Making Audit Trails Accessible for the CE Quarterly Interview Survey

Brandon Kopp, Yezzi Angi Lee, Lucilla Tan

CE Methods Symposium
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Making **Audit Trails** Accessible

- Record of all navigation and data transactions within the instrument
- Built into the Blaise programming language
- Raw audit trail files are provided for each case for a given month

```
"6/12/2018 7:46:31 AM","Enter Field:Sect09.TableA.Row[1].Amount","Status:Normal","Value:"

"6/12/2018 7:46:41 AM","Action:Store Field Data","Field:Sect09.TableA.Row[1].Amount"

"6/12/2018 7:46:41 AM","Leave Field:Sect09.TableA.Row[1].Amount","Cause:Next Field",
"Status:Normal", "Value:32"
```

Example Audit Trail

"6/12/2018 7:34:45 AM","Leave Field:Sect03.Sect3A2.OTHERHOM","Cause:Next Field","Status:Normal","Value:2"

"6/12/2018 7:34:45 AM","Enter Field:Sect03.Sect3A2.BUSPROP3","Status:Normal","Value:2"

"6/12/2018 7:34:45 AM","Leave Field:Sect03.Sect3A2.BUSPROP3","Cause:Next Field","Status:Normal","Value:2"

"6/12/2018 7:34:45 AM","Enter Field:Sect03.Sect3A2.RESBUSPR","Status:Normal","Value:2"

"6/12/2018 7:34:45 AM","Leave Field:Sect03.Sect3A2.RESBUSPR","Cause:Next Field","Status:Normal","Value:2"

"6/12/2018 7:34:45 AM","Enter Field:Sect03.Sect3A2.SECHOME","Status:Normal","Value:1"

"6/12/2018 7:34:45 AM","Leave Field:Sect03.Sect3A2.SECHOME","Cause:Next Field","Status:Normal","Value:1"

"6/12/2018 7:34:45 AM","Enter Field:Sect03.Sect3A2.SEC_NUM","Status:Normal","Value:1"

"6/12/2018 7:34:46 AM","Leave Field:Sect03.Sect3A2.SEC_NUM","Cause:Next Field","Status:Normal","Value:1"

"6/12/2018 7:34:46 AM","Enter Field:Sect03.Sect3A2.NOBUILD","Status:Normal","Value:2"

"6/12/2018 7:34:46 AM","Leave Field:Sect03.Sect3A2.NOBUILD","Cause:Next Field","Status:Normal","Value:2"

"6/12/2018 7:34:46 AM","Enter Field:Sect03.Sect3A2.NOLONGER","Status:Normal","Value:1"

"6/12/2018 7:34:46 AM","Leave Field:Sect03.Sect3A2.NOLONGER","Cause:Next Field","Status:Normal","Value:1"

"6/12/2018 7:34:46 AM","Enter Field:Sect03.Sect3A2.NUMPRPTY","Status:Normal","Value:1"

*Does not contain actual respondent data

Consumer Expenditure Survey - Version 18.14 - 10/28/2016

Forms Answer Navigate Options Help Hide Watch Window

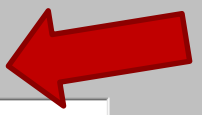
CE | Apt | Ros | Crp | Prs | Sts | FAQ | S1 | S2 | S3 | S6 | S7 | S8 | S9 | S10 | S11 | S13 | S16 | S17 | S18 | S19 | S20 | S21 | Pindx

In what month did you make the first payment on this mortgage?

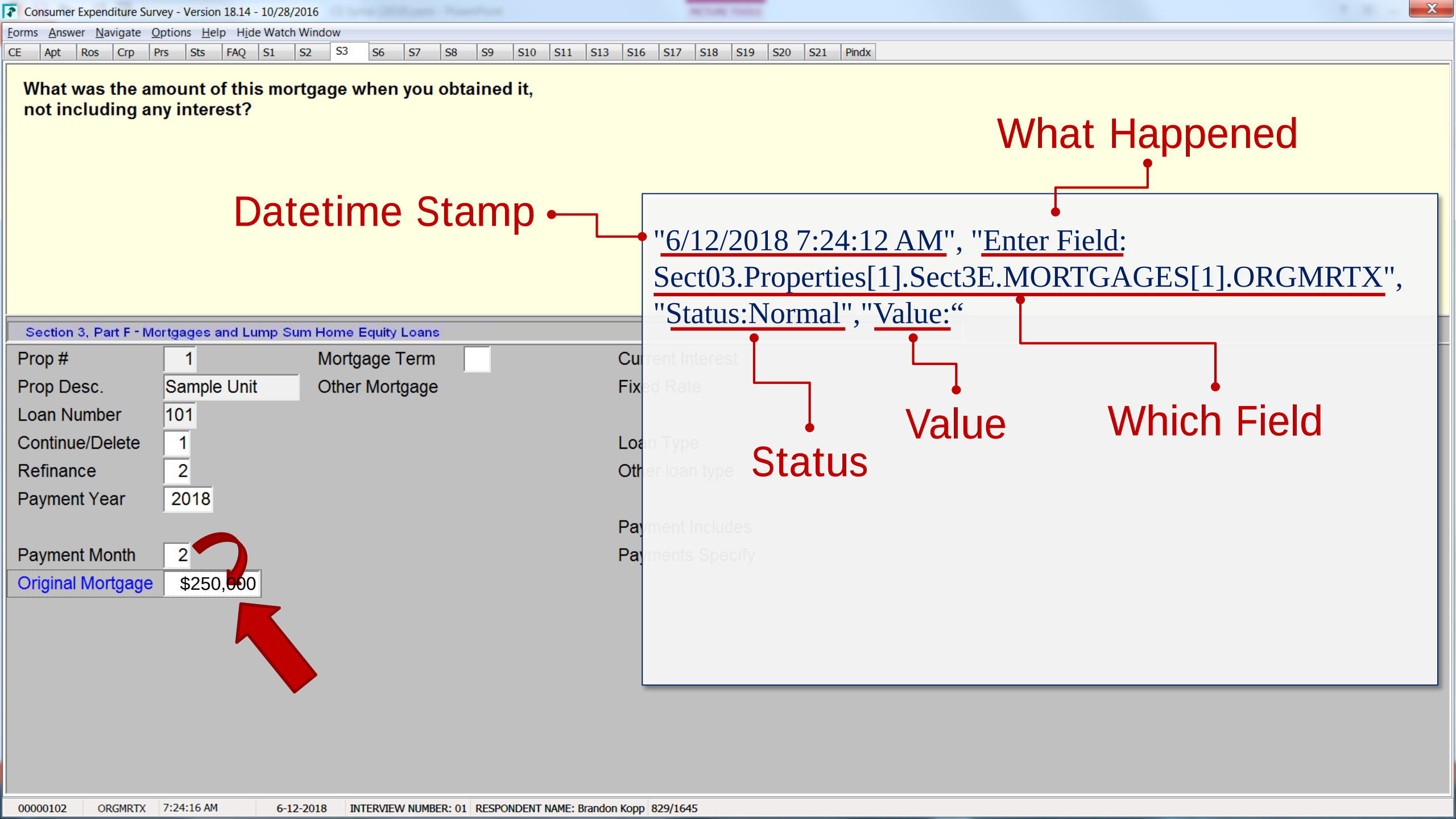
- 1. January
- 2. February
- 3. March
- 4. April
- 5. May
- 6. June
- 7. July
- 8. August
- 9. September
- 10. October
- 11. November
- 12. December

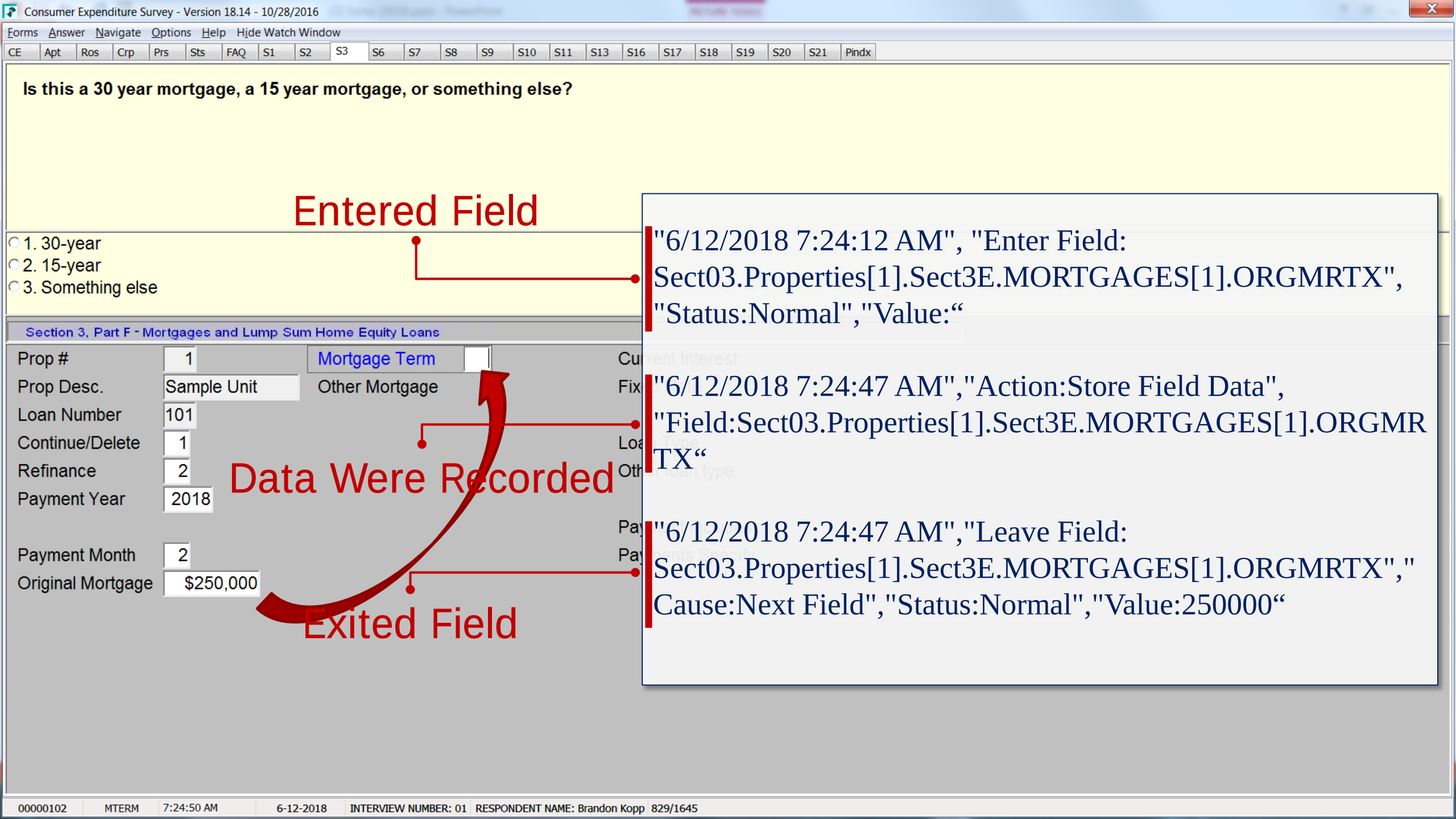
Section 3, Part F - Mortgages and Lump Sum Home Equity Loans

Prop #	1	Mortgage Term		Current Interest	
Prop Desc.	Sample Unit	Other Mortgage		Fixed Rate	
Loan Number	101				
Continue/Delete	1			Loan Type	
Refinance	2			Other loan type	
Payment Year	2018				
				Payment Includes	
Payment Month	2			Payments Specify	
Original Mortgage					



00000102 | FRSTPYMO | 7:23:46 AM | 6-12-2018 | INTERVIEW NUMBER: 01 | RESPONDENT NAME: Brandon Kopp | 829/1645


Consumer Expenditure Survey - Version 18.14 - 10/28/2016
Forms Answer Navigate Options Help Hide Watch Window
CE Apt Ros Crp Prs Sts FAQ S1 S2 S3 S6 S7 S8 S9 S10 S11 S13 S16 S17 S18 S19 S20 S21 Pindx
What was the amount of this mortgage when you obtained it, not including any interest?
Section 3, Part F - Mortgages and Lump Sum Home Equity Loans
Prop # 1
Prop Desc. Sample Unit
Loan Number 101
Continue/Delete 1
Refinance 2
Payment Year 2018
Payment Month 2
Original Mortgage $250,000
Mortgage Term
Other Mortgage
00000102 ORGMRTX 7:24:16 AM 6-12-2018 INTERVIEW NUMBER: 01 RESPONDENT NAME: Brandon Kopp 829/1645
What Happened
Datetime Stamp
"6/12/2018 7:24:12 AM", "Enter Field: Sect03.Properties[1].Sect3E.MORTGAGES[1].ORGMRTX", "Status:Normal","Value:“
Status
Value
Which Field


Consumer Expenditure Survey - Version 18.14 - 10/28/2016
Forms Answer Navigate Options Help Hide Watch Window
CE Apt Ros Crp Prs Sts FAQ S1 S2 S3 S6 S7 S8 S9 S10 S11 S13 S16 S17 S18 S19 S20 S21 Pindx
Is this a 30 year mortgage, a 15 year mortgage, or something else?
1. 30-year
2. 15-year
3. Something else
Entered Field
Section 3, Part F - Mortgages and Lump Sum Home Equity Loans
Prop # 1
Prop Desc. Sample Unit
Loan Number 101
Continue/Delete 1
Refinance 2
Payment Year 2018
Payment Month 2
Original Mortgage $250,000
Mortgage Term
Other Mortgage
Data Were Recorded
Exited Field
"6/12/2018 7:24:12 AM", "Enter Field: Sect03.Properties[1].Sect3E.MORTGAGES[1].ORGMRTX", "Status:Normal","Value:“
"6/12/2018 7:24:47 AM","Action:Store Field Data", "Field:Sect03.Properties[1].Sect3E.MORTGAGES[1].ORGMRTX“
"6/12/2018 7:24:47 AM","Leave Field: Sect03.Properties[1].Sect3E.MORTGAGES[1].ORGMRTX","Cause:Next Field","Status:Normal","Value:250000“
00000102 MTERM 7:24:50 AM 6-12-2018 INTERVIEW NUMBER: 01 RESPONDENT NAME: Brandon Kopp 829/1645

Making **Audit Trails** Accessible

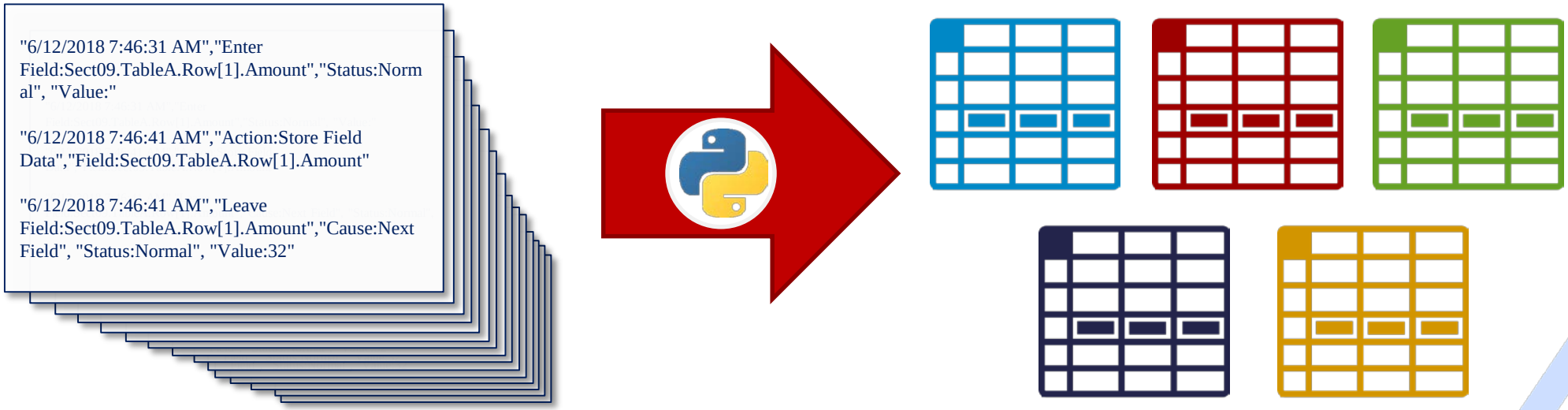
- How long did it take to answer the question?
- Was the answer changed?
- Were any errors triggered?
- Did the interviewer access any help materials?
- Did the interviewer come back to this question later?

Making Audit Trails Accessible

- Chan, Ho, Kang, Smith, & Tan (2004)
  - Used SAS to parse audit trail files into four tables
  - Prepared documentation for the audit trail tables
  - Conducted several analyses
  - Explored the idea of creating a long-term storage for future months of audit trail files
- Priorities changed and no further work was completed using the parsing program or the created datasets

Making Audit Trails Accessible

- This project looked to reprise the Chan et al. (2004) work with some modern updates
- The goal is to encourage researchers in the CE program to make use of the audit trail data to answer questions related to their branch
- Wrote a script that converts raw audit trail files into five rectangular datasets for easier analysis



Five Linked Tables

Case Table

Consumer unit for one month

Form Table

Instance where the instrument was opened and closed for a case

Field Table

Interaction with a data field in the instrument

Action Table

Audit trail line containing the “Action” keyword

Error Table

Triggered error and its resolution

Making Audit Trails Accessible

00000102.adt

"1/11/2018 10:06:57 AM","Enter Form:1","Key:00000102"
... Stuff happening
... Stuff happening
"1/11/2018 10:09:56 AM","Leave Form:1",
"Key:00000102"

"1/13/2018 11:19:56 AM","Enter Form:1","Key:00000102"
... Stuff happening
... Stuff happening
"1/13/2018 12:45:18 AM","Leave
Form:1","Key:00000102"

00000103.adt

"1/09/2018 06:19:56 PM","Enter Form:1","Key:00000103"
... Stuff happening
... Stuff happening
"1/09/2018 08:45:18 PM","Leave Form:1","Key:00000103"

Form Table

fprimary	month	year	order_enter	datetime_enter	order_leave	datetime_leave
p00000102	1	2018	1	1/11/2018 10:06:57 AM	42	1/11/2018 10:09:56 AM
p00000102	1	2018	43	1/13/2018 11:19:56 AM	1092	1/13/2018 12:45:18 AM
p00000103	1	2018	1	1/9/2018 06:19:56 PM	2832	1/9/2018 08:45:18 PM

Making Audit Trails Accessible

- Some Quick Stats (August 2017)

- Raw Audit Trail Files: 3,993
- Recorded Events: 3,756,625
- Mean Events per Case:
  - Complete: 1,662
  - Incomplete: 163
- Time to Parse: 8h 39m 24s

	Number of Rows	File Size
Case Table	3,993	0.7 MB
Form Table	16,950	1.4 MB
Field Table	1,247,006	181.6 MB
Action Table	853,618	73.2 MB
Error Table	11,652	2.1 MB
Total	2,133,219	259.0 MB

Making Audit Trails Accessible

- In addition to the parsing script, we have produced documentation for the newly created data tables
- Five tables will be produced for each month going forward
- Past months/years could be converted upon request or when time permits (more than 10 years' worth)
- Tables will be stored as .csv files on secured share drive
- Establish code repository
  - Reading in files
  - Simple calculations (e.g., section/question timing)

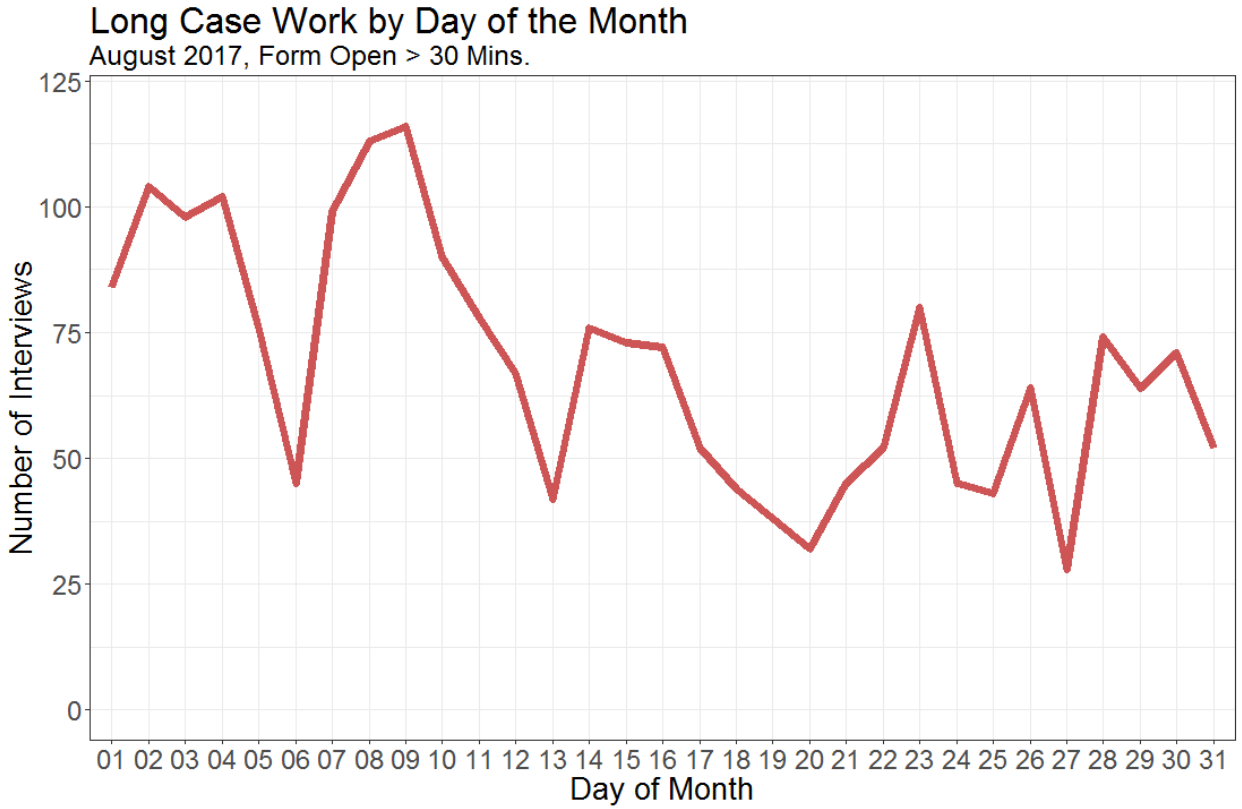
Keeping Audit Trails Going

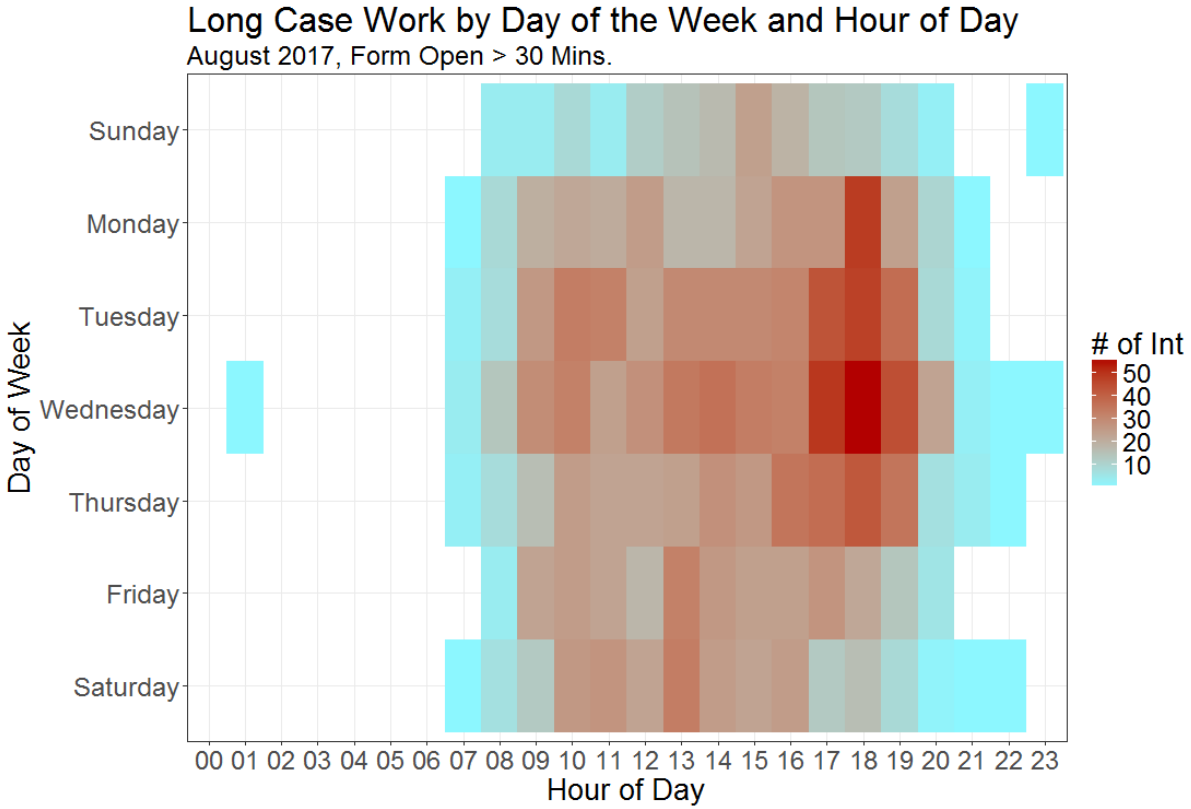
- We don’t want this project to suffer the same fate as Chan et al.
- We are building this pipeline for parsing audit trail files for CE Staff
- We are committed to knocking down barriers to CE Staff working with the parsed audit trails tables
  - Education/orientation
  - Providing sample analysis code
  - Generating research ideas

Making Audit Trails Useful

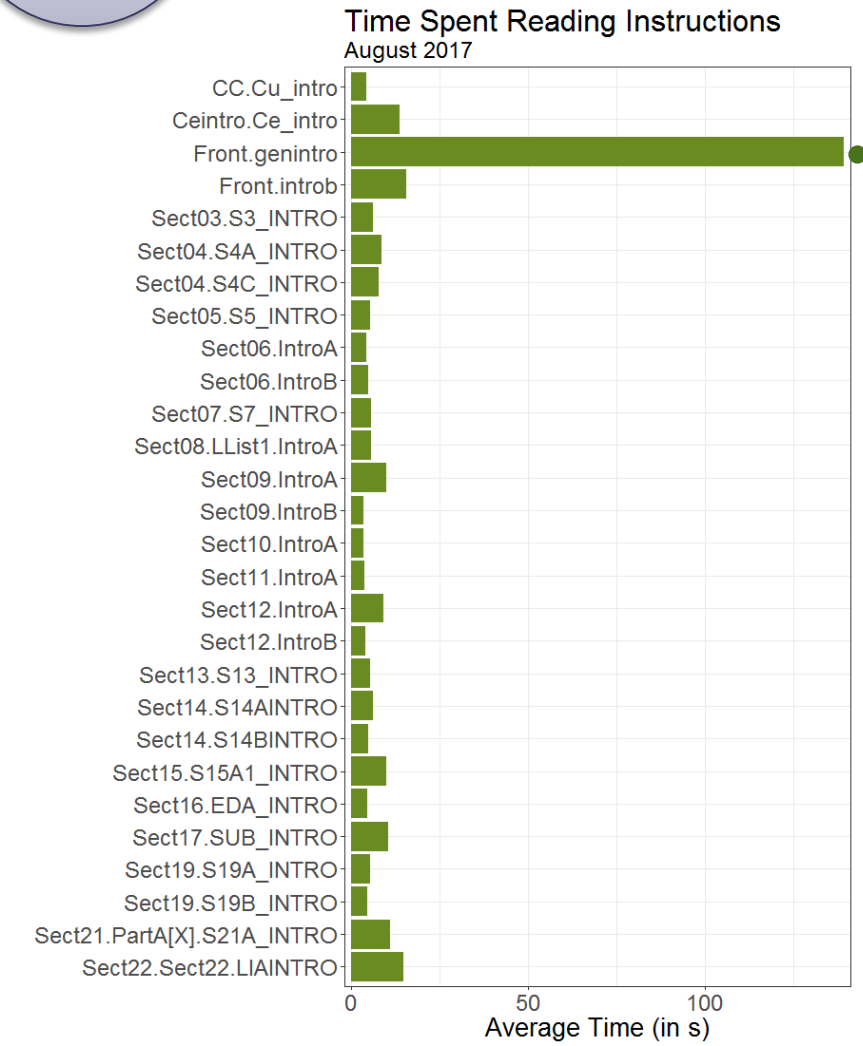
(Some Examples)

Form Table


Long Case Work by Day of the Month
August 2017, Form Open > 30 Mins.
Number of Interviews
125
100
75
50
25
0
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Day of Month


Long Case Work by Day of the Week and Hour of Day
August 2017, Form Open > 30 Mins.
Day of Week
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day
# of Int
50
40
30
20
10

Field Table



- Do not read as worded below

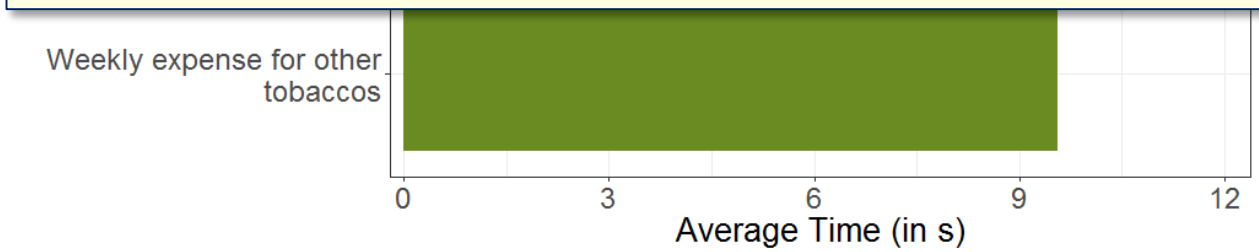
- Identify yourself - show I.D.
- Ask for eligible respondent
- Introduce survey - adjust introduction to last interview`s status and respondent
- The Household address is:
  5034 Blue Ct

- Read if necessary

I am (your name) **from the US Census Bureau. Here is my identification card. We are conducting a Consumer Expenditure survey for the Bureau of Labor Statistics. I have some questions I would like to ask you.**

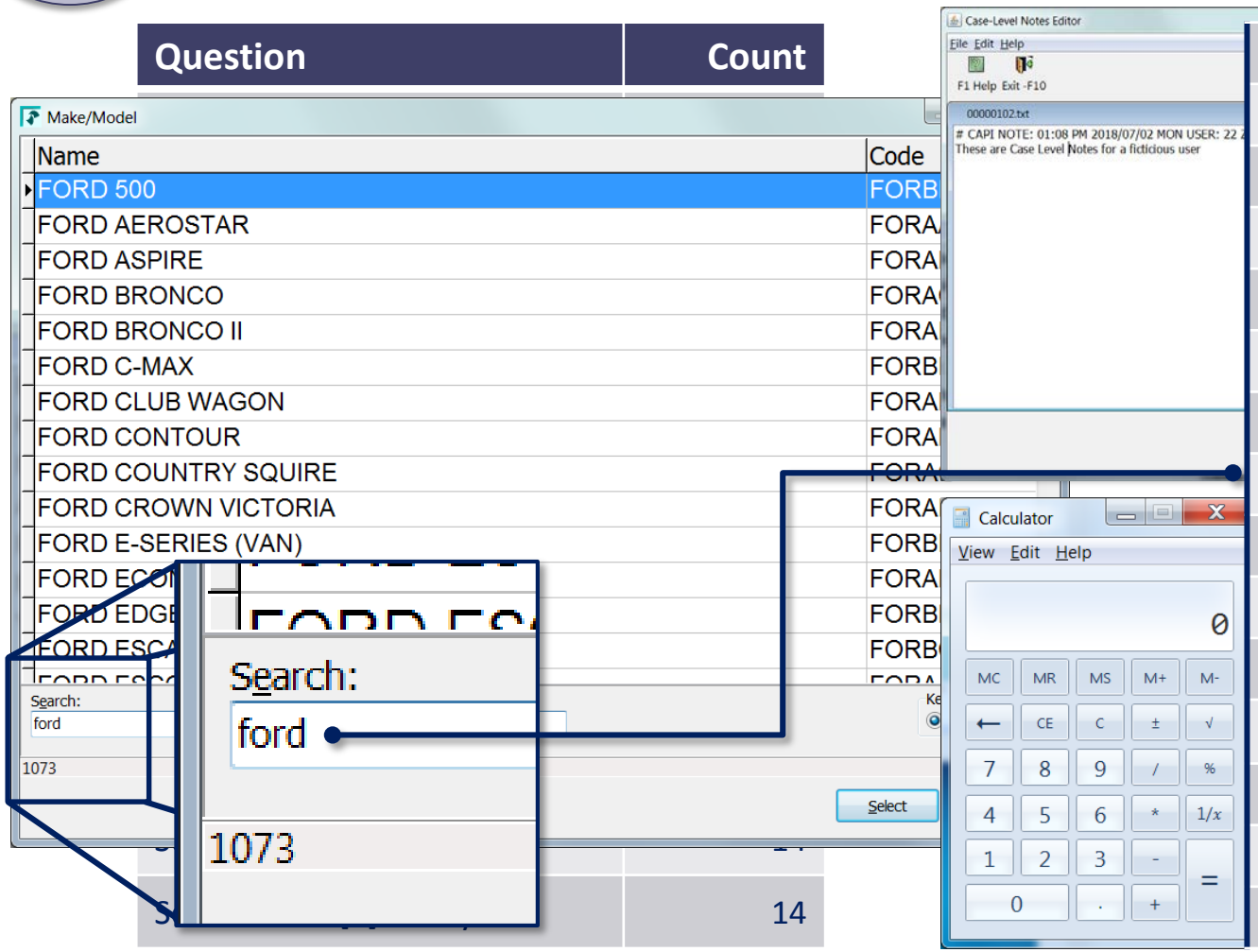
Did you receive our letter?

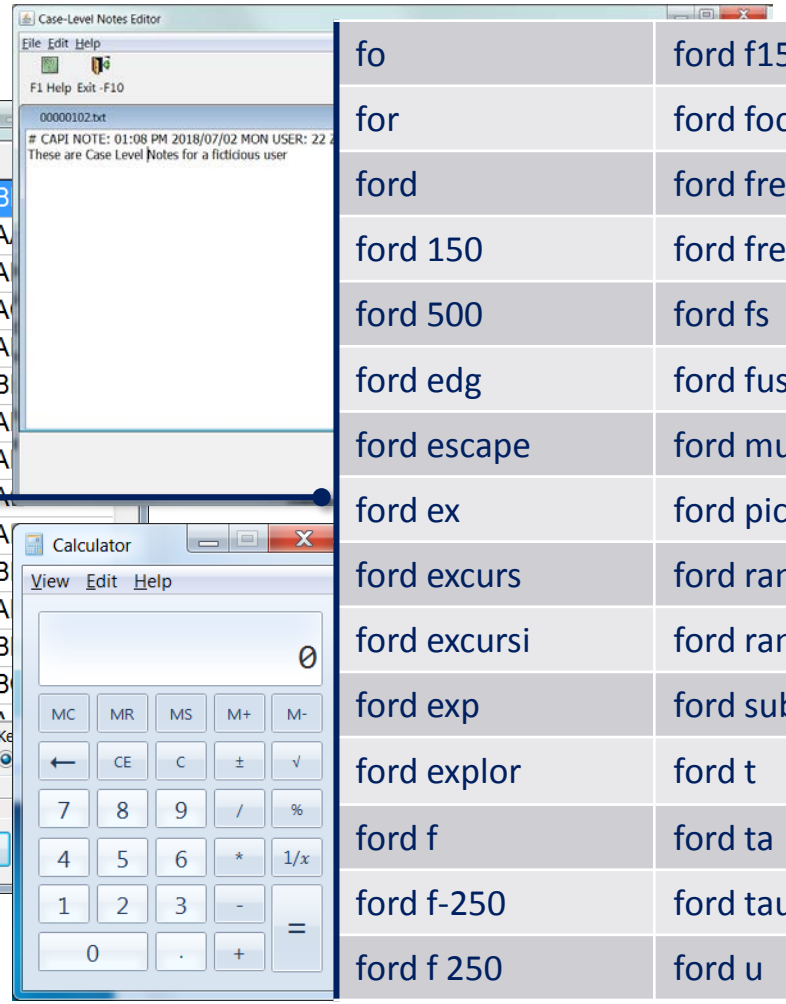
1. Yes
2. No
3. Non-interview



Action Table

Question	Count
S	14

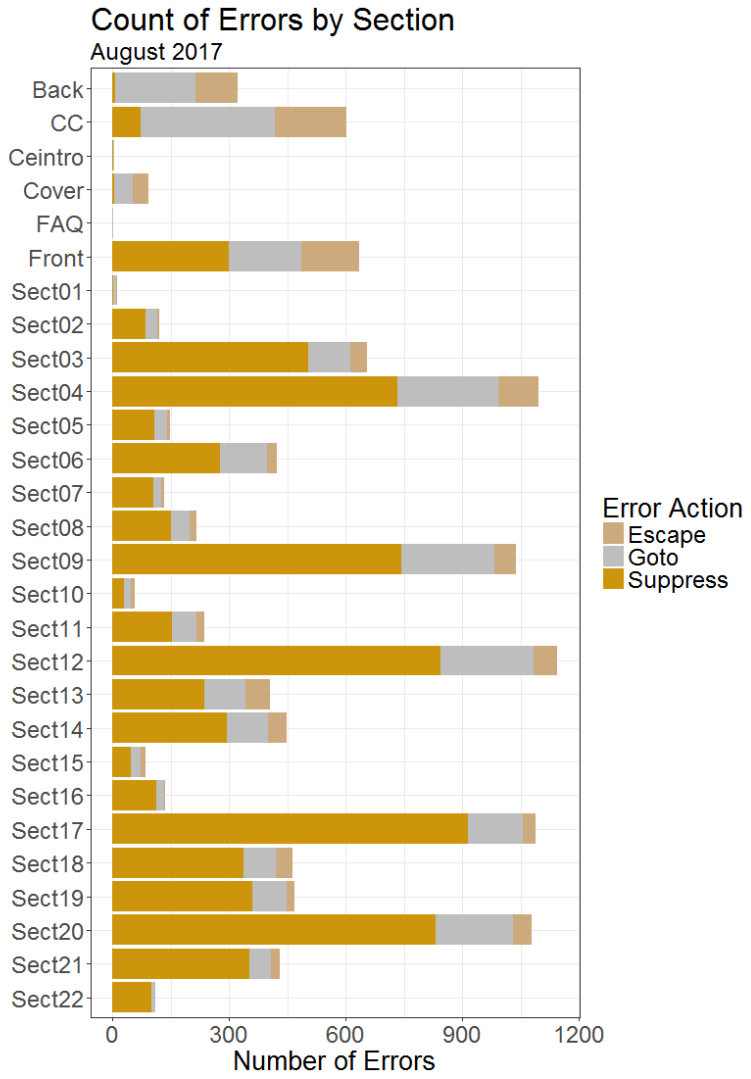




Ford-Related Search Terms

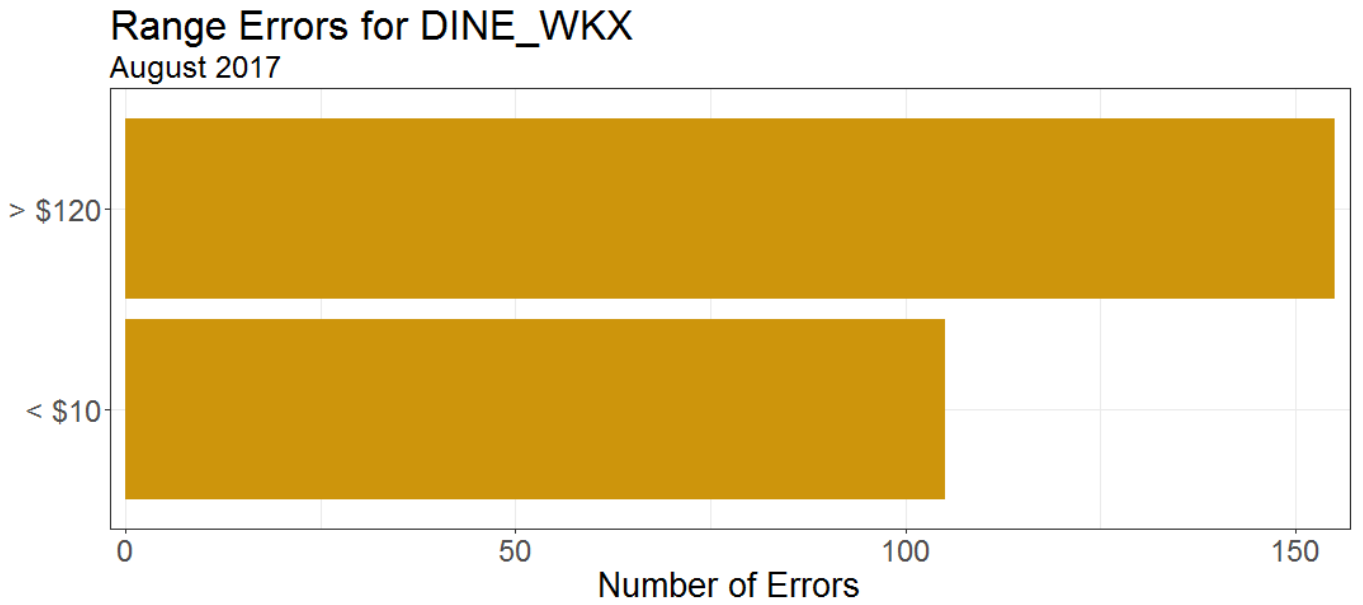
fo	ford f1502
for	ford focus
ford	ford free
ford 150	ford freestar
ford 500	ford fs
ford edg	ford fusio
ford escape	ford mus
ford ex	ford pick
ford excurs	ford ran
ford excursi	ford rang
ford exp	ford suber
ford explor	ford t
ford f	ford ta
ford f-250	ford tau
ford f 250	ford u

Error Table

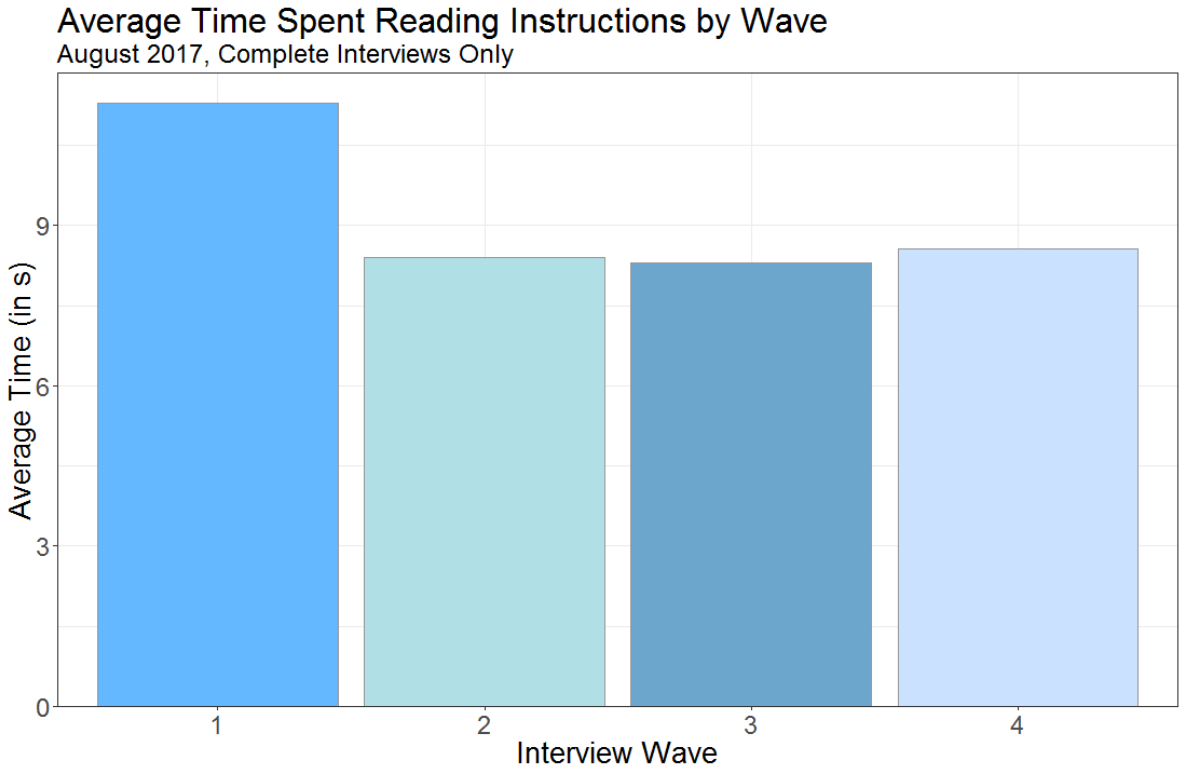


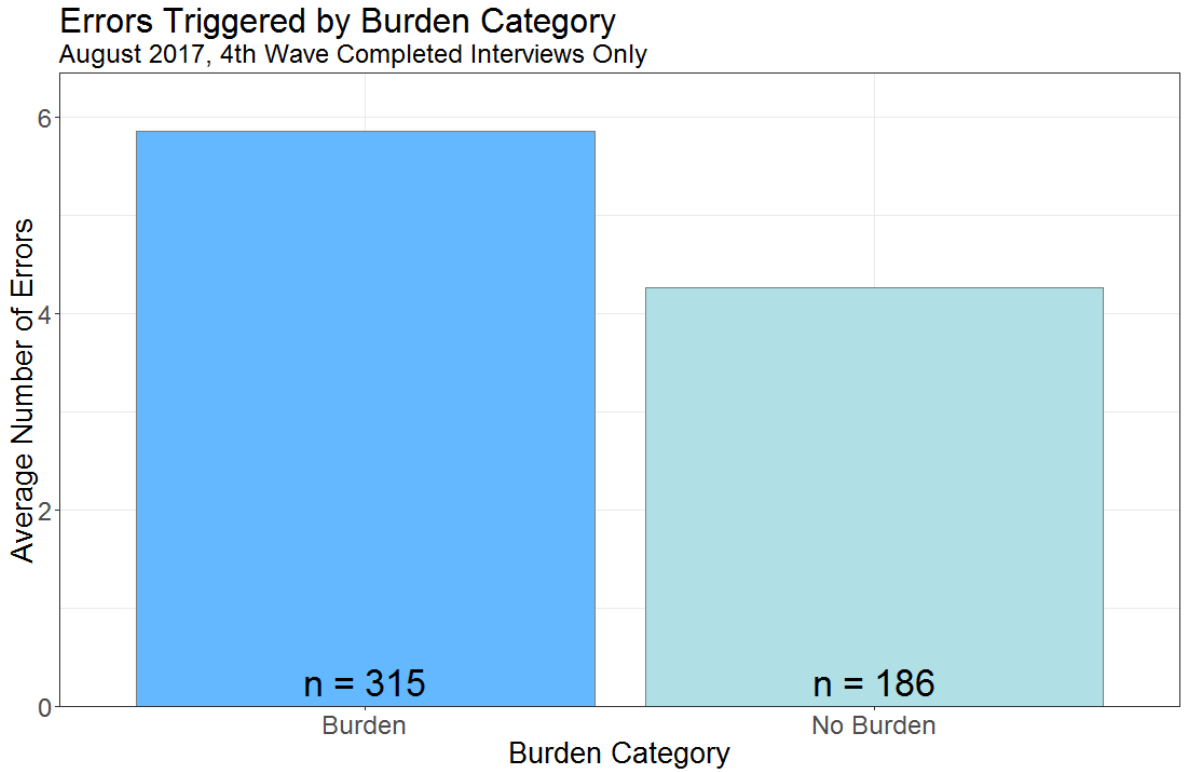
Questions That Trigger the Most Errors

Question	Error Text	Count
Sect20.DINE_WKX	THE VALUE ENTERED IS UNUSUALLY HIGH OR LOW PLEASE VERIFY	260
Sect09.TableA.Row[1].Amount	THE VALUE ENTERED IS UNUSUALLY HIGH OR LOW PLEASE VERIFY	254
Sect12.TableA.Row[1].Amount	THE VALUE ENTERED IS UNUSUALLY HIGH OR LOW PLEASE VERIFY	247
Sect20.SECT20B.SALONX	THE VALUE ENTERED IS UNUSUALLY HIGH OR LOW PLEASE VERIFY	162
Sect20.OTHSTUFX	THE VALUE ENTERED IS UNUSUALLY HIGH OR LOW PLEASE VERIFY	157



Case Table


Average Time Spent Reading Instructions by Wave
August 2017, Complete Interviews Only
Average Time (in s)
0
3
6
9
1
2
3
4
Interview Wave


Errors Triggered by Burden Category
August 2017, 4th Wave Completed Interviews Only
Average Number of Errors
0
2
4
6
n = 315
n = 186
Burden
No Burden
Burden Category

Contact Information

Brandon Kopp
Research Psychologist
Office of Survey Methods Research
www.bls.gov/osmr
202-691-7514
kopp.brandon@bls.gov