Using Survey Paradata

Gina Cheung, Andrew Piskorowski, Lisa Wood, and Hueichun Peng, University of Michigan Survey Research Center, United States

1. Abstract

Paradata that are captured during the survey process are a valuable source of information in helping us understand and improve the data collection process.

One of the advantages of using Blaise for survey data collection is the rich capture of paradata that is native to the application. Paradata which are linked directly to the administration of a survey instrument are collected automatically through the Blaise software (i.e., audit trail). The ADT file from Blaise 4 has been very valuable in understanding interviewer behavior. With the advent of BlaiseIS and Blaise 5, we now are able to increase the richness of our paradata collection for understanding respondent behavior on web-SAQ (self-administered questionnaires) and/or mixed mode projects (i.e., interviewer and web-SAQ combined).

The main focus of this paper will be to provide some practical examples to illustrate how the survey paradata can be used to inform decision making throughout the data collection process and assist in fieldwork monitoring.

Specific practical uses include:

- Examining question timings and survey routing (i.e., which questions were asked but not answered and which questions were not seen due to survey logic?)
- Improving questionnaire design (including mobile survey design)
- Recovering lost survey data
- Identifying issues related to quality control
- Understanding respondent and interviewer behavior within a survey

These examples will illustrate the value of the native Blaise paradata and the supplemental survey paradata captured at the University of Michigan. Also some of the challenges/limitations of the native Blaise 5 paradata will be considered.

2. Introduction

Paradata that are captured during the survey process are a valuable source of information in helping us understand and improve the data collection process.
"Traditionally" paradata includes:

- Interviewer (experience, training grades, historical performance)
- Sample segments (PSU, Stratum, observations)
- Address (probability of selection, observations, # contacts, status)
- Screener contacts (call #, interviewer, time, date, informant behavior, outcome)
- Household (composition, informant behavior, sample respondent characteristics)
- Main interview contacts (call #, interviewer, time, date, informant behavior, outcome)

"Now" paradata also includes…

- Audit trails (keystrokes, timings, functions, consistency checks, suspensions)
- Sample management system (log and timing of actions)
- Digital photos
- Fingerprints
- GPS (Global Positioning System)
- Digital recordings
- Collection of various anthropometric data using digital devices

One of the advantages of using Blaise for survey data collection is the rich capture of paradata that is native to the application. Paradata which are linked directly to the administration of a survey instrument are collected automatically through the Blaise software (i.e., audit trail, called ADT file). The ADT file from Blaise 4 has been very valuable in understanding interviewer behavior. With the advent of Blaise 5, we now are able to increase the richness of our paradata collection for understanding respondent behavior on web-SAQ (self-administered questionnaires) and/or mixed mode projects (i.e., interviewer administrated and web-SAQ combined).

The main focus of this paper will be to provide some practical examples to illustrate how the survey paradata can be used to inform decision making throughout the data collection process and assist in fieldwork monitoring.

Specific practical uses include:

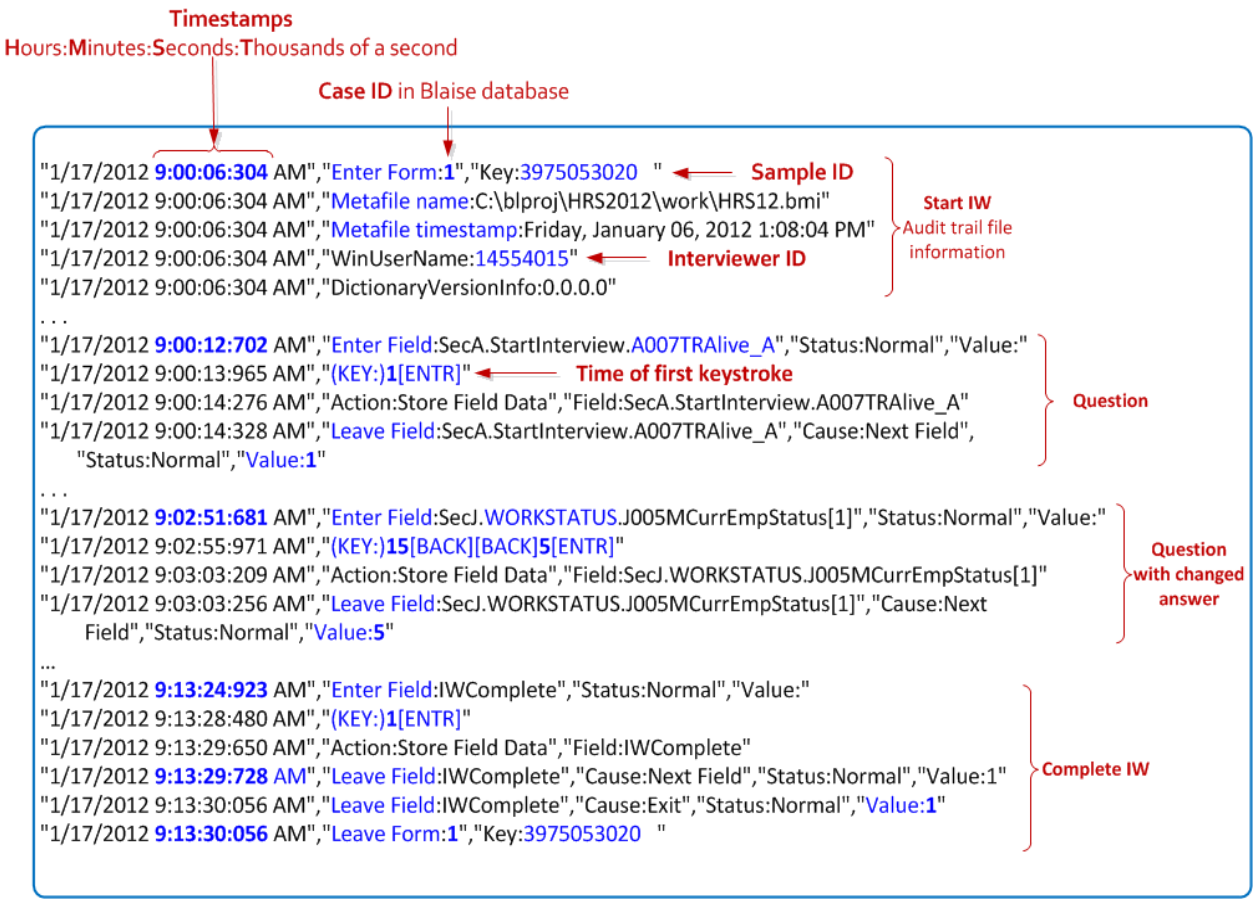
- Examining question timings and survey routing (i.e., which questions were asked but not answered and which questions were not seen due to survey logic)
- Understanding respondent and interviewer behavior within a survey
- Identifying issues related to quality control
- Improving Web questionnaire design

We discuss each of these examples in detail to illustrate the value of the native Blaise paradata and the supplemental survey paradata captured at the University of Michigan.

3. Blaise Audit Trail File

Blaise Statistics Netherlands provides a default program that permits users to record audit trails for all Blaise cases automatically. Every time a field in the instrument is entered or exited, or a specific action is performed, a record containing a time stamp and the current name, value, and state of the field is created. In the past 15 years, the UM Survey Research Center has created a few systems to parse out the ADT file as well as systems designed to utilize the ADT data for reporting purposes. Figure1 is an illustration of a typical Blaise ADT file layout.

Figure 1. Typical Blaise ADT file layout



Here is a list of IBUC papers related to use Blaise Audit Trail files presented by UM SRC staff

- IBUC 2001: Reporting on Item Times and Keystrokes from Blaise Audit Trails by Sue Ellen Hansen and Theresa Marvin, University of Michigan
- IBUC 2004: Replaying Blaise Audit Trail Files for Data Verification by Jason Langfahl
- IBUC 2004: Replaying ADK Files for Testing Blaise Applications by Jason Ostergren and Rhonda Ash
- IBUC 2004: Blaise AT Report System by Youhong Liu, Eduardo Galvan, and Gina Cheung
- IBUC 2006: Blaise PlayBack And Recovery System by Youhong Liu and Gina-Qian Cheung
- IBUC 2012: Blaise Audit Trail Data in Relational Database by Joel Devonshire, Youhong Liu, and Gina Cheung
- IBUC 2013: Blaise 5 Paradata Requirements by Rebecca Gatward, Lisa Wood, Patty Maher and Gina Cheung
- IBUC 2013: Adding Business Intelligence to Paradata: The Blaise Audit Trail by Joel Devonshire and Gina Cheung

Review of the ADT data can reveal potential problems in question wording or question comprehension, for example, if a disproportionate amount of time is being spent on a single question. It might also reveal problems with the survey logic, for example, if a question is erroneously being skipped or displayed for respondents.

4. Using paradata to understand respondent and interviewer behaviors

4.1 Examine web SAQ (self-administrated questionnaire by the respondent) routing:

To reduce the burden on respondents, we have designed the web SAQ to allow a respondent to skip an answer and move onto the next question. But for analysis purposes, we need to know which questions are intentionally skipped as a function of instrument logic -NASK, and which questions are being skipped by respondents - NANS, either intentionally or unintentionally. In conjunction with the survey data and audit trail, we are able to identify fields within the survey that a respondent skipped without answering and fields that a respondent did not see – off route. The audit trail contains an entry for every field a respondent has entered or "focused" on. Comparing this list of fields from the audit trail to a list of survey data fields with responses, we are able to determine which fields were presented to the respondent [EnterField in the audit trail] but were not answered [no value in survey data] as well as which fields were never seen due to logic [no value in survey data] and [no value in audit trail]. In Figure 2, we can see some of this process.

Figure 2. NANS and NASK

		Audit Trail Data	
		Present	Missing
Survey Data	Answered	ANSWERED	ERROR
	Blank	NANS	NASK

SampleId	Sex	Age	Status_F	OverallFeel	ETS	ThinkEnlist	K001	K002
11111	1	22	1	1	8	NASK	1	2
22222	2	23	1	2	4	NASK	1	3
33333	2	24	1	3	3	NASK	1	2
44444	1	25	NANS	4	NANS	NANS	NANS	NANS
55555	1	26	2	1	NASK	2	1	1
66666	1	27	2	5	NASK	2	1	2
77777	1	28	2	2	NASK	NANS		

4.2 Trace interview routing to understand how the interviewer administered the interview:

The Blaise instrument can be designed with parallel blocks so that multiple sessions (topics) with multiple respondents in one household can be administered easily. For example, as shown in Figure 3, the interviewer can "jump" to any "cell" depending on the respondent's answers. This design provides a high level of flexibility for a large, complex household interview. However, it is important to know whether this kind of design flexibility has any impact on interview length.

Figure 3. Blaise instrument with parallel blocks

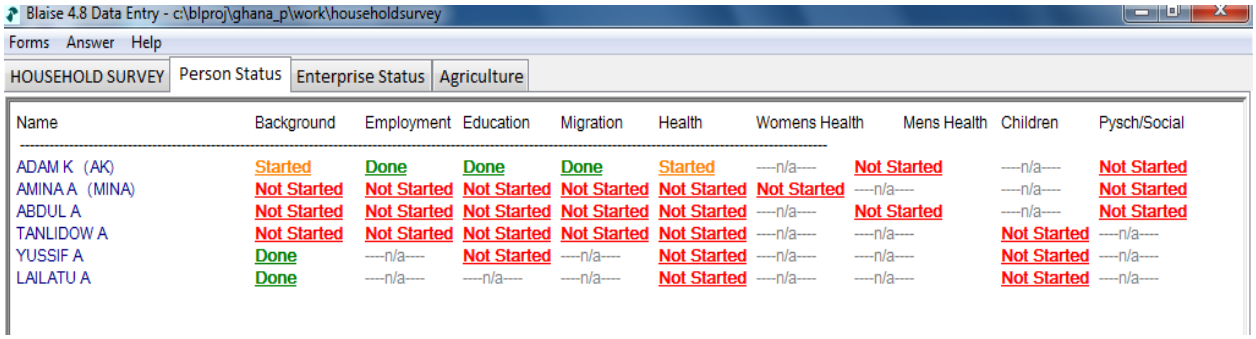
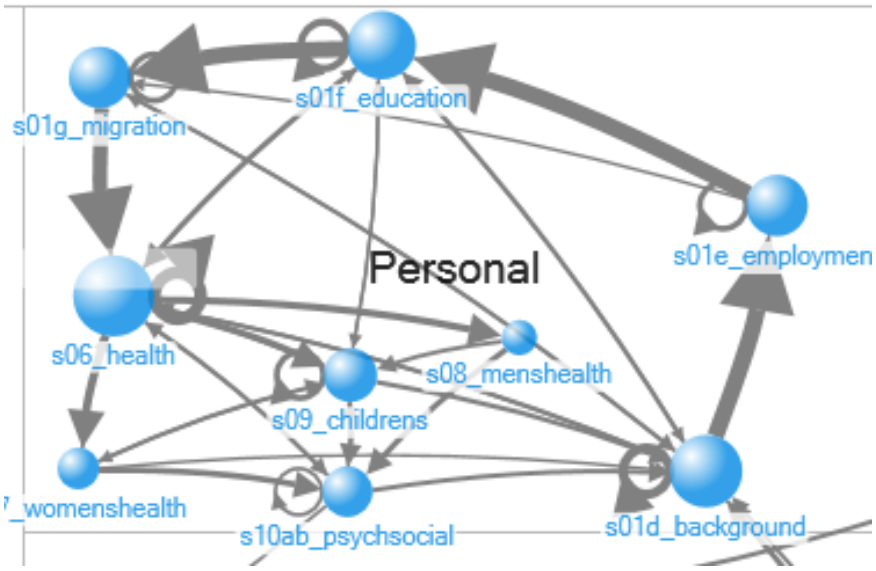


Figure 4 illustrates the multitude of paths an interviewer can take when administering an interview with parallel blocks. Most interviewers will follow the traditional route and ask one respondent to answer each item, in order, before moving onto the next respondent in the household; in Figure 4, this is depicted by the largest arrows. Another interviewing technique that an interviewer may use is to ask all respondents in a household to answer one item before moving onto the next item; in Figure 4, this is illustrated by the grey circle next to each item name. The remaining arrows in Figure 4 demonstrate alternate paths that may be taken throughout the interview based on how the respondent chooses to answer—or not answer—survey items. When comparing the various routes that an interviewer may take when administering an interview, the traditional route (asking one respondent to answer all survey items before moving onto the next respondent) proves to take less time than the alternative of asking all respondents to answer one survey item before moving onto the next survey item.

Figure 4. Routes taken by an interviewer when administering a survey with parallel blocks



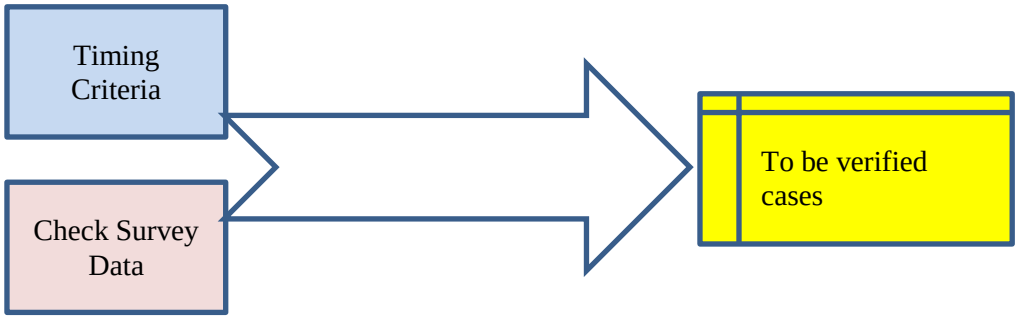
5. Using paradata for quality control

Traditionally, quality control procedures for some survey research organizations are categorized into three steps:

1. Verification by quality control team or verifiers;
2. Evaluation or live-monitoring of interviews;
3. Real-time data-driven assessment by project managers.

To reduce the cost of evaluations or verifications, and to increase the efficiency of the quality control process, many projects have been using Blaise ADT files to identify cases for evaluation or verification. Figure 5 provides a simple illustration of how paradata such as timing and review of the survey data might be used to efficiently select cases for verification.

Figure 5. Using Blaise ADT files to select "to-be verified" cases



The following examples are types of timing criteria that might be included in a paradata review:

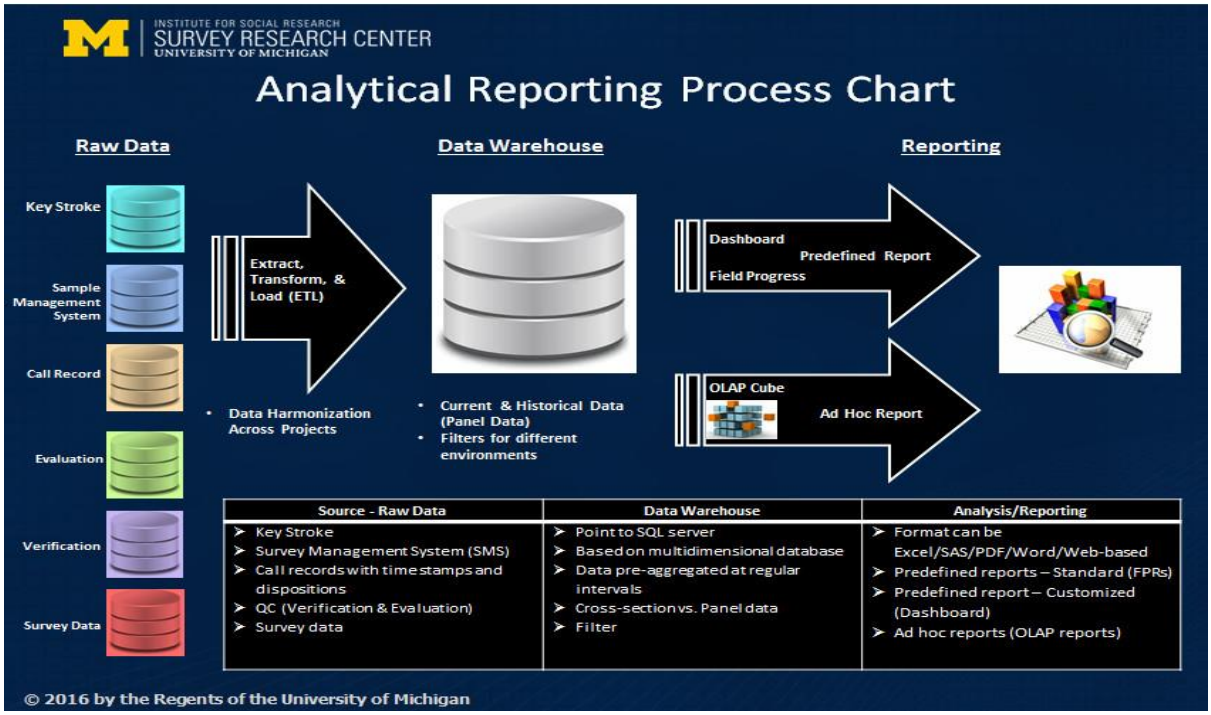
- Deviations from a pre-determine minimum time required to complete each module
- Interviewers who do not ask questions in a standard manner (such as any question read < 1 second)
- Long pauses within the questionnaire

In checking the survey data, review of paradata might include high rates of missing data or "No" responses to the following types of questions:

- Key Questions (most important questions)
- Sensitive Questions (%missing values)
- Branching Questions (%taking shortcut)
- Subjective Questions
- Vignettes (min time)

By using rich paradata, SRC at Michigan has created a QC reporting process. Figure 6 shows data warehouse extracts including not only Blaise (keystroke) data but also rich paradata including call records, sample management information, interview verification, and interviewer evaluation data. The automated system transforms the raw data, creates a relational database, and parses each file into SQL server columns. Eventually, the data are securely stored on the centralized server and can be more easily joined to other data sets and analyzed. Paradata are aggregated to create predefined field progress reports and the static quality control reports. Using the Online Analytical Processing (OLAP) Cube to access the data warehouse allows for fast and flexible queries.

Figure 6. UM SRC Analytical Reporting process Chart



6. Using paradata for improving web questionnaire design

With web surveys, research shows that there is a strong relationship between the presentation of the questionnaire and how respondents answer the questions. Even minor changes in the visual layout of the survey question can affect the way respondents answer. Therefore, it will be helpful for questionnaire design purposes to know exactly how the layout (and the display on the device) potentially impacts the answer or the way the response is provided.

Paradata provides information about the respondents' behavior on the question and web browser, and collects information about the respondents' environment, such as their browsers, OS, etc. This information helps analyze the respondents' behavior on the page and better understand the way respondents construct their answers. Recently, with the increasing number of respondents taking web surveys on smartphones and tablets of all different sizes, the way a questionnaire displays or behaves on mobile devices has become its own field of research. Even within the same brand of smartphone, there might be differences in screen layout due to screen size, specific version of operating system, and the browser used. This introduces new dimensions of research and complicates how to identify the relationship between questionnaire design and the respondents' behavior.

The following is a list of some key research items in regards to questionnaire design and paradata can help with research purpose.

- Break-off rates

Respondents using mobile devices seem to have higher break-off rates. They generally spend a longer time on the survey, and they exhibit lower response rates. Plausible explanations for these behaviors include:

  - Frustration with answering the question like scrolling, both vertical and horizontal
  - Font is too small and need pinch-in
  - Too much text to read on the small screen
  - Respondents' internet speed on the phone is too slow

- Page-load time is slow on mobile
- Respondents may be in a distracting environment when taking survey on a mobile device

- Screen Size

With the variety of device and screen size on mobile platforms (smartphone and tablets), research communities wish to know if the answers given on a small screen device (e.g. smartphone) differ from answers given on a large screen device (e.g. laptop or desktop computer). Although recently most web surveys will use mobile style-sheets for mobile platforms like responsive design, the screen layout may still vary within a single platform (like iPhone) due to different versions of the phone, aspect ratio and sizes.

- Grid question

The difficulties with presenting grid/table questions on a smaller mobile device like a smartphone or small tablet are a major concern with questionnaire design. The scrolling problems in either vertical or horizontal modes create challenges for respondents and are expected predictors of higher non-response or unreliable data. A common approach is to change a grid question to item-by-item questions on the same page. Either judging by the mobile OS or using media query, the page will automatically change from a grid/table layout to question level layout on a mobile device or viewport. However, this raises the concern that the change of display may affect the data or the respondents' judgement. (Revilla, Toninelli and Ochoa, 2015) The vertical scrolling required to answer item-by-item questions on the mobile device could result in increased non-response or less reliable data.

- Scrolling and long text (like consent statement)

The need for scrolling can potentially impact other aspects of the survey instrument as well. It is common to have information presented in a web survey that has long text/paragraphs, like consent forms or instructional paragraphs. Will the scrolling mean require a longer amount of time to download on a mobile device? Could this, in turn, be perceived by respondents to be more burdensome? Will the scrolling result in a higher rate of early break-offs? On a mobile device, what can we use to replace scrolling? Some surveys use an accordion format for long scrolling text or grid question. Will this format produce the same data quality?

Paradata is useful information to assist further analysis on all the above issues. Especially by collecting the User-Agent-String and other client-side paradata, we can identify the respondents' operating system, browser type and name of the device. This information, with other attributes captured via paradata functions and more detailed tracking of respondents' behavior, are likely to inform methodological issues in instrument design.

7. Final observation

- Rich paradata collection is becoming the norm
- Paradata can be used across the lifecycle for design issues as well as quality control
- Using paradata for data quality control monitoring is highly effective
- Paradata analysis should be specified throughout the data collection lifecycle but should also have a dynamic component for problem exploration
- Analyzing rich paradata can require a great deal of effort; well-designed systems can make a considerable difference

8. References

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