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# Updating the Classics: a New Life for Old Data

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Data Publishing and Curation Manager

IASSIST & CARTO 2018: Once Upon a Data Point:  
Sustaining our Data Storytellers

Montreal, Canada, 31<sup>st</sup> May 2018

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UK Data Service



University of Essex



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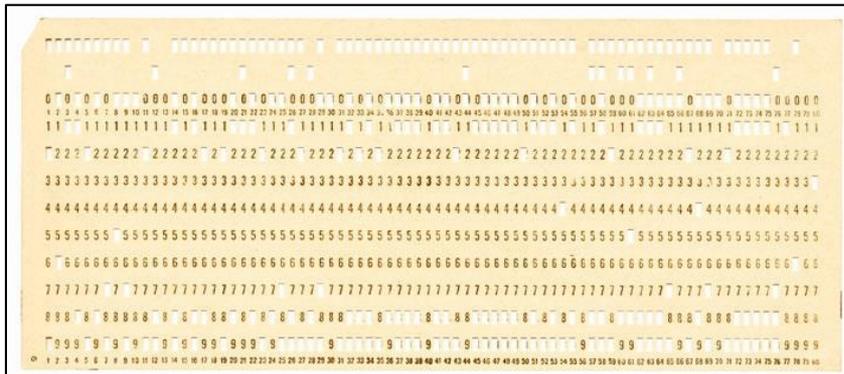
# Setting the scene

- 2016 Brexit referendum result:
  - What had changed since 1975? New interest in revisiting old research
- Worked with researcher to find the data needed
  - Public attitudes to UK foreign policy in late 1960s/early 1970s
  - Lots of literature but less data
  - National Opinion Polls (NOP) data had most potential
- Roper Center holds extensive collection, behind paywall
- UK Data Service holds many – some not used for a long time
  - Paper documentation scanned to PDF and available on web, but
  - Data in older 'column binary' format, difficult to use



# What is column binary data?

- Raw data once stored on computer punch cards - standard 80 columns of data occupies the 12 rows of each card. Data stored in this way are called column binary or multi-punch data, and allow more than one variable (in this case, survey question) to be stored in the same column (adapted from Landman, 1996)



- Read by card reader machine that creates digital column binary data files
- Data can't be read by current statistical packages without conversion

# Column binary layout

- 12 columns → 80 rows ↓
- Usually, & = value 11, - = 12, 0 = 10, 1-9 = 4-12, Blank=missing
- But not always – check the data!

```

:***:*****:***:
:Col:  &   -   0   1   2   3   4   5   6   7   8   9  Blank :Col: Punches
:***:*****:***:
:  1:                911                :  1:  911
:  2:                911                :  2:  911
:  3:                911                :  3:  911
:  4:                271  288  352                :  4:  911
:  5:                65  73  62   97  122  107  108  111  81  85                :  5:  911
:  6:                87  74  77   84  98  107  91  109  77  107                :  6:  911
:  7:                105 100  85   89  98  90  86  87  91  80                :  7:  911
:  8:                151 180 130 129 192 108  21                :  8:  911
:  9:                75  74 110 149 97  83  88   61  59 115                :  9:  911
: 10:                54  82  87   97  52 141  72 140  86 100                : 10:  911
: 11:                82 133  50  72  91 106  62  75  19 108  58  55                : 11:  911
: 12:                57  18   7  223 149 102 144  48  54  39  47  23                : 12:  911
: 13:                911                48  261                108 266  64 164                : 13: 1822 Multipunched
: 14:                1                199 552 156 290 535 83 291 398 219                : 14: 2724 Multipunched
: 15:                108   5   2  388 218  77  24  11 191  43  19  15   1                : 15: 1101 Multipunched
: 16:                237 289 331  44  7   1                4                : 16:  909 Multipunched
: 17:                1  206 437 213                5   2   1   4   1  60                : 17:  870 Multipunched
: 18:                323 163 258 513 153 235 317 284 343 322 130                : 18: 2911 Multipunched
: 19:                254 148 206 179 202 202 232 240 245 267 166                : 19: 2175 Multipunched
: 20:                140 215 201  92 207 195 162 177 137 132 252                : 20: 1658 Multipunched
: 21:                162 354 226 102 314 247 162 181 151 147 220                : 21: 2046 Multipunched
: 22:                1  298 229  35  22 314                3   2                14                : 22:  904 Multipunched
: 23:                356 358 187  2   1   2   2   2   1   9                : 23:  911 Multipunched
: 24:                224 537 130  3   3   1   1   2   1  21                : 24:  902 Multipunched
: 25:                669 567 555 611 774 398 408 600 256 45                : 25: 4838 Multipunched
: 26:                123 177 122 153  39 200 253  95 360 280                : 26: 1522 Multipunched

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## How did we get here?

- UK Data Archive 50 years old – large collection over lifetime
- Collection management requires time and resources, funding constraints had meant other work prioritised
- ‘Data archaeologist’ used documents from long-finished Gallup Poll project to develop conversion script for column binary > SPSS (Landman, 1996)
- Had used method before but never on this scale: over 50 datasets in NOP series, researcher needed c.30 in a timely fashion



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# Serendipity

- One-time extra funding agreed for collection management
- The mission – search and rescue
  - Find and convert the NOP series
- The quest
  - Recruited a curator and trained him in the tools to do the job
  - Background in data analysis
  - Programming in SPSS, using and manipulating syntax, running scripts
- The goal
  - Make the NOP series data available and easy to use



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## How do we do it?

- Make a map - tell the software where to look in the column binary data file and what to do with the information it finds
- Making the map depends on good metadata - if the map is correct you can find the treasure
- Did we have enough information to find our way? Write the script and see
- Documentation = curation notes, questionnaires, reports



# Metadata dream

<u>074 NOP 6728 (10 - 15 APRIL 1973)</u>			
CARD/ COLUMN	VAR NO	TITLE	CODES
1/1-4		Case Number	0000 - 9999
1/5-6		Card Number	01 Card 1
1/7-10		NOP Number	6728
1/11	1	Sex	1 Male 2 Female, housewife 3 Female, non-housewife
1/12	2	Marital status	1 Married 2 Single/ <del>widowed</del> /divorced/ separated
1/13	3	Head of household: Respondent	1 Male head of household 2 Female head of household 3 Not head of household
1/14	4	Number of people in household	1 1 2 2 3 3 4 4 5 5+
1/15	5	Children	1 Household has children under 16 2 Household has no children under 16
1/16	6	Age	1 16-20 2 21-24 3 25-34 4 35-44 5 45-54 6 55-64 7 65+
1/17	7	Class	1 A 2 B 3 C1 4 C2 5 DE



# Metadata nightmare

NON CONTACT ENTER X HERE

RANDOM ORBITAL QUESTIONNAIRE

Serial No. (Office Use)

1525

NOP/9538 9583 7

NAME: Mr/Mrs/Miss

ADDRESS: (In full)

TELEPHONE NO. (If any)

REGISTER NO.: POLLING DISTRICT (Letter &/or No.)

OCCUPATION OF HEAD OF HOUSEHOLD: (Write in)

SFX	(11)	CONSTITUENCY NO.	WHETHER 1ST OR 2ND INTERVIEW IN HOUSEHOLD	(25)
Male	1	(15) (16) (17) (18) (19) (20)	First	
Female, housewife	2		Second	
Female, non-housewife	3			
MARITAL STATUS		AGE FINISHED FULL TIME EDUCATION	REASON FOR NON-CONTACT	
Married	5	13-17	Refused	1
Single/Widowed/Divorced/Separated	6	15	Moved	2
		16	Dead	3
		17	Too ill	4
		18	On holiday	5
HEAD OF HOUSEHOLD (See instructions)		19	Away during survey	6
Male head of household	1	20	Not available after 4 or 5 move recalls	7
Female head of household	2	20+	House demolished/empty	8
Not head of household	3	Still at school/Full time student	Other (write in and ring)	9
		0		10
NUMBER OF PEOPLE IN THIS HOUSE		WHETHER RESIDENT WORKING	NO OF CALLS	(26)
2		Full time (10 hours or more)	DATE	
3		Part time (8 hours to 9 hours a week)	Day	1
4		Not working (ie less than 8 hours)	Tue	2
5+	(12)		Wed	3
CHILDREN		REASON FOR NON CONTACT	Thur	4
Household has children under 16	1	Working	Fri	5
Household has no children under 16	2	Non-Working	Sat	6
			Sun	7
AGE	(13)			8

SAP3: E2388A. BIN. and Fol

Title Public Attitude

the Police in Granada

Television area

Cards 19 Num 2-5

Ident 6/9

Num 20

Num 49/50

2cp

Get 12 R+ - 0

Get 16 R+ - 0

Get 17 R+ -

Get 18 R+ - 0 1 2 3 4

Get 19 R+ -

Get 13 R+ - 0 1 2 3 4

Get 14 R+ - 0 1 2

Get 15 R+ -

Get 21 R+ - 0 1 2 3

Skip 10/11

Get 22 R+ - 0 1 2

Get 23 R+ - 0 1 2 3

Get 24 R+ - 0 1 2

Get 25 R+ - 0

Get 26 R+ - 0

Get 27 R+ - 0 1

Get 28 R+ - 0 1

Spread 29

Spread 30 R+ - 0 1 2 3 4

Spread 31

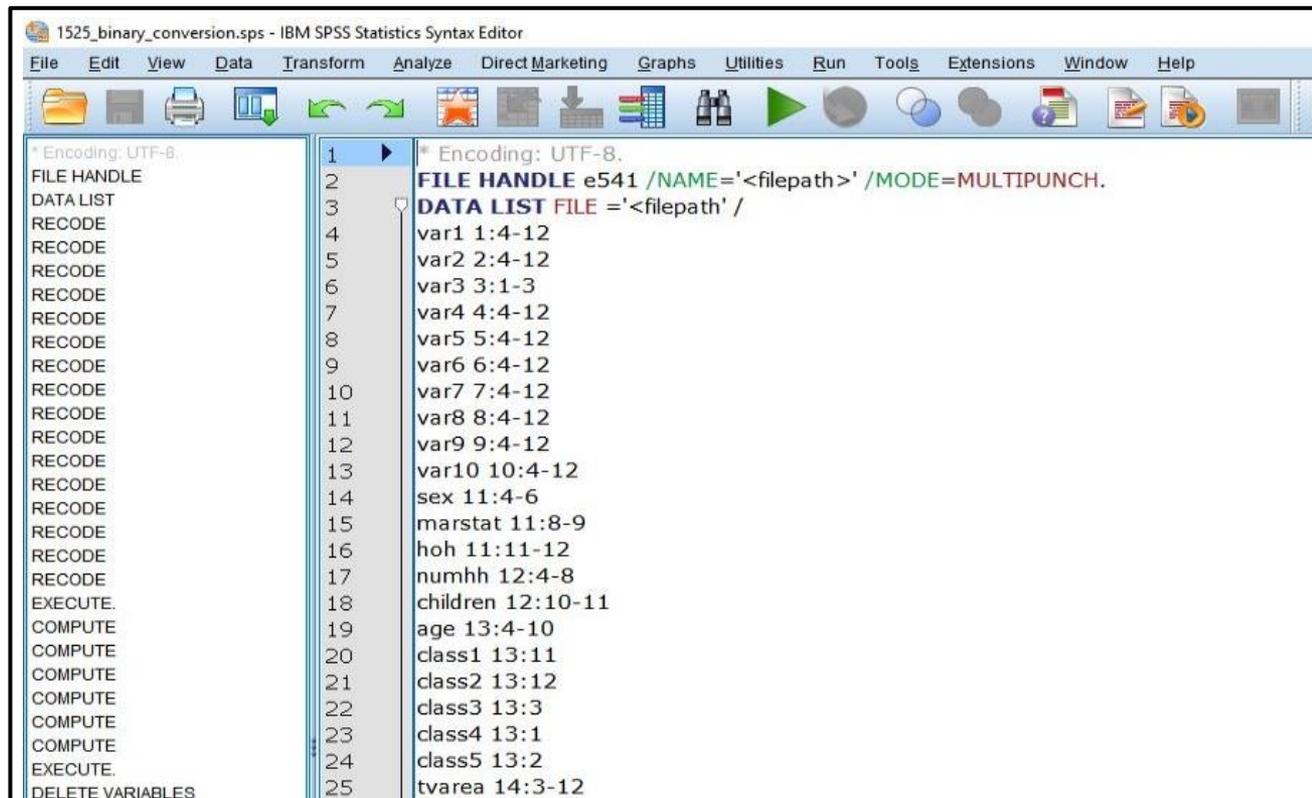
Spread 32 R+ - 0 1 2 3 4

Get 33 R+ - 0 1 2 3



# Drawing the map

- Write and format the script – no shortcuts
- Trial and error: run the script, check the results against the documentation – multipunch columns can cause errors
- Amend the script, run it again until data correct



The screenshot shows the IBM SPSS Statistics Syntax Editor window titled "1525\_binary\_conversion.sps". The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Run, Tools, Extensions, Window, and Help. The toolbar contains icons for file operations, editing, and running. The main text area displays the following syntax script:

```
* Encoding: UTF-8.
1 FILE HANDLE
2 DATA LIST
3 RECODE
4 RECODE
5 RECODE
6 RECODE
7 RECODE
8 RECODE
9 RECODE
10 RECODE
11 RECODE
12 RECODE
13 RECODE
14 RECODE
15 RECODE
16 RECODE
17 RECODE
18 EXECUTE.
19 COMPUTE
20 COMPUTE
21 COMPUTE
22 COMPUTE
23 COMPUTE
24 EXECUTE.
25 DELETE VARIABLES

* Encoding: UTF-8.
FILE HANDLE e541 /NAME='<filepath>' /MODE=MULTIPUNCH.
DATA LIST FILE ='<filepath>' /
var1 1:4-12
var2 2:4-12
var3 3:1-3
var4 4:4-12
var5 5:4-12
var6 6:4-12
var7 7:4-12
var8 8:4-12
var9 9:4-12
var10 10:4-12
sex 11:4-6
marstat 11:8-9
hoh 11:11-12
numhh 12:4-8
children 12:10-11
age 13:4-10
class1 13:11
class2 13:12
class3 13:3
class4 13:1
class5 13:2
tvarea 14:3-12
```

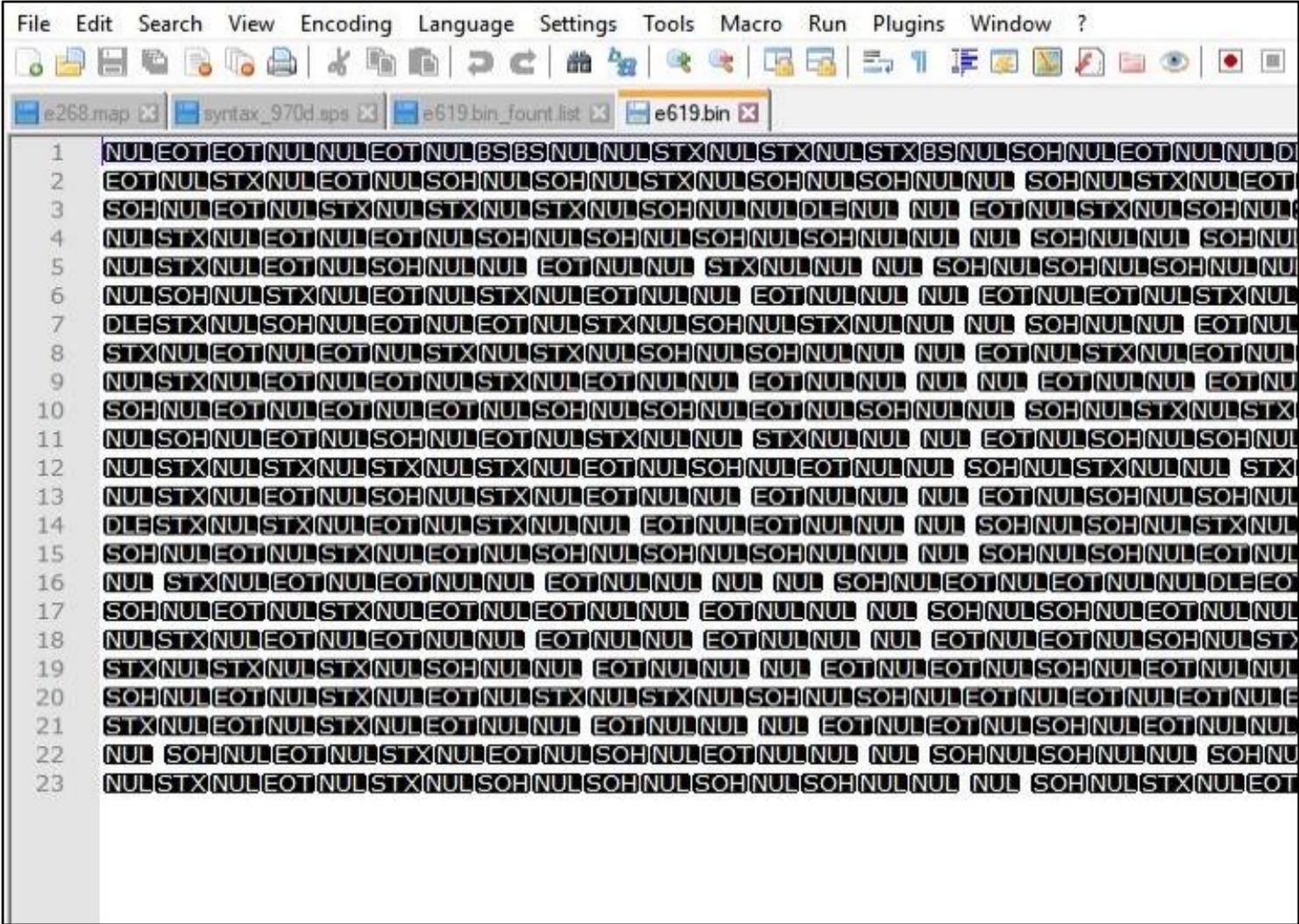
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## Completing the job

- Clean and label the data – recoding multi-punch variables, string characters to numeric, add metadata (variable and value labels)
- Enhance usability - apply robust UK Data Service curation standards
- Create preservation format (ASCII) and preservation metadata
- Create current standard dissemination formats – SPSS, Stata, tab-delimited text
- Upgrade scanned documentation – optical character recognition (OCR), PDF/A where possible
- Augment catalogue metadata



# Before ...



The screenshot shows a text editor window with the following menu items: File, Edit, Search, View, Encoding, Language, Settings, Tools, Macro, Run, Plugins, Window, ?. The toolbar contains various icons for file operations and editing. The active tab is 'e619.bin'. The main text area contains 23 lines of text, each consisting of a sequence of control characters: NUL, EOT, SOH, and STX. The text is as follows:

```
1 NUL EOT EOT NUL NUL EOT NUL BS BS NUL NUL STX NUL STX NUL STX BS NUL SOH NUL EOT NUL NUL D
2 EOT NUL STX NUL EOT NUL SOH NUL SOH NUL STX NUL SOH NUL SOH NUL NUL SOH NUL STX NUL EOT
3 SOH NUL EOT NUL STX NUL STX NUL STX NUL SOH NUL NUL D L E N U L N U L E O T N U L STX N U L SOH N U L
4 NUL STX NUL EOT NUL EOT NUL SOH NUL SOH NUL SOH NUL SOH NUL NUL NUL SOH NUL NUL SOH NUL
5 NUL STX NUL EOT NUL SOH NUL NUL EOT NUL NUL STX NUL NUL NUL SOH NUL SOH NUL SOH NUL NUL
6 NUL SOH NUL STX NUL EOT NUL STX NUL EOT NUL NUL EOT NUL NUL NUL EOT NUL EOT NUL STX NUL
7 D L E STX N U L SOH N U L E O T N U L E O T N U L STX N U L SOH N U L STX N U L N U L N U L SOH N U L N U L E O T N U L
8 STX N U L E O T N U L E O T N U L STX N U L STX N U L SOH N U L SOH N U L N U L N U L E O T N U L STX N U L E O T N U L
9 N U L STX N U L E O T N U L E O T N U L STX N U L E O T N U L N U L E O T N U L N U L N U L E O T N U L N U L E O T N U L
10 SOH N U L E O T N U L E O T N U L E O T N U L SOH N U L SOH N U L E O T N U L SOH N U L N U L SOH N U L STX N U L STX
11 N U L SOH N U L E O T N U L SOH N U L E O T N U L STX N U L N U L STX N U L N U L N U L E O T N U L SOH N U L SOH N U L
12 N U L STX N U L STX N U L STX N U L STX N U L E O T N U L SOH N U L E O T N U L N U L SOH N U L STX N U L N U L STX
13 N U L STX N U L E O T N U L SOH N U L STX N U L E O T N U L N U L E O T N U L N U L N U L E O T N U L SOH N U L SOH N U L
14 D L E STX N U L STX N U L E O T N U L STX N U L N U L E O T N U L E O T N U L N U L N U L SOH N U L SOH N U L STX N U L
15 SOH N U L E O T N U L STX N U L E O T N U L SOH N U L SOH N U L SOH N U L N U L N U L SOH N U L SOH N U L E O T N U L
16 N U L STX N U L E O T N U L E O T N U L N U L E O T N U L N U L N U L N U L SOH N U L E O T N U L E O T N U L N U L D L E O
17 SOH N U L E O T N U L STX N U L E O T N U L E O T N U L N U L E O T N U L N U L N U L SOH N U L SOH N U L E O T N U L N U L
18 N U L STX N U L E O T N U L E O T N U L N U L E O T N U L N U L E O T N U L N U L N U L E O T N U L E O T N U L SOH N U L ST
19 STX N U L STX N U L STX N U L SOH N U L N U L E O T N U L N U L N U L E O T N U L E O T N U L SOH N U L E O T N U L N U L
20 SOH N U L E O T N U L STX N U L E O T N U L STX N U L STX N U L SOH N U L SOH N U L E O T N U L E O T N U L E O T N U L E
21 STX N U L E O T N U L STX N U L E O T N U L N U L E O T N U L N U L N U L E O T N U L E O T N U L SOH N U L E O T N U L N U L
22 N U L SOH N U L E O T N U L STX N U L E O T N U L SOH N U L E O T N U L N U L N U L SOH N U L SOH N U L N U L SOH N U
23 N U L STX N U L E O T N U L STX N U L SOH N U L SOH N U L SOH N U L SOH N U L N U L N U L SOH N U L STX N U L E O T
```



# After ...

	Name	Type	W...	D...	Label	Values	Missing	Columns	Align	Measure
1	serial	Numeric	8	0	Serial number	None	None	8	Right	Scale
2	constituency	Numeric	3	0	Constituency number	None	None	15	Right	Nominal
3	class	Numeric	3	0	Social class	{1, AB}...	None	7	Right	Nominal
4	age	Numeric	3	0	Age groups	{1, 18-24}...	None	5	Right	Nominal
5	sex	Numeric	3	0	Sex	{1, Male}...	None	5	Right	Nominal
6	q1doctors	Numeric	3	0	Honesty and ethical standards: doctors	{1, High}...	0	11	Right	Nominal
7	q1mps	Numeric	3	0	Honesty and ethical standards: members of Parliament	{1, High}...	0	7	Right	Nominal
8	q1police	Numeric	3	0	Honesty and ethical standards: police officers	{1, High}...	0	10	Right	Nominal
9	q1tuleaders	Numeric	3	0	Honesty and ethical standards: trade union leaders	{1, High}...	0	13	Right	Nominal
10	q1busexecs	Numeric	3	0	Honesty and ethical standards: business executives	{1, High}...	0	12	Right	Nominal
11	q1localcounc	Numeric	3	0	Honesty and ethical standards: local councillors	{1, High}...	0	14	Right	Nominal
12	q1solicitors	Numeric	3	0	Honesty and ethical standards: solicitors	{1, High}...	0	14	Right	Nominal
13	q2	Numeric	3	0	What were root causes of recent riots (1981)	None	None	5	Right	Nominal
14	q3	Numeric	3	0	Policing of riots too tough/too soft/about right?	{1, Too toug...}	0	5	Right	Nominal
15	q4	Numeric	3	0	Favour or oppose creation of special riot police force	{1, Favour}...	0	5	Right	Nominal
16	q5	Numeric	3	0	Police usually fair or unfair when dealing with motoring offences?	{1, Fair}...	0	5	Right	Nominal
17	q6	Numeric	3	0	Would creation of special traffic police force improve/damage police-public relations?	{1, Improve}...	0	5	Right	Nominal
18	q7respect	Numeric	3	0	Respect the police?	{1, A lot}...	0	11	Right	Nominal
19	q7distrust	Numeric	3	0	Distrust the police?	{1, A lot}...	0	12	Right	Nominal
20	q7sympathise	Numeric	3	0	Sympathise with the police?	{1, A lot}...	0	14	Right	Nominal
21	q7fear	Numeric	3	0	Fear the police?	{1, A lot}...	0	8	Right	Nominal
22	q7hate	Numeric	3	0	Hate the police?	{1, A lot}...	0	8	Right	Nominal
23	q8	Numeric	3	0	Has your opinion of police changed over past few years and how?	{1, Not chan...}	0	5	Right	Nominal
24	q9	Numeric	3	0	How satisfied are you with the way your area is policed?	{1, Very sati...}	0	5	Right	Nominal
25	q10	Numeric	3	0	Should council representatives have more/less control over local area policing?	{1, More co...}	0	5	Right	Nominal
26	q11armed	Numeric	3	0	I think police should be armed more often	{1, Strongly ...}	0	10	Right	Nominal
27	q11corrupt	Numeric	3	0	There are now more corrupt police than before	{1, Strongly ...}	0	12	Right	Nominal
28	q11punish	Numeric	3	0	Police officers who break the law should be more severely punished than public	{1, Strongly ...}	0	11	Right	Nominal
29	q11methods	Numeric	3	0	Bad policing methods were partly responsible for causing recent (1981) riots	{1, Strongly ...}	0	12	Right	Nominal
30	q11wonderful	Numeric	3	0	I think the police are wonderful	{1, Strongly ...}	0	14	Right	Nominal
31	tumember	Numeric	3	0	Trade union member?	{1, Yes}...	0	10	Right	Nominal
32	phone	Numeric	3	0	Telephone at home?	{1, Yes}...	0	7	Right	Nominal
33	workstatus	Numeric	3	0	Working status	{1, Full time...}	0	12	Right	Nominal
34										



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## End of Part One

- Special funding finished, back to conversion where and when we can
- Celebrate achievements so far
  - Impact! Researcher soon to publish book:

*Clements, B. Public Opinion towards Foreign and Defence Policy in Britain, 1945-2017 (forthcoming, Routledge)*

- Not just NOP series, but >100 column binary datasets upgraded to current formats
- Proven conversion methodology – scripts and algorithms work
- Trained curator in useful data science skills



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# Looking forward to Part Two

- Remaining column binary datasets to convert
- Modify scripts to work in other software (R, SAS, others?)
- Make scripts available to others, user guide, GitHub?
- These data born digital to UK Data Archive, need machine to read hard copy cards
- Renewed interest in data rescue (Research Data Alliance (RDA) Data Rescue IG)
- New funding opportunities for collection management?



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# Questions

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