 31, 2000. We investigate the representativeness of the recruitment and replenishment samples and look for selection bias in each of the six diary surveys. We report descriptive statistics and perform hypothesis tests to see if there are statistical differences between (1) the recruitment sample and census data for the target population, (2) the replenishment sample and census data, (3) beach users and non-beach users, (4) those who agreed to participate in the panel and those who declined, and (5) and the panel members who actually did participate in each diary survey as compared to those who do not participate.

A few words on our terminology. Though the sample acquired in the middle of the panel can be thought of as having been recruited, when we speak of recruitment, we refer to the sample gained via the initial recruitment effort. We call survey participants acquired in the middle of the study the replenishment sample. A note about the scope of this effort – we highlight some of the significant features that emerge from the numbers presented below. But, this is still a preliminary analysis. Statistical modeling of participation and attrition are left to future research.

The work described here was carried out in Stata 6.0. The code is available if requested.

In both the recruitment and replenishment surveys, we sought to gain representative samples of the adult population by random digit dialing households in four counties in Southern California (Los Angeles, Orange, San Bernardino, and Riverside). The surveys were conducted in both English and Spanish in an effort to make sure that the study area's important Hispanic population, a substantial proportion of which may speak only Spanish, was not underrepresented. Though we were interested in recruiting for our panel only beach users (whom we defined as people who had gone to the beach in Southern California at least once in the past 12 months), our initial recruitment and replenishment surveys included questions for non-beach users too. This was for two reasons. We wanted to see the extent to which poor water quality might play a factor in discouraging beach use. We also wanted to get a picture of the beach users as a subsample of the population. Such an understanding is necessary for scaling up model results to the general population.

2.   Comparing demographics of recruitment and replenishment samples

In this section, we investigate the representativeness of the recruitment sample and the replenishment sample. There are 1848 people in the recruitment sample and 662 in the replenishment sample. In Table 1, we give some descriptive statistics for two. In Table 2 we compare the recruitment data to census data for the four-county area, and in Table 3 we do the same for replenishment data. We use census data from the U.S. Census and the California Department of Finance's Office of Demographics.

TABLE 1. Comparing demographics of recruitment and replenishment samples. [1]

Demographic Category	Profile of Recruitment Sample		Profile of Replenishment Sample	
	(Percentage)	(Number)	(Percentage)	(Number)
Gender				
Male	42.0	776	45.5	301
Female	57.5	1062	54.5	361
Declined, unknown, or missing	0.5	10	0	0
Total	100.0	1848	100.0	662
Age				
18 and 19	3.5	65	5.3	35
20	2.4	44	0.9	6
21	2.4	45	2.4	16
22-24	6.0	111	6.7	44
25-29	10.6	195	12.7	84
30-34	11.0	203	10.7	71
35-39	11.7	221	11.9	79
40-44	9.3	171	13.8	91
45-49	8.0	147	7.7	51
50-54	6.9	127	7.4	49
55-59	4.9	90	6.5	43
60 and 61	2.5	47	2.4	16
62-64	2.2	41	0.9	6
65 and 66	1.8	33	2.0	13
67-69	2.3	42	1.5	10
70-74	2.8	52	3.3	22
75-79	3.1	58	2.3	15
80-84	2.1	37	0.8	5
85 and over	1.2	22	0.9	6
Declined, unknown, or missing	5.3	97	0	0
Total	100.0	1848	100.1	662
Race/Ethnicity				
White, Not Hispanic	50.9	940	47.6	315
Hispanic	29.8	550	27.3	181
Black, Not Hispanic	6.7	124	7.3	48
Native American, Not Hispanic	1.2	22	0.9	6
Asian, Not Hispanic	5.8	107	9.4	62
Declined, unknown, or missing	5.7	105	7.6	50
Total	100.1	1848	100.1	662

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[1] Some totals do not equal precisely 100% due to rounding.

TABLE 1 (Continued). Comparing Recruitment and Replenishment. [2]

Demographic Category	Profile of Recruitment Sample		Profile of Replenishment Sample	
	(Percentage)	(Number)	(Percentage)	(Number)
Household Income				
$0 to $9,999	5.8	108	5.1	34
$10,000 to $19,999	10.4	193	11.0	73
$20,000 to $29,999	11.2	206	8.9	59
$30,000 to $39,999	7.6	141	8.8	58
$40,000 to $49,999	7.5	138	7.1	47
$50,000 to $59,999	7.6	140	8.2	54
$60,000 to $99,999	14.3	264	12.4	82
$100,000 to $149,999	7.1	132	7.0	46
$150,000 or more	4.8	88	7.4	49
Declined, unknown, or missing	23.7	438	24.2	160
Total	100.0	1848	100.1	662
Education				
Less than 9th	7.0	130	7.7	51
9th to 12th	5.8	107	4.4	29
HS graduate	22.8	421	22.1	146
Some college	29.5	545	27.5	182
Bachelor's	21.4	394	26.0	172
Grad/Prof.	11.3	208	9.7	64
Declined	2.0	37	2.1	14
Unknown or missing	0.3	6	0.6	4
Total	100.1	1848	100.1	662
Household Size				
1 person	37.9	695	30.2	200
2 people	31.2	577	26.3	174
3 people	13.6	251	14.5	96
4 people	10.9	202	9.5	63
5 people	4.0	74	3.8	25
6 people	1.9	35	1.4	9
7 or more	0.6	11	1.5	10
Declined, unknown, missing	0.2	3	12.8	85
Total	100.3	1848	100.0	662
Employment Status				
Employed	65.8	1216	69.2	458
Unemployed	6.5	121	8.8	58
Not in work force	25.8	477	19.3	128
Declined, unknown, missing	1.8	34	2.7	18
Total	99.9	1848	100.0	662

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[2] Some totals do not equal precisely 100% due to rounding.

In the following table, we compare the recruitment sample to census figures for the four county study area. For testing purposes, we drop observations for which we have no information (unknown, declined, missing).[3]

TABLE 2. Comparing recruitment sample to target population.[4]

Demographic Category	Profile of Target Population (%) (Sources in Parentheses)	Profile of Recruitment Sample (%)	P-value for χ^2 Test of Equality[5]
Gender			
Male	49.8 (CA 2000[6])	42.2	0.000
Female	50.2	57.8	0.000
Total	100.0	100.0	Not applicable (NA)
Age			
18 and 19	4.1 (CA 2000)	3.7	0.000
20	2.0	2.5	0.143
21	2.0	2.7	0.061
22-24	6.0	6.3	0.514
25-29	10.9	11.1	0.751
30-34	11.5	11.6	0.903
35-39	11.7	12.6	0.230
40-44	10.8	9.8	0.163
45-49	9.2	8.4	0.250
50-54	7.7	7.3	0.455
55-59	5.8	5.1	0.251
60 and 61	1.9	2.7	0.024
62-64	2.6	2.3	0.481
65 and 66	1.6	1.9	0.361
67-69	2.3	2.4	0.718
70-74	3.5	3.0	0.212
75-79	3.0	3.3	0.413
80-84	1.9	2.1	0.493
85 and over	1.6	1.3	0.240
Total	100.1	100.1	NA
Race/Ethnicity			
White, Not Hispanic	46.1 (CA 2000)	53.9	0.000
Hispanic	34.5	31.6	0.010
Black, Not Hispanic	7.5	7.1	0.541
Native American, Not Hispanic	0.4	1.3	0.000
Asian, Not Hispanic	11.5	6.1	0.000
Total	100.0	100.0	NA

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[3] We want our categories to be comparable to our census data. We do test "declined" for education because we have a value for this.

[4] Some totals do not equal precisely 100% due to rounding.

[5] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for respondents to census data. The null hypothesis is that the our sample has the same distribution (e.g. has the same proportion) as the population as a whole.

[6] Department of Finance, Demographics Office, State of California. 2000 survey. Available at http://www.dof.ca.gov/HTML/DEMOGRAP

TABLE 2 (Continued). Comparing recruitment sample to target population.

Demographic Category	Profile of Target Population (Sources in Parentheses)	Profile of Recruitment Sample	P-value for χ^2 Test of Equality[7]
Household Income			
$0 to $9,999	11.6 (US 1989[8])	7.7	0.000
$10,000 to $19,999	14.4	13.7	0.446
$20,000 to $29,999	14.7	14.6	0.924
$30,000 to $39,999	13.7	10.0	0.000
$40,000 to $49,999	11.4	9.8	0.057
$50,000 to $59,999	9.1	9.9	0.279
$60,000 to $99,999	17.3	18.7	0.158
$100,000 to $149,999	4.9	9.4	0.000
$150,000 or more	2.9	6.2	0.000
Total	100.0	100.0	Not applicable (NA)
Education			
Less than 9th	12.9 (US 1989[9])	7.1	0.000
9th to 12th	15.6	5.8	0.000
HS graduate	19.8	22.9	0.001
Some college	29.8	29.5	0.842
Bachelor's	12.9	21.4	0.000
Grad/Prof.	6.4	11.3	0.000
Declined	2.6	2.0	0.111
Total	100.0	100.0	NA
Household Size			
1 person	23.0 (CA 2000[10])	37.6	0.000
2 people	27.3	31.3	0.000
3 people	15.9	13.6	0.007
4 people	15.3	10.9	0.000
5 people	8.97	4.0	0.000
6 people	4.62	1.9	0.000
7 or more	4.91	0.7	0.000
Total	100.0	100.0	NA
Employment Status			
Employed	48.4 (CA 1999)	67.0	0.000
Unemployed	2.5	6.7	0.000
Not in work force	49.1	26.3	0.000
Total	100.0	100.0	NA

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[7] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for respondents to census data. The null hypothesis is that our sample has the same distribution (e.g. has the same proportion) as the population as a whole.

[8] Source: United States Census, 1989. Income data from 2000 census not available until mid-2002 according to: http://www.census.gov/hhes/www/income.html.

[9] Source: United States Census, 1989 (http://www.census.gov/population/).

[10] Department of Finance, Demographics Office, State of California. 2000 survey. Available at http://www.dof.ca.gov/HTML/DEMOGRAP

Next we compare the replenishment sample to census figures for the four county study area. Again, for testing purposes, we drop observations for which we have no information (unknown, declined, missing).[11]

TABLE 3. Comparing replenishment sample to target population. [12]

Demographic Category	Profile of Target Population (Sources in Parentheses)	Profile of Replenishment Sample	P-value for χ^2 Test of Equality[13]
Gender			
Male	49.8 (CA 2000[14])	45.5	0.015
Female	50.2	54.5	0.015
Total	100.0	100.0	Not applicable (NA)
Age			
18 and 19	4.1 (CA 2000)	5.3	0.124
20	2.0	0.9	0.042
21	2.0	2.4	0.385
22-24	6.0	6.7	0.463
25-29	10.9	12.7	0.140
30-34	11.5	10.7	0.532
35-39	11.7	11.9	0.852
40-44	10.8	13.8	0.015
45-49	9.2	7.7	0.186
50-54	7.7	7.4	0.752
55-59	5.8	6.5	0.430
60 and 61	1.9	2.4	0.374
62-64	2.6	0.9	0.006
65 and 66	1.6	2.0	0.470
67-69	2.3	1.5	0.190
70-74	3.5	3.3	0.784
75-79	3.0	2.3	0.280
80-84	1.9	0.8	0.032
85 and over	1.6	0.9	0.150
Total	100.1	100.1	NA
Race/Ethnicity			
White, Not Hispanic	46.1 (CA 2000)	51.5	0.008
Hispanic	34.5	29.6	0.010
Black, Not Hispanic	7.5	7.8	0.747
Native American, Not Hispanic	0.4	1.0	0.023
Asian, Not Hispanic	11.5	10.1	0.288
Total	100.0	100.0	NA

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[11] We want our categories to be comparable to our census data. We do test "declined" for education because we have a value for this.

[12] Some totals do not equal precisely 100% due to rounding.

[13] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for respondents to census data. The null hypothesis is that our sample has the same distribution (e.g. has the same proportion) as the population as a whole.

[14] Department of Finance, Demographics Office, State of California. 2000 survey. Available at http://www.dof.ca.gov/HTML/DEMOGRAP

TABLE 3 (Continued). Comparing replenishment sample to target population. [15]

Demographic Category	Profile of Target Population (Sources in Parentheses)	Profile of Replenishment Sample	P-value for χ^2 Test of Equality[16]
Household Income			
$0 to $9,999	11.6 (US 1989[17])	6.8	0.000
$10,000 to $19,999	14.4	14.5	0.928
$20,000 to $29,999	14.7	11.8	0.062
$30,000 to $39,999	13.7	11.6	0.162
$40,000 to $49,999	11.4	9.4	0.151
$50,000 to $59,999	9.1	10.8	0.197
$60,000 to $99,999	17.3	16.3	0.567
$100,000 to $149,999	4.9	9.2	0.000
$150,000 or more	2.9	9.7	0.000
Total	100.0	100.1	Not applicable (NA)
Education			
Less than 9th	12.9 (US 1989[18])	7.8	0.000
9th to 12th	15.6	4.4	0.000
HS graduate	19.8	22.2	0.124
Some college	29.8	27.7	0.230
Bachelor's	12.9	26.1	0.000
Grad/Prof.	6.4	9.7	0.000
Declined	2.6	2.1	0.446
Total	100.0	100.0	NA
Household Size			
1 person	23.0 (CA2000[19])	34.7	0.000
2 people	27.3	30.2	0.124
3 people	15.9	16.6	0.628
4 people	15.3	10.9	0.004
5 people	8.97	4.3	0.000
6 people	4.62	1.6	0.000

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[15] Some totals do not equal precisely 100% due to rounding.

[16] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for respondents to census data. The null hypothesis is that our sample has the same distribution (e.g. has the same proportion) as the population as a whole.

[17] Source: United States Census, 1989. Income data from 2000 census not available until mid-2002 according to: http://www.census.gov/hhes/www/income.html.

[18] Source: United States Census, 1989 (http://www.census.gov/population/).

[19] Department of Finance, Demographics Office, State of California. 2000 survey. Available at http://www.dof.ca.gov/HTML/DEMOGRAP

7 or more	4.91	1.7	0.000
Total	100.0	100.0	NA

Employment Status

Employed	48.4 (CA 1999)	71.1	0.000
Unemployed	2.5	9.0	0.000
Not in work force	49.1	19.9	0.000
Total	100.0	100.0	NA

Figure 1. Gender and Age for Census, Recruitment, and Replenishment
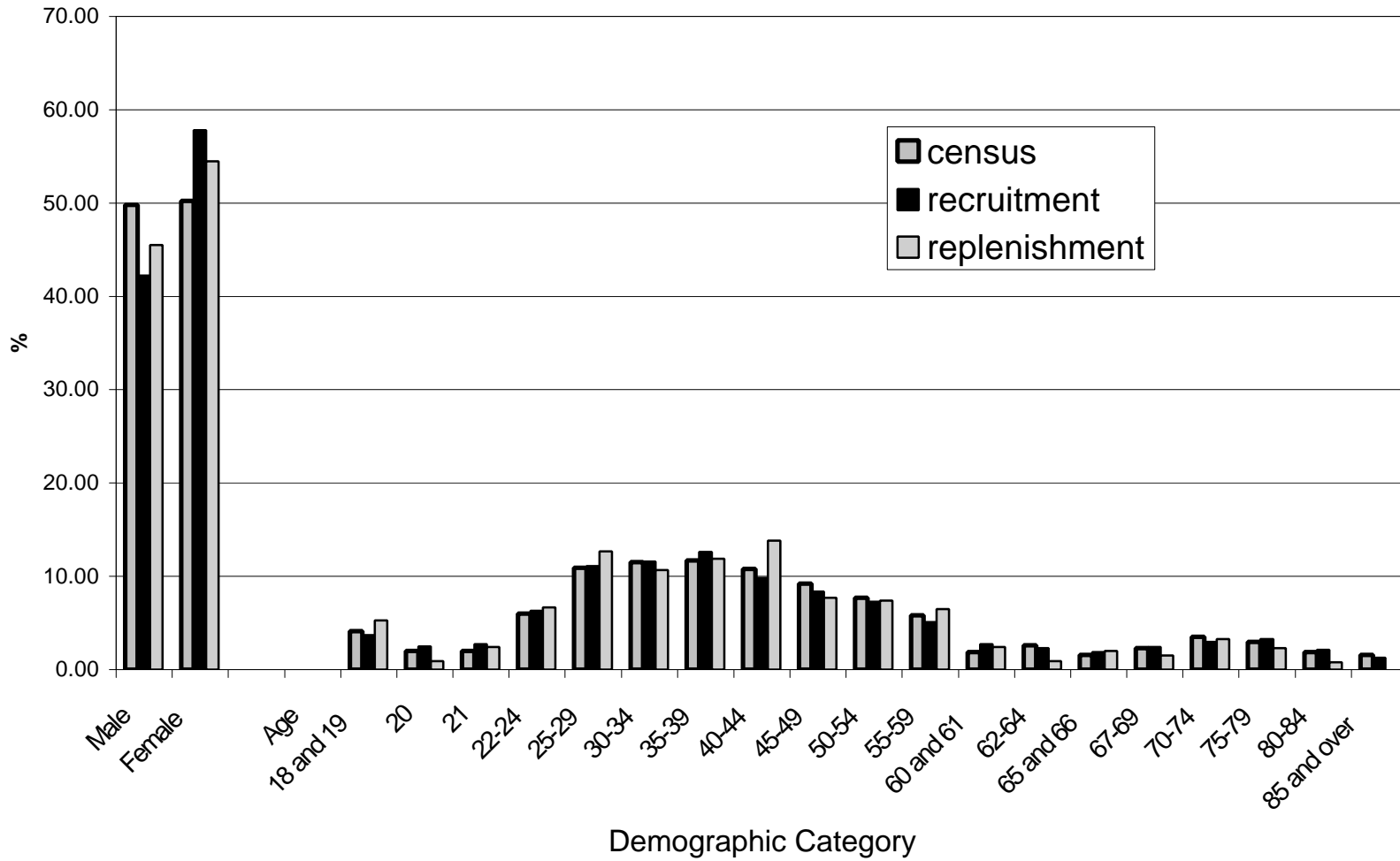
Figure 2. Race - Ethnicity and Household Income for Census, Recruitment, and Replenishment

Demographic Category
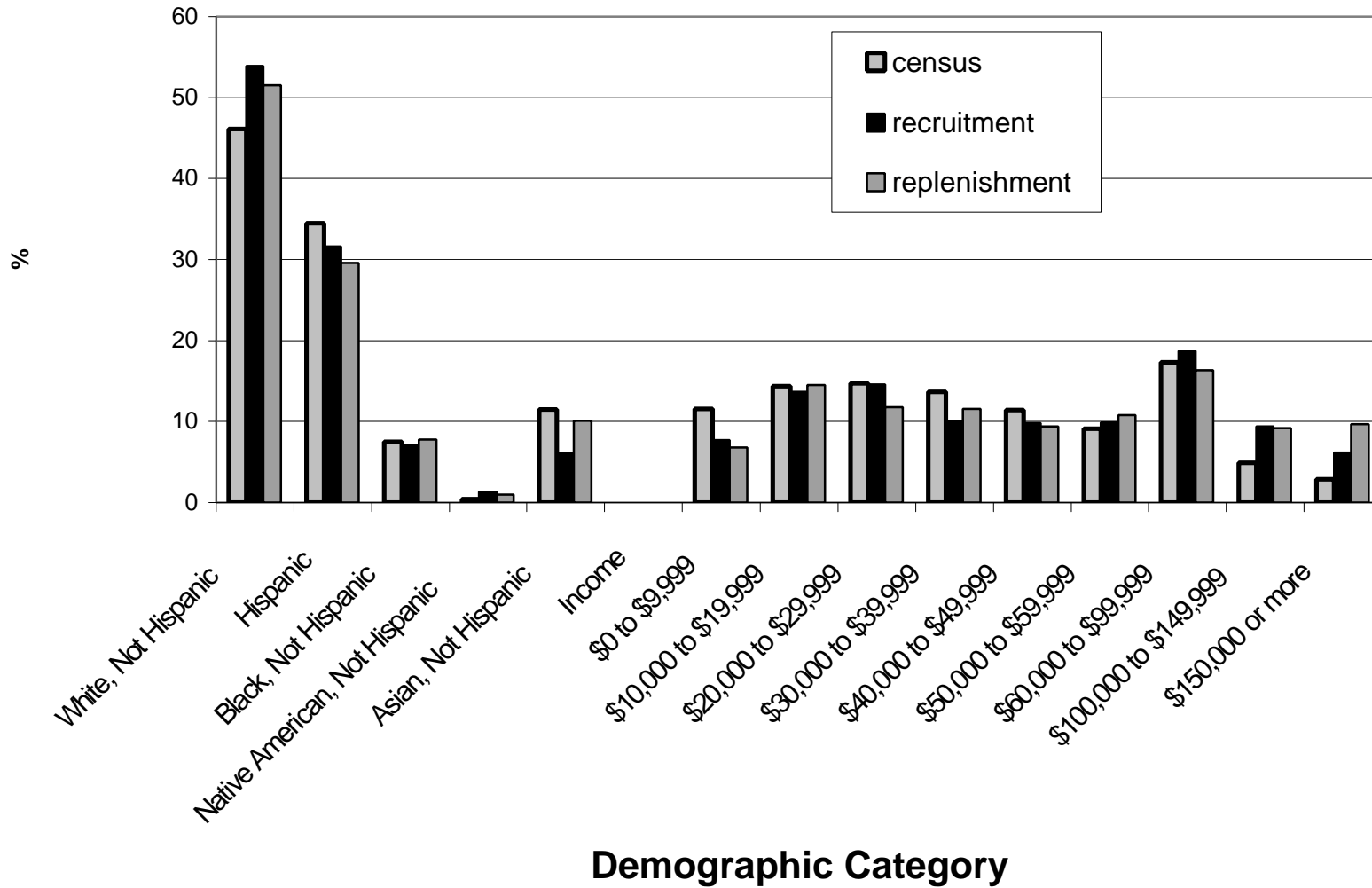
Figure 3. Education, Household Size, Employment Status for Census, Recruitment, and Replenishment

Demographic Categories
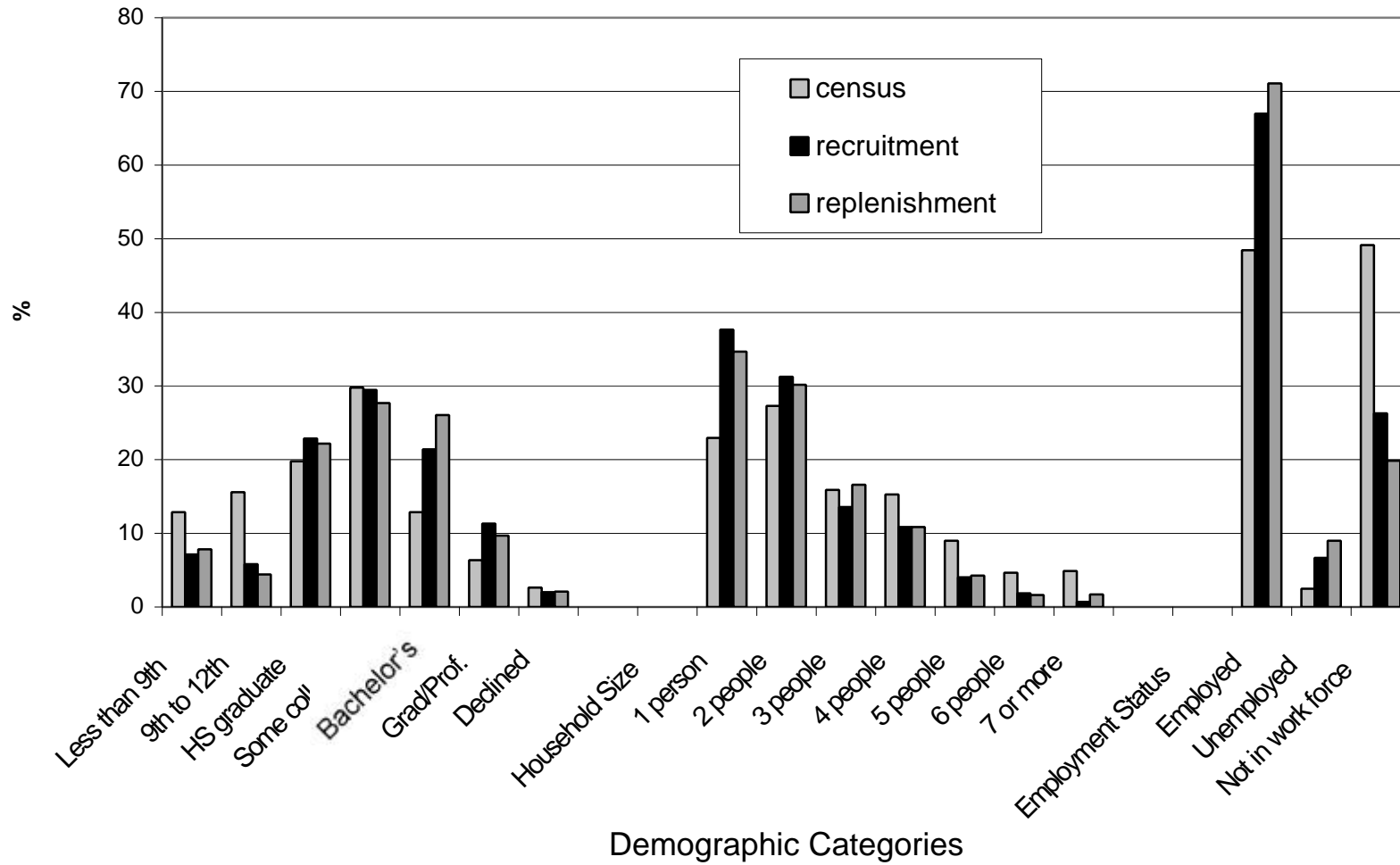
What does our comparison to census data tell us about the representativeness of our recruitment sample and replenishment sample?

The analysis suggests that when compared to the four county population as a whole the recruitment survey sample has a few too many females and not enough males. There are slightly too few 18-19 year olds and too many 60-61 year olds – otherwise the age breakdown appears very similar to the general population. The recruitment includes a few too many white (not Hispanic) and Native American respondents and not enough Hispanics or Asians; the proportion of African Americans answering the survey roughly approximates that of the population as a whole. There are too few poor people and not enough of lower educational attainment and too many people with an income over $100,000 and too many highly-educated people. We have a disproportionately large number of one and two person households and smaller numbers of other household sizes. The recruitment survey sample has too few people who are out of the workforce than in the general population.

These differences are not large overall, and not at all surprising for a survey of the general population using a sample frame based on telephone ownership. We believe that they can readily be corrected with appropriated weighting of the data. However, we have not yet developed the requisite weights – that will be the subject for future work..

The comparison between the people in the replenishment survey sample and the general population is broadly similar to that for the recruitment survey sample. Again there are a few too many females answering the survey. The age breakdown appears to largely approximate the population as a whole. Unlike the recruitment survey sample, the proportion of Asians in the replenishment is not significantly different from our target population. Apart from this, the representativeness of the replenishment survey sample is essentially the same as that of the recruitment survey sample.

3.   Comparing Beach Users and Non-Beach Users.

Next we examine characteristics of beach users and non-beach users among recruitment and replenishment survey samples. We define beach users to be people have gone to beach in Southern California (San Diego County through Santa Barbara Counties) in the previous 12 months. For the purpose of assessing welfare impacts (due to policy changes or pollution events), we need an understanding of how beach users differ, if at all, from the general population. Census data do not disaggregate along beach use lines. So, in our recruitment and replenishment surveys we collected demographic data on non-beach users. Table 4 below provides an overview of demographic characteristics of beach users and non-beach users in both the recruitment and replenishment samples. In the two following tables, we examine each of the two samples in greater detail and perform some hypothesis testing. For each demographic category, we do a Chi square test on a null hypothesis that the two groups have the same proportion of ones in that category (where a value of one indicates that the person falls in that category). Table 5 compares the 1034

beach users to the 814 non-beach users in the recruitment sample. Table 6 profiles the 458 beach users and the 204 non-beach users from the replenishment sample.

TABLE 4. Overview of beach users and non-beach users (all figures in percentage terms). [20]

Demographic Category	Recruitment Sample Profile			Replenishment Sample Profile		
	Overall	**Beach Users**	**Non Beach Users**	**Overall**	**Beach Users**	**Non Beach Users**
Sample Size	1848	1034	814	662	458	204
Gender						
Male	42.0	44.9	38.3	45.5	52.6	41.2
Female	57.5	54.7	60.9	54.5	47.4	58.8
Declined, unknown, missing	0.5	0.4	0.7	0	0	0
Total	100.0	100.0	99.9	100.0	100.0	100.0
Age						
18 and 19	3.5	4.2	2.7	5.3	6.1	3.4
20	2.4	3.1	1.5	0.9	1.1	0.5
21	2.4	2.7	2.1	2.4	2.8	1.5
22-24	6.0	7.6	3.9	6.7	7.2	5.4
25-29	10.6	13.2	7.3	12.7	12.7	12.8
30-34	11.0	12.2	9.5	10.7	10.7	10.8
35-39	11.7	13.7	9.7	11.9	14.4	6.4
40-44	9.3	10.9	7.1	13.8	14.6	11.7
45-49	8.0	9.0	6.6	7.7	9.0	4.9
50-54	6.9	6.0	8.0	7.4	7.2	7.8
55-59	4.9	4.0	6.0	6.5	5.0	9.8
60 and 61	2.5	1.4	4.1	2.4	1.5	4.4
62-64	2.2	1.6	3.0	0.9	0.7	1.5
65 and 66	1.8	1.8	1.7	2.0	1.5	2.9
67-69	2.3	1.3	3.6	1.5	1.8	1.0
70-74	2.8	1.6	4.3	3.3	1.3	7.8
75-79	3.1	1.6	5.2	2.3	1.3	4.4
80-84	2.1	0.4	4.1	0.8	0.9	0.5
85 and over	1.2	0.5	2.1	0.9	0.2	2.5
Declined, unknown, missing	5.3	3.3	7.7	0	0	0
Total	100.0	100.1	100.2	100.1	100.0	100.0
Race/Ethnicity						
White, Not Hispanic	50.9	54.7	46.0	47.6	54.8	31.4
Hispanic	29.8	28.1	31.8	27.3	23.4	36.3
Black, Not Hispanic	6.7	5.4	8.4	7.3	6.6	8.8
Native American, Not Hisp.	1.2	1.6	0.7	0.9	0.9	1.0
Asian, Not Hispanic	5.8	5.8	5.8	9.4	8.1	12.3
Declined, unknown, missing	5.7	4.4	7.4	7.6	6.3	10.3
Total	100.1	100.0	100.1	100.1	100.1	100.1

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[20] Some totals do not equal precisely 100% due to rounding.

TABLE 4 (Continued). Overview of beach users and non-users (figures in percentages) [21]

Demographic Category	Recruitment Sample Profile			Replenishment Sample Profile		
	Overall	Beach Users	Non Beach Users	Overall	Beach Users	Non Beach Users
Household Income						
$0 to $9,999	5.8	4.4	7.7	5.1	4.2	7.4
$10,000 to $19,999	10.4	10.1	10.9	11.0	10.0	13.2
$20,000 to $29,999	11.2	10.3	12.3	8.9	7.4	12.3
$30,000 to $39,999	7.6	8.5	6.5	8.8	8.7	8.8
$40,000 to $49,999	7.5	8.8	5.8	7.1	5.7	10.3
$50,000 to $59,999	7.6	8.4	6.5	8.2	10.5	2.9
$60,000 to $99,999	14.3	17.5	10.2	12.4	15.3	5.9
$100,000 to $149,999	7.1	9.8	3.8	7.0	8.7	2.9
$150,000 or more	4.8	6.1	3.1	7.4	9.6	2.5
Declined, unknown, missing	23.7	16.3	33.2	24.2	19.9	33.8
Total	100.0	100.2	100.0	100.1	100.0	100.0
Education						
Less than 9th	7.0	4.1	10.8	7.7	4.8	14.2
9th to 12th	5.8	4.7	7.1	4.4	3.7	5.9
HS graduate	22.8	19.6	26.8	22.1	19.2	28.4
Some college	29.5	32.5	25.7	27.5	29.0	24.0
Bachelor's	21.4	24.3	17.6	26.0	29.3	18.6
Grad/Prof.	11.3	14.1	7.6	9.7	12.2	3.9
Declined, unknown, missing	2.3	0.7	4.4	2.7	1.8	4.9
Total	100.1	100.0	100.0	100.1	100.0	99.9
Household Size						
1 person	37.9	31.0	46.0	30.2	21.8	49
2 people	31.2	31.2	31.2	26.3	27.5	23.5
3 people	13.6	13.3	11.4	14.5	15.5	12.3
4 people	10.9	15.3	8.0	9.5	11.4	5.4
5 people	4.0	5.2	2.5	3.8	3.9	3.4
6 people	1.9	2.8	0.7	1.4	1.8	0.5
7 or more	0.6	1.0	0.3	1.5	1.3	2.0
Declined, unknown, missing	0.2	0.2	0	12.8	16.8	3.9
Total	100.3	100.0	100.1	100.0	100.0	100.0
Employment Status						
Employed	65.8	75.5	53.4	69.2	74.0	58.3
Unemployed	6.5	6.9	6.1	8.8	8.7	8.8
Not in work force	25.8	16.7	37.6	19.3	15.5	27.9
Declined, unknown, missing	1.8	0.9	3.0	2.7	1.8	4.9
Total	99.9	100.0	100.1	100.0	100.0	99.9

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[21] Some totals do not equal precisely 100% due to rounding.

TABLE 5. Comparing beach users and non-users in recruitment. [22]

Demographic Category	Profile of Beach Users in Recruitment		Profile of Non-Beach Users in Recruitment		P-value on χ^2 Test[23]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	44.9	464	38.3	312	0.006
Female	54.7	566	60.9	496	0.006
Declined, unknown, missing	0.4	4	0.7	6	NA[24]
Total	100.0	1034	99.9	814	NA
Age					
18 and 19	4.2	43	2.7	22	0.133
20	3.1	32	1.5	12	0.034
21	2.7	28	2.1	17	0.483
22-24	7.6	79	3.9	32	0.002
25-29	13.2	136	7.3	59	0.000
30-34	12.2	126	9.5	77	0.129
35-39	13.7	142	9.7	79	0.022
40-44	10.9	113	7.1	58	0.013
45-49	9.0	93	6.6	54	0.115
50-54	6.0	62	8.0	65	0.050
55-59	4.0	41	6.0	49	0.023
60 and 61	1.4	14	4.1	33	0.000
62-64	1.6	17	3.0	24	0.041
65 and 66	1.8	19	1.7	14	0.157
67-69	1.3	13	3.6	29	0.000
70-74	1.6	17	4.3	35	0.000
75-79	1.6	16	5.2	42	0.000
80-84	0.4	4	4.1	33	0.000
85 and over	0.5	5	2.1	17	0.001
Declined, unknown, missing	3.3	34	7.7	63	NA
Total	100.1	1034	100.2	814	NA
Race/Ethnicity					
White, Not Hispanic	54.7	566	46.0	374	0.002
Hispanic	28.1	291	31.8	259	0.028
Black, Not Hispanic	5.4	56	8.4	68	0.007
Native American, Not Hisp.	1.6	16	0.7	6	0.128
Asian, Not Hispanic	5.8	60	5.8	47	0.886
Declined, unknown, missing	4.4	45	7.4	60	NA
Total	100.0	1034	100.1	814	NA

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[22] Some totals do not equal precisely 100% due to rounding.

[23] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for beach users and non-beach users. The null hypothesis is that the two groups are drawn populations with the same distribution (e.g. have the same proportion in expectation).

[24] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 5 (Continued). Comparing beach users and non-users in recruitment. [25]

Demographic Category	Profile of Beach Users in Recruitment		Profile of Non-Beach Users in Recruitment		P-Value on χ^2 Test [26]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	4.4	45	7.7	63	0.000
$10,000 to $19,999	10.1	104	10.9	89	0.021
$20,000 to $29,999	10.3	106	12.3	100	0.002
$30,000 to $39,999	8.5	88	6.5	53	0.779
$40,000 to $49,999	8.8	91	5.8	47	0.250
$50,000 to $59,999	8.4	87	6.5	53	0.853
$60,000 to $99,999	17.5	181	10.2	83	0.008
$100,000 to $149,999	9.8	101	3.8	31	0.000
$150,000 or more	6.1	63	3.1	25	0.043
Declined, unknown, missing	16.3	168	33.2	270	NA[27]
Total	100.2	1034	100.0	814	NA
Education					
Less than 9th	4.1	42	10.8	88	0.000
9th to 12th	4.7	49	7.1	58	0.017
HS graduate	19.6	203	26.8	218	0.000
Some college	32.5	336	25.7	209	0.007
Bachelor's	24.3	251	17.6	143	0.002
Grad/Prof.	14.1	146	7.6	62	0.000
Declined, unknown, missing	0.7	7	4.4	36	NA
Total	100.0	1034	100.0	814	NA
Household Size					
1 person	31.0	321	46.0	374	0.000
2 people	31.2	323	31.2	254	0.965
3 people	13.3	158	11.4	93	0.016
4 people	15.3	137	8.0	65	0.000
5 people	5.2	54	2.5	20	0.003
6 people	2.8	29	0.7	6	0.001
7 or more	1.0	10	0.3	2	0.055
Declined, unknown, missing	0.2	2	0	0	NA
Total	100.0	1034	100.1	814	NA
Employment Status					
Employed	75.5	781	53.4	435	0.000
Unemployed	6.9	71	6.1	50	0.618
Not in work force	16.7	173	37.6	304	0.000
Declined, unknown, missing	0.9	9	3.0	25	NA
Total	100.0	1034	100.1	814	NA

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[25] Some totals do not equal precisely 100% due to rounding.

[26] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for beach users and non-beach users. The null hypothesis is that the two groups are drawn populations with the same distribution (e.g. have the same proportion in expectation).

[27] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 6.   Comparing beach users and non-users in replenishment. [28]

Demographic Category	Profile of Beach Users in Replenishment		Profile of Non-Beach Users in Replenishment		P-value on χ^2 Test[29]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	52.6	217	41.2	84	0.139
Female	47.4	241	58.8	120	0.139
Declined, unknown, missing	0	0	0	0	NA[30]
Total	100.0	458	100.0	204	NA
Age					
18 and 19	6.1	28	3.4	7	0.155
20	1.1	5	0.5	1	0.451
21	2.8	13	1.5	3	0.290
22-24	7.2	33	5.4	11	0.387
25-29	12.7	58	12.8	26	0.977
30-34	10.7	49	10.8	22	0.974
35-39	14.4	66	6.4	13	0.003
40-44	14.6	67	11.7	24	0.323
45-49	9.0	41	4.9	10	0.071
50-54	7.2	33	7.8	16	0.772
55-59	5.0	23	9.8	20	0.021
60 and 61	1.5	7	4.4	9	0.026
62-64	0.7	3	1.5	3	0.307
65 and 66	1.5	7	2.9	6	0.226
67-69	1.8	8	1.0	2	0.455
70-74	1.3	6	7.8	16	0.000
75-79	1.3	6	4.4	9	0.013
80-84	0.9	4	0.5	1	0.599
85 and over	0.2	1	2.5	5	0.005
Declined, unknown, missing	0	0	0	0	NA
Total	100.0	458	100.0	204	NA
Race/Ethnicity					
White, Not Hispanic	54.8	251	31.4	64	0.000
Hispanic	23.4	107	36.3	74	0.231
Black, Not Hispanic	6.6	30	8.8	18	0.000
Native American, Not Hispanic	0.9	4	1.0	2	0.854
Asian, Not Hispanic	8.1	37	12.3	25	0.059
Declined, unknown, missing	6.3	29	10.3	21	NA
Total	100.1	458	100.1	204	NA

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[28] Some totals do not equal precisely 100% due to rounding.

[29] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for beach users and non-beach users. The null hypothesis is that the two groups are drawn populations with the same distribution (e.g. have the same proportion in expectation).

[30] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 6 (Continued). Comparing beach users and non-users in replenishment. [31]

Demographic Category	Profile of Beach Users in Recruitment		Profile of Non-Beach Users in Recruitment		P-Value on χ^2 Test[32]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	4.2	19	7.4	15	0.019
$10,000 to $19,999	10.0	46	13.2	27	0.035
$20,000 to $29,999	7.4	34	12.3	25	0.004
$30,000 to $39,999	8.7	40	8.8	18	0.449
$40,000 to $49,999	5.7	26	10.3	21	0.004
$50,000 to $59,999	10.5	48	2.9	6	0.005
$60,000 to $99,999	15.3	70	5.9	12	0.006
$100,000 to $149,999	8.7	40	2.9	6	0.026
$150,000 or more	9.6	44	2.5	5	0.006
Declined, unknown, missing	19.9	91	33.8	69	NA[33]
Total	100.0	458	100.0	204	NA
Education					
Less than 9th	4.8	22	14.2	29	0.000
9th to 12th	3.7	17	5.9	12	0.176
HS graduate	19.2	88	28.4	58	0.004
Some college	29.0	133	24.0	49	0.266
Bachelor's	29.3	134	18.6	38	0.007
Grad/Prof.	12.2	56	3.9	8	0.001
Declined, unknown, missing	1.8	8	4.9	10	NA
Total	100.0	458	99.9	204	NA
Household Size					
1 person	21.8	100	49.0	100	0.000
2 people	27.5	126	23.5	48	0.033
3 people	15.5	71	12.3	25	0.073
4 people	11.4	52	5.4	11	0.003
5 people	3.9	18	3.4	7	0.519
6 people	1.8	8	0.5	1	0.145
7 or more	1.3	6	2.0	4	0.685
Declined, unknown, missing	16.8	77	3.9	8	NA
Total	100.0	458	100.0	204	

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[31] Some totals do not equal precisely 100% due to rounding.

[32] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for beach users and non-beach users. The null hypothesis is that the two groups are drawn populations with the same distribution (e.g. have the same proportion in expectation).

[33] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

Employment Status

Employed	74.0	339	58.3	119	0.000
Unemployed	8.7	40	8.8	18	0.874
Not in work force	15.5	71	27.9	57	0.000
Declined, unknown, missing	1.8	8	4.9	10	NA
Total	100.0	458	99.9	204	NA

Figure 4. Beach Users vs. Non-Beach Users in Recruitment and Replenishment (I)
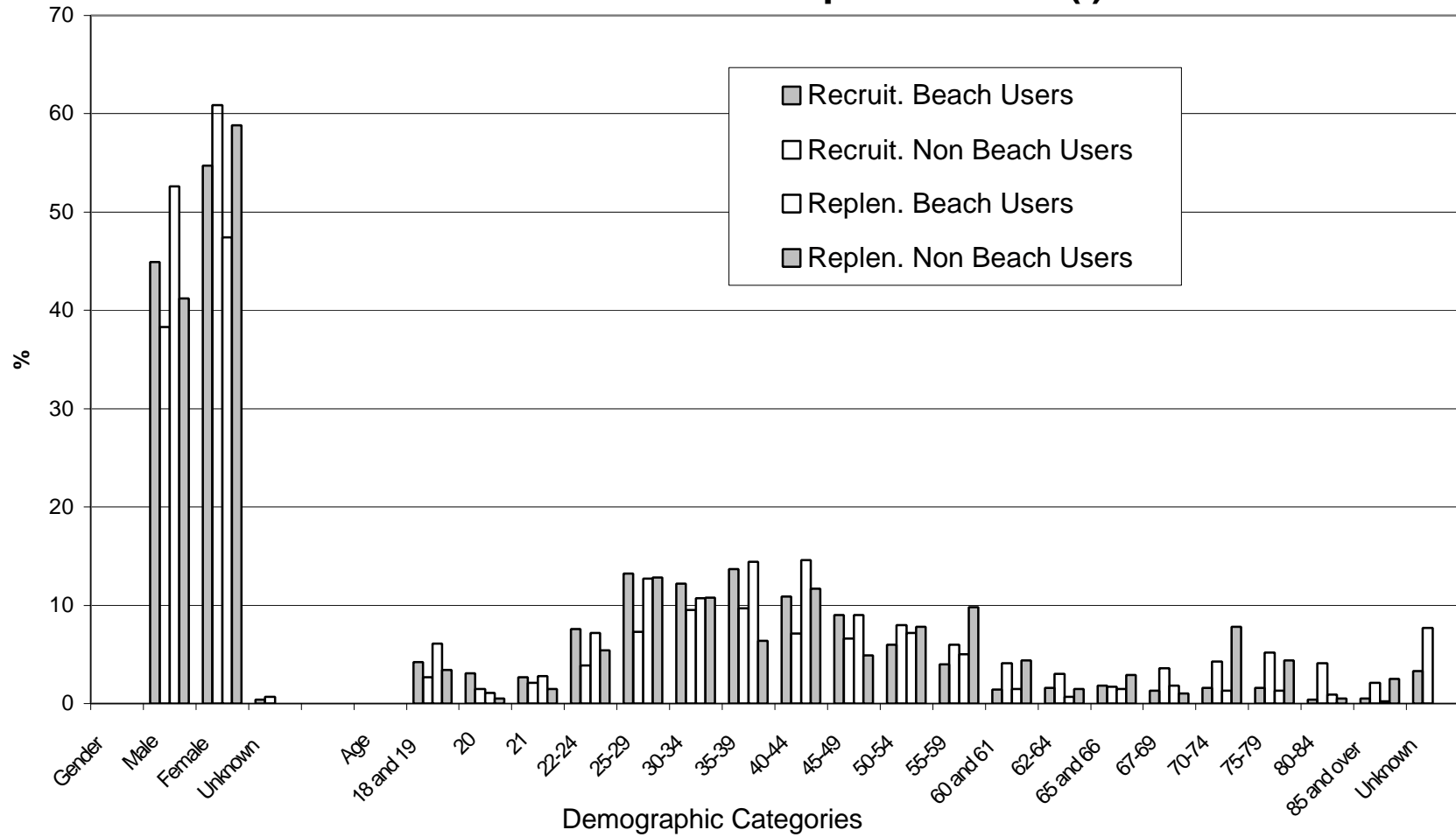
Figure 5. Beach Users vs. Non-Beach Users in Recruitment and Replenishment (II)
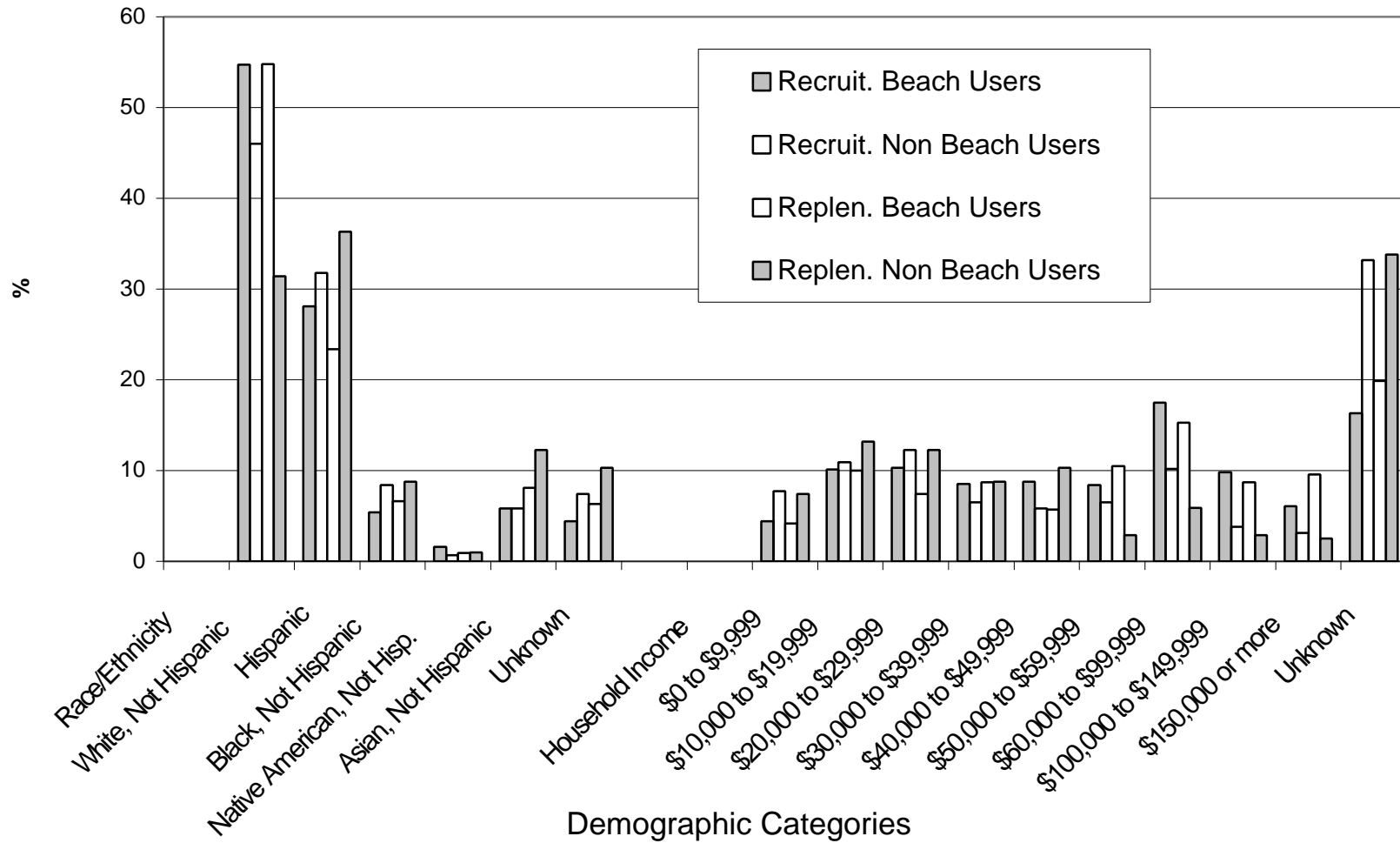
Figure 6. Beach Users and Non-Beach Users in Recruitment and Replenishment (III)

These tables and figures show that beach users as a group are somewhat different from non-beach users. Consider the recruitment sample first. For this group, it appears that males are more likely to be beach users and females are more likely to be non-beach users since we can reject at a 1% level of statistical significance the null hypothesis that for each gender there is the same proportion of beach users and non-users (p-value= 0.006). Those people less than 45 years of age are more likely to be beach users and those people greater than 45 years old are less likely to be beach users. Whites are more likely, while Hispanics and African Americans are less likely, to be beach users. Differences between proportions of beach users and non-users are not significant for Native Americans and Asians. People living in smaller households are less likely to be beach users (both one and three person households are statistically significant). Those living in households that include more than three people are all more likely to be beach users (all statistically significant). People who are working are more likely to be beach users. People who are not in the work force are less likely to be beach users.

Again, as with the two samples overall, there are some differences between recruitment and replenishment, but they exhibit broadly similar trends. We highlight areas where the replenishment sample breakdown of beach users and non-beach users is substantially different from the recruitment sample. For replenishment, we are unable to reject the null hypothesis that the proportion of beach users and non-users are the same for each gender (p-value=0.136). Though we again see a pattern of relatively more beach users among people under 45 and relatively fewer beach users among people over 45 in replenishment, these differences are much less statistically significant than in the recruitment survey. The differences are significant at a 5% level in 6 categories in the replenishment sample as compared to 14 categories in the recruitment. Again whites are more likely to be beach users and African Americans are less likely, but Asians are statistically less likely to be beach users and the difference for Hispanics is not statistically significant. The trends in education and income are the same. More educated, more wealthy pe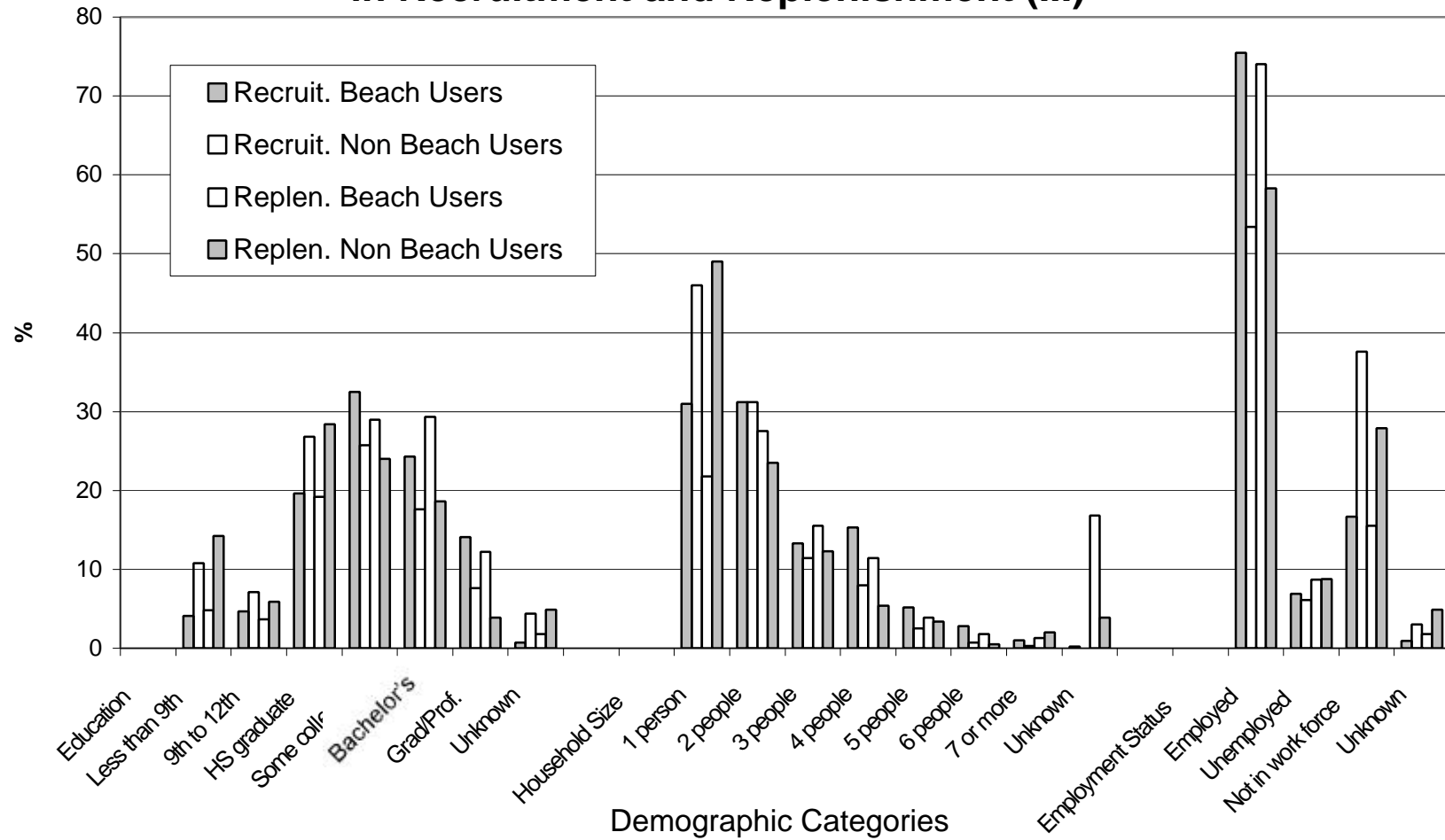ople are more likely to be beach users. Again members of households with three or fewer members are less likely to be beach users, though unlike recruitment, the differences among the 5, 6, and 7 or more categories are not statistically significant.

Conclusions based on the Chi-square test results on equality of beach users and non-beach users should be treated with caution. Such tests are like univariate regressions: they do no control for differences among other variables. In order to further investigate the differences between beach users and non-beach users, we carried out a logit analysis on the zero-one variable of whether or each respondent is identified as a beach user. For the logit analysis we pool the two samples which enables us to examine whether or not there is a systematic difference between replenishment and recruitment in the likelihood to be identified as a beach user. Certainly a higher percentage of people in the replenishment survey satisfy our definition of a beach user. 56% of the recruitment sample are beach users and 69.2 % of the replenishment sample are beach users. This could be due to the fact that it was the end of the summer when we asked replenishment survey respondents if they had been to the beach in the past 12 months whereas it was winter time when we asked recruitment survey respondents. This might cause more

people on average to recall having been to the beach. Alternatively, the difference in the percentage of beach users might be the result of different demographic characteristics between the two samples.

Our logit analysis suggests that the former is true and not the latter, that is that the higher percentage of beach users in replenishment can not be explained by differences in demographics, but rather appear to be due to some other factor, which we suspect is the timing of the survey. The coefficient on a dummy variable indicating that the respondent joined during replenishment is highly significant (p-value=0.000), positive, and has a relatively large magnitude in comparison to other variables. See Appendix 1 for full results. We discuss some of the results here. Perhaps most interesting is that when other demographic variables are controlled for, gender and race no longer appear to be very significant factors in whether or not a person is a beach user. None of these variables are significant at a 5% level (the p-value on gender is 0.416), though variables indicating that a person is white or Asian are both significant at a 10% level (the coefficients on these variables are both positive). Other results are for the most part similar to conclusions suggested by Chi-square testing. Variables indicating that respondents are over 50 years old are almost all significant and indicate these people are less likely to be beach users (though none of the variables on younger age categories are significant at a 5% level). Variables for the three highest income levels and education levels are all highly significant (at a 1% level) and have positive signs. Variables for being in a one person household (negative coefficient) and being in a six person household (positive coefficient) are both significant, though none of the other household variables are. Unlike Chi-square results, this multivariate view does not suggest that employment status is a strong factor in determining whether a person is a beach user (none of these variables are significant at a 5% level).

4. Examining Participation and Attrition

Is there sample selection in the subset of beach users who joined our panel and answered our surveys at two-month intervals? We are interested in seeing whether are panel consists of a random sample of beach users, or whether any selectivity was at work in either the initial recruitment or in the subsequent attrition.

4.1. Willingness to Participate at Time of Recruitment

Here we begin by examining whether a person agreed to participate in the study at the time of their recruitment, either in the initial recruitment survey or the replenishment. Table 7 compares the characteristics of the 887 people who agreed to participate in the study to the 147 people who did not. These account for the 1034 beach users from recruitment. Next we look at the 458 beach users from the replenishment sample. Table 8 looks at the 373 people who said, "yes," to participating and the 85 people who said, "no." The respondent who agreed to participate in the panel at this first contact may or may not have actually followed through and answered one or more diary surveys. After this subsection, we examine demographics for beach users included in waves as compared to those who dropped out.

TABLE 7. Focus on beach users in recruitment. Who said "Yes" vs. "No" to participating? [34]

Demographic Category	Profile of those who said "YES" to participation		Profile of those who said "NO" to participation		P-value on x^2 Test[35]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	45.0	399	55.8	82	0.827
Female	54.6	484	44.2	65	0.827
Declined, unknown, missing	0.5	4	0	0	NA[36]
Total	100.1	887	100.0	147	NA
Age					
18 and 19	4.2	37	4.1	6	0.897
20	2.9	26	4.1	6	0.356
21	2.8	25	2.0	3	0.683
22-24	8.2	73	4.1	6	0.120
25-29	13.6	121	10.2	15	0.402
30-34	12.6	112	9.5	14	0.439
35-39	13.9	124	12.2	18	0.813
40-44	11.6	103	6.8	10	0.139
45-49	8.3	74	12.9	19	0.335
50-54	6.3	56	4.1	6	0.386
55-59	4.1	36	3.4	5	0.832
60 and 61	1.1	10	2.7	4	0.090
62-64	1.4	12	3.4	5	0.049
65 and 66	1.7	15	2.7	4	0.315
67-69	1.0	9	2.7	4	0.062
70-74	1.6	14	2.0	3	0.595
75-79	1.5	13	2.0	3	0.518
80-84	0.3	3	0.7	1	0.490
85 and over	0.5	4	0.7	1	0.658
Declined, unknown, missing	2.3	20	9.5	14	NA
Total	99.9	887	99.8	147	NA
Race/Ethnicity					
White, Not Hispanic	55.5	492	50.3	74	0.690
Hispanic	28.4	252	26.5	39	0.831
Black, Not Hispanic	5.5	49	4.8	7	0.978
Native American, Not Hisp.	1.6	14	1.4	2	0.911
Asian, Not Hispanic	5.5	49	7.8	11	0.252
Declined, unknown, missing	3.5	31	9.5	14	NA
Total	100.0	887	100.3	147	NA

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[34] Some totals do not equal precisely 100% due to rounding.

[35] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for those agreeing and those declining to participate. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[36] NA=Not Applicable. For the x^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 7 (Continued). Focus on recruitment. Who Said "Yes" vs. "No" to participating?[37]

Demographic Category	Profile of those who said "YES" to participation		Profile of those who said "NO" to participation		P-Value on χ^2 Test[38]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	4.3	38	4.8	7	0.298
$10,000 to $19,999	9.7	86	12.2	18	0.024
$20,000 to $29,999	10.8	96	6.8	10	0.616
$30,000 to $39,999	8.6	76	8.2	12	0.376
$40,000 to $49,999	9.6	85	4.1	6	0.167
$50,000 to $59,999	8.6	76	7.5	11	0.572
$60,000 to $99,999	18.2	161	13.6	20	0.924
$100,000 to $149,999	10.8	96	3.4	5	0.042
$150,000 or more	6.5	58	3.4	5	0.439
Declined, unknown, missing	13.0	115	36.1	53	NA[39]
Total	100.1	887	100.1	147	NA
Education					
Less than 9th	3.6	32	6.8	10	0.053
9th to 12th	5.1	45	2.7	4	0.246
HS graduate	19.5	173	20.4	30	0.628
Some college	33.3	295	27.9	41	0.322
Bachelor's	24.2	215	24.5	36	0.745
Grad/Prof.	14.2	126	13.6	20	0.991
Declined, unknown, missing	0.1	1	4.1	6	NA
Total	100.0	887	100.0	147	NA
Household Size					
1 person	29.4	261	40.8	60	0.006
2 people	31.5	279	29.9	44	0.700
3 people	15.7	139	12.9	19	0.386
4 people	14.2	126	7.5	11	0.025
5 people	5.1	45	6.1	9	0.601
6 people	2.8	25	2.7	4	0.944
7 or more	1.1	10	0	0	0.195
Declined, unknown, missing	0.2	2	0	0	NA
Total	100.0	887	99.9	147	NA

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[37] Some totals do not equal precisely 100% due to rounding.

[38] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for those agreeing and those declining to participate. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[39] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

Employment Status

Employed	77.2	685	65.3	96	0.015
Unemployed	7.1	63	5.4	8	0.528
Not in work force	15.3	136	25.2	37	0.001
Declined, unknown, missing	0.3	3	4.1	6	NA
Total	99.9	887	100.0	147	NA

Figure 7. Recruitment: Who Said Yes vs. No to Participating (I)

Demographic Categories
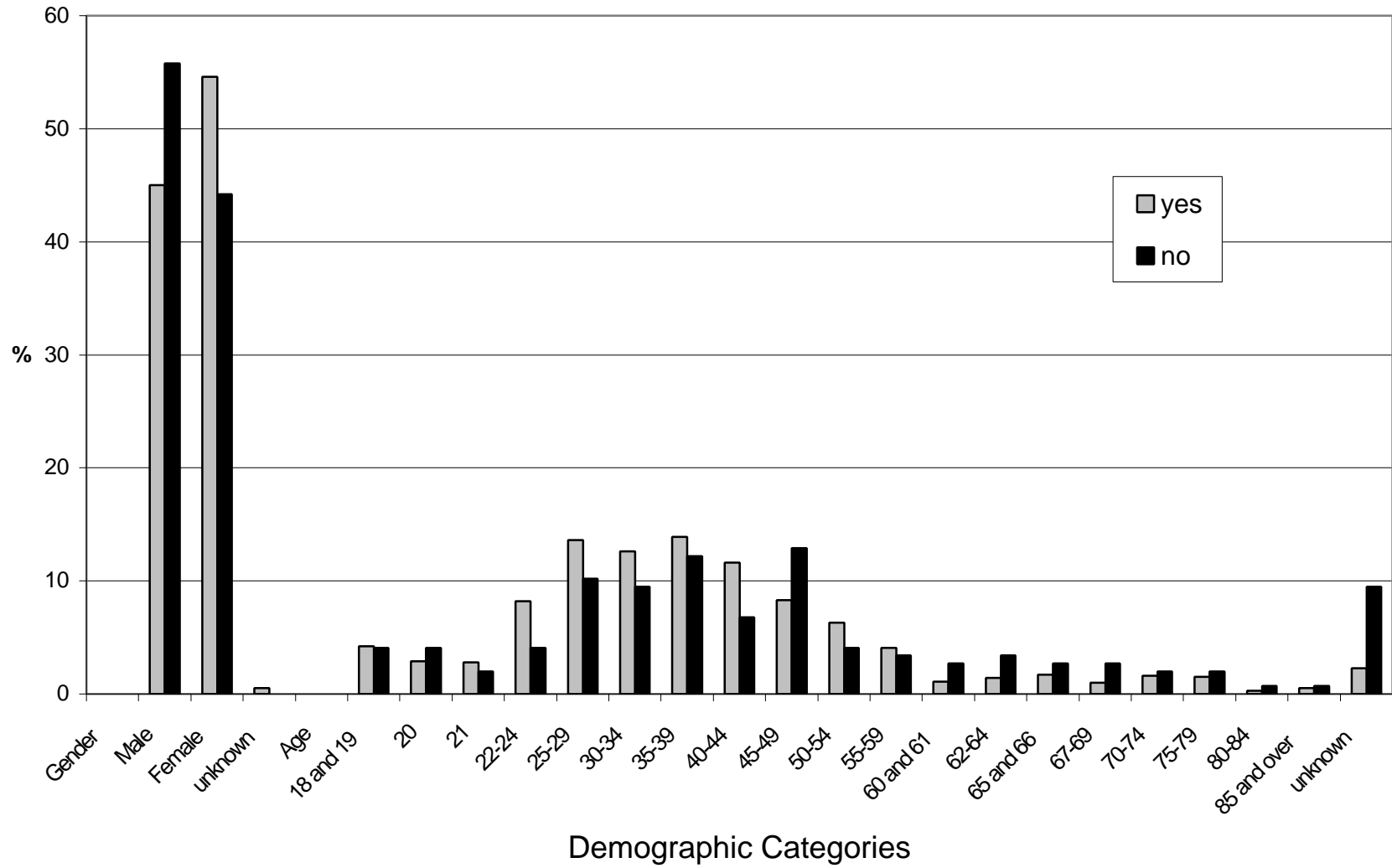
Figure 8. Recruitment: Who Said Yes vs. No to Participating (II)

Demographic Categories
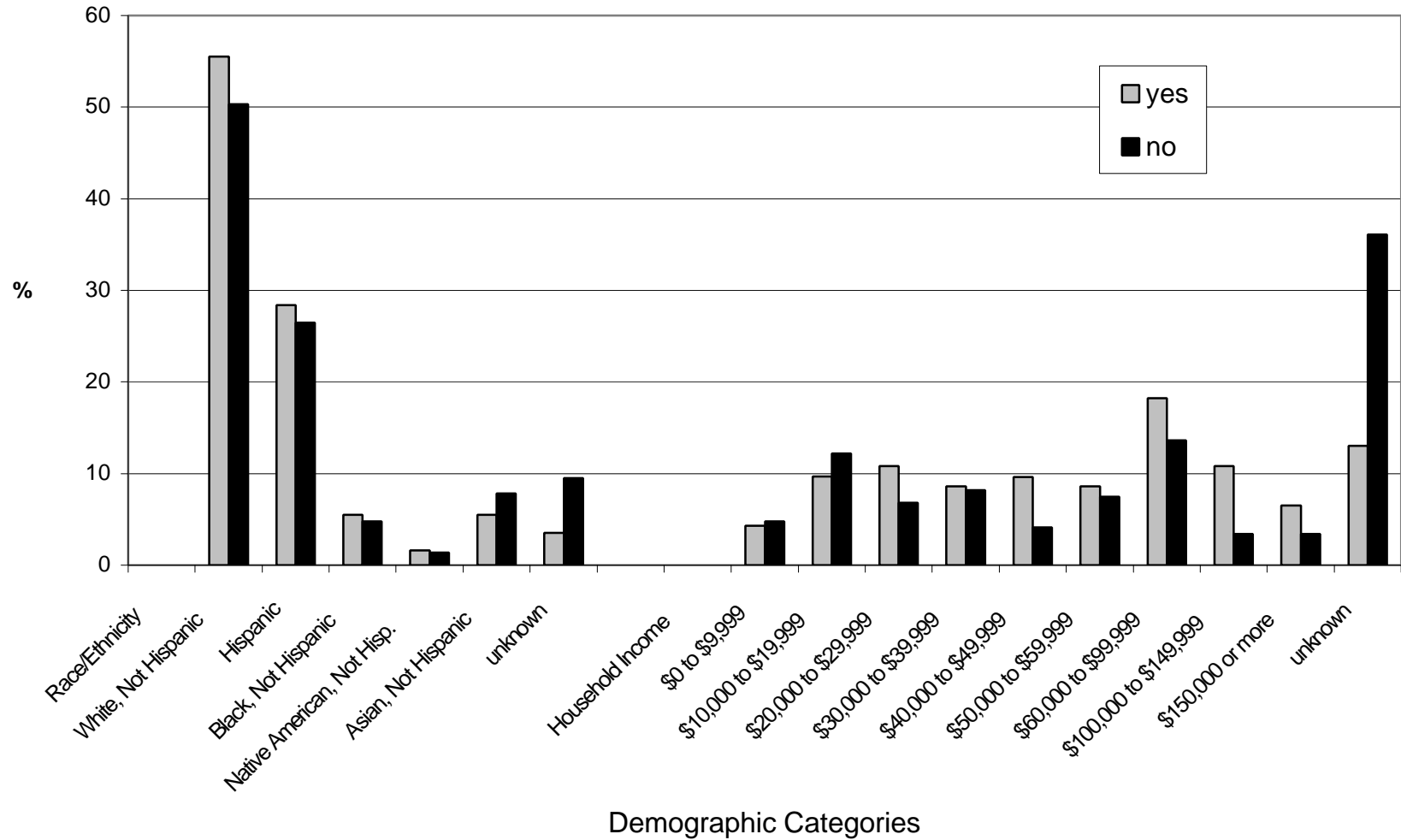
Figure 9. Recruitment: Who Said Yes vs. No to Participating (III)

Demographic Categories
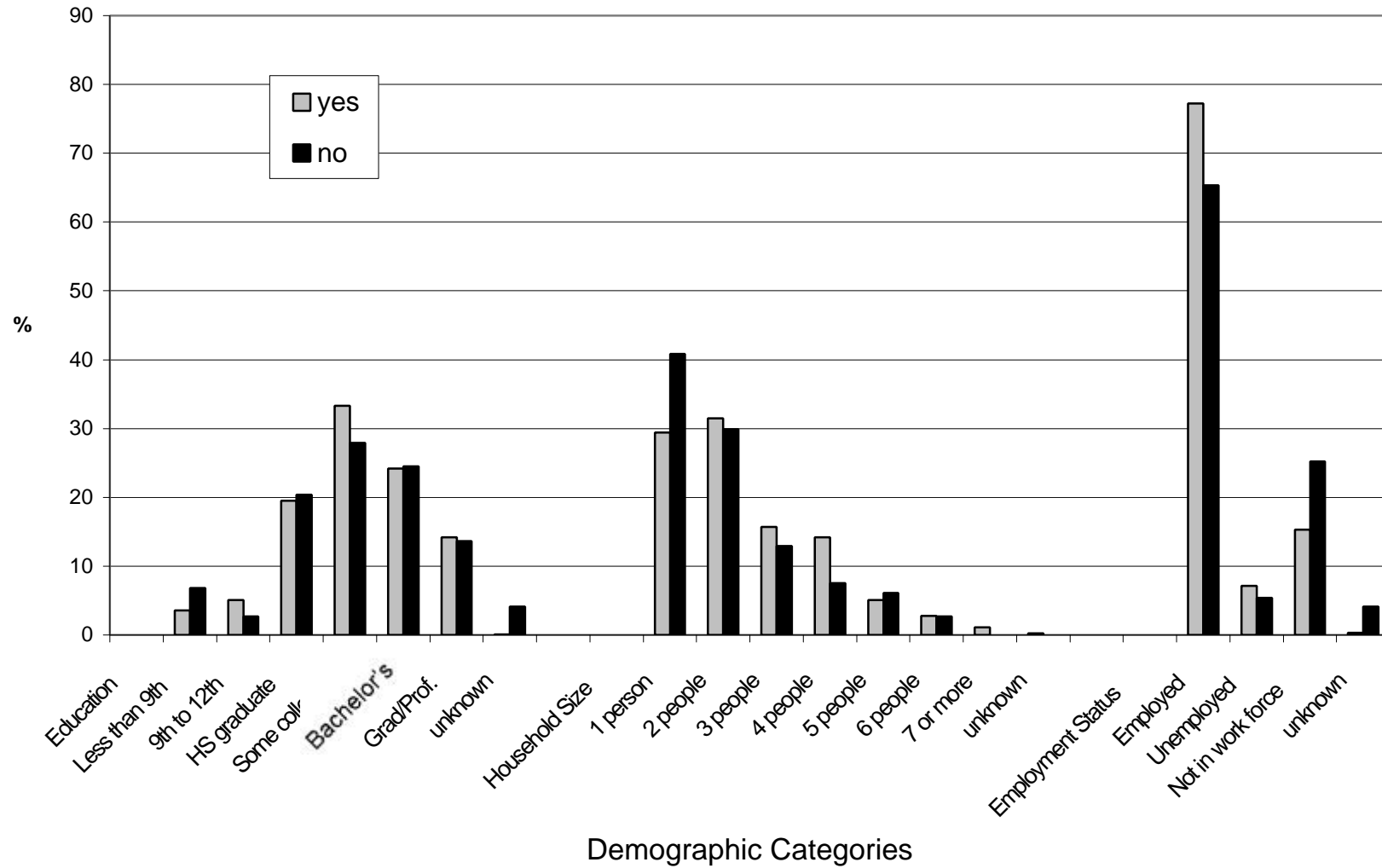
TABLE 8. Focus on beach users in replenishment. Who said "Yes" vs. "No" to participating? [40]

Demographic Category	Profile of those who said "YES" to participation		Profile of those who said "NO" to participation		P-value on χ^2 Test [41]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	49.9	183	37.4	34	0.033
Female	50.1	184	62.6	57	0.033
Declined, unknown, missing	0	0	0	0	NA [42]
Total	100.0	367	100.0	91	NA
Age					
18 and 19	6.0	22	6.6	6	0.831
20	1.1	4	1.1	1	0.994
21	3.5	13	0	0	0.069
22-24	8.2	30	3.3	3	0.107
25-29	13.6	50	8.8	8	0.215
30-34	9.8	36	14.3	13	0.216
35-39	15.3	56	11.0	10	0.299
40-44	15.0	55	13.2	12	0.664
45-49	8.7	32	9.9	9	0.726
50-54	6.8	25	8.8	8	0.513
55-59	4.6	17	6.6	6	0.443
60 and 61	1.4	5	2.2	2	0.561
62-64	0.5	2	1.1	1	0.558
65 and 66	1.1	4	3.3	3	0.125
67-69	1.4	5	3.3	3	0.207
70-74	0.8	3	3.3	3	0.063
75-79	1.4	5	1.1	1	0.843
80-84	0.8	3	1.1	1	0.796
85 and over	0	0	1.1	1	0.044
Declined, unknown, missing	0	0	0	0	NA
Total	100.0	367	100.1	91	NA
Race/Ethnicity					
White, Not Hispanic	53.4	196	60.4	55	0.057
Hispanic	23.9	88	20.9	19	0.732
Black, Not Hispanic	7.4	27	3.3	3	0.198
Native American, Not Hisp.	1.1	4	0	0	0.332
Asian, Not Hispanic	9.0	33	4.4	4	0.190
Declined, unknown, missing	5.2	19	11.0	10	NA
Total	100.0	367	100.0	91	NA

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[40] Some totals do not equal precisely 100% due to rounding.

[41] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for those agreeing and those declining to participate. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[42] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 8 (continued). Focus on replenishment. Who said "Yes" vs. "No" to participating? [43]

Demographic Category	Profile of those who said "YES" to participation		Profile of those who said "NO" to participation		P-Value on χ^2 Test [44]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	4.4	16	3.3	3	0.864
$10,000 to $19,999	11.2	41	5.5	5	0.461
$20,000 to $29,999	7.9	29	5.5	5	0.963
$30,000 to $39,999	10.1	37	3.3	3	0.186
$40,000 to $49,999	5.7	21	5.5	5	0.471
$50,000 to $59,999	10.9	40	8.8	8	0.638
$60,000 to $99,999	16.6	61	9.9	9	0.675
$100,000 to $149,999	8.7	32	8.8	8	0.289
$150,000 or more	10.1	37	7.7	7	0.768
Declined, unknown, missing	14.4	53	41.8	38	NA[45]
Total	100.0	367	100.1	91	NA
Education					
Less than 9th	4.4	16	6.6	6	0.303
9th to 12th	3.8	14	3.3	3	0.894
HS graduate	21.0	77	12.1	11	0.088
Some college	30.0	110	25.3	23	0.575
Bachelor's	28.6	105	31.9	29	0.331
Grad/Prof.	11.7	43	14.3	13	0.377
Declined, unknown, missing	0.5	2	6.6	6	NA
Total	100.0	367	100.1	91	NA
Household Size					
1 person	20.9	77	25.3	23	0.256
2 people	26.2	96	33.0	30	0.105
3 people	15.5	57	15.4	14	0.895
4 people	13.1	48	4.4	4	0.024
5 people	4.9	18	0	0	0.034
6 people	1.6	6	2.2	2	0.671
7 or more	1.6	6	0	0	0.229
Declined, unknown, missing	16.1	59	19.8	18	NA
Total	99.9	367	100.1	91	NA

---

[43] Some totals do not equal precisely 100% due to rounding.

[44] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for those agreeing and those declining to participate. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[45] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

Employment Status

Employed	76.0	279	65.9	60	0.260
Unemployed	8.5	31	9.9	9	0.541
Not in work force	15.0	55	17.6	16	0.392
Declined, unknown, missing	0.5	2	6.6	6	NA
Total	100.0	367	100.0	91	NA

Figure 10. Repelenishment:
Who Said Yes vs. No to Participating (I)
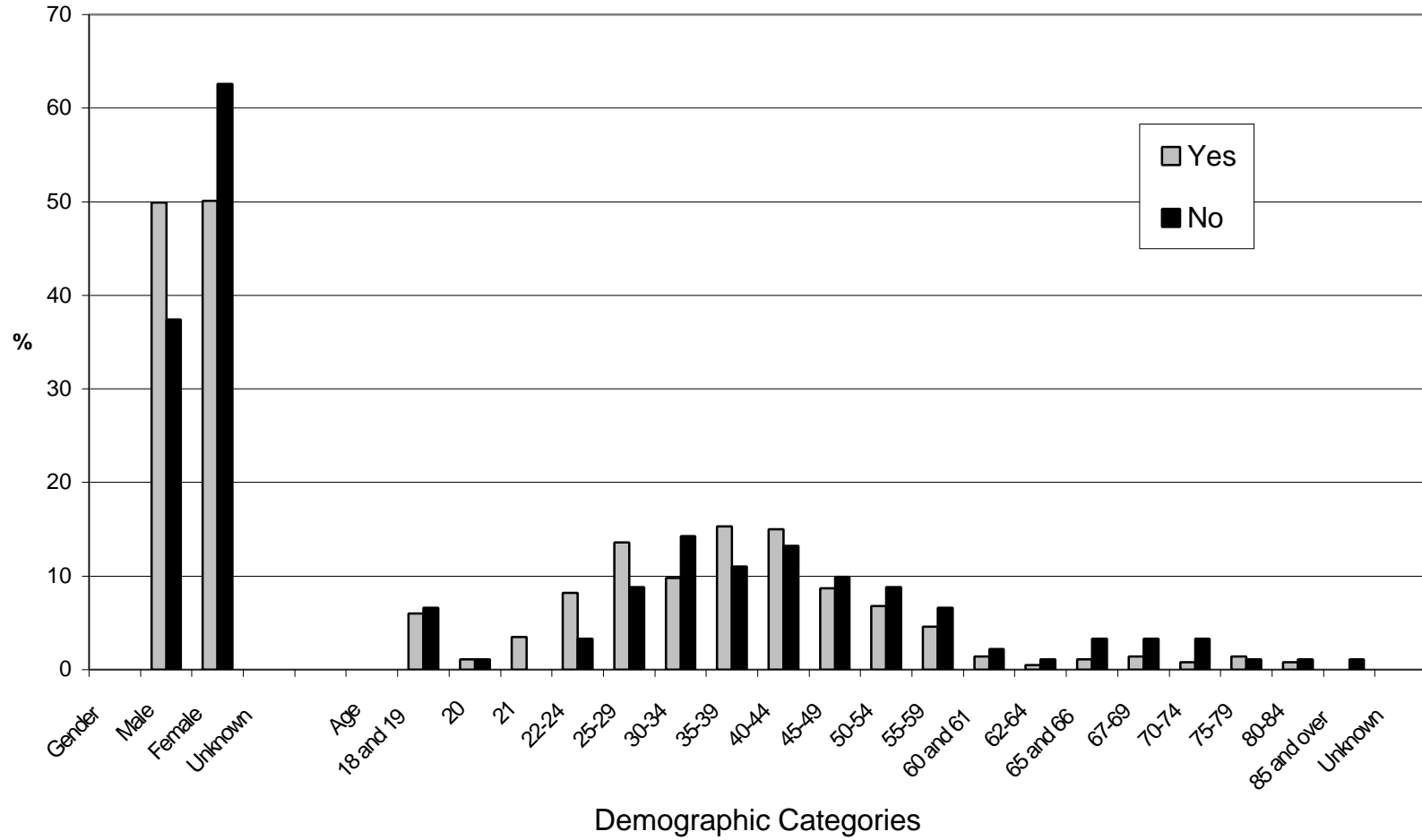
Figure 11. Replenishment:
Who Said Yes vs. No to Participating (II)

Demographic Categories
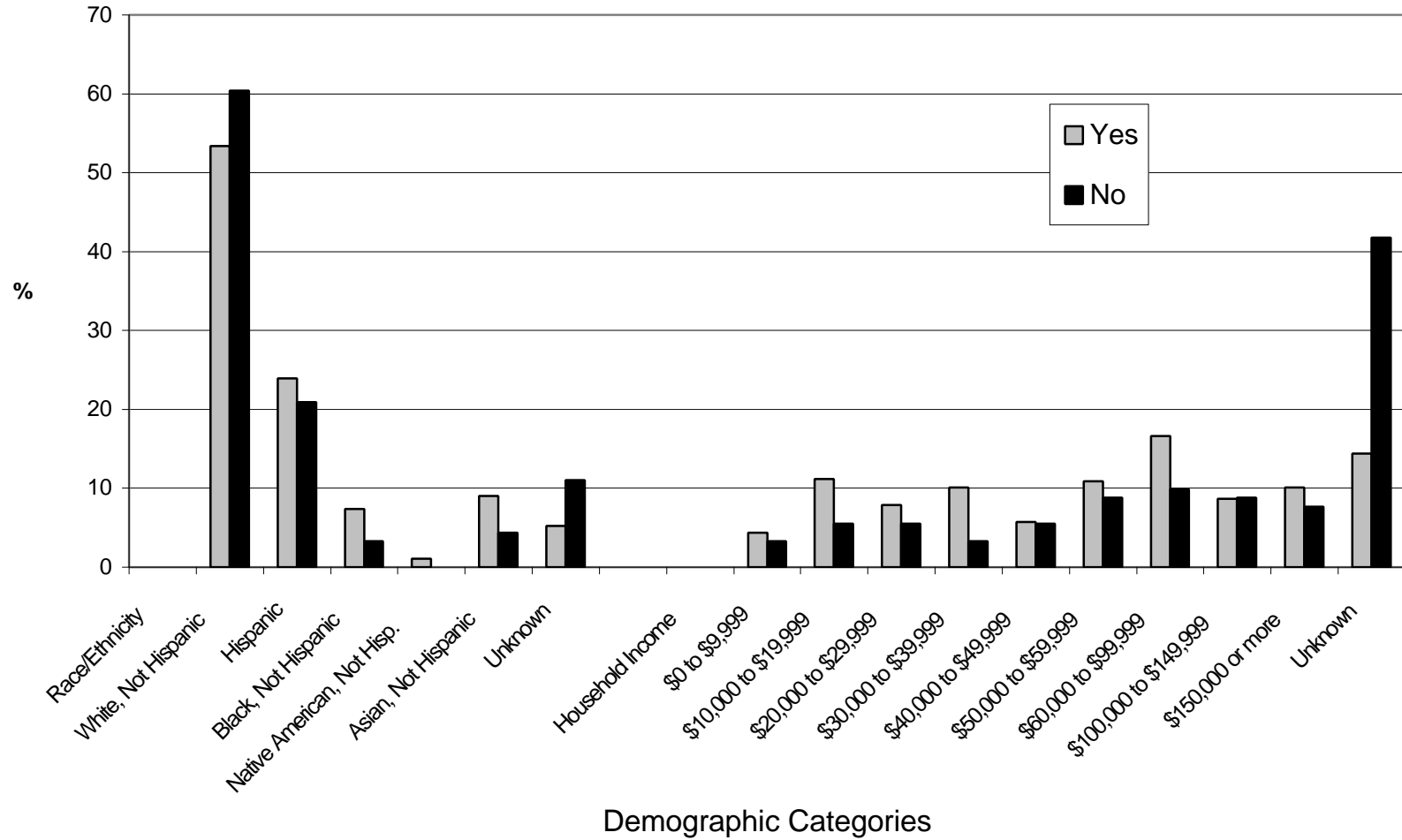
Figure 12. Replenishment:
Who Said Yes vs. No to Participating (III)

Demographic Categories
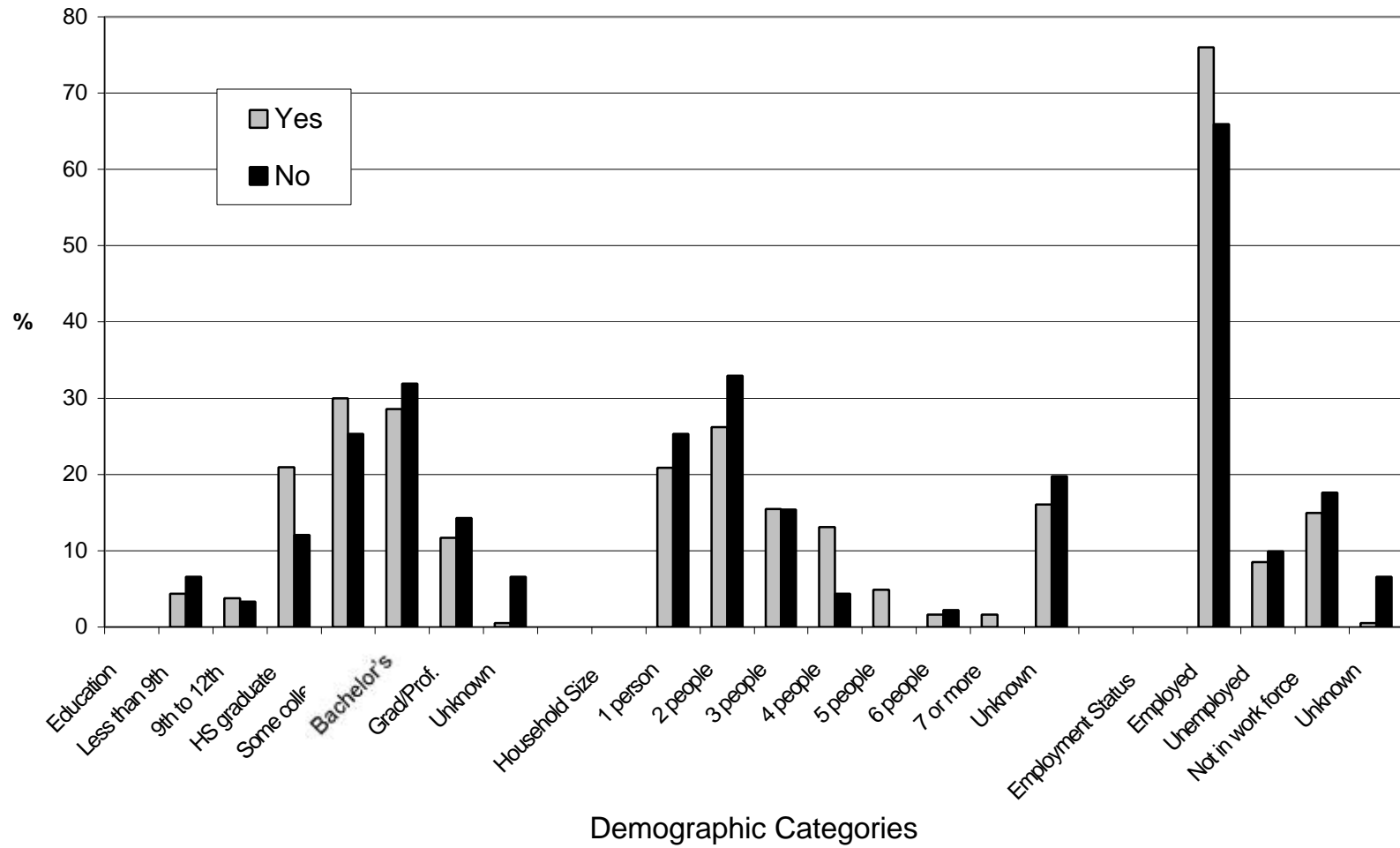
The results of the hypothesis testing reported on above suggests that the differences between people agreeing to participate in the panel at first contact and those declining are not very large. For the recruitment, there are only six instances where the difference between those saying "Yes" and those saying "No" are statistically significant at a 5% level. People 62-64, living in a one person household, or not in the work force were less likely to agree to participate. People making $100,000-$149,999, living in a four person household, or employed were more likely to agree to participate. Even fewer demographic categories showed statistically significant differences in the replenishment survey. People living in four or five person households and females were more likely to agree to participate (and this implies the corollary that males were more likely to decline). These were the only three significant results, though being white (and more likely to significant) was almost significant at a 5% level (p-value = 0.057).

4.2. Wave-by-Wave Analysis of Participation and Attrition

Before going on to assess the demographic characteristics of participants and non-participants in each wave, here is an overview of sample size across the panel.

TABLE 9. Sample Size by Wave

	Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6
Recruitment	658	629	504	517[*]	468	452
Replenishment	(Not Applicable)			458[**]	255	261[*]
Total Respondents	658	629	504	975	723	713

[*] Some may wonder why participation increased in this period over the previous period. If a respondent was not reached during calling for a diary, we would continue trying to contact them and in some cases people who had dropped out of the panel during one wave then rejoined in later waves.

[**] Note that though we have data on beach trips in June and July for all replenishment respondents the questions that elicited these vary slightly from diary survey format.

In the table above and in this report generally, we focus on whether or not a respondent completed a survey or not in order to give us insight into participation and attrition. Appendix 1 of the Production Report gives more detailed and differentiated survey outcomes. Examples of these are "refusal", "partial interview", or "scheduled callback." The production report also includes a more detailed analysis of response rates.

Now for some insight into the number of surveys completed by each respondent. Table 10 shows the distribution of this for the recruitment and replenishment samples respectively.

TABLE 10. Distribution of the Number of Diary Surveys Completed.

Number of Diary Survey Completed	Recruitment		Replenishment	
	Frequency	Percentage	Frequency	Percentage
None	291	28.1	NA[*]	NA
1	90	8.7	178	38.9
2	75	7.3	44	9.6
3	63	6.1	236	51.5
4	80	7.7	NA	NA
5	131	12.7	NA	NA
6	304	29.4	NA	NA
Total (beach users)	1034	100.0	458	100.0

[*]NA = Not Applicable. All beach users answered questions on beach trips during the replenishment survey and so we have no cases of "none" for this sample.   Similarly, this group could participate in a most three waves.

For both the recruitment and replenishment samples, respondents most frequently answered all possible diary surveys (six or three, respectively). For both, the next most common behavior was to answer no questions beyond recruitment or replenishment (which implies no data on beach usage for recruitment and data on trips in June and July for replenishment).

Next we look in detail at participation and attrition across waves. The following eight tables compare demographic characteristics for each of the six waves in the panel. In each wave, we compare two groups—beach users who completed a diary survey and those who did not. Tables 11-14 cover waves 1-4. These waves include diary survey responses only from people from the initial recruitment, and so there is only one table per wave. The first possibility of attrition for person recruited during replenishment was in Wave 5. For Waves 5 and 6, we separately profile participation and attrition according to recruitment and replenishment sample frames of references in Tables 15-18. As noted above, at the time of replenishment, all beach users answered questions about trips to the beach in June and July. (These data will be merged with diary survey data for Wave 4.) Since all beach users the replenishment survey answered these questions, there is no attrition to consider in this case. After the separate tables on each wave, we offer separate figures on each wave. Lastly, we offer two overview tables that cover all six waves. The first, Table 19, gives demographics, and the second, Table 20, gives p-values.

TABLE 11. Participation and Attrition in Wave 1. [46]

Demographic Category	Profile of beach users participating in Wave 1		Profile of beach users NOT participating in Wave 1		P-value on χ^2 Test[47]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	42.0	276	50.0	188	0.013
Female	57.6	379	49.7	187	0.013
Declined, unknown, missing	0.5	3	0.3	1	NA[48]
Total	100.1	658	100.0	376	NA
Age					
18 and 19	3.3	22	5.6	21	0.061
20	3.0	20	3.2	12	0.807
21	2.7	18	2.7	10	0.972
22-24	8.5	56	6.1	23	0.250
25-29	12.8	84	13.9	52	0.468
30-34	12.5	82	11.7	44	0.890
35-39	14.1	93	13.1	49	0.796
40-44	11.1	73	10.7	40	0.486
45-49	8.4	55	10.1	38	0.220
50-54	6.1	40	5.9	22	0.998
55-59	5.0	33	2.1	8	0.029
60 and 61	1.4	9	1.3	5	0.985
62-64	1.7	11	1.6	6	0.988
65 and 66	2.0	13	1.6	6	0.720
67-69	1.2	8	1.3	5	0.821
70-74	1.8	12	1.3	5	0.598
75-79	1.7	11	1.3	5	0.722
80-84	0.3	2	0.5	2	0.543
85 and over	0.6	4	0.3	1	0.468
Declined, unknown, missing	1.8	12	5.9	22	NA
Total	100.0	658	100.2	376	NA
Race/Ethnicity					
White, Not Hispanic	61.3	403	43.3	163	0.000
Hispanic	23.9	157	35.6	134	0.000
Black, Not Hispanic	5.3	35	5.6	21	0.759
Native American, Not Hisp.	1.4	9	1.9	7	0.492
Asian, Not Hispanic	5.0	33	7.2	27	0.116
Declined, unknown, missing	3.2	21	6.4	24	NA
Total	100.1	658	100.0	376	NA

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[46] Some totals do not equal precisely 100% due to rounding.

[47] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[48] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 11 (Continued). Participation and Attrition in Wave 1. [49]

Demographic Category	Profile of beach users participating in Wave 1		Profile of beach users NOT participating in Wave 1		P-Value on χ^2 Test[50]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	4.1	27	4.5	18	0.307
$10,000 to $19,999	8.2	54	13.3	50	0.000
$20,000 to $29,999	10.8	71	9.3	35	0.999
$30,000 to $39,999	8.5	56	8.5	32	0.482
$40,000 to $49,999	9.7	64	7.2	27	0.472
$50,000 to $59,999	9.0	59	7.5	28	0.860
$60,000 to $99,999	19.8	130	13.6	51	0.119
$100,000 to $149,999	11.9	78	6.1	23	0.020
$150,000 or more	6.2	41	5.9	22	0.740
Declined, unknown, missing	11.9	78	23.9	90	NA[51]
Total	100.0	658	99.8	376	NA
Education					
Less than 9th	2.7	18	6.4	24	0.004
9th to 12th	4.0	26	6.1	23	0.103
HS graduate	19.5	128	20.0	75	0.761
Some college	32.1	211	33.2	125	0.584
Bachelor's	26.4	174	20.5	77	0.042
Grad/Prof.	15.2	100	12.2	46	0.219
Declined, unknown, missing	0.2	1	1.6	6	NA
Total	100.1	658	100.0	376	NA
Household Size					
1 person	28.6	188	35.4	133	0.022
2 people	33.0	217	28.2	106	0.113
3 people	15.2	100	15.4	58	0.916
4 people	13.2	87	13.3	50	0.967
5 people	5.6	37	4.5	17	0.446
6 people	3.3	22	1.9	7	0.166
7 or more	0.9	6	1.1	4	0.809
Declined, unknown, missing	0.2	1	0.3	1	NA
Total	100.0	658	100.1	376	NA
Employment Status					
Employed	75.8	499	75.0	282	0.991
Unemployed	6.1	40	8.2	31	0.169
Not in work force	17.6	116	15.2	57	0.344
Declined, unknown, missing	0.5	3	1.6	6	NA
Total	100.0	658	100.0	376	NA

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[49] Some totals do not equal precisely 100% due to rounding.

[50] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[51] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 12. Participation and Attrition in Wave 2. [52]

Demographic Category	Profile of beach users participating in Wave 2		Profile of beach users NOT participating in Wave 2		P-value on χ^2 Test [53]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	58.2	366	49.4	200	0.006
Female	41.5	261	50.1	203	0.006
Declined, unknown, missing	0.3	2	0.5	2	NA[54]
Total	100.0	629	100.0	405	NA
Age					
18 and 19	3.0	19	5.9	24	0.015
20	3.3	21	2.7	11	0.651
21	2.5	16	3.0	12	0.607
22-24	8.3	52	6.7	27	0.443
25-29	12.2	77	14.6	59	0.181
30-34	11.8	74	12.8	52	0.448
35-39	14.3	90	12.8	52	0.676
40-44	11.3	71	10.4	42	0.811
45-49	8.6	54	9.6	39	0.436
50-54	6.8	43	4.7	19	0.206
55-59	5.1	32	2.2	9	0.029
60 and 61	1.4	9	1.2	5	0.847
62-64	1.6	10	1.7	7	0.499
65 and 66	2.1	13	1.5	6	0.549
67-69	1.3	8	1.2	5	0.984
70-74	1.8	11	1.5	6	0.804
75-79	1.9	12	1.0	4	0.273
80-84	0.3	2	0.5	2	0.627
85 and over	0.6	4	0.3	1	0.401
Declined, unknown, missing	1.8	11	5.7	23	NA
Total	100.0	629	100.0	405	NA
Race/Ethnicity					
White, Not Hispanic	61.5	387	44.2	179	0.000
Hispanic	23.4	147	35.6	144	0.000
Black, Not Hispanic	5.7	36	4.9	20	0.668
Native American, Not Hisp.	1.3	8	2.0	8	0.337
Asian, Not Hispanic	4.9	31	7.2	29	0.103
Declined, unknown, missing	3.2	20	6.2	25	NA
Total	100.0	629	100.1	405	NA

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[52] Some totals do not equal precisely 100% due to rounding.

[53] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[54] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 12 (Continued). Participation and Attrition in Wave 2. [55]

Demographic Category	Profile of beach users participating in Wave 2		Profile of beach users NOT participating in Wave 2		P-Value on χ^2 Test [56]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	3.3	21	5.9	24	0.017
$10,000 to $19,999	8.4	53	12.6	51	0.005
$20,000 to $29,999	11.1	70	8.9	36	0.547
$30,000 to $39,999	8.7	55	8.2	33	0.854
$40,000 to $49,999	10.0	63	6.9	28	0.222
$50,000 to $59,999	8.6	54	8.2	33	0.787
$60,000 to $99,999	19.1	120	15.1	61	0.362
$100,000 to $149,999	11.3	71	7.4	30	0.126
$150,000 or more	6.7	42	5.2	21	0.576
Declined, unknown, missing	12.7	80	21.7	88	NA[57]
Total	99.9	629	100.1	405	NA
Education					
Less than 9th	2.5	16	6.4	26	0.002
9th to 12th	4.5	28	5.2	21	0.556
HS graduate	18.1	114	22.0	89	0.103
Some college	34.0	214	30.1	122	0.244
Bachelor's	25.4	160	22.5	91	0.332
Grad/Prof.	15.3	96	12.4	50	0.218
Declined, unknown, missing	0.2	1	1.5	6	NA
Total	100.0	629	100.1	405	NA
Household Size					
1 person	28.0	176	35.8	145	0.007
2 people	32.6	205	29.1	118	0.263
3 people	14.2	89	17.0	69	0.196
4 people	14.8	93	10.9	44	0.074
5 people	6.2	39	3.7	15	0.081
6 people	3.2	20	2.2	9	0.369
7 or more	1.1	7	0.7	3	0.556
Declined, unknown, missing	0	0	0.5	2	NA
Total	100.1	629	99.9	405	NA
Employment Status					
Employed	75.8	477	75.1	304	0.998
Unemployed	5.7	36	8.6	35	0.063
Not in work force	18.0	113	14.8	60	0.209
Declined, unknown, missing	0.5	3	1.5	6	NA
Total	100.0	629	100.0	405	NA

---

[55] Some totals do not equal precisely 100% due to rounding.

[56] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[57] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 13. Participation and Attrition in Wave 3. [58]

Demographic Category	Profile of beach users participating in Wave 3		Profile of beach users NOT participating in Wave 3		P-value on χ^2 Test [59]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	41.3	208	48.3	256	0.017
Female	58.7	296	50.9	270	0.017
Declined, unknown, missing	0	0	0.8	4	NA [60]
Total	100.0	504	100.0	530	NA
Age					
18 and 19	2.6	13	5.7	30	0.010
20	3.2	16	3.0	16	0.945
21	2.0	10	3.4	18	0.142
22-24	7.3	37	7.9	42	0.635
25-29	13.1	66	13.2	70	0.827
30-34	11.7	59	12.6	67	0.536
35-39	13.7	69	13.8	73	0.835
40-44	10.9	55	10.9	58	0.870
45-49	9.1	46	8.9	47	0.990
50-54	7.1	36	4.9	26	0.159
55-59	6.2	31	1.9	10	0.000
60 and 61	1.0	5	1.7	9	0.302
62-64	1.6	8	1.7	9	0.846
65 and 66	2.0	10	1.7	9	0.776
67-69	1.6	8	0.9	5	0.378
70-74	1.6	8	1.7	9	0.846
75-79	2.4	12	0.8	4	0.039
80-84	0.4	2	0.4	2	0.981
85 and over	0.6	3	0.4	2	0.645
Declined, unknown, missing	2.0	10	4.5	24	NA
Total	100.1	504	100.0	530	NA
Race/Ethnicity					
White, Not Hispanic	60.7	306	49.1	260	0.000
Hispanic	23.0	116	33.0	175	0.000
Black, Not Hispanic	5.8	29	5.1	27	0.672
Native American, Not Hisp.	1.6	8	1.5	8	0.938
Asian, Not Hispanic	5.2	26	6.4	34	0.362
Declined, unknown, missing	3.8	19	4.9	26	NA
Total	100.1	504	100.0	530	NA

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[58] Some totals do not equal precisely 100% due to rounding.

[59] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[60] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 13 (Continued). Participation and Attrition in Wave 3.[61]

Demographic Category	Profile of beach users who participating in Wave 3		Profile of beach users NOT participating in Wave 3		P-Value on χ^2 Test[62]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	2.4	12	6.2	33	0.001
$10,000 to $19,999	8.3	42	11.7	62	0.027
$20,000 to $29,999	10.5	53	10.0	53	0.899
$30,000 to $39,999	9.3	47	7.7	41	0.575
$40,000 to $49,999	9.9	50	7.7	41	0.378
$50,000 to $59,999	8.9	45	7.9	42	0.822
$60,000 to $99,999	20.6	104	14.5	77	0.037
$100,000 to $149,999	11.7	59	7.9	42	0.094
$150,000 or more	5.2	26	7.0	37	0.125
Declined, unknown, missing	13.1	66	19.3	102	NA[63]
Total	99.9	504	99.9	530	NA
Education					
Less than 9th	2.6	13	5.5	29	0.017
9th to 12th	4.6	23	4.9	26	0.770
HS graduate	18.7	94	20.6	109	0.395
Some college	32.5	164	32.5	172	0.940
Bachelor's	24.6	124	24.0	127	0.877
Grad/Prof.	16.9	85	11.5	61	0.160
Declined, unknown, missing	0.2	1	1.1	6	NA
Total	100.1	504	100.1	530	NA
Household Size					
1 person	27.8	140	34.2	181	0.024
2 people	32.5	164	30.0	159	0.401
3 people	14.5	73	16.0	85	0.472
4 people	13.9	70	12.6	67	0.573
5 people	6.6	33	4.0	21	0.064
6 people	3.6	18	2.1	11	0.148
7 or more	1.2	6	0.8	4	0.478
Declined, unknown, missing	0	0	0.4	2	NA
Total	100.1	504	100.1	530	NA
Employment Status					
Employed	76.0	383	75.1	398	0.942
Unemployed	4.8	24	8.9	47	0.008
Not in work force	18.9	95	14.7	78	0.097
Declined, unknown, missing	0.4	2	1.3	7	NA
Total	100.1	504	100.0	530	NA

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[61] Some totals do not equal precisely 100% due to rounding.

[62] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[63] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 14. Participation and Attrition in Wave 4. [64]

Demographic Category	Profile of beach users participating in Wave 4		Profile of beach users NOT participating in Wave 4		P-value on χ^2 Test [65]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	59.0	305	50.5	261	0.007
Female	40.8	211	48.9	253	0.007
Declined, unknown, missing	0.2	1	0.6	3	NA [66]
Total	100.0	517	100.0	517	NA
Age					
18 and 19	2.3	12	6.0	31	0.002
20	2.5	13	3.7	19	0.247
21	2.3	12	3.1	16	0.400
22-24	7.9	41	7.4	38	0.824
25-29	11.8	61	14.5	75	0.142
30-34	11.6	60	12.8	66	0.459
35-39	14.7	76	12.8	66	0.470
40-44	12.0	62	9.9	51	0.347
45-49	9.5	49	8.5	44	0.682
50-54	6.8	35	5.2	27	0.350
55-59	5.8	30	2.1	11	0.003
60 and 61	1.4	7	1.4	7	0.958
62-64	1.9	10	1.4	7	0.499
65 and 66	1.9	10	1.7	9	0.865
67-69	1.2	6	1.4	7	0.741
70-74	1.7	9	1.6	8	0.852
75-79	1.7	9	1.4	7	0.654
80-84	0.4	2	0.4	2	0.978
85 and over	0.6	3	0.4	2	0.677
Declined, unknown, missing	1.9	10	4.6	24	NA
Total	99.9	517	100.2	517	NA
Race/Ethnicity					
White, Not Hispanic	62.7	324	46.8	242	0.000
Hispanic	22.1	114	34.2	177	0.000
Black, Not Hispanic	6.2	32	4.6	24	0.303
Native American, Not Hisp.	1.6	8	1.6	8	0.971
Asian, Not Hispanic	4.1	21	7.5	39	0.014
Declined, unknown, missing	3.5	18	5.2	27	NA
Total	100.2	517	99.9	517	NA

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[64] Some totals do not equal precisely 100% due to rounding.

[65] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[66] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 14 (Continued). Participation and Attrition in Wave 4. [67]

Demographic Category	Profile of beach users participating in Wave 4		Profile of beach users NOT participating in Wave 4		P-Value on χ^2 Test[68]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	2.7	14	6.0	31	0.003
$10,000 to $19,999	7.0	36	13.2	68	0.000
$20,000 to $29,999	11.2	58	9.3	48	0.687
$30,000 to $39,999	9.3	48	7.7	40	0.742
$40,000 to $49,999	11.2	58	6.4	33	0.028
$50,000 to $59,999	9.3	48	7.5	39	0.653
$60,000 to $99,999	21.7	112	13.4	69	0.006
$100,000 to $149,999	10.3	53	9.3	48	0.930
$150,000 or more	6.0	31	6.2	32	0.543
Declined, unknown, missing	11.4	59	21.1	109	NA[69]
Total	100.1	517	100.1	517	NA
Education					
Less than 9th	2.3	12	5.8	30	0.004
9th to 12th	3.7	19	5.8	30	0.100
HS graduate	18.4	95	20.9	108	0.273
Some college	33.9	175	31.1	161	0.411
Bachelor's	24.8	128	23.8	123	0.784
Grad/Prof.	16.8	87	11.4	59	0.015
Declined, unknown, missing	0.2	1	1.2	6	NA
Total	100.1	517	100.0	517	NA
Household Size					
1 person	26.3	136	35.8	185	0.001
2 people	31.7	164	30.8	159	0.769
3 people	15.9	82	14.7	76	0.623
4 people	14.7	76	11.8	61	0.176
5 people	6.8	35	3.7	19	0.026
6 people	3.7	19	1.9	10	0.092
7 or more	1.0	5	1.0	5	0.995
Declined, unknown, missing	0	0	0.4	2	NA
Total	100.1	517	100.1	517	NA
Employment Status					
Employed	75.6	391	75.4	390	0.837
Unemployed	5.2	27	8.5	44	0.033
Not in work force	18.8	97	14.7	76	0.093
Declined, unknown, missing	0.4	2	1.4	7	NA
Total	100.0	517	100.0	517	NA

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[67] Some totals do not equal precisely 100% due to rounding.

[68] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[69] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 15. Participation and Attrition in Wave 5, Part 1, Recruitment Sample. [70]

Demographic Category	Profile of recruitment beach users participating in Wave 5		Profile of recruitment beach users NOT participating in Wave 5		P-value on x^2 Test[71]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	42.3	198	47.0	266	0.120
Female	57.5	269	52.5	297	0.120
Declined, unknown, missing	0.2	1	0.5	3	NA[72]
Total	100.0	468	100.0	566	NA
Age					
18 and 19	2.8	13	5.3	30	0.035
20	3.4	16	2.8	16	0.636
21	2.6	12	2.8	16	0.743
22-24	7.3	34	8.0	45	0.595
25-29	10.3	48	15.6	88	0.008
30-34	11.5	54	12.7	72	0.464
35-39	14.7	69	12.9	73	0.487
40-44	11.5	54	10.4	59	0.669
45-49	10.0	47	8.1	46	0.346
50-54	7.1	33	5.1	29	0.232
55-59	6.4	30	1.9	11	0.000
60 and 61	1.3	6	1.9	8	0.818
62-64	1.9	9	1.4	8	0.557
65 and 66	1.7	8	1.9	11	0.738
67-69	0.9	4	1.6	9	0.271
70-74	1.9	9	1.4	8	0.557
75-79	1.9	9	1.2	7	0.402
80-84	0.4	2	0.4	2	0.869
85 and over	0.4	2	0.5	3	0.791
Declined, unknown, missing	1.9	9	4.4	25	NA
Total	99.9	468	100.3	566	NA
Race/Ethnicity					
White, Not Hispanic	63.0	295	47.9	271	0.000
Hispanic	23.3	109	32.2	182	0.000
Black, Not Hispanic	4.9	23	5.8	33	0.474
Native American, Not Hisp.	1.7	8	1.4	8	0.728
Asian, Not Hispanic	3.6	17	7.6	43	0.005
Declined, unknown, missing	3.4	16	5.1	29	NA
Total	99.9	468	100.0	566	NA

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[70] Some totals do not equal precisely 100% due to rounding.

[71] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[72] NA=Not Applicable. For the x^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 15 (Continued). Participation – Attrition in Wave 5, Part 1, Recruitment Sample. [73]

Demographic Category	Profile of recruitment beach users participating in Wave 5		Profile of recruitment beach users NOT participating in Wave 5		P-Value on χ^2 Test[74]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	12.2	57	6.0	34	0.002
$10,000 to $19,999	2.4	11	12.2	69	0.003
$20,000 to $29,999	7.5	35	9.2	52	0.443
$30,000 to $39,999	11.5	54	8.5	48	0.691
$40,000 to $49,999	8.6	40	6.7	38	0.030
$50,000 to $59,999	11.3	53	8.3	47	0.770
$60,000 to $99,999	8.6	40	15.0	85	0.091
$100,000 to $149,999	20.5	96	8.8	50	0.516
$150,000 or more	10.9	51	5.7	32	0.773
Declined, unknown, missing	6.6	31	19.6	111	NA[75]
Total	100.1	468	100.0	566	NA
Education					
Less than 9th	2.1	10	5.7	32	0.004
9th to 12th	3.6	17	5.7	32	0.121
HS graduate	18.8	88	20.3	115	0.498
Some college	31.8	149	33.0	187	0.613
Bachelor's	25.9	121	23.0	130	0.317
Grad/Prof.	17.5	82	11.3	64	0.005
Declined, unknown, missing	0.2	1	1.1	6	NA
Total	99.9	468	100.1	566	NA
Household Size					
1 person	26.7	125	34.6	196	0.006
2 people	31.4	147	31.1	176	0.944
3 people	15.2	71	15.4	87	0.910
4 people	16.2	76	10.8	61	0.011
5 people	6.4	30	4.2	24	0.122
6 people	3.2	15	2.5	14	0.484
7 or more	0.9	4	1.1	6	0.733
Declined, unknown, missing	0	0	0.4	2	NA
Total	100.0	468	100.1	566	NA
Employment Status					
Employed	76.9	360	74.4	421	0.402
Unemployed	5.1	24	8.3	47	0.043
Not in work force	17.3	81	16.3	92	0.673
Declined, unknown, missing	0.6	3	1.1	6	NA
Total	99.9	468	100.1	566	NA

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[73] Some totals do not equal precisely 100% due to rounding.

[74] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[75] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 16. Participation and Attrition in Wave 5, Part 2, Replenishment Sample. [76]

Demographic Category	Profile of replenishment beach users participating in Wave 5		Profile of replenishment beach users NOT participating in Wave 5		P-value on χ^2 Test[77]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	47.1	120	47.8	97	0.877
Female	52.9	135	52.2	106	0.877
Declined, unknown, missing	0	0	0	0	NA[78]
Total	100.0	255	100.0	203	NA
Age					
18 and 19	8.9	18	3.9	10	0.028
20	1.5	3	0.8	2	0.478
21	3.9	8	2.0	5	0.205
22-24	5.9	12	8.2	21	0.339
25-29	13.8	28	11.8	30	0.517
30-34	10.8	22	10.6	27	0.932
35-39	9.4	19	18.4	47	0.006
40-44	14.3	29	14.9	38	0.853
45-49	9.9	20	8.2	21	0.547
50-54	7.4	15	7.1	18	0.892
55-59	4.4	9	5.5	14	0.607
60 and 61	1.5	3	1.6	4	0.937
62-64	0.5	1	0.8	2	0.701
65 and 66	2.0	4	1.2	3	0.491
67-69	1.5	3	2.0	5	0.695
70-74	2.0	4	0.8	2	0.267
75-79	1.5	3	1.2	3	0.778
80-84	0.5	1	1.2	3	0.435
85 and over	0.5	1	0	0	0.262
Declined, unknown, missing	0	0	0	0	NA
Total	100.2	255	100.2	203	NA
Race/Ethnicity					
White, Not Hispanic	54.9	140	54.7	111	0.312
Hispanic	25.9	66	20.2	41	0.349
Black, Not Hispanic	5.9	15	7.4	15	0.369
Native American, Not Hisp.	1.2	3	0.5	1	0.484
Asian, Not Hispanic	9.4	24	6.4	13	0.363
Declined, unknown, missing	2.8	7	10.8	22	NA
Total	100.1	255	100.0	203	NA

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[76] Some totals do not equal precisely 100% due to rounding.

[77] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[78] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 16 (Continued). Participation – Attrition in Wave 5, Part 2, Replenishment Sample. [79]

Demographic Category	Profile of replenishment beach users participating in Wave 5		Profile of replenishment beach users NOT participating in Wave 5		P-Value on χ^2 Test[80]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	2.8	7	5.9	12	0.051
$10,000 to $19,999	9.8	25	10.3	21	0.560
$20,000 to $29,999	8.2	21	6.4	13	0.668
$30,000 to $39,999	9.0	23	8.4	17	0.912
$40,000 to $49,999	5.9	15	5.4	11	0.947
$50,000 to $59,999	11.8	30	8.9	18	0.528
$60,000 to $99,999	16.9	40	13.3	27	0.556
$100,000 to $149,999	9.0	23	8.4	17	0.912
$150,000 or more	10.6	27	8.4	17	0.662
Declined, unknown, missing	16.1	41	24.6	50	NA[81]
Total	100.1	255	100.0	203	NA
Education					
Less than 9th	3.5	9	6.4	13	0.132
9th to 12th	3.9	10	3.5	7	0.840
HS graduate	19.2	49	19.2	39	0.872
Some college	32.2	82	25.1	51	0.149
Bachelor's	26.7	68	32.5	66	0.112
Grad/Prof.	14.1	32	9.9	20	0.206
Declined, unknown, missing	0.4	1	3.5	7	NA
Total	100.0	255	100.0	203	NA
Household Size					
1 person	18.8	48	25.6	52	0.084
2 people	23.5	60	32.5	66	0.032
3 people	16.9	43	13.8	28	0.330
4 people	14.9	38	6.9	14	0.006
5 people	5.9	15	1.5	3	0.015
6 people	2.0	5	1.5	3	0.682
7 or more	0.8	2	2.0	4	0.274
Declined, unknown, missing	17.3	44	16.3	33	NA
Total	100.1	255	100.1	203	NA
Employment Status					
Employed	76.5	195	70.9	144	0.331
Unemployed	5.9	15	12.3	25	0.012
Not in work force	16.9	43	13.8	28	0.422
Declined, unknown, missing	0.8	2	3.0	6	NA
Total	100.1	255	100.0	203	NA

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[79] Some totals do not equal precisely 100% due to rounding.

[80] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[81] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 17. Participation and Attrition in Wave 6, Part 1, Recruitment Sample. [82]

Demographic Category	Profile of recruitment beach users participating in Wave 6		Profile of recruitment beach users NOT participating in Wave 6		P-value on χ^2 Test [83]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	59.5	269	51.0	297	0.009
Female	40.5	183	48.3	281	0.009
Declined, unknown, missing	0	0	0.7	4	NA[84]
Total	100.0	452	100.0	582	NA
Age					
18 and 19	3.1	14	5.0	29	0.116
20	2.7	12	3.4	20	0.438
21	2.2	10	3.1	18	0.359
22-24	7.3	33	7.9	46	0.651
25-29	10.4	47	15.3	89	0.015
30-34	12.2	55	12.2	71	0.894
35-39	13.9	63	13.6	79	0.966
40-44	12.2	55	10.0	58	0.309
45-49	8.9	40	9.1	53	0.808
50-54	7.1	32	5.2	30	0.225
55-59	6.6	30	1.9	11	0.000
60 and 61	1.3	6	1.4	8	0.919
62-64	2.0	9	1.4	8	0.464
65 and 66	1.8	8	1.9	11	0.853
67-69	1.1	5	1.4	8	0.675
70-74	2.0	9	1.4	8	0.464
75-79	2.0	9	1.2	7	0.328
80-84	0.4	2	0.3	2	0.815
85 and over	0.7	3	0.3	2	0.476
Declined, unknown, missing	2.2	10	4.1	24	NA[85]
Total	100.1	452	100.1	582	NA
Race/Ethnicity					
White, Not Hispanic	63.1	285	48.3	281	0.000
Hispanic	22.8	103	32.3	188	0.000
Black, Not Hispanic	4.9	22	5.8	34	0.485
Native American, Not Hisp.	1.3	6	1.7	10	0.610
Asian, Not Hispanic	3.8	17	7.4	43	0.013
Declined, unknown, missing	4.2	19	4.5	26	NA
Total	100.1	452	100.0	582	NA

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[82] Some totals do not equal precisely 100% due to rounding.

[83] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[84] NA=Not Applicable. For the χ^2 testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

[85] NA=Not Applicable. For the test that the proportion of 0s (zeroes) and 1s (ones) in a demographic category is the same for beach users and non-users, we want to work only with known values. So we drop unknown values for testing. Thus, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 17 (Continued). Participation – Attrition in Wave 6, Part 1, Recruitment Sample. [86]

Demographic Category	Profile of recruitment beach users participating in Wave 6		Profile of recruitment beach users NOT participating in Wave 6		P-Value on $?^2$ Test [87]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	2.2	10	6.0	35	0.000
$10,000 to $19,999	7.3	33	12.2	71	0.001
$20,000 to $29,999	11.7	53	9.1	53	0.401
$30,000 to $39,999	9.3	42	7.9	46	0.760
$40,000 to $49,999	10.6	48	7.4	43	0.185
$50,000 to $59,999	8.9	40	8.1	47	0.967
$60,000 to $99,999	21.0	95	14.8	86	0.056
$100,000 to $149,999	10.8	49	8.9	52	0.618
$150,000 or more	6.6	30	5.7	33	0.813
Declined, unknown, missing	11.5	52	19.9	116	NA [88]
Total	99.9	452	100.0	582	NA
Education					
Less than 9th	2.2	10	5.5	32	0.007
9th to 12th	4.4	20	5.0	29	0.654
HS graduate	17.7	80	21.1	123	0.149
Some college	33.4	151	31.8	185	0.644
Bachelor's	24.6	111	24.1	140	0.910
Grad/Prof.	17.5	79	11.5	67	0.007
Declined, unknown, missing	0.2	1	1.0	6	NA
Total	100.0	452	100.0	582	NA
Household Size					
1 person	27.2	123	34.0	198	0.017
2 people	31.9	144	30.8	179	0.723
3 people	13.3	60	16.8	98	0.109
4 people	16.8	76	10.5	61	0.003
5 people	6.6	30	4.1	24	0.074
6 people	3.1	14	2.6	15	0.622
7 or more	1.1	5	0.9	5	0.691
Declined, unknown, missing	0	0	0.3	2	NA
Total	100.0	452	100.0	582	NA
Employment Status					
Employed	75.9	343	75.3	438	0.986
Unemployed	5.5	25	7.9	46	0.126
Not in work force	18.1	82	15.6	91	0.309
Declined, unknown, missing	0.4	2	1.2	7	NA
Total	99.9	452	100.0	582	NA

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[86] Some totals do not equal precisely 100% due to rounding.

[87] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[88] NA=Not Applicable. For the $?^2$ testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 18. Participation and Attrition in Wave 6, Part 2, Replenishment Sample. [89]

Demographic Category	Profile of replenishment beach users participating in Wave 6		Profile of replenishment beach users NOT participating in Wave 6		P-value on $?^2$ Test[90]
	(Percentage)	(Number)	(Percentage)	(Number)	
Gender					
Male	46.4	121	48.7	96	0.615
Female	53.6	140	51.3	101	0.615
Declined, unknown, missing	0	0	0	0	NA[91]
Total	100.0	261	100.0	197	NA
Age					
18 and 19	4.6	12	8.1	16	0.119
20	0.8	2	1.5	3	0.441
21	2.3	6	3.6	7	0.424
22-24	8.1	21	6.1	12	0.423
25-29	12.6	33	12.7	25	0.988
30-34	10.3	27	11.2	22	0.778
35-39	17.2	45	10.7	21	0.047
40-44	13.8	36	15.7	31	0.560
45-49	8.8	23	10.1	18	0.904
50-54	8.1	21	6.1	12	0.423
55-59	5.8	15	4.1	8	0.413
60 and 61	1.5	4	1.5	3	0.993
62-64	0.4	1	1.0	2	0.406
65 and 66	1.2	3	2.0	4	0.447
67-69	1.9	5	1.5	3	0.751
70-74	0.8	2	2.0	4	0.239
75-79	0.8	2	2.0	4	0.239
80-84	1.2	3	0.5	1	0.465
85 and over	0	0	0.5	1	0.249
Declined, unknown, missing	0	0	0	0	NA
Total	100.2	261	99.9	197	NA
Race/Ethnicity					
White, Not Hispanic	55.2	144	54.3	107	0.652
Hispanic	24.1	63	22.3	44	0.884
Black, Not Hispanic	6.9	18	6.1	12	0.843
Native American, Not Hisp.	1.5	4	0	0	0.089
Asian, Not Hispanic	8.1	21	8.1	16	0.845
Declined, unknown, missing	4.2	11	9.1	18	NA
Total	100.0	261	99.9	197	NA

---

[89] Some totals do not equal precisely 100% due to rounding.

[90] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[91] NA=Not Applicable. For the $?^2$ testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

TABLE 18 (Continued). Participation – Attrition in Wave 6, Part 2, Replenishment Sample. [92]

Demographic Category	Profile of replenishment beach users participating in Wave 6		Profile of replenishment beach users NOT participating in Wave 6		P-Value on ?² Test[93]
	(Percentage)	(Number)	(Percentage)	(Number)	
Household Income					
$0 to $9,999	3.1	8	5.6	11	0.092
$10,000 to $19,999	10.3	27	9.6	19	0.790
$20,000 to $29,999	9.6	25	4.6	9	0.103
$30,000 to $39,999	9.6	25	7.6	15	0.783
$40,000 to $49,999	6.1	16	5.1	10	0.910
$50,000 to $59,999	10.7	28	10.2	20	0.743
$60,000 to $99,999	16.1	42	14.2	28	0.926
$100,000 to $149,999	8.4	22	9.1	18	0.452
$150,000 or more	11.1	29	7.6	15	0.433
Declined, unknown, missing	14.9	39	26.4	52	NA[94]
Total	99.9	261	100.0	197	NA
Education					
Less than 9th	3.8	10	6.1	12	0.230
9th to 12th	3.8	10	3.6	7	0.929
HS graduate	19.5	51	18.8	37	0.970
Some college	31.4	82	25.9	51	0.281
Bachelor's	28.7	75	30.0	59	0.613
Grad/Prof.	12.3	32	12.2	24	0.918
Declined, unknown, missing	0.4	1	3.6	7	NA
Total	99.9	261	100.2	197	NA
Household Size					
1 person	20.7	54	23.4	46	0.314
2 people	23.8	62	32.5	64	0.012
3 people	17.6	46	12.7	25	0.217
4 people	14.6	38	7.1	14	0.020
5 people	5.0	13	2.5	5	0.219
6 people	2.3	6	1.0	2	0.332

---

[92] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

[93] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in this wave. The null hypothesis is that there is no difference between the two groups.

[94] NA=Not Applicable. For the ?² testing, we drop unknown values and work only with known values. So, the test results reported in this column use proportions that differ slightly from those in columns to the left, which include unknown values.

7 or more	1.2	3	1.5	3	0.679
Declined, unknown, missing	14.9	39	19.3	38	NA
Total	100.1	261	100.0	197	NA
Employment Status					
Employed	77.4	202	69.5	137	0.128
Unemployed	5.4	14	13.2	26	0.003
Not in work force	16.5	43	14.2	28	0.576
Declined, unknown, missing	0.8	2	3.1	6	NA
Total	100.1	261	100.0	197	NA

Figure 13. Wave 1 Participation and Attrition (I)
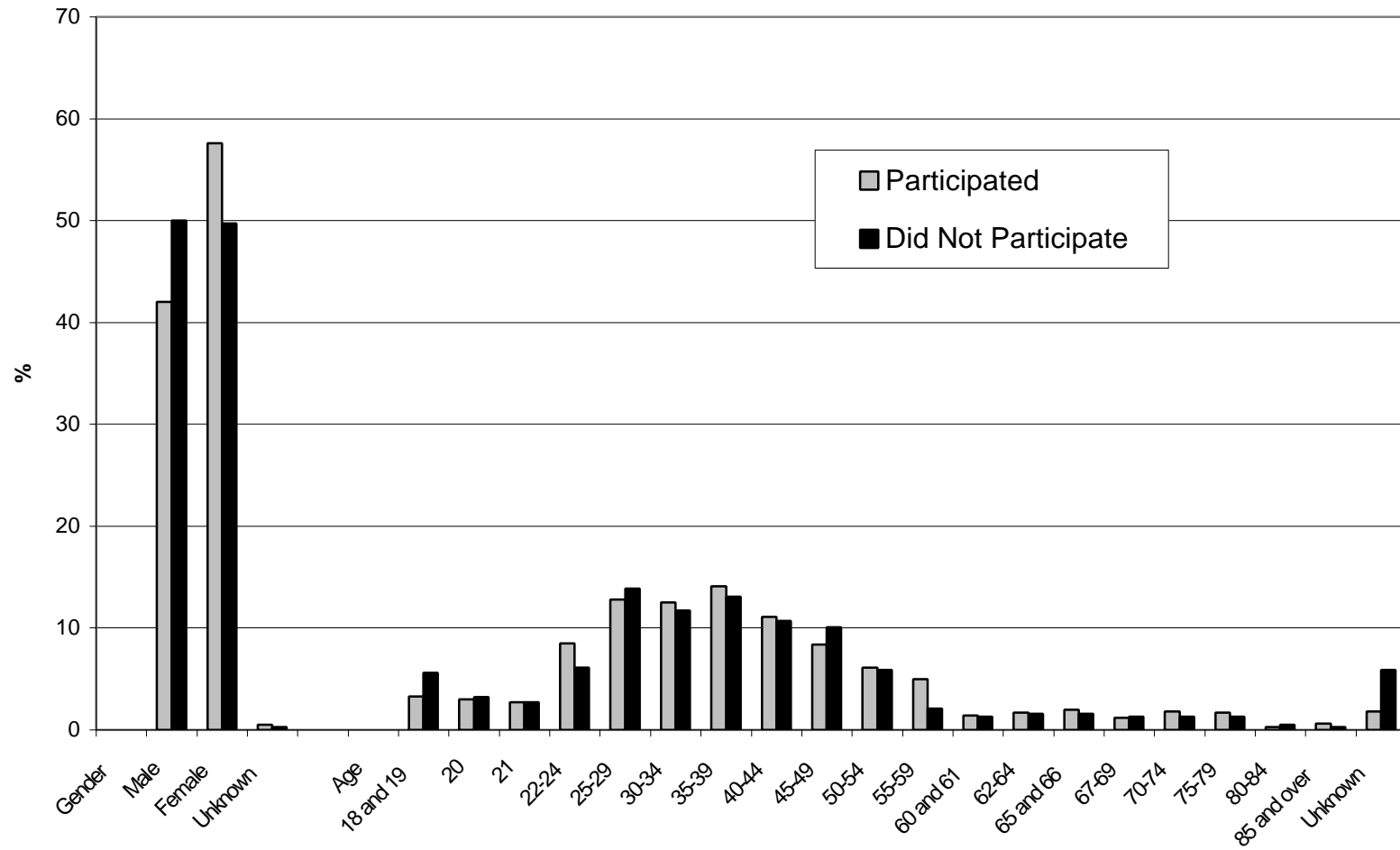
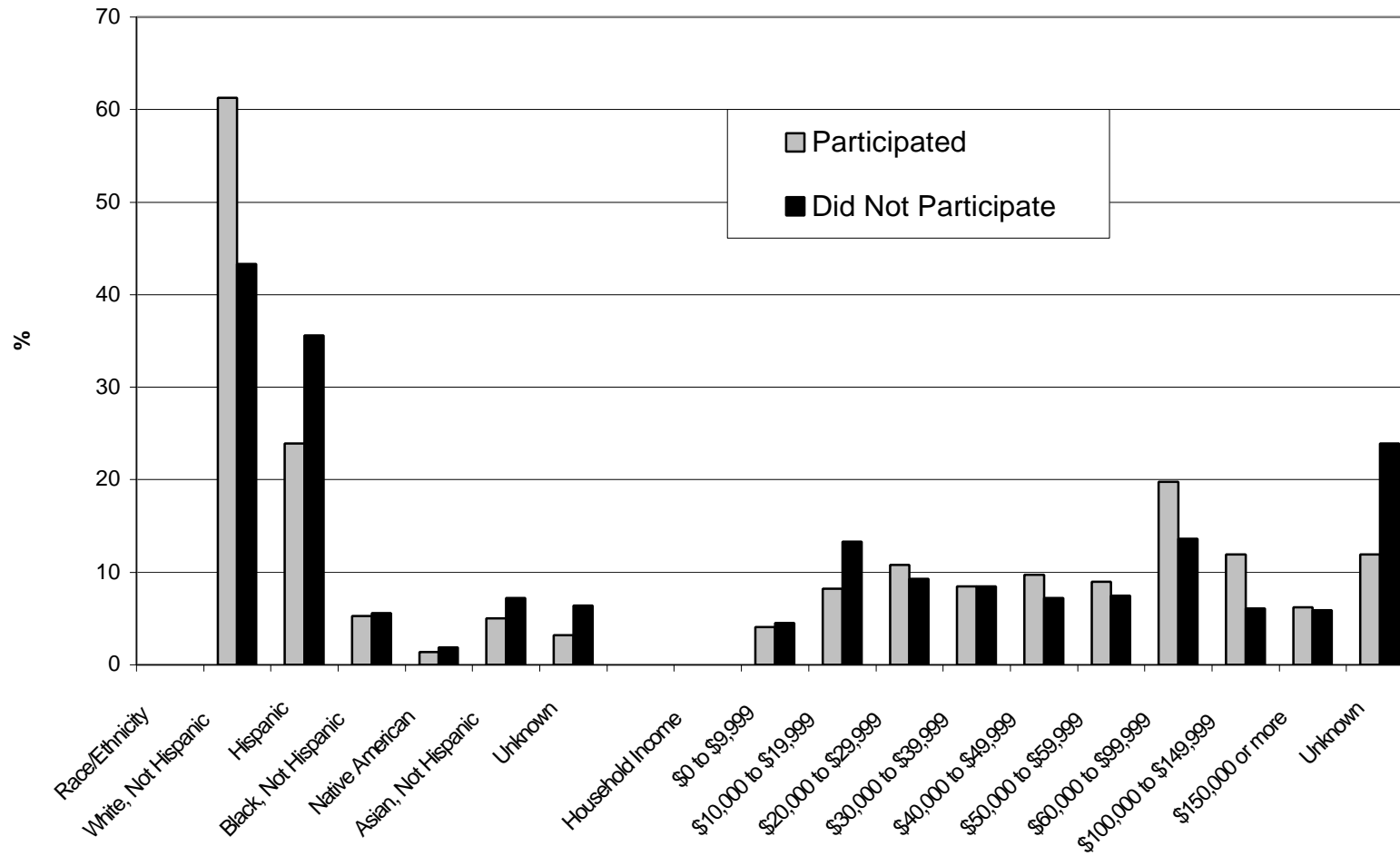# Figure 14. Wave 1 Participation and Attrition (II)

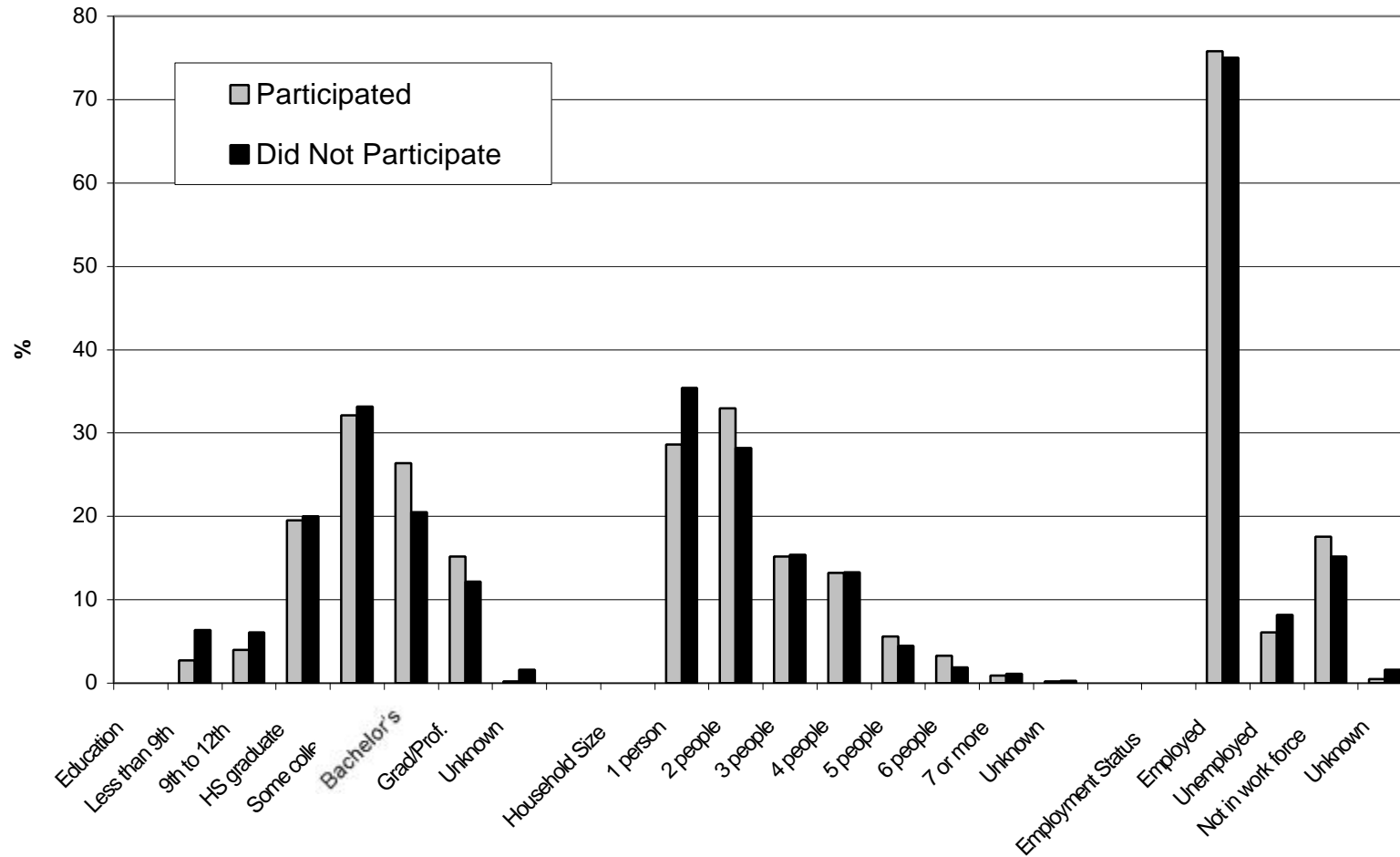# Figure 15. Wave 1 Participation and Attrition (III)

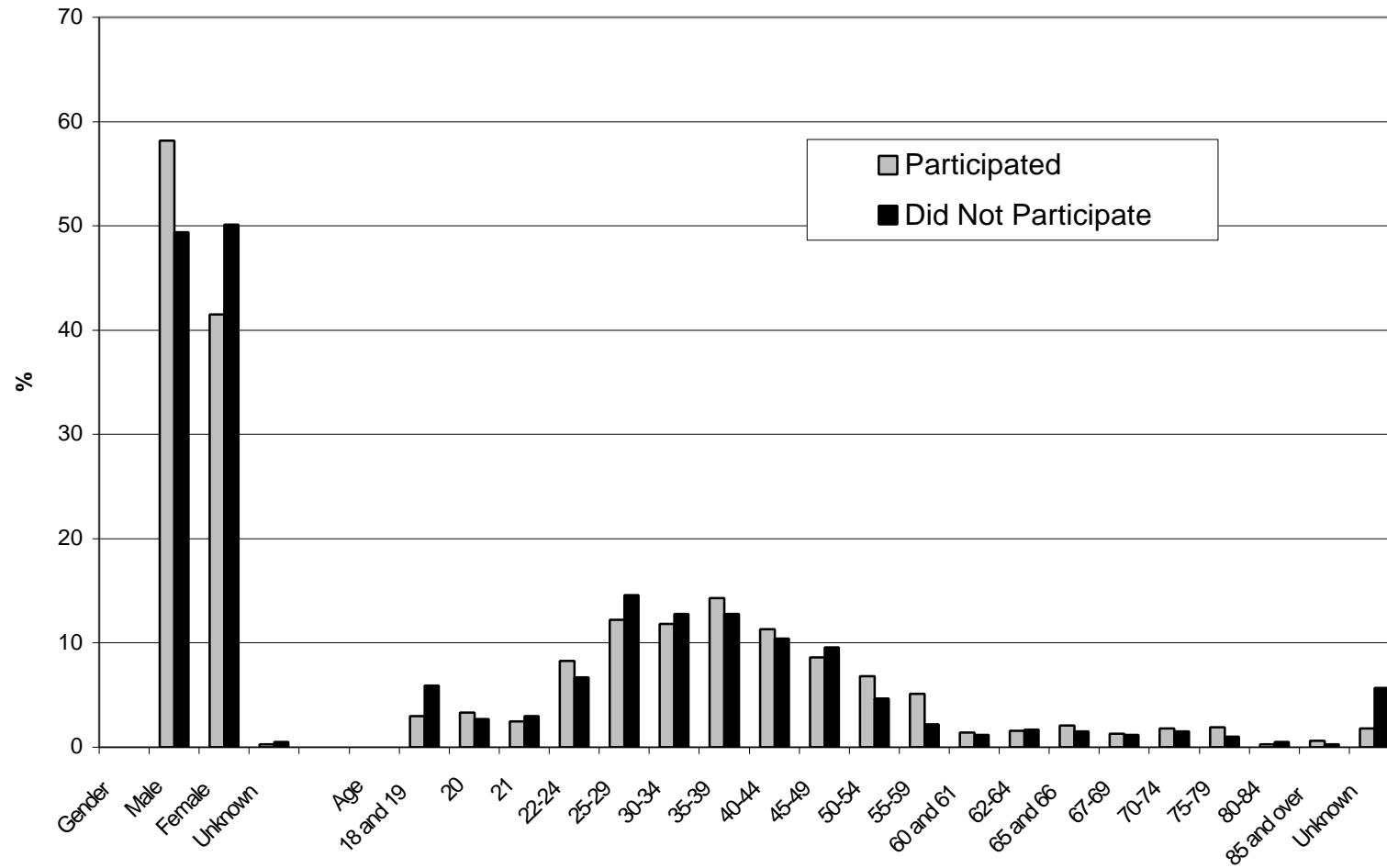# Figure 16. Wave 2 Participation and Attrition (I)

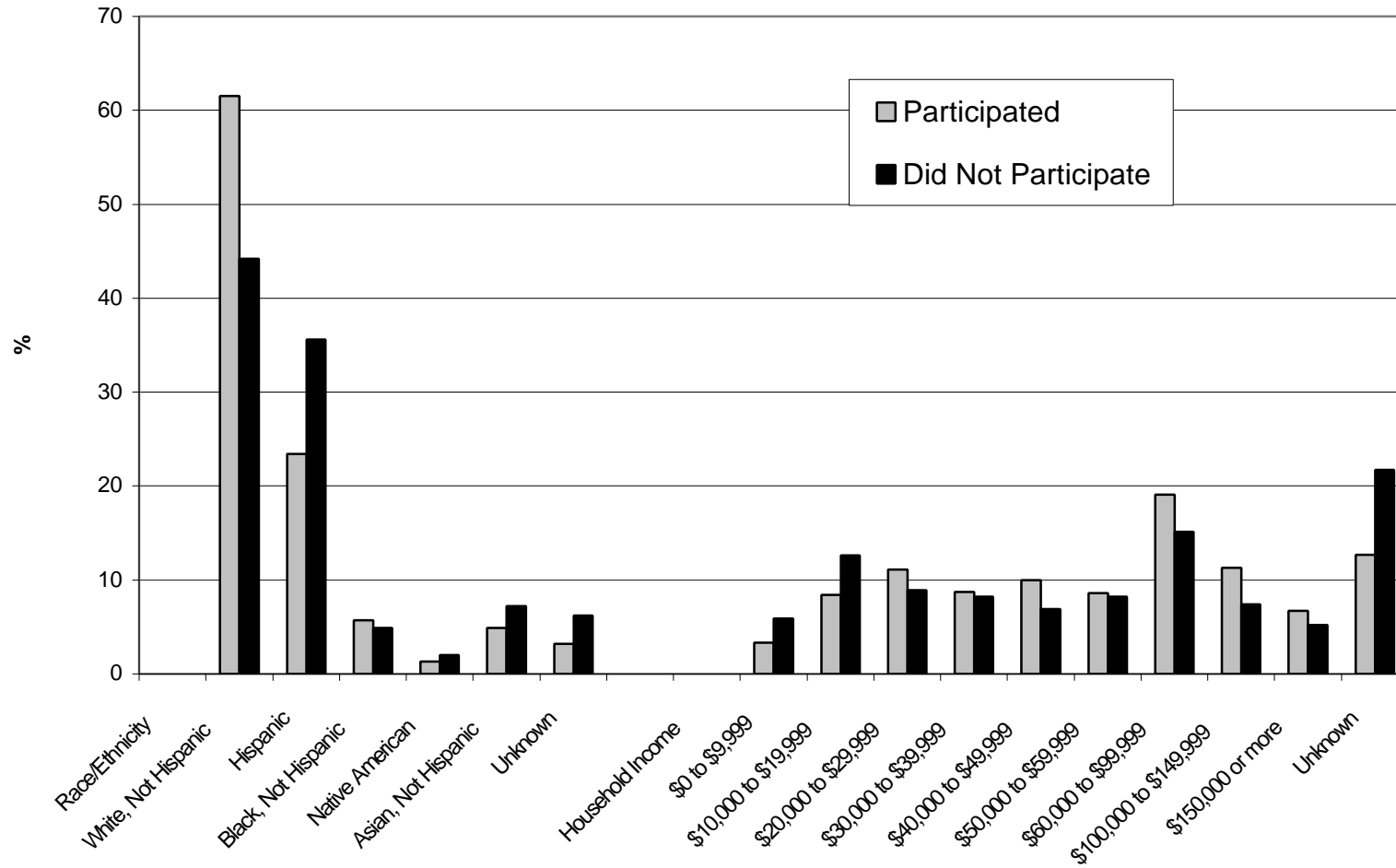# Figure 17. Wave 2 Participaton and Attrition (II)

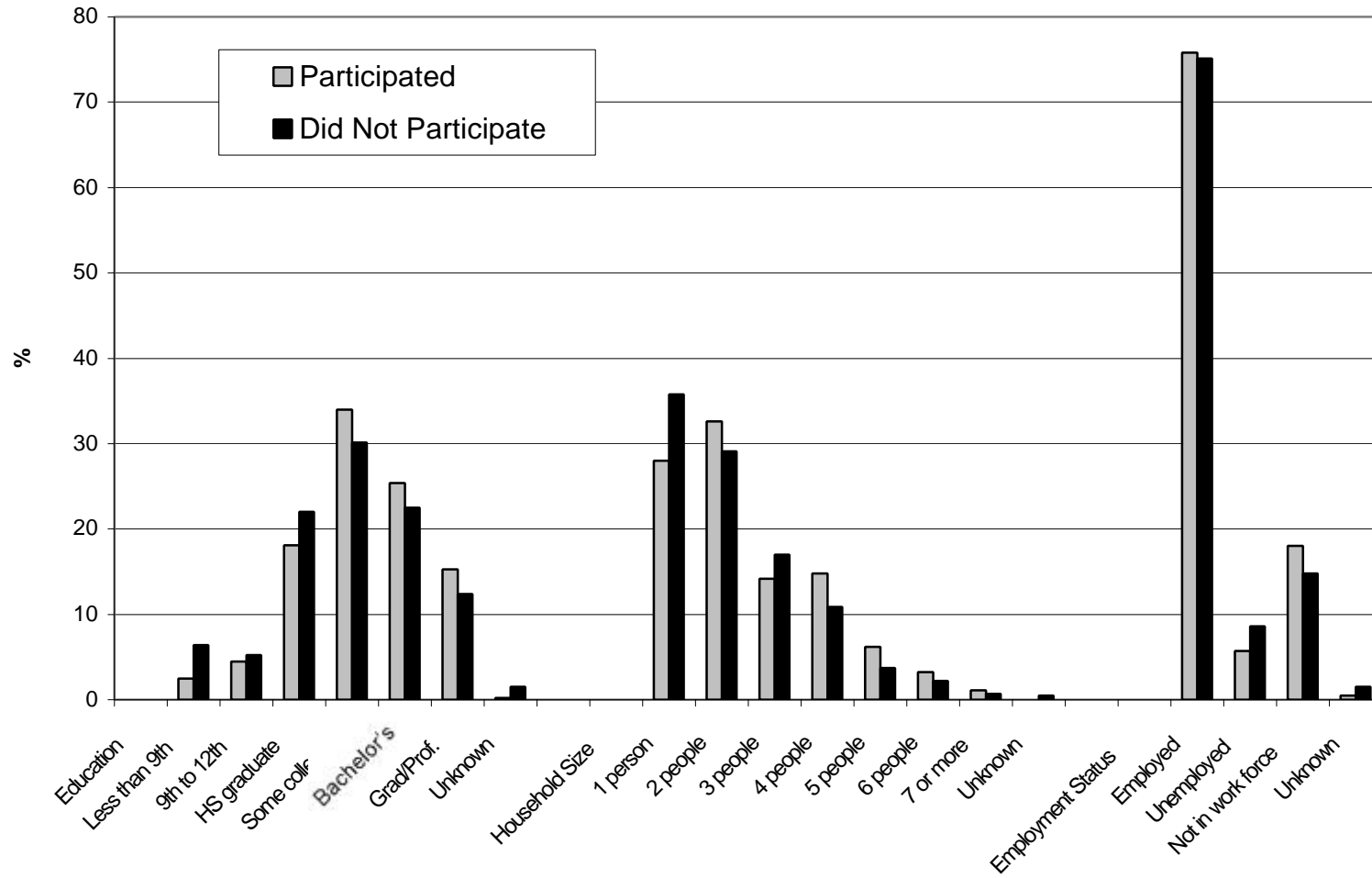# Figure 18. Wave 2 Participation and Attrition (III)

Figure 19. Wave 3 Participation and Attrition (I)

Figure 20. Wave 3 Participation and Attrition (II)

Figure 21. Wave 3 Participation and Attrition (III)

Legend:
- □ Participated
- ■ Did Not Participate

X-axis categories: Education, Less than 9th, 9th to 12th, HS graduate, Some college, Bachelor's, Grad/Prof., Unknown, Household Size, 1 person, 2 people, 3 people, 4 people, 5 people, 6 people, 7 or more, Unknown, Employment Status, Employed, Unemployed, Not in work force, Unknown
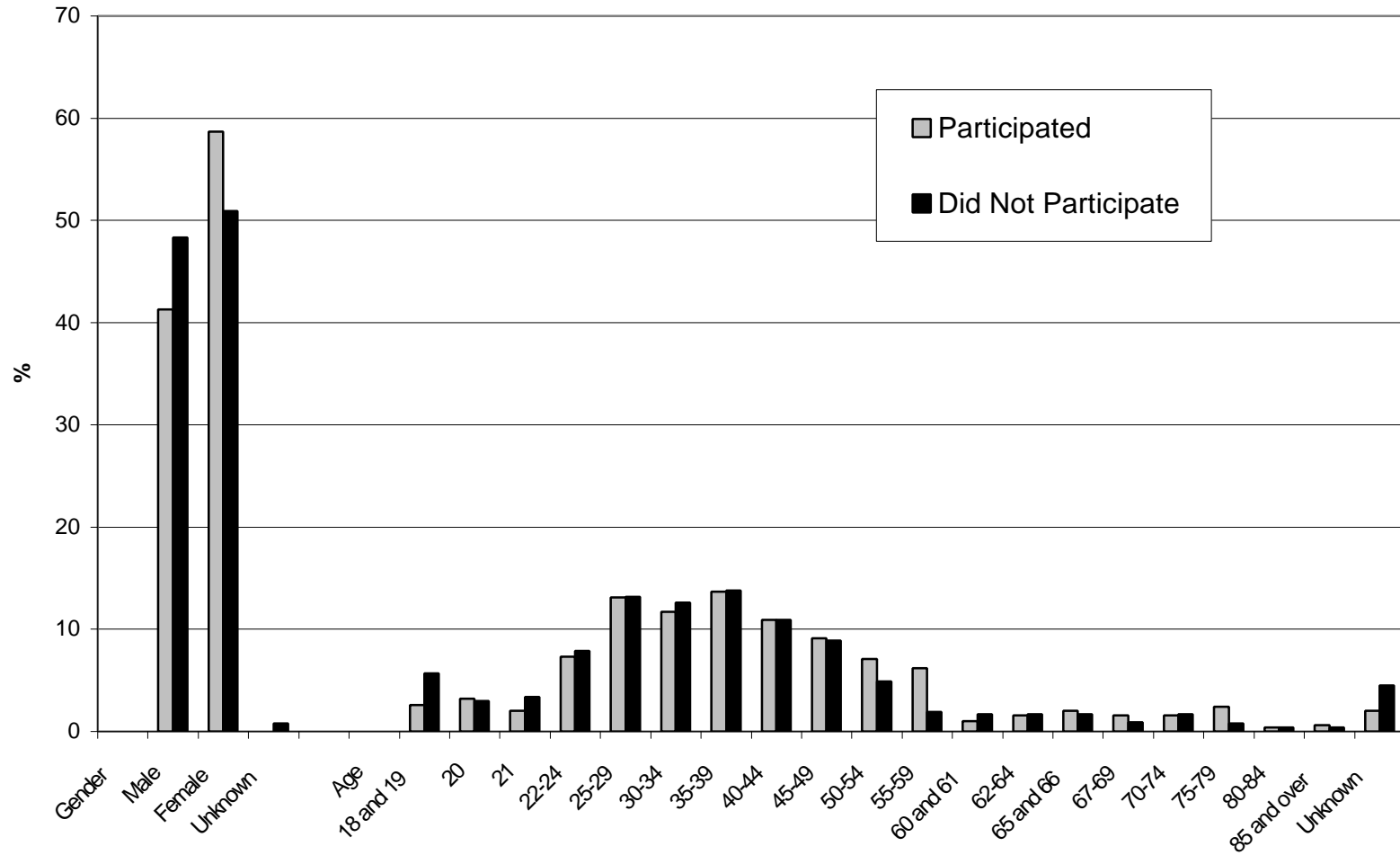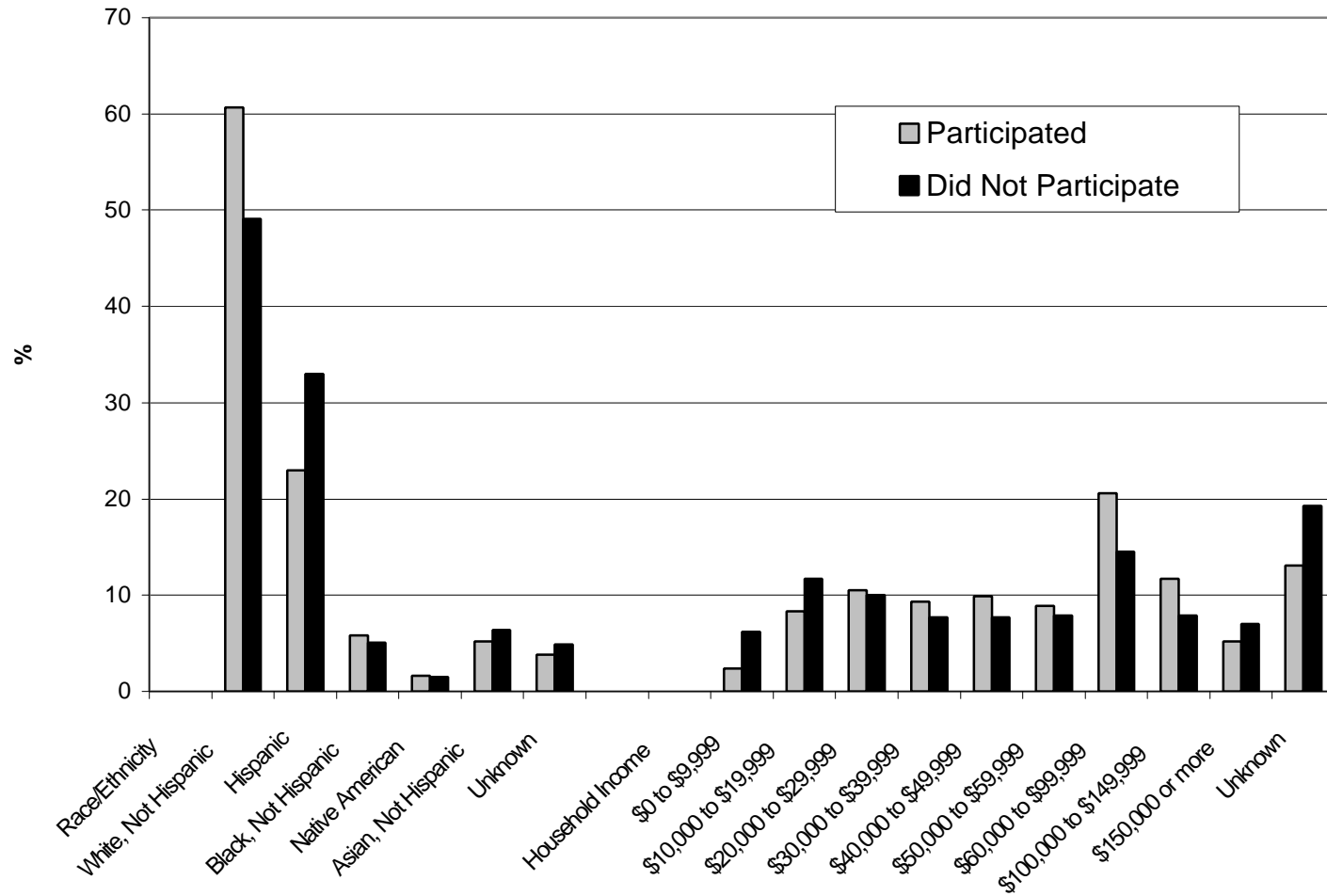
Y-axis: % (0 to 80)
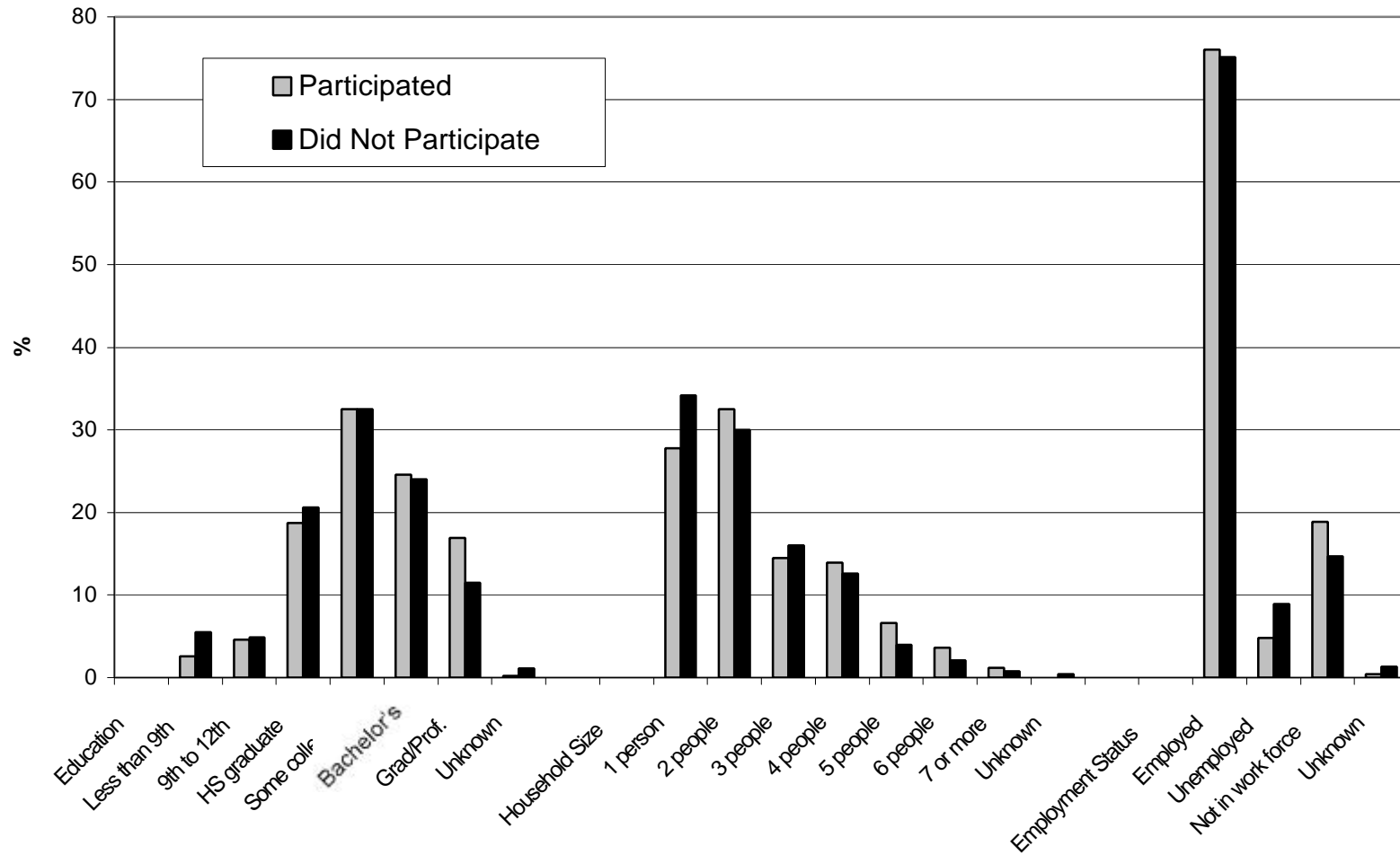
Figure 22. Wave 4 Participation and Attrition (I)
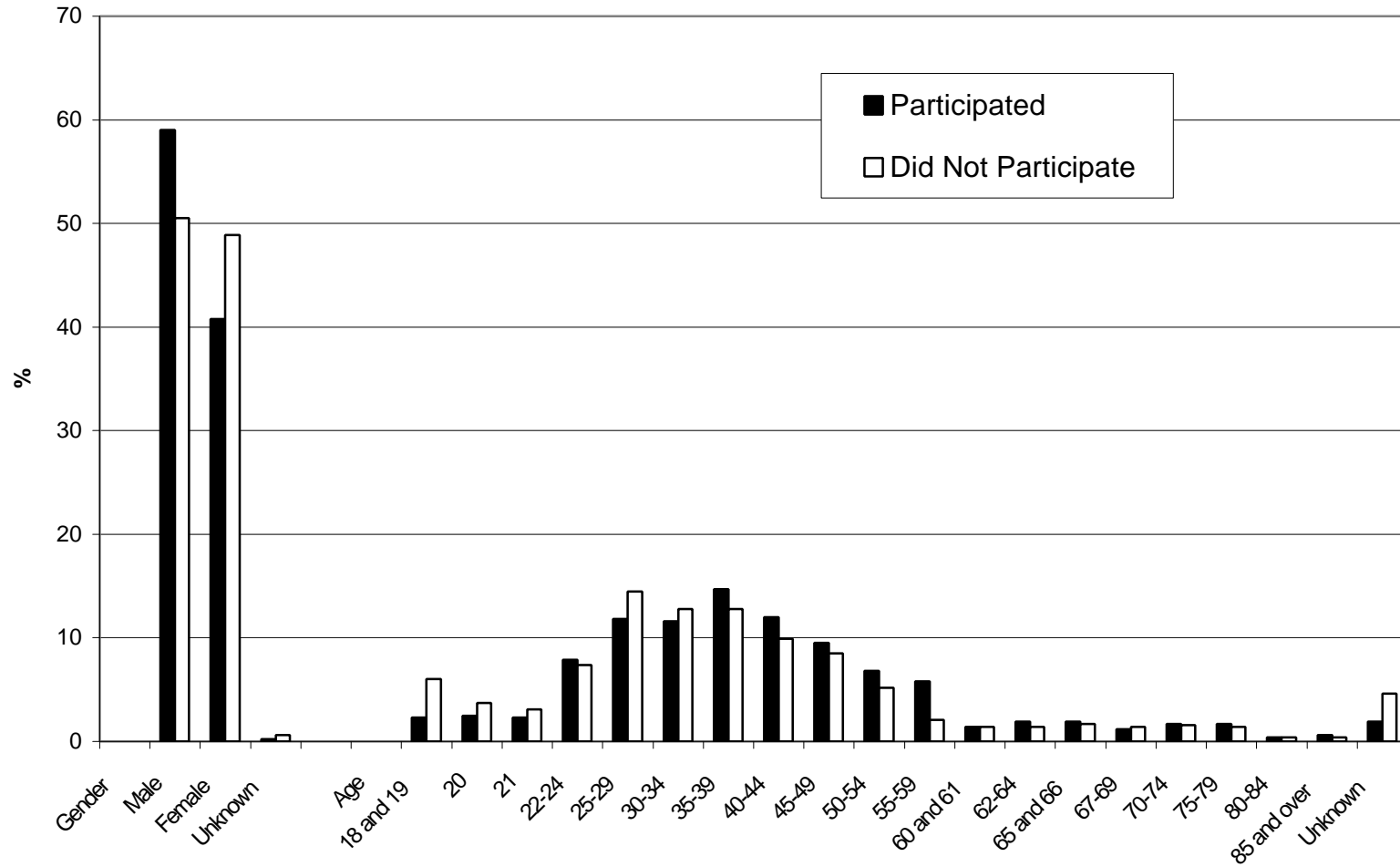
Figure 23. Wave 4 Participation and Attrition (II)
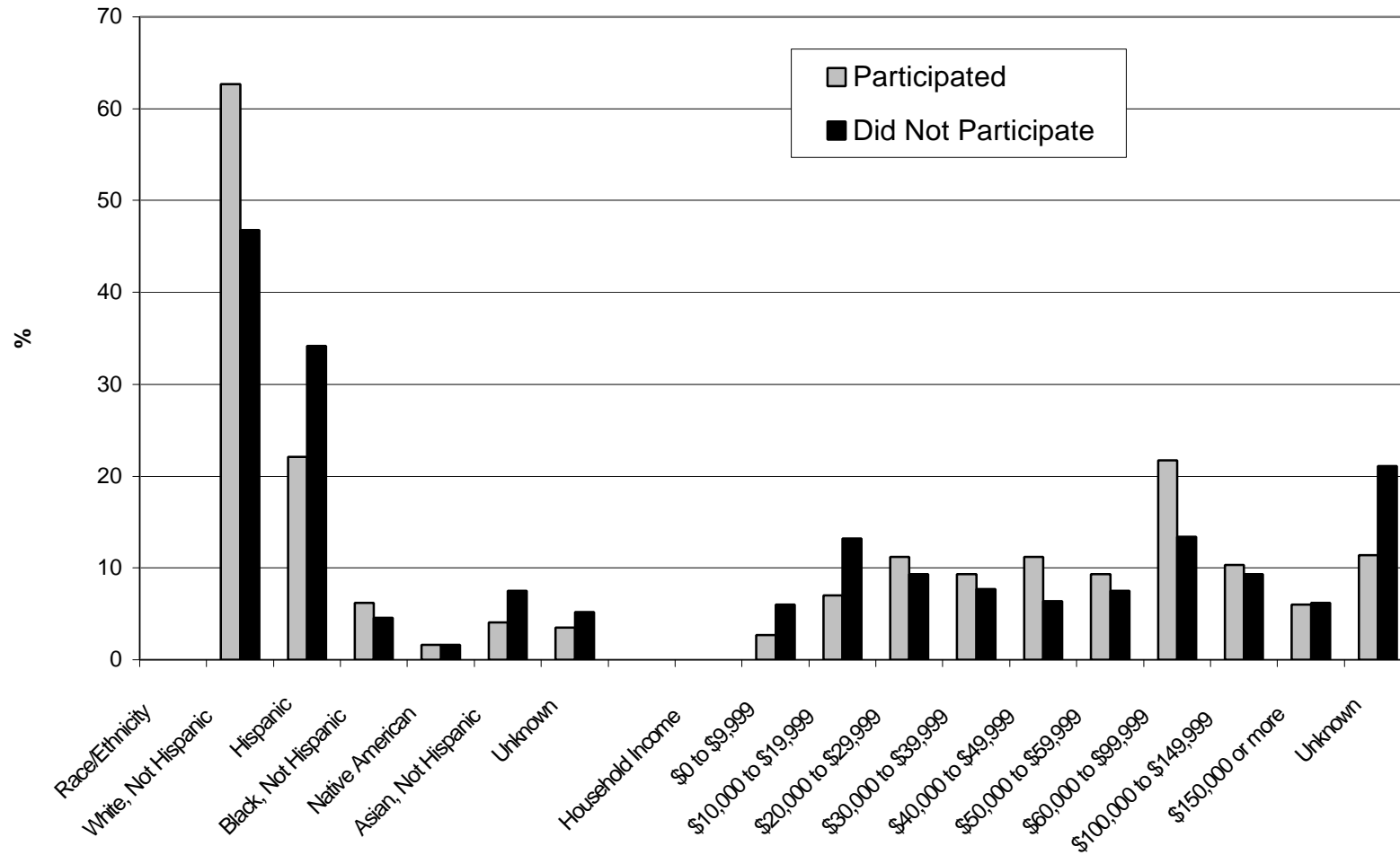
Figure 24. Wave 4 Participaton and Attrition (III)

Legend:
- ☐ Participated
- ■ Did Not Participate

Y-axis: % (0 to 80)

X-axis categories: Education, Less than 9th, 9th to 12th, HS graduate, Some colle, Bachelor's, Grad/Prof., Unknown, Household Size, 1 person, 2 people, 3 people, 4 people, 5 people, 6 people, 7 or more, Unknown, Employment Status, Employed, Unemployed, Not in work force, Unknown

Figure 25. Wave 5 Participation and Attrition from Recruitment (I)

Figure 26. Wave 5 Participation and Attrition from Recruitment (II)

Figure 27. Wave 5 Participation and Attrition from Recruitment (III)

Figure 28. Wave 5 Participation and Attrition from Replenishment (I)

Figure 29. Wave 5 Participation and Attrition from Replenishment (II)

Figure 30. Wave 5 Participation and Attrition from Replenishment (III)

Figure 31. Wave 6 Participation and Attrition from Recruitment (I)

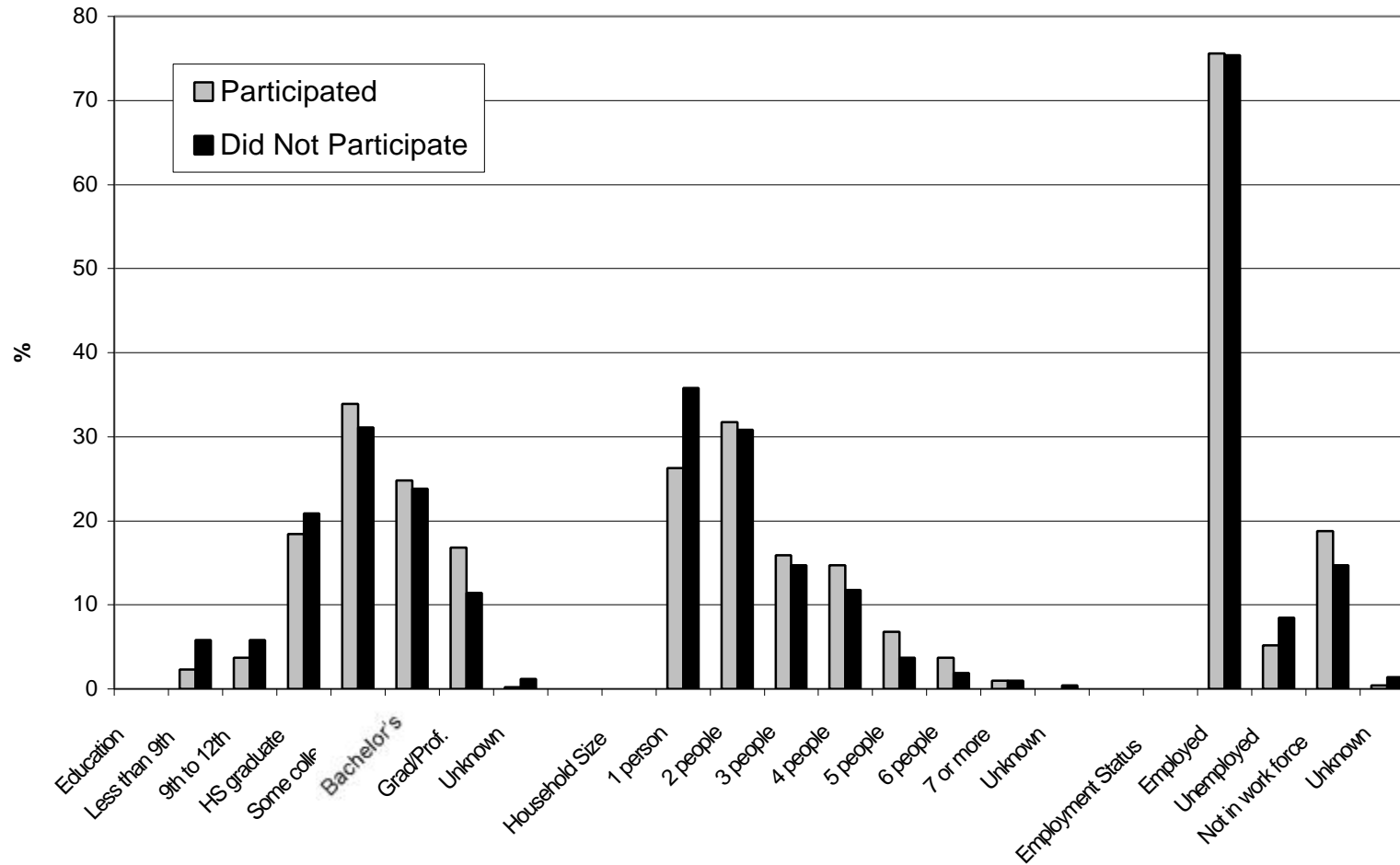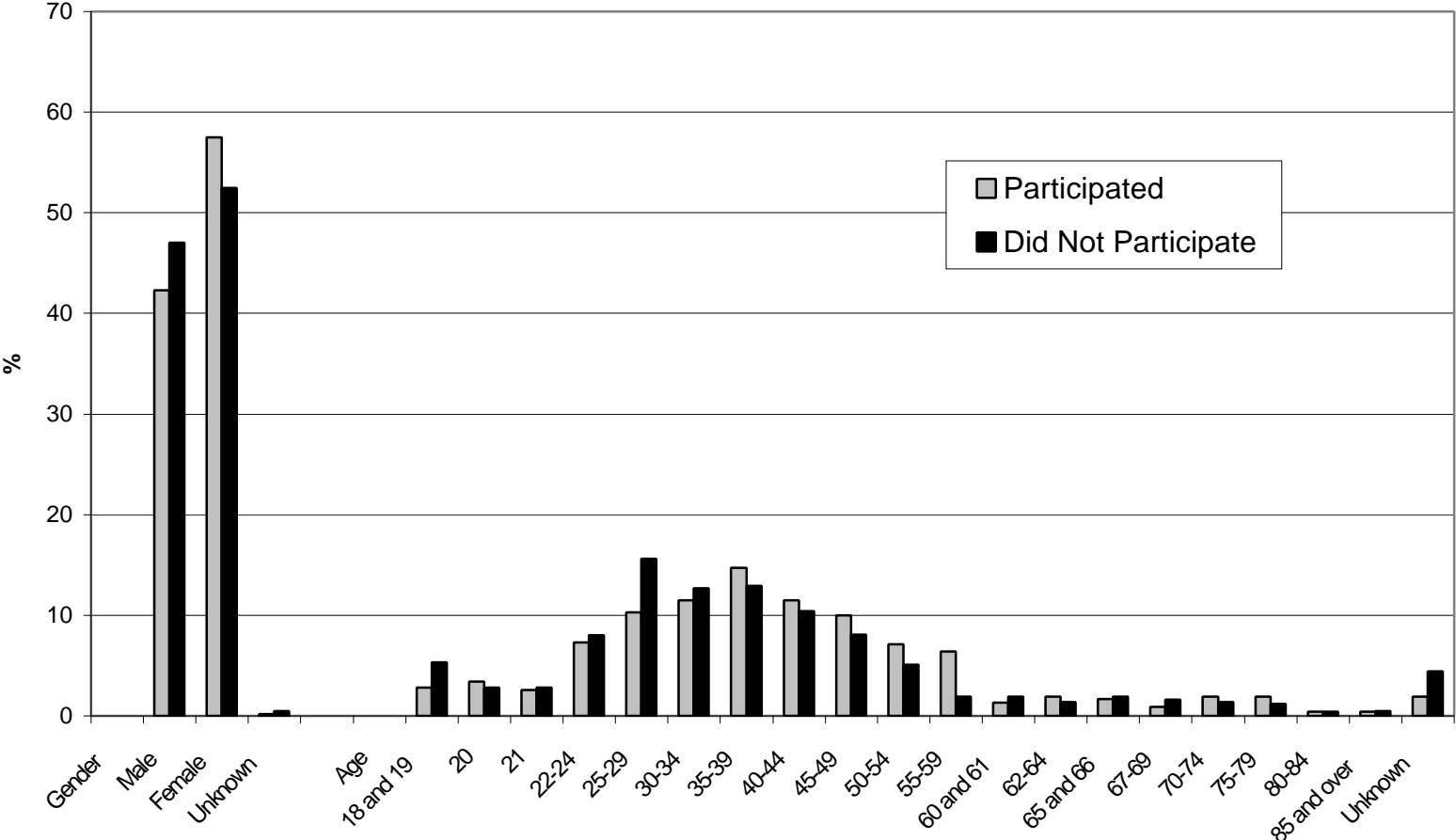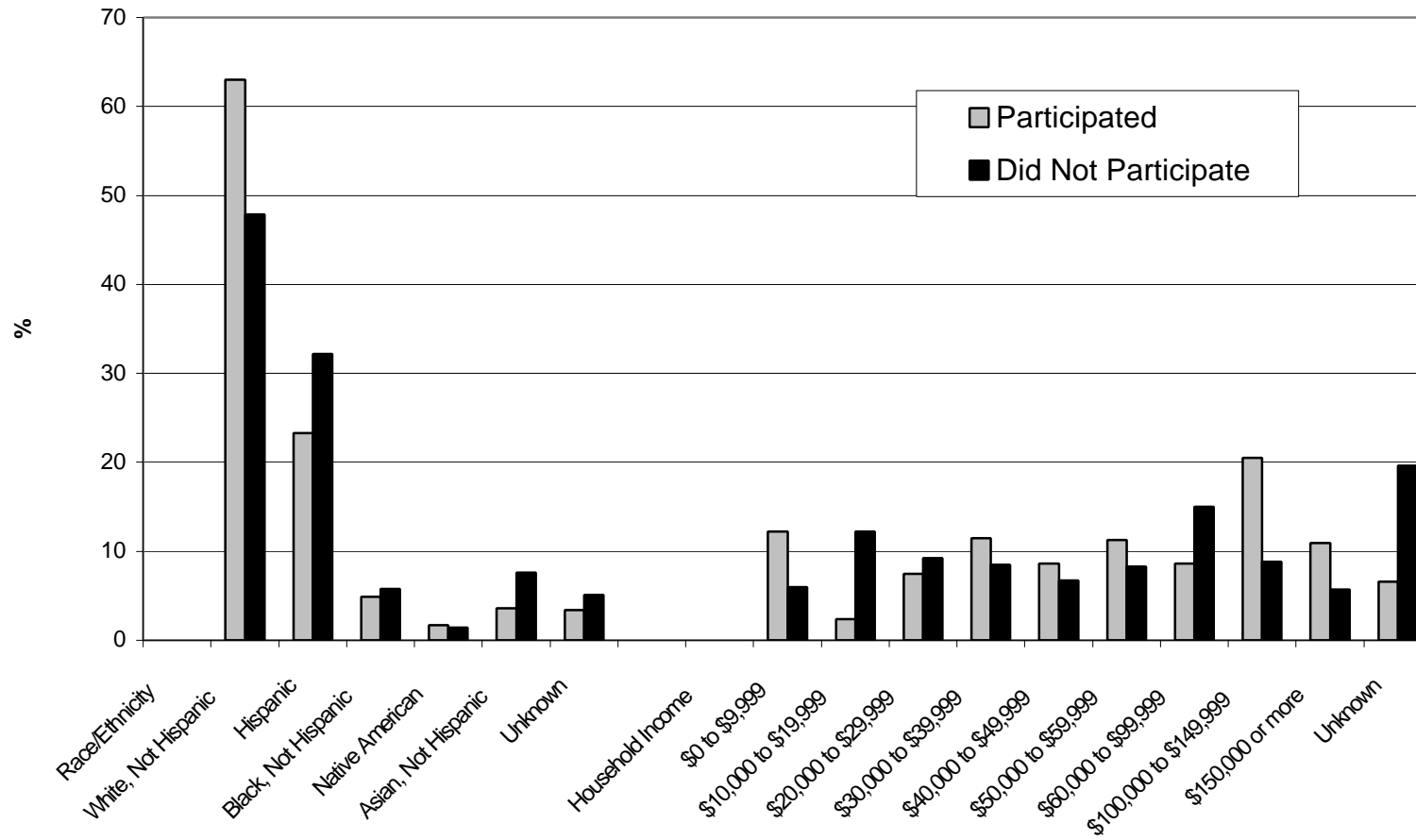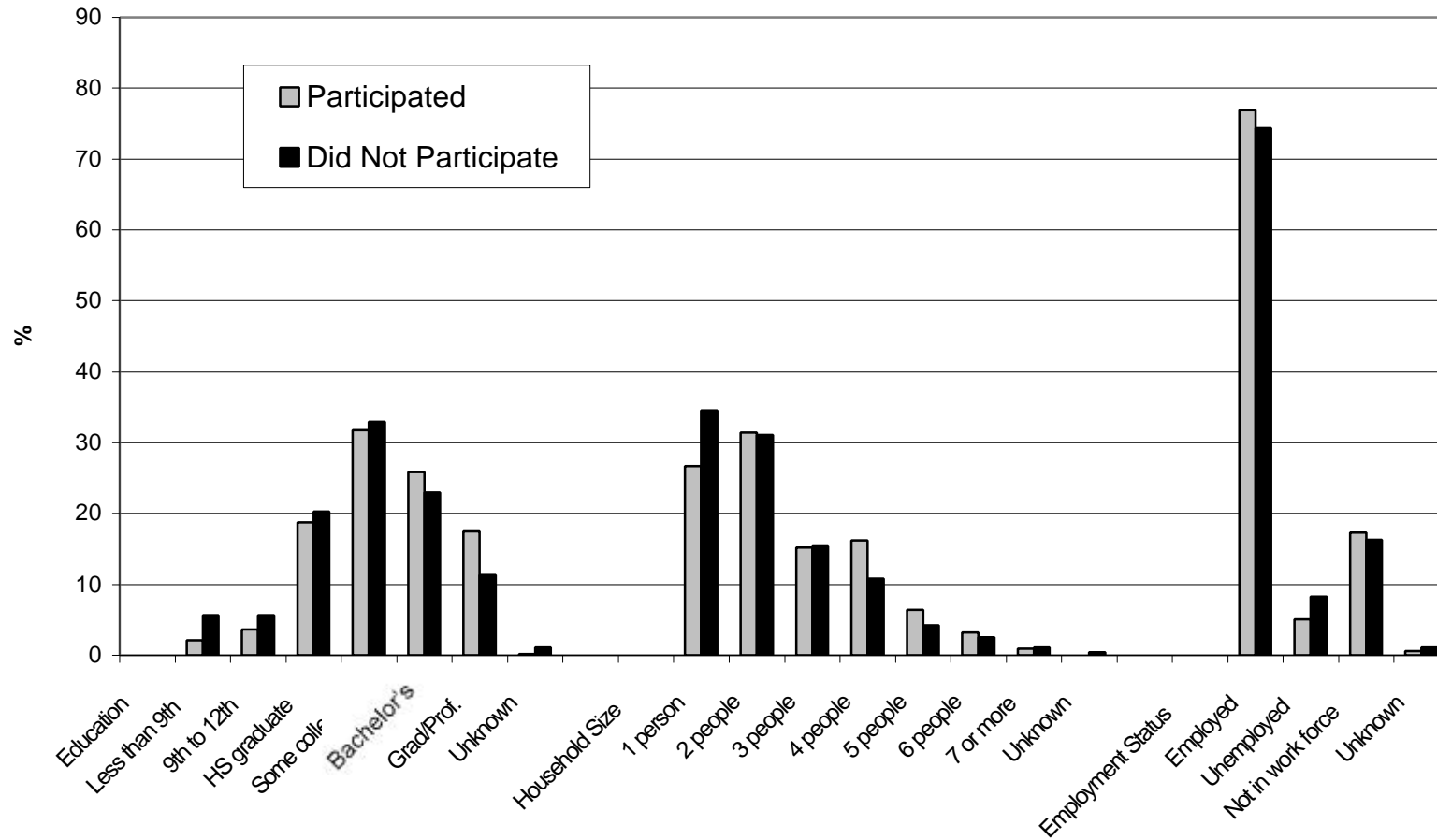**Figure 32. Wave 6 Participation and Attrition from Recruitment (II)**

Figure 33. Wave 6 Participation and Attrition from Recruitment (III)

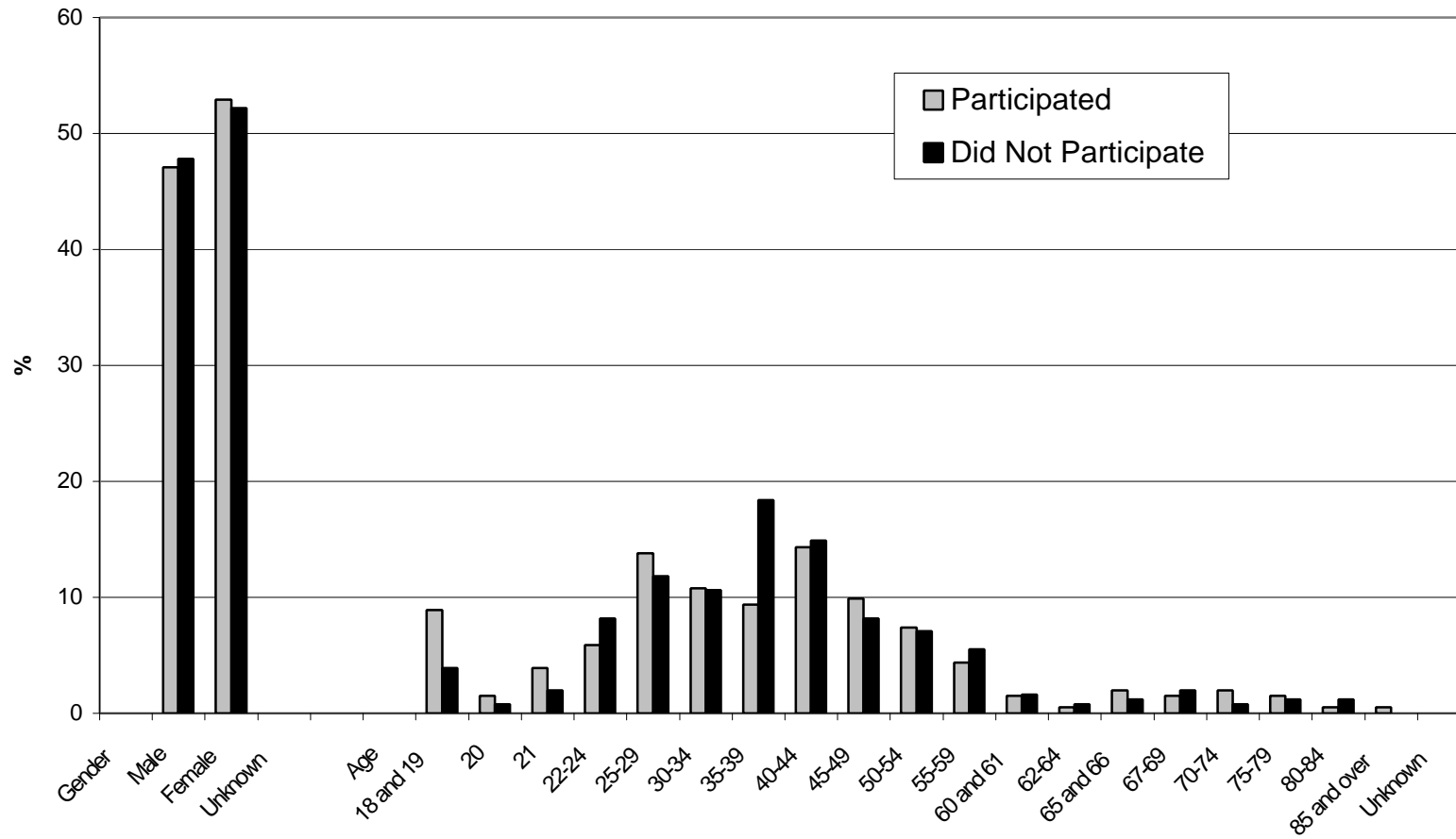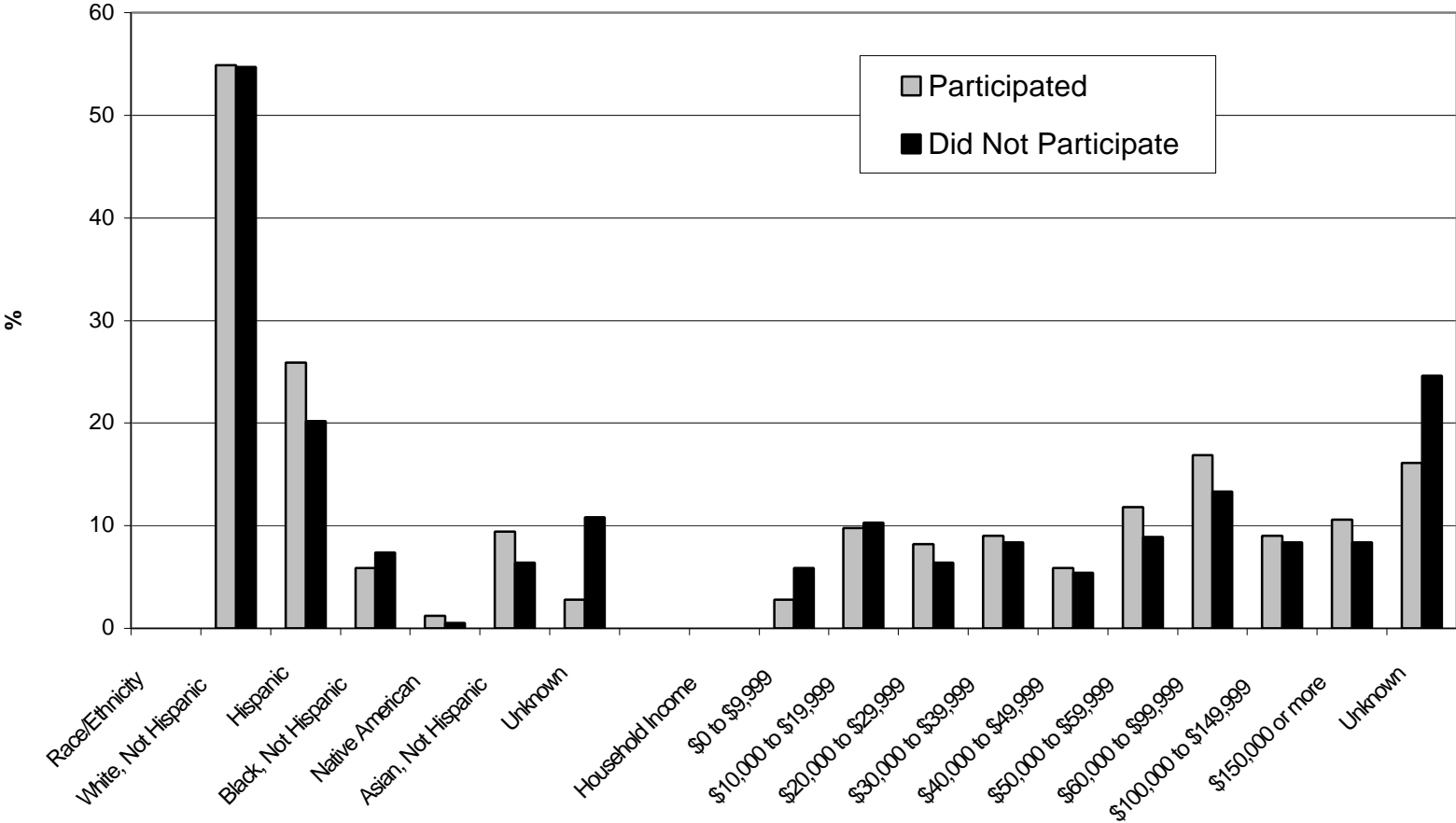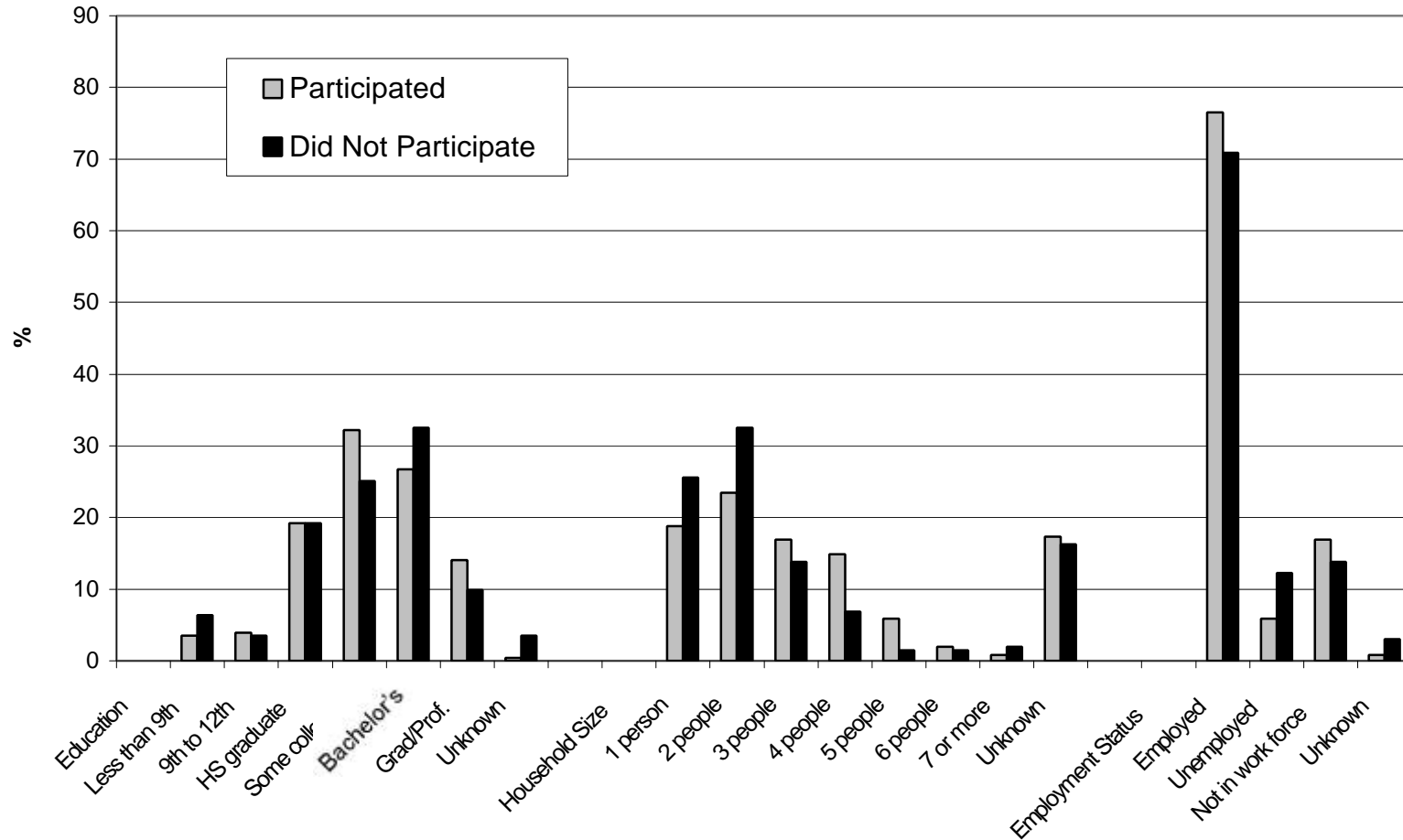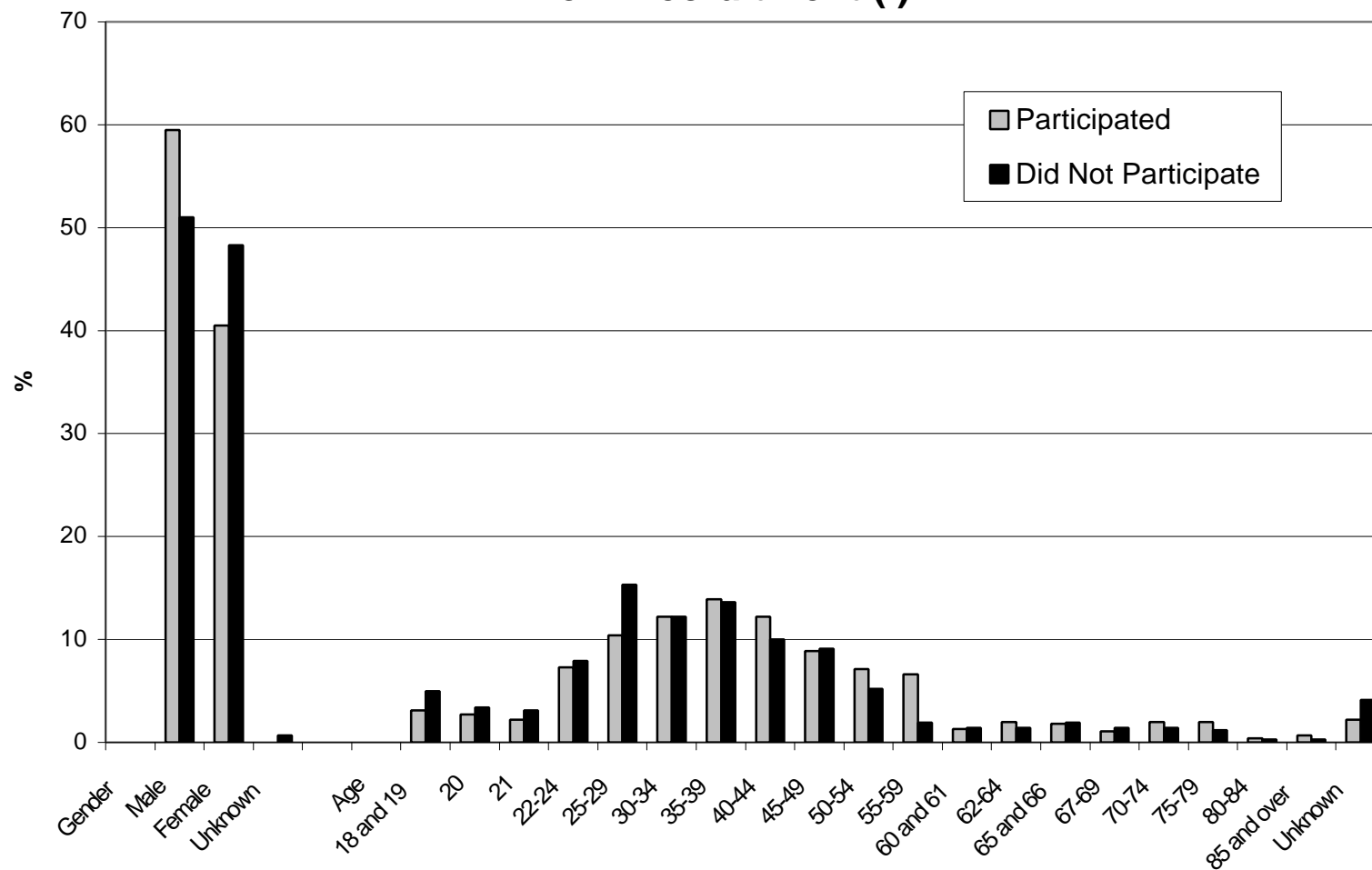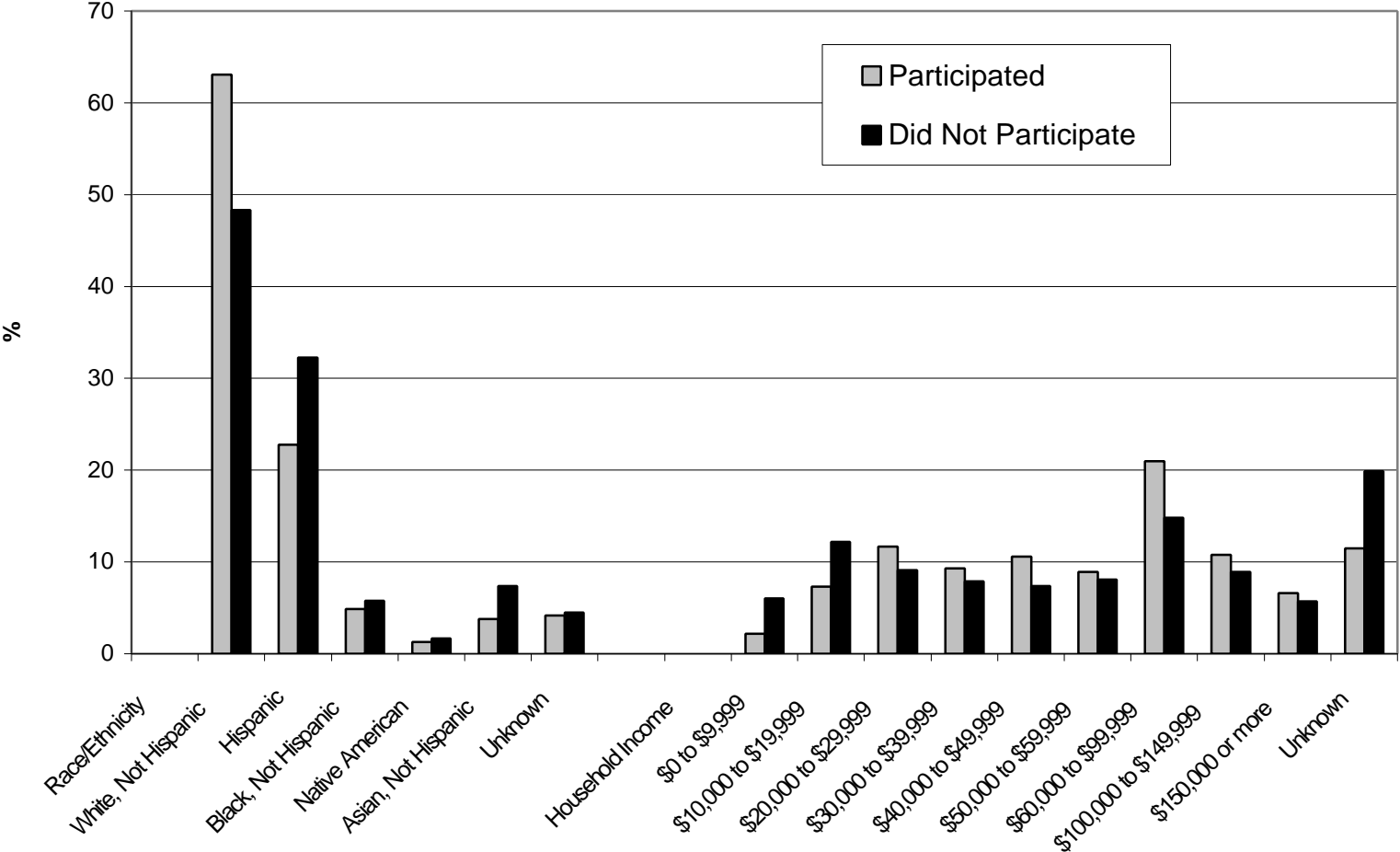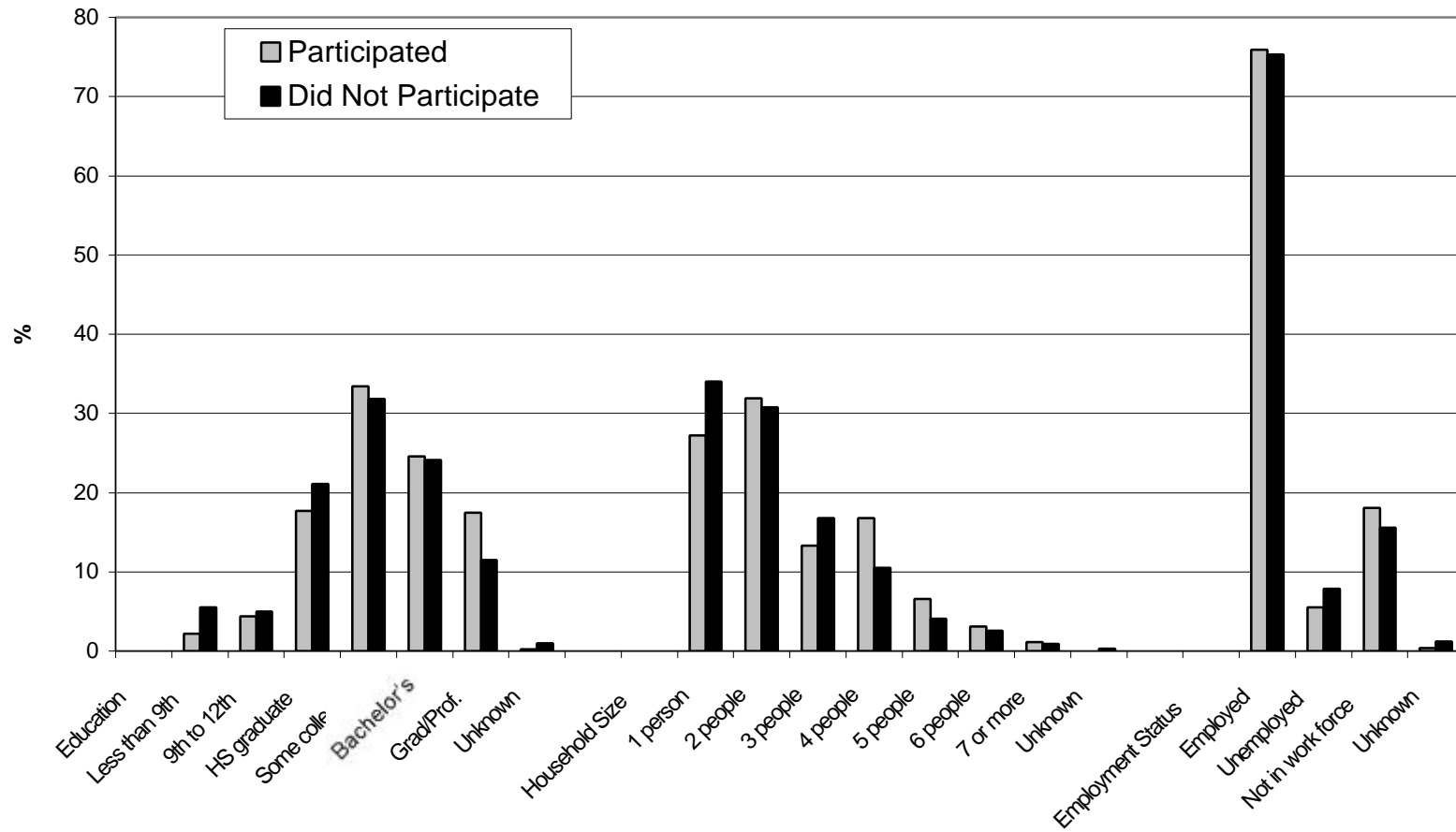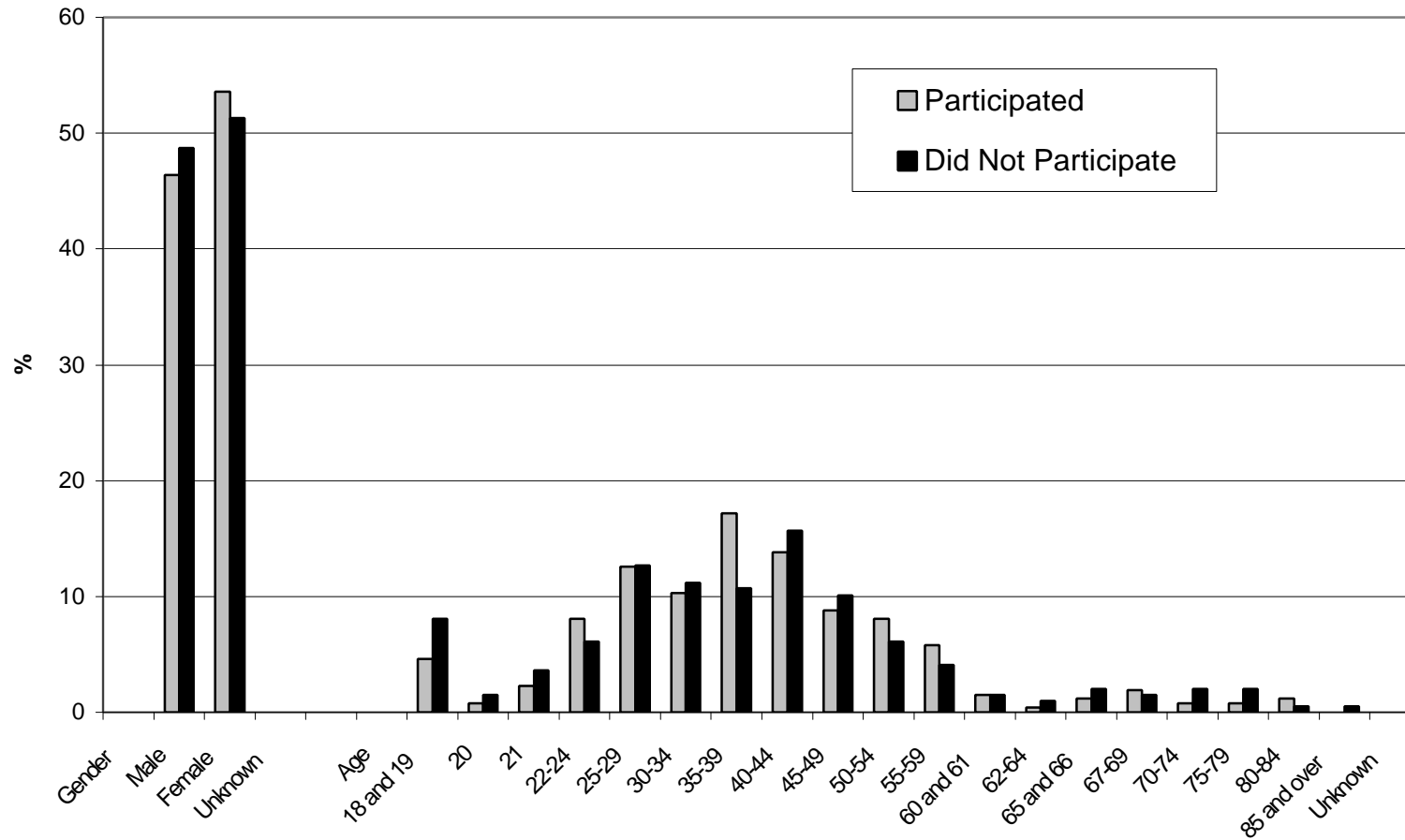**Figure 34. Wave 6 Participation and Attrition from Replenishment (I)**

TABLE 19. Comparing Participation and Attrition Across Waves. [95]

Demographic Category	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5 (recruit.)		Wave 5 (replen.)		Wave 6 (recruit.)		Wave 6 (replen.)	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Sample Size	658	376	629	405	504	530	517	517	468	566	255	203	452	582	261	197
Gender																
Male	42.0	50.0	58.2	49.4	41.3	48.3	59.0	50.5	42.3	47.0	47.1	47.8	59.5	51.0	46.4	48.7
Female	57.6	49.7	41.5	50.1	58.7	50.9	40.8	48.9	57.5	52.5	52.9	52.2	40.5	48.3	53.6	51.3
Unknown	0.5	0.3	0.3	0.5	0	0.8	0.2	0.6	0.2	0.5	0	0	0	0.7	0	0
Total	100.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age																
18 and 19	3.3	5.6	3.0	5.9	2.6	5.7	2.3	6.0	2.8	5.3	8.9	3.9	3.1	5.0	4.6	8.1
20	3.0	3.2	3.3	2.7	3.2	3.0	2.5	3.7	3.4	2.8	1.5	0.8	2.7	3.4	0.8	1.5
21	2.7	2.7	2.5	3.0	2.0	3.4	2.3	3.1	2.6	2.8	3.9	2.0	2.2	3.1	2.3	3.6
22-24	8.5	6.1	8.3	6.7	7.3	7.9	7.9	7.4	7.3	8.0	5.9	8.2	7.3	7.9	8.1	6.1
25-29	12.8	13.9	12.2	14.6	13.1	13.2	11.8	14.5	10.3	15.6	13.8	11.8	10.4	15.3	12.6	12.7
30-34	12.5	11.7	11.8	12.8	11.7	12.6	11.6	12.8	11.5	12.7	10.8	10.6	12.2	12.2	10.3	11.2
35-39	14.1	13.1	14.3	12.8	13.7	13.8	14.7	12.8	14.7	12.9	9.4	18.4	13.9	13.6	17.2	10.7
40-44	11.1	10.7	11.3	10.4	10.9	10.9	12.0	9.9	11.5	10.4	14.3	14.9	12.2	10.0	13.8	15.7
45-49	8.4	10.1	8.6	9.6	9.1	8.9	9.5	8.5	10.0	8.1	9.9	8.2	8.9	9.1	8.8	10.1
50-54	6.1	5.9	6.8	4.7	7.1	4.9	6.8	5.2	7.1	5.1	7.4	7.1	7.1	5.2	8.1	6.1
55-59	5.0	2.1	5.1	2.2	6.2	1.9	5.8	2.1	6.4	1.9	4.4	5.5	6.6	1.9	5.8	4.1
60 and 61	1.4	1.3	1.4	1.2	1.0	1.7	1.4	1.4	1.3	1.9	1.5	1.6	1.3	1.4	1.5	1.5
62-64	1.7	1.6	1.6	1.7	1.6	1.7	1.9	1.4	1.9	1.4	0.5	0.8	2.0	1.4	0.4	1.0
65 and 66	2.0	1.6	2.1	1.5	2.0	1.7	1.9	1.7	1.7	1.9	2.0	1.2	1.8	1.9	1.2	2.0
67-69	1.2	1.3	1.3	1.2	1.6	0.9	1.2	1.4	0.9	1.6	1.5	2.0	1.1	1.4	1.9	1.5
70-74	1.8	1.3	1.8	1.5	1.6	1.7	1.7	1.6	1.9	1.4	2.0	0.8	2.0	1.4	0.8	2.0
75-79	1.7	1.3	1.9	1.0	2.4	0.8	1.7	1.4	1.9	1.2	1.5	1.2	2.0	1.2	0.8	2.0
80-84	0.3	0.5	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	1.2	0.4	0.3	1.2	0.5
85 and over	0.6	0.3	0.6	0.3	0.6	0.4	0.6	0.4	0.4	0.5	0.5	0	0.7	0.3	0	0.5
Unknown	1.8	5.9	1.8	5.7	2.0	4.5	1.9	4.6	1.9	4.4	0	0	2.2	4.1	0	0
Total	100.0	100.2	100.0	100.0	100.1	100.0	99.9	100.2	99.9	100.3	100.2	100.2	100.1	100.1	100.2	99.9

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[95] Some totals do not equal precisely 100% due to rounding.

TABLE 19 (continued). Comparing Participation and Attrition Across Waves. [96]

Demographic Category	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5 (recruit.)		Wave 5 (replen.)		Wave 6 (recruit.)		Wave 6 (replen.)	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Race/Ethnicity																
White, Not Hispanic	61.3	43.3	61.5	44.2	60.7	49.1	62.7	46.8	63.0	47.9	54.9	54.7	63.1	48.3	55.2	54.3
Hispanic	23.9	35.6	23.4	35.6	23.0	33.0	22.1	34.2	23.3	32.2	25.9	20.2	22.8	32.3	24.1	22.3
Black, Not Hispanic	5.3	5.6	5.7	4.9	5.8	5.1	6.2	4.6	4.9	5.8	5.9	7.4	4.9	5.8	6.9	6.1
Native American	1.4	1.9	1.3	2.0	1.6	1.5	1.6	1.6	1.7	1.4	1.2	0.5	1.3	1.7	1.5	0
Asian, Not Hispanic	5.0	7.2	4.9	7.2	5.2	6.4	4.1	7.5	3.6	7.6	9.4	6.4	3.8	7.4	8.1	8.1
Unknown	3.2	6.4	3.2	6.2	3.8	4.9	3.5	5.2	3.4	5.1	2.8	10.8	4.2	4.5	4.2	9.1
Total	100.1	100.0	100.0	100.1	100.1	100.0	100.2	99.9	99.9	100.0	100.1	100.0	100.1	100.0	100.0	99.9
Household Income																
$0 to $9,999	4.1	4.5	3.3	5.9	2.4	6.2	2.7	6.0	12.2	6.0	2.8	5.9	2.2	6.0	3.1	5.6
$10,000 to $19,999	8.2	13.3	8.4	12.6	8.3	11.7	7.0	13.2	2.4	12.2	9.8	10.3	7.3	12.2	10.3	9.6
$20,000 to $29,999	10.8	9.3	11.1	8.9	10.5	10.0	11.2	9.3	7.5	9.2	8.2	6.4	11.7	9.1	9.6	4.6
$30,000 to $39,999	8.5	8.5	8.7	8.2	9.3	7.7	9.3	7.7	11.5	8.5	9.0	8.4	9.3	7.9	9.6	7.6
$40,000 to $49,999	9.7	7.2	10.0	6.9	9.9	7.7	11.2	6.4	8.6	6.7	5.9	5.4	10.6	7.4	6.1	5.1
$50,000 to $59,999	9.0	7.5	8.6	8.2	8.9	7.9	9.3	7.5	11.3	8.3	11.8	8.9	8.9	8.1	10.7	10.2
$60,000 to $99,999	19.8	13.6	19.1	15.1	20.6	14.5	21.7	13.4	8.6	15.0	16.9	13.3	21.0	14.8	16.1	14.2
$100,000 to $149,999	11.9	6.1	11.3	7.4	11.7	7.9	10.3	9.3	20.5	8.8	9.0	8.4	10.8	8.9	8.4	9.1
$150,000 or more	6.2	5.9	6.7	5.2	5.2	7.0	6.0	6.2	10.9	5.7	10.6	8.4	6.6	5.7	11.1	7.6
Unknown	11.9	23.9	12.7	21.7	13.1	19.3	11.4	21.1	6.6	19.6	16.1	24.6	11.5	19.9	14.9	26.4
Total	100.0	99.8	99.9	100.1	99.9	99.9	100.1	100.1	100.1	100.0	100.1	100.0	99.9	100.0	99.9	100.0

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[96] Some totals do not equal precisely 100% due to rounding.

TABLE 19 (continued). Comparing Participation and Attrition Across Waves. [97]

Demographic Category	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5 (recruit.)		Wave 5 (replen.)		Wave 6 (recruit.)		Wave 6 (replen.)	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Education																
Less than 9th	2.7	6.4	2.5	6.4	2.6	5.5	2.3	5.8	2.1	5.7	3.5	6.4	2.2	5.5	3.8	6.1
9th to 12th	4.0	6.1	4.5	5.2	4.6	4.9	3.7	5.8	3.6	5.7	3.9	3.5	4.4	5.0	3.8	3.6
HS graduate	19.5	20.0	18.1	22.0	18.7	20.6	18.4	20.9	18.8	20.3	19.2	19.2	17.7	21.1	19.5	18.8
Some college	32.1	33.2	34.0	30.1	32.5	32.5	33.9	31.1	31.8	33.0	32.2	25.1	33.4	31.8	31.4	25.9
Bachelor's	26.4	20.5	25.4	22.5	24.6	24.0	24.8	23.8	25.9	23.0	26.7	32.5	24.6	24.1	28.7	30.0
Grad/Prof.	15.2	12.2	15.3	12.4	16.9	11.5	16.8	11.4	17.5	11.3	14.1	9.9	17.5	11.5	12.3	12.2
Unknown	0.2	1.6	0.2	1.5	0.2	1.1	0.2	1.2	0.2	1.1	0.4	3.5	0.2	1.0	0.4	3.6
Total	100.1	100.0	100.0	100.1	100.1	100.1	100.1	100.0	99.9	100.1	100.0	100.0	100.0	100.0	99.9	100.2
Household Size																
1 person	28.6	35.4	28.0	35.8	27.8	34.2	26.3	35.8	26.7	34.6	18.8	25.6	27.2	34.0	20.7	23.4
2 people	33.0	28.2	32.6	29.1	32.5	30.0	31.7	30.8	31.4	31.1	23.5	32.5	31.9	30.8	23.8	32.5
3 people	15.2	15.4	14.2	17.0	14.5	16.0	15.9	14.7	15.2	15.4	16.9	13.8	13.3	16.8	17.6	12.7
4 people	13.2	13.3	14.8	10.9	13.9	12.6	14.7	11.8	16.2	10.8	14.9	6.9	16.8	10.5	14.6	7.1
5 people	5.6	4.5	6.2	3.7	6.6	4.0	6.8	3.7	6.4	4.2	5.9	1.5	6.6	4.1	5.0	2.5
6 people	3.3	1.9	3.2	2.2	3.6	2.1	3.7	1.9	3.2	2.5	2.0	1.5	3.1	2.6	2.3	1.0
7 or more	0.9	1.1	1.1	0.7	1.2	0.8	1.0	1.0	0.9	1.1	0.8	2.0	1.1	0.9	1.2	1.5
Unknown	0.2	0.3	0	0.5	0	0.4	0	0.4	0	0.4	17.3	16.3	0	0.3	14.9	19.3
Total	100.0	100.1	100.1	99.9	100.1	100.1	100.1	100.1	100.0	100.1	100.1	100.1	100.0	100.0	100.1	100.0
Employment Status																
Employed	75.8	75.0	75.8	75.1	76.0	75.1	75.6	75.4	76.9	74.4	76.5	70.9	75.9	75.3	77.4	69.5
Unemployed	6.1	8.2	5.7	8.6	4.8	8.9	5.2	8.5	5.1	8.3	5.9	12.3	5.5	7.9	5.4	13.2
Not in work force	17.6	15.2	18.0	14.8	18.9	14.7	18.8	14.7	17.3	16.3	16.9	13.8	18.1	15.6	16.5	14.2
Unknown	0.5	1.6	0.5	1.5	0.4	1.3	0.4	1.4	0.6	1.1	0.8	3.0	0.4	1.2	0.8	3.1

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[97] Some totals do not equal precisely 100% due to rounding.

| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 99.9 | 100.1 | 100.1 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | |

TABLE 20. Test results comparing participants and non-participants across waves.

Demographic Category	P-Values on $?^2$ Test [98]							
Wave	1	2	3	4	5 recruit.	5 replen.	6 recruit.	6 replen.
Gender								
Male	0.013	0.006	0.017	0.007	0.120	0.877	0.009	0.615
Female	0.013	0.006	0.017	0.007	0.120	0.877	0.009	0.615
Age								
18 and 19	0.061	0.015	0.010	0.002	0.035	0.028	0.116	0.119
20	0.807	0.651	0.945	0.247	0.636	0.478	0.438	0.441
21	0.972	0.607	0.142	0.400	0.743	0.205	0.359	0.424
22-24	0.250	0.443	0.635	0.824	0.595	0.339	0.651	0.423
25-29	0.468	0.181	0.827	0.142	0.008	0.517	0.015	0.988
30-34	0.890	0.448	0.536	0.459	0.464	0.932	0.894	0.778
35-39	0.796	0.676	0.835	0.470	0.487	0.006	0.966	0.047
40-44	0.486	0.811	0.870	0.347	0.669	0.853	0.309	0.560
45-49	0.220	0.436	0.990	0.682	0.346	0.547	0.808	0.904
50-54	0.998	0.206	0.159	0.350	0.232	0.892	0.225	0.423
55-59	0.029	0.029	0.000	0.003	0.000	0.607	0.000	0.413
60 and 61	0.985	0.847	0.302	0.958	0.818	0.937	0.919	0.993
62-64	0.988	0.499	0.846	0.499	0.557	0.701	0.464	0.406
65 and 66	0.720	0.549	0.776	0.865	0.738	0.491	0.853	0.447
67-69	0.821	0.984	0.378	0.741	0.271	0.695	0.675	0.751
70-74	0.598	0.804	0.846	0.852	0.557	0.267	0.464	0.239
75-79	0.722	0.273	0.039	0.654	0.402	0.778	0.328	0.239
80-84	0.543	0.627	0.981	0.978	0.869	0.435	0.815	0.465
85 and over	0.468	0.401	0.645	0.677	0.791	0.262	0.476	0.249
Race/Ethnicity								
White, Not Hispanic	0.000	0.000	0.000	0.000	0.000	0.312	0.000	0.652
Hispanic	0.000	0.000	0.000	0.000	0.000	0.349	0.000	0.884
Black, Not Hispanic	0.759	0.668	0.672	0.303	0.474	0.369	0.485	0.843
Native American, Not Hisp.	0.492	0.337	0.938	0.971	0.728	0.484	0.610	0.089
Asian, Not Hispanic	0.116	0.103	0.362	0.014	0.005	0.363	0.013	0.845

---

[98] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

TABLE 20 (Continued). Test results comparing participants and non-participants.

Demographic Category	P-Values on χ^2 Test[99]							
Wave	1	2	3	4	5 recruit.	5 replen.	6 recruit.	6 replen
Household Income								
$0 to $9,999	0.307	0.017	0.001	0.003	0.002	0.051	0.000	0.092
$10,000 to $19,999	0.000	0.005	0.027	0.000	0.003	0.560	0.001	0.790
$20,000 to $29,999	0.999	0.547	0.899	0.687	0.443	0.668	0.401	0.103
$30,000 to $39,999	0.482	0.854	0.575	0.742	0.691	0.912	0.760	0.783
$40,000 to $49,999	0.472	0.222	0.378	0.028	0.030	0.947	0.185	0.910
$50,000 to $59,999	0.860	0.787	0.822	0.653	0.770	0.528	0.967	0.743
$60,000 to $99,999	0.119	0.362	0.037	0.006	0.091	0.556	0.056	0.926
$100,000 to $149,999	0.020	0.126	0.094	0.930	0.516	0.912	0.618	0.452
$150,000 or more	0.740	0.576	0.125	0.543	0.773	0.662	0.813	0.433
Education								
Less than 9th	0.004	0.002	0.017	0.004	0.004	0.132	0.007	0.230
9th to 12th	0.103	0.556	0.770	0.100	0.121	0.840	0.654	0.929
HS graduate	0.761	0.103	0.395	0.273	0.498	0.872	0.149	0.970
Some college	0.584	0.244	0.940	0.411	0.613	0.149	0.644	0.281
Bachelor's	0.042	0.332	0.877	0.784	0.317	0.112	0.910	0.613
Grad/Prof.	0.219	0.218	0.160	0.015	0.005	0.206	0.007	0.918
Household Size								
1 person	0.022	0.007	0.024	0.001	0.006	0.084	0.017	0.314
2 people	0.113	0.263	0.401	0.769	0.944	0.032	0.723	0.012
3 people	0.916	0.196	0.472	0.623	0.910	0.330	0.109	0.217
4 people	0.967	0.074	0.573	0.176	0.011	0.006	0.003	0.020
5 people	0.446	0.081	0.064	0.026	0.122	0.015	0.074	0.219
6 people	0.166	0.369	0.148	0.092	0.484	0.682	0.622	0.332
7 or more	0.809	0.556	0.478	0.995	0.733	0.274	0.691	0.679
Employment Status								
Employed	0.991	0.998	0.942	0.837	0.402	0.331	0.986	0.128
Unemployed	0.169	0.063	0.008	0.033	0.043	0.012	0.126	0.003
Not in work force	0.344	0.209	0.097	0.093	0.673	0.422	0.309	0.576

---

[99] This Chi-square test compares the proportion of 0s (zeroes) and 1s (ones) in a given demographic category for participants and non-participants in a wave. The null hypothesis is that the two groups are drawn from populations with the same underlying distribution (e.g. have the same proportion).

What insights does this assessment of participation and attrition give us? We highlight some of the more interesting trends here.

First, take recruitment. We see that gender is significant across all six waves. Females are more likely to have participated and males less likely. Few of the age categories show statistically significant differences. Exceptions are (1) age equal to 18 (less likely to participate), in which case all but one wave is significant, and (2) age between 55 and 59 (more likely to participate), in which case all six waves are significant. Being white (more likely to participate) or Hispanic (less likely to participate) are both significant in all six waves, but none of the other race or ethnicity categories is significant. The lower two income categories, which are associated with lower participation rates, show significance in 11 out of 12 instances. There is some spotty significance at higher income levels, in which more people participate. A somewhat similar pattern emerges in the education demographic. The lowest education level (depressing participation) is significant across all six waves, while the top level (increasing participation) is significant in half of the waves. In household size, the only consistent results are for one person households. People living alone were less likely to participate in all six waves. In three of six waves, testing suggests that the unemployed were less likely to participate.

There appears to be much less of a selection issue on the whole for the replenishment survey. There are fewer statistically significant differences and few instances where demographic categories show consistent results across the two waves. There are no significant differences in gender, age, or race/ethnicity categories for replenishment. Similarly, none of the results for education or income categories suggest a selection bias. The lowest income category is almost significant at a 5% level (p-value = 0.051). We do find some evidence of differences in participation with respect to household size. People living alone were less likely to participate and those living in four person households were more likely to participate in both Wave 5 and Wave 6. People living in five person households were more likely to participate in Wave 5. In both waves, the unemployed appear to have been systematically less likely to have answered our diary survey questions. The test for a difference is statistically significant for the unemployed in both Wave 5 and Wave 6.

5. Conclusion

Though we find that in many categories our recruitment and replenishment samples appear statistically different from the population of the four county area that was our target, this is not reason for alarm. Nor are we concerned about the apparent presence of some selection bias in membership and attrition, that is the fact that the selection of participants in any particular wave from the larger sample of beach users identified in either recruitment or replenishment does not appear to be completely random. With knowledge of these differences, and an understanding of the differences between beach users and non-beach users, we will be able to weight model and valuation results in order to properly reflect the characteristics of beach users and the population as a whole.

Though this report has sought to provide a comprehensive demographic analysis of our panel, some future work remains to be done on this very rich collection of data. In the same way that we undertook a logit analysis to give a more nuanced, multivariate view of the differences between beach users and non-beach users, we would like to do logit analysis on the decision to participate or not in each wave. We would also like to investigate the characteristics of the groups who answered different numbers of waves. For example, it would be useful to know if there are

systematic differences between those people who only answered no diary survey after first contact (i.e. after recruitment or replenishment) and those who participated in all six wave.

Appendix 1 – Logit Analysis of Beach User or No

<u>dependent variable</u>

```
bch_use = whether or not the respondent is a beach user (1 = yes)
```

<u>explanatory variables</u>

Replenishment
replen = whether or not the respondent joined during replenishment (1 = yes)

Gender
male = 1 if yes

Age
age* = age or age range indicated by * (age85 = 85 and older)

Race/Ethnicity
race1 = White, Not Hispanic
race2 = Hispanic
race3 = Black, Not Hispanic
race4 = Native American, Not Hisp.
race5 = Asian, Not Hispanic

Household Income
in1 = $0 to $9,999
in2 = $10,000 to $19,999
in3 = $20,000 to $29,999
in4 = $30,000 to $39,999
in5 = $40,000 to $49,999
in6 = $50,000 to $59,999
in7 = $60,000 to $99,999
in8 = $100,000 to $149,999
in9 = $150,000 or more

Education
ed1 = Less than 9th
ed2 = 9th to 12th
ed3 = HS graduate
ed4 = Some college
ed6 = Bachelor's
ed7 = Grad/Prof.

Household Size
hh1 = 1 person
hh2 = 2 people
hh3 = 3 people
hh4 = 4 people
hh5 = 5 people
hh6 = 6 people
hh7 = 7 or more

Employment Status
emp1 = Employed
emp2 = Unemployed
emp3 = Not in work force

(Note: Some variables dropped to avoid colinearity.)

Results

```
Logit estimates                                 Number of obs   =       2500
                                                LR chi2(47)     =     518.01
                                                Prob > chi2     =     0.0000
Log likelihood = -1428.2679                     Pseudo R2       =     0.1535
------------------------------------------------------------------------------
  bch_use |     Coef.    Std. Err.       z     P>|z|    [95% Conf. Interval]
----------+-------------------------------------------------------------------
   replen |   .5420767    .1090236     4.972   0.000    .3283943     .7557591
     male |   .0781813    .0960538     0.814   0.416   -.1100808     .2664433
 age18_19 |    .479236     .276285     1.735   0.083   -.0622726     1.020745
   age_20 |   .3843698    .3701283     1.038   0.299   -.3410683     1.109808
   age_21 |   .0061531    .3196424     0.019   0.985   -.6203344     .6326407
 age22_24 |   .2976644    .2356717     1.263   0.207   -.1642438     .7595725
 age25_29 |   .1039883    .1927388     0.540   0.590   -.2737729     .4817495
 age30_34 |   -.194377    .1902921    -1.021   0.307   -.5673427     .1785886
 age40_44 |  -.1695513    .1973024    -0.859   0.390   -.5562569     .2171543
 age45_49 |  -.2505725    .2119282    -1.182   0.237   -.6659441     .1647991
 age50_54 |  -.8707894    .2152035    -4.046   0.000    -1.29258    -.4489984
 age55_59 |  -.9591212    .2358226    -4.067   0.000   -1.421325    -.4969173
 age60_61 |  -1.390969    .3270279    -4.253   0.000   -2.031931    -.7500055
 age62_64 |  -.6364682    .3556515    -1.790   0.074   -1.333532     .0605959
 age65_66 |   -.123275    .3544775    -0.348   0.728   -.8180382     .5714882
 age67_69 |  -1.038656    .3522617    -2.949   0.003   -1.729076    -.3482356
 age70_74 |  -1.190519     .317049    -3.755   0.000   -1.811924    -.5691145
 age75_79 |   -1.30892    .3287159    -3.982   0.000   -1.953191    -.6646484
 age80_84 |   -1.74382    .4517857    -3.860   0.000   -2.629304    -.8583367
    age85 |  -.9892591    .2591148    -3.818   0.000   -1.497115    -.4814034
    race1 |   .3691671    .2072677     1.781   0.075   -.0370701     .7754044
    race2 |   .0025487    .2196149     0.012   0.991   -.4278885     .4329859
    race3 |  -.3535805    .2588255    -1.366   0.172   -.8608691      .153708
    race4 |     .89018    .5082873     1.751   0.080   -.1060448     1.886405
    race5 |  -.3625177    .2598191    -1.395   0.163   -.8717537     .1467183
      in1 |   .1220807    .2091563     0.584   0.559   -.2878582     .5320195
      in3 |   .0370404    .1568488     0.236   0.813   -.2703775     .3444584
      in4 |   .3280391     .180384     1.819   0.069   -.0255071     .6815853
      in5 |   .3301801    .1855187     1.780   0.075   -.0334299     .6937902
      in6 |   .3609328     .190558     1.894   0.058    -.012554     .7344197
      in7 |   .4862512    .1580852     3.076   0.002    .1764099     .7960926
      in8 |   .7855283     .217723     3.608   0.000     .358799     1.212258
      in9 |   .6712389    .2425837     2.767   0.006    .1957836     1.146694
      ed1 |  -.2960399    .2046223    -1.447   0.148   -.6970923     .1050125
      ed2 |   .0599534    .2082722     0.288   0.773   -.3482527     .4681595
      ed4 |   .4854432    .1281566     3.788   0.000    .2342609     .7366255
      ed5 |   .6329423     .142428     4.444   0.000    .3537886     .9120961
      ed6 |   .9581179    .1857972     5.157   0.000     .593962     1.322274
      hh1 |  -.6752016     .140881    -4.793   0.000   -.9513232    -.3990799
      hh2 |  -.2209724    .1441429    -1.533   0.125   -.5034873     .0615426
      hh4 |   .0598464    .1870831     0.320   0.749   -.3068297     .4265226
      hh5 |   .1050393    .2684106     0.391   0.696   -.4210358     .6311143
      hh6 |   1.007153    .4513427     2.231   0.026    .1225375     1.891769
      hh7 |  -.1724364    .5071271    -0.340   0.734   -1.166387     .8215144
     emp1 |   .6403975    .3580434     1.789   0.074   -.0613547      1.34215
     emp2 |   .5317154    .3912975     1.359   0.174   -.2352135     1.298644
     emp3 |   .2865043    .3696831     0.775   0.438   -.4380614      1.01107
    _cons |   -.407793    .3848263    -1.060   0.289   -1.162039     .3464528
------------------------------------------------------------------------------
```