

# Influence of Social Demographic Characteristics on Respondents' Responses in a Longitudinal Survey.

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## ABSTRACT

Non-response rates in surveys have been recognized as important indicators of data quality since they introduce bias in the estimates which increases the mean square error. This study was designed to examine the effects of socio-demographic characteristics on respondents' responses in a longitudinal survey.

A two-stage stratified random sampling scheme was used in selecting 750 households in Oyo town. Households were interviewed in five waves (waves 1, 2, 3, 4, and 5). An interviewer-administered questionnaire was used to collect data on demographic characteristics and response predictors including age, gender, educational qualifications, religion, employment status, family size, and duration of interview. Demographic characteristics were analyzed using summary statistics.

Response rates for waves 1-5 were 72.7%, 82.0%, 81.3%, 82.0%, and 80.7%, respectively. Patterns of participation in the surveys were as follow: continued participation (80.0%), monotone attrition (2.0%), new entry (8.0%), occasional non-response (3.3%), and occasional response (6.7%). Females respond better to survey questions than males. The higher the educational level, the higher the response rate. Respondents at the middle age (50-79 years) respond better to survey questions compared with youth and old age respondents. There was no significant difference in the response rate from unemployed respondents and employed respondents.

(Keywords: longitudinal survey, response predictors, non-response rate)

## INTRODUCTION

Item non-response results when a person selected for the sample, and responding to the survey, does not respond to an item on the questionnaire. It is always common in numerous survey research findings and it is well known that non-response rates usually vary by respondent subgroups. If the patterns of non-response are known, then appropriate methods that can increase the response rates can be adopted, thereby reducing bias due to differences between characteristics of respondents and non-respondents.

Gaining valid answers to sensitive questions, such as questions pertaining to private, socially frowned upon, or illegal behavior is difficult. People typically underreport sensitive behavior while over-reporting socially desirable behaviors (Warner, 1965). Various techniques have been developed to guarantee anonymity and minimize the respondents' feelings of jeopardy, so that more honest answers can be expected. Two such techniques are: the randomized response technique RRT Warner (1965), Fox and Tracy (1986) and the unmatched count technique UCT; also called item count technique, unmatched block design, or block total response Dalton et al. (1994), Raghavarao and Federer (1979).

In their study titled "The Effect of Prior Notification on the Refusal Rate in Surveys", Brunner and Carroll (1969) studied the effects of survey sponsor on the response rate and they found that an advance letter printed on university stationary increased response by 30% over samples who received no advance letter, while an advance letter on stationary from a relatively unknown business decreased response rate by 6%.

Heberlein and Baumgartner (1978) worked on factors affecting response rates to mail questionnaires. They compared response rates for 98 published mail questionnaire surveys and found higher response rates for government-sponsored surveys.

Kalton et al. (1978) studied the effects of general and specific questions on response rate. Respondents were asked about driving standards generally and about driving standards among younger drivers. When the general question was asked first, 34% of the respondents said that general driving standards were lower than they used to be. When that question followed the more specific question about younger drivers, the corresponding percentage fell by 7%.

Schuman et al. (1981). studied the context effects on survey response to questions with two opinion questions on abortion and they found that the distributions of answers to the more specific questions were the same whether the specific question was asked before or after the general question, but the distributions of answers to the general questions differed according to the question position.

Groves, et al. (1992) examined the effect of interviewer interaction with the respondents on the response rate and they found that tailoring the interaction was important. However, they also found that mentioning the survey sponsor was rated as a highly efficient means of securing cooperation. Successful interviewers also felt that the agency should pay more attention to public relations and thus, "the image of the agency is seen as a tool to work with and attain a better response rate."

Harris-Kojetin and Tucker (1999) in their study titled "Exploring Relation of Economic and Political Conditions with Refusal Rates to Government Survey" found that in times of more positive public opinion regarding the government and government leaders, cooperation rates were higher. Survey respondents representing establishments (such as schools, hospitals, factories, farms or other businesses) may be somewhat different from respondents representing themselves or their households. These differences may make attitudes toward the survey sponsor more important than in general household surveys.

Snijkers et al. (1999) studied the tactics that high performing survey interviewers can use to gain cooperation. Similar to Groves, et al. (1992), they found that tailoring the interaction was important. However, they also found that mentioning the survey sponsor was rated as a highly efficient means of securing cooperation. Successful interviewers also felt that the agency should pay more attention to public relations and thus, "the image of the agency is seen as a tool to work with and attain a better response rate."

Mac Elroy (2000) worked on a topic titled "Variables Influencing Drop-Out Rate in Web Based Surveys". The paper reviewed 19 studies done by Modalis Research Technology (USA) involving business-to-business technology related decisions. He found that drop-out rates decrease with incentives and increase with questionnaire length.

Sheehan (2001) in his study titled "E-mail Survey Response Rates" studied the influence of five factors (the year the study was undertaken, the number of questions in the survey, the number of pre-notification contacts, the number of follow-up contacts, and survey topic salience) on response rates in 31 e-mail surveys undertaken since 1986. She showed that the year the survey was undertaken and the number of follow-up contacts had the most influence on response rates to the survey questions: response rates decrease with time and increase with the number of follow-ups.

Knapp and Heidingsfelder (2001) conducted research on "Drop Out Analysis". He reviewed nine unrestricted self-selected surveys done by Internet Rogator (Germany) in order to identify factors influencing drop-out rates. They found that longer surveys, sensitive topics and lack of incentives lead to higher drop-out rates.

Ariel Rubinstein (2004) carried out research on response time to survey questions. Lecture audiences and students were asked to respond to virtual decision and game situation at [gametheory.tau.ac.il](http://gametheory.tau.ac.il). Several thousand observations were collected and the response time for each answer was recorded. He showed that emotional response, require less response time than choices that require the use of cognitive reasoning.

Cheti and Franco (2005) worked on survey response and survey characteristics using probit model and they found that the number of children in the household, home ownership and the length of residence at the current address were positively influenced contact of the respondents in the survey. Women, people with college education respond more to the survey questions.

Sigrig Haunberger (2006) carried out research on the effects of interviewer and respondents characteristics on response behaviour in panel surveys. The logistic regression analysis provides results that several respondents' characteristics as well as interviewer characteristics has an impact on the refusal rate. For older interviewers, female interviewer, interviewers with high experience and interviewers with higher education lower refusal rates has been found. Older respondents agreed more than the younger ones to cooperate.

Fitzgerald et al. (1998), Campanelli et al. (1997), and Lepkowski and Couper (2002), offered suggestions about which variables were likely to help to predict contact and cooperation. These variables included both survey features and household and personal characteristics.

We may distinguish between two sets of variables that explain the probability of contact: household-specific variables that are linked to the probability of contacting a household, and person-specific variables that are linked to the probability of contacting a person.

The probability of contacting a household is inversely related to its degree of geographical mobility and to the probability of finding someone at home. Moreover, because people may pretend to be absent when an interviewer knocks at the door, the contact probability may also be related to a household's willingness to cooperate.

Predictors of contact include the number of adults, number of children in a household, home ownership, year of residence, high number of visit, duration of household interview in the last wave. Once a household has been successfully contacted, a lack of cooperation is mainly the result of a personal decision that reflects personal characteristics. The personal characteristics that we consider include age,

gender, education, employment status, couple living relationship.

To capture a person's past experience with the survey, we include features of the personal interview process in the current wave, namely duration of personal interview, mode of interview, language of interview, interviewer familiarity (a person who is contacted by the same interviewer as in previous waves is likely to be more willing to co-operate again (Groves and Couper, 1998; Laurie et al., 1999; Hox and de Leeuw, 2002).

This paper examined the influence of social demographic characteristics on respondents' responses in longitudinal survey carried out within fifteen randomly selected Enumeration Areas in Oyo town (Ilorra, Kosobo, Awe, Akinmorin, Saabo, Ladigbolu, Cele, Monbolaje, Owode, Dacamca, Agunpopo, Akesan, Asipa, Araromi, Idi-igda) Oyo State, Nigeria.

## **MATERIALS AND METHODS**

### **Method of Data Collection and Source of the Data**

A two-stage stratified random sampling scheme was used in selecting 750 households in Oyo town. Household heads were interviewed in five waves (waves 1, 2, 3, 4, and 5) within twelve months. An interviewer-administered questionnaire was used to collect data on demographic characteristics and response predictors including age, gender, educational qualification, religion, employment status, family size, and duration of interview within fifteen randomly selected Enumeration Areas in Oyo town (Ilorra, Kosobo, Awe, Akinmorin, Saabo, Ladigbolu, Cele, Monbolaje, Owode, Dacamca, Agunpopo, Akesan, Asipa, Araromi, Idi-igda, In each community, fifty house heads were interviewed.

### **Collection and Coding of the Research Data**

Questionnaires were distributed to the respondents on five different occasions (wave 1 - wave 5). The predictors of response and socio demographic characteristics were extracted from the questionnaires and coded for further statistical analysis.

Family size was classified into six categories; namely, family without children, family with one child, two, three, four and more than four children. Duration of interview was classified into four levels. Respondents that were interviewed for less than five minutes, 5-10 minutes, 11-15 minutes and more than fifteen minutes.

Spouse living condition was classified in to two categories, those that were living and those that were not living with their spouse as at the time of interview. Language of interview, both English and Yoruba language were use during the survey. Age was grouped in to three age categories; 30-50 years, 51-70 years and 71 years and above. Familiarity with the interviewer was in two categories, those that are familiar with the interviewer and those that are not. Levels of education were categorised in to three; (primary, secondary and tertiary).

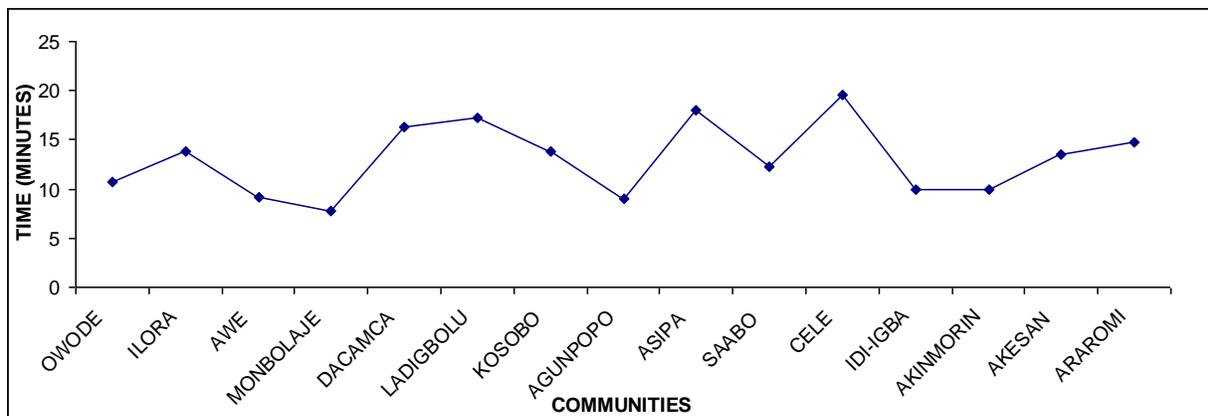
Call back / number of visit to the respondents was divided in five levels, some respondents were visited one, two, three, four, and five times in each wave before they were contacted for the interview . Sex/gender, both male and female participated in the survey. House ownership was classified into tenants and owner occupiers. Employment status is in two categories: employed and unemployed respondents. Duration of residence was classified into four categories; 1-5 years, 6-10 years, 11-15 years, 16 years and above. Tribe also is in two categories, Nigerian and non-Nigerian.

## RESULTS AND DISCUSSION

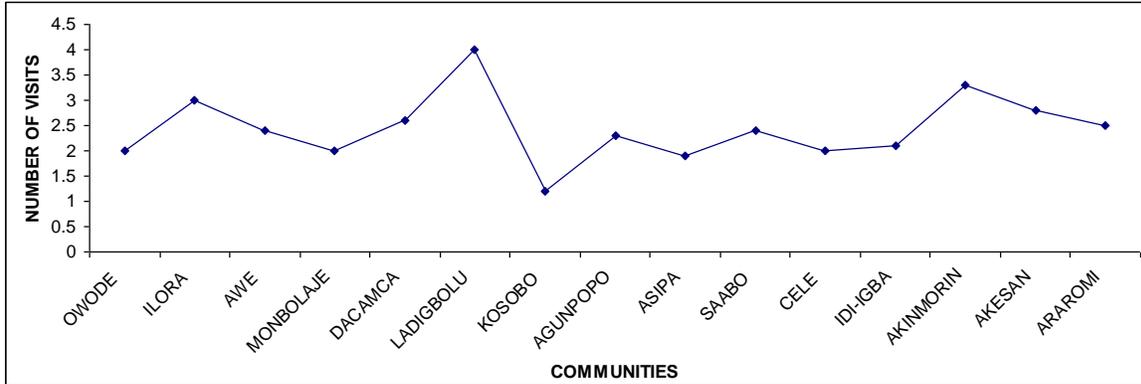
The average duration of household interview ranges between a minimum of 9 minutes in Agunpopo and maximum 18 minutes in Asipa. The average number of visit ranges from minimum of 1.2 in Kosobo to a maximum of 4 in Ladigbolu. This variability across communities may reflect both a different organization of the call-backs and differences in the ease of contact. In particular, a high average number of visits signaled contact difficulty, see Table 1 and Figures 1 and 2.

**Table 1:** Mean of selected Survey Features by Enumeration Areas.

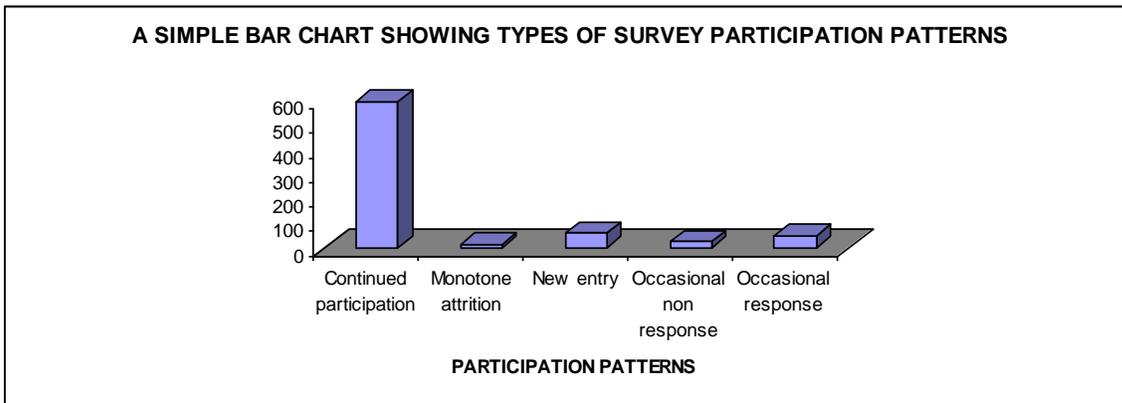
Enumeration Areas	Average number of visits	Average length of household Interview (minutes)
Owode	2.0	10.7
Iloro	3.0	13.8
Awe	2.4	9.1
Monbolaje	2.0	7.7
Dacamca	2.6	16.3
Ladigbolu	4	17.3
Kosobo	1.2	13.8
Agunpopo	2.3	9.0
Asipa	1.9	18
Saabo	2.4	12.3
Cele	2.0	19.5
Idi-igba	2.1	9.9
Akinmorin	3.3	10.0
Akesan	2.8	13.5
Araromi	2.5	14.7



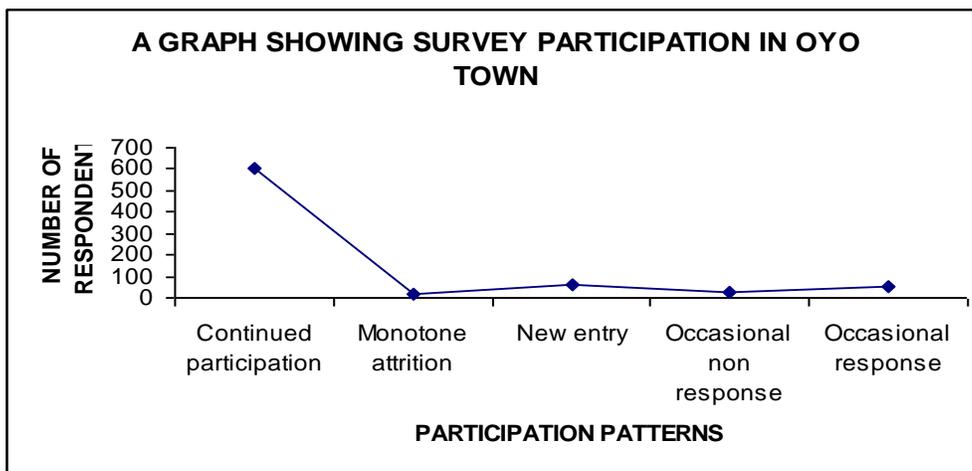
**Figure 1:** Graphical Illustration of Average Duration of Interview (Minutes).



**Figure 2:** Graphical Illustration of Average Number of Visits.



**Figure 3:** A Bar Chart Showing Survey Participation Patterns in Oyo Town.



**Figure 4:** Graphical Illustration of Survey Participation Pattern in Oyo Town.

**Patterns of Survey Participation in Oyo Town**

According to Cheti and Franco (2005), participation patterns can be classified into six categories: Continued participation, Monotone attrition, new entry, Occasion nonresponse, occasional response, and Very irregular response.

Table 2 and Figures 3 and 4 compares participation patterns across communities. Patterns of participation in the surveys were as follow: continued participation (80.0%), monotone attrition

(2.0%), new entry (8.0%), occasional non-response (3.3%) and occasional response (6.7%). Continued participation is always the most frequent survey participation pattern in Oyo town, followed by new entry and occasional response.

**Table 2:** Patterns of Survey Participation in Oyo Community

<i>Survey participation patterns in Oyo community</i>	<i>Number of respondent</i>
<i>Continued participation</i>	<i>600</i>
<i>Monotone attrition</i>	<i>15</i>
<i>New entry</i>	<i>60</i>
<i>Occasional non response</i>	<i>25</i>
<i>Occasional response</i>	<i>50</i>

**Response Rate at Each Level of the Predictor of Response**

Family size was classified into six categories. Family without children, family with one child, family with two children, family with three children, family with four children and more than four children. The first category was taken as reference level and its incidence rate ratio (IRR) is 1, which was compared with other levels. Any IRR value greater than 1 means higher response rate compared with reference level and value lower than 1 implies low response rate. Response from the family with one child was 27% higher compared with the family without child, response from the family with two, three, four, and more than four were higher in the following percentage, respectively, 56%, 66% 75% and 84%.

Duration of interview was classified into four levels. Respondents that were interviewed for not more than five minutes, 5-10 minutes, 11-15 minutes, and more than fifteen minutes. Less than 5 minutes was taken as reference level and this was compared with other levels. The response from those that were interviewed for 5-10 minutes was 23% higher compared with those that were interviewed for less than 5 minutes. Response from 11-15 minutes was 58% higher and response from those that were interviewed for more than 16 minutes was 59% higher compared with those that were interview for less than 5 minutes.

The response rate from those that were living with their spouse is 14% higher compared with those that were not living with their spouse as at the time of interview.

The response from those that were interviewed with English language is 53% higher compared with those that were interviewed with Yoruba language.

The response from the respondents between ages 51-70 years is 94% higher compared with the response from respondents between ages 30-50 and response from the respondents between ages 71 years and above is 12% higher compared with the response from respondents between ages 30-50 . This implies that respondents at the middle age respond better to survey questions compared with youth and old age respondents.

The response rate from those that are familiar with the Interviewer is 21% higher compare with those that are not familiar with the interviewer, the more the familiarity, the higher the response rate. The response from the respondents with secondary education was 27% higher compared with those with primary education and the response from the respondents with Tertiary education was 54% higher compared with those with primary education. The higher the educational level, the higher the response rate.

The response rate increases from first visit till fourth visits and at fifth visit, it declined. At the fifth visit, the response obtained was 98% lower compared with the first visit. The female response rate was 15% higher than the response rate from the males.

A majority of the respondents are tenants while a minority are owner-occupiers. The response rate from tenants was 7% higher than the owner-occupiers. There was no significant difference in the response rate from unemployed respondents and employed respondents. The response rate from respondents that have been living in their community within 6-10 years is 33% higher compared with the response from those that have been living in their community within 1-5 years. 11-15 years is 58% higher, for more than 15 years is 81% higher compared with the response from those that have been living in their community within 1-5 years. The greater the number of years a respondent has spent in his/her community, the more they response to survey questions. The response from Nigerians was 52% higher compared with response from non-Nigerians.

**Table 3:** Incidence Rate Ratios for Various Levels of Socio-Demographic Characteristics and Response Predictors.

<b>Level of family size</b>	<b>Incidence Rate Ratio (IRR)</b>
One	1.27134
Two	1.564931
Three	1.664464
Four	1.75134
More than four	1.844516
<b>Duration of interview</b>	<b>Incidence Rate Ratio (IRR)</b>
1-5 minutes	1.0000
6-10 minutes	1.234665
11-15 minutes	1.581354
More than 15 minutes	1.586665
<b>Language of interview</b>	<b>Incidence Rate Ratio (IRR)</b>
Yoruba language	1.0000
English language	1.5326667
<b>Age categories</b>	<b>Incidence Rate Ratio (IRR)</b>
30-50 years	1.0000
51-70 years	1.9417225
71-90 years	1.1235789
<b>Familiarity</b>	<b>Incidence Rate Ratio (IRR)</b>
Unfamiliar Respondents	1.0000
Familiar Respondents	1.209975
<b>Level of Education</b>	<b>Incidence Rate Ratio (IRR)</b>
Primary	1.0000
Secondary	1.2712579
Tertiary	1.5419527
<b>Number of visit</b>	<b>Incidence Rate Ratio (IRR)</b>
One visit	1.0000
Two visits	1.0096
Three visits	1.0030435
Four visits	1.002353
Five visits	0.1200002
<b>Sex</b>	<b>Incidence Rate Ratio (IRR)</b>
Female	1.0000
Male	0.854966
<b>House ownership</b>	<b>Incidence Rate Ratio (IRR)</b>
Tenant	1.0000
Owner occupier	0.925
<b>Employment status</b>	<b>Incidence Rate Ratio (IRR)</b>
Unemployed respondents	1.0000
Employed respondents	1.003194
<b>Duration of residence</b>	<b>Incidence Rate Ratio (IRR)</b>
1-5 years	1.0000
6-10 years	1.333665
11-15 years	1.584354
16 years and above	1.814665
<b>Tribe</b>	<b>Incidence Rate Ratio (IRR)</b>
Nigerian	1.0000
Non Nigerian	0.479778

$$IRR = \frac{\text{response from target population}}{\text{response from reference level}}$$

## CONCLUSION

Females respond better to survey questions than males. The higher the educational qualification, the higher the response rate. The response rate from those that were living with their spouse was higher than those that were not living with their spouse. The response from those that were interviewed in the English language was higher compared with those that were interviewed in the Yoruba language. Respondents at the middle age (50-79 years) respond better to survey questions compared with youth and old age respondents.

The response rate from those that are familiar with the interviewer was higher than those that are not familiar with the interviewer. Response rates increased from first visit to fourth visits and at the fifth visit, it declined. Response rates from tenants were higher than from owner occupiers.

There was no significant difference in the response rate from unemployed respondents and employed respondents. The more the number of years a respondent has spent in his/her community, the more they response to survey questions. The response from Nigerians was higher than that of the non-Nigerians.

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