ICPSR


# Managing research and data for reproducibility and transparency

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Office of Planning, Research and Evaluation

2019 Open Science Methods Meeting

# ICPSR

Founded in 1962 by 22 universities, now consortium of ~800 institutions world-wide

Focus on social and behavioral science data, broadly defined

Current holdings

- 11,000 studies, quarter million files
- 1500 are *restricted studies*, almost always to protect confidentiality
- Bibliography of Data-related Literature with 80,000 citations

Approximately 60,000 active MyData (“shopping cart”) accounts

Thematic collections of data about addiction and HIV, aging, arts and culture, child care and early education, criminal justice, demography, health and medical care, and minorities

# What is reproducibility?

Can another researcher obtain the same results, using the same data and code?

- Can they access the data and code?
- If they can, are their results the same?
  - If not, why not?

Replication versus reproduction

- Same substantive inference with other data, specification

# Why does reproducibility matter?

1. Knowledge building
   - Is it true?
     - Challenges of p-hacking, especially in a big data world
   - Why is it true?
2. Credibility
   - How do others know it is true?
     - Traditional refereeing process and imprimatur of the academy
       - No longer enough
         - Internet and post-modernism undermined gatekeeper role
     - Confidential and found data confound even the referees

The “crisis of reproducibility” undermines the use of science for evidence-based policy

Psychology, economics, but also health, others

# Sharing is caring

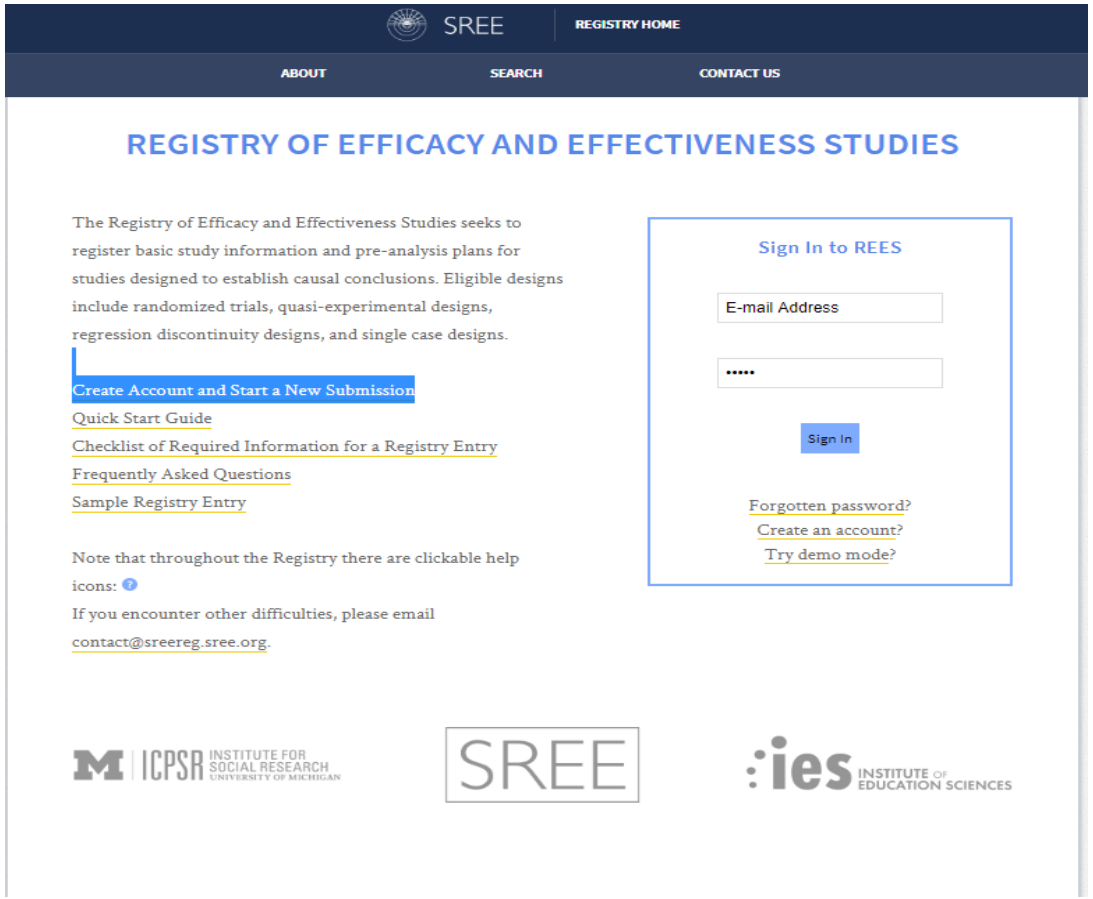
Reproducibility requires sharing data and code
- Respect for study participants
- Minimize burden and increase impact
- Incremental knowledge building
- Trust and credibility

Plan for data sharing
- Preregister research
- Data management plan
- Consent statement

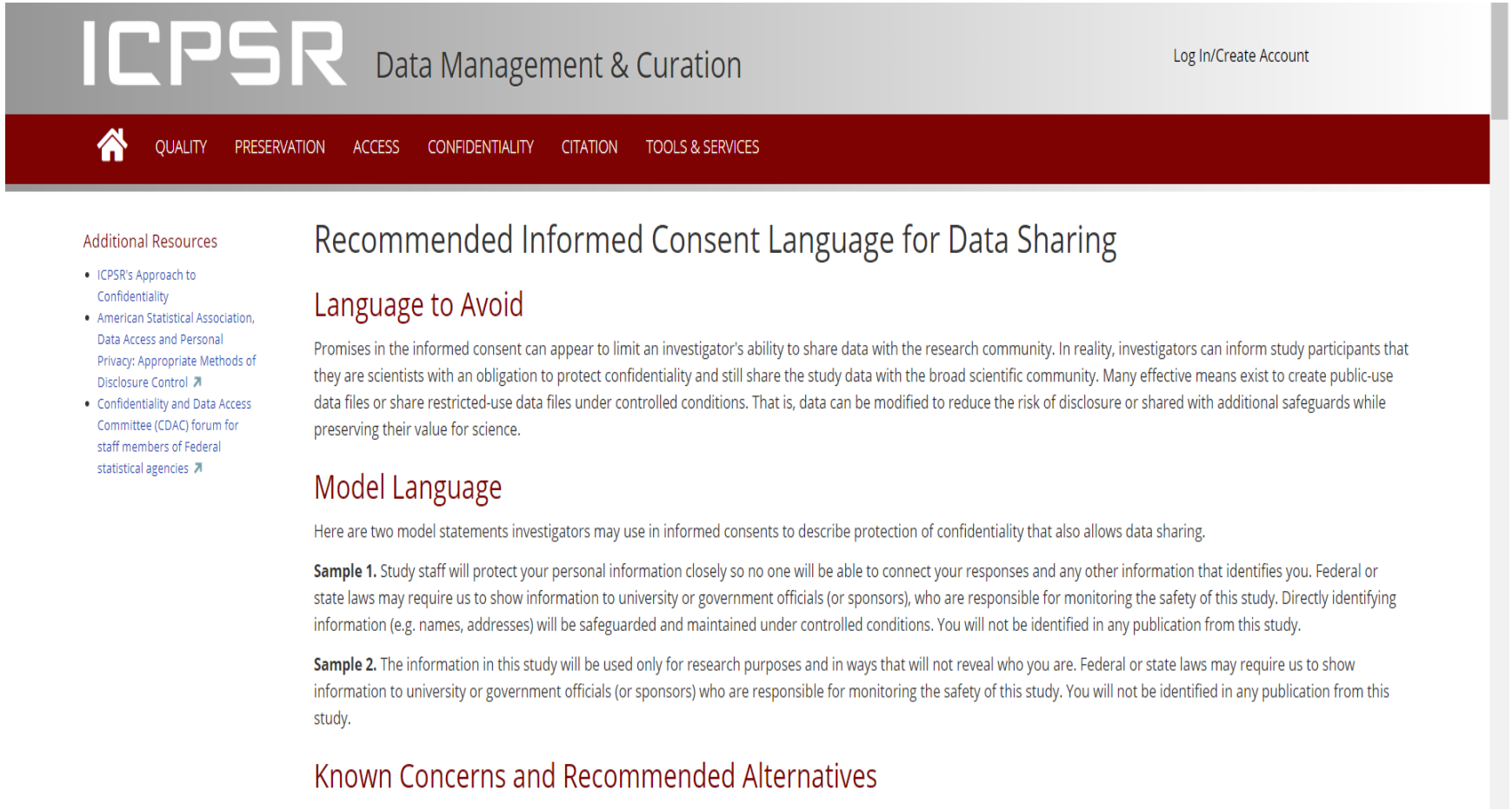
# Resources for sharing

Preregistration for education effectiveness studies

https://sreereg.icpsr.umich.edu/



# Resources for sharing




https://www.icpsr.umich.edu/icpsrweb/content/datamanagement/confidentiality/conf-language.html

# Consent statements and sharing

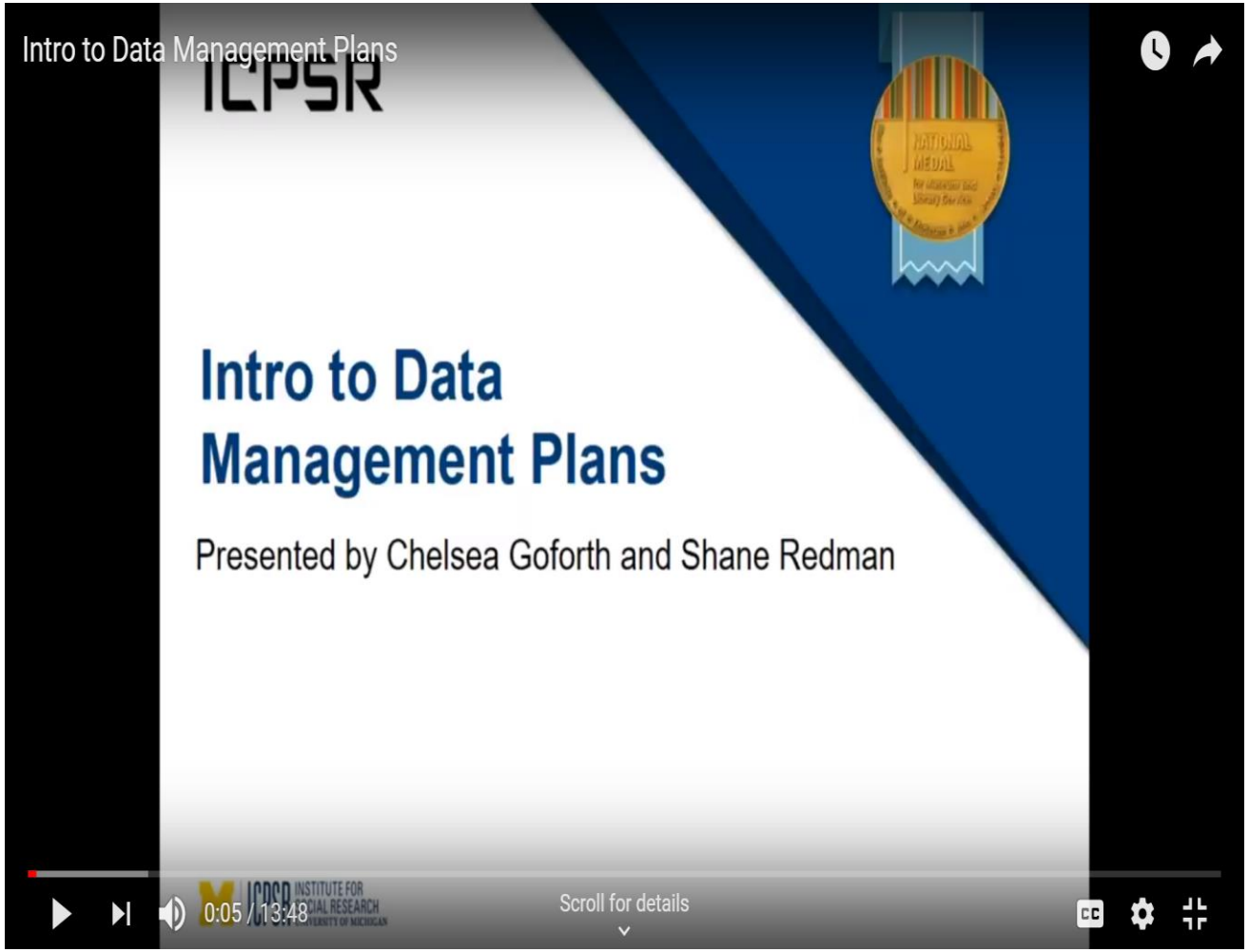
Temptation is to promise that no one else will see the data

- Or even that the data will be destroyed
  - This is the direction GDPR has taken

Promise instead to create the most scientific impact while protecting confidentiality

- Separate and encrypt Personally Identifiable Information (PII)
- Restrict use to scientific and evidence-building purposes
- Never reveal information about individual or share with those who try to use to re-identify individuals

# Resources for sharing

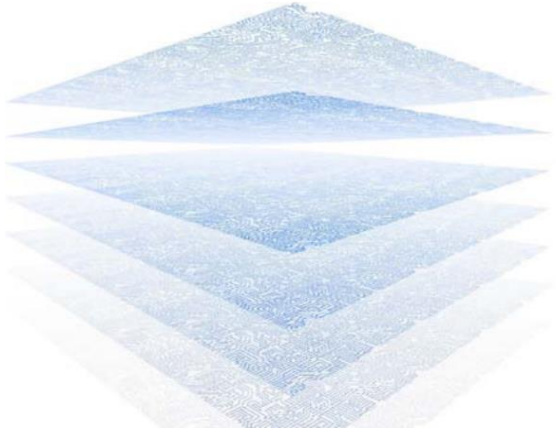



https://youtu.be/0m5kgYsPwe0

# For you old schoolers

ICPSR

Guidelines for Effective Data Management Plans



**Data Management Plans**
Federal funding agencies are increasingly recommending or requiring formal data management plans with all grant applications.

To help researchers meet those requirements, ICPSR offers these guidelines.

Based on our Data Management Plan Web site, this document contains a framework, example data management plans, links to other resources, and a bibliography of related publications.

ICPSR also hosts a blog on data management plans, and a recent webinar on the subject can be viewed on our Web site.

We hope you find this information helpful as you craft a data management plan. Please contact us at netmail@icpsr.umich.edu with any comments or suggestions.

https://www.icpsr.umich.edu/files/datamanagement/DataManagementPlans-All.pdf

# Why are DMP important?

Think about data documentation and sharing at the beginning of the project

- Improves the research
- Makes research reproducible
- Reduces cost and increases quality of shared data

Communicates to others

- Participants
- Funders
- Archive

# Key elements of DMP

Description of collection (sample, methods)

Short-term storage

Metadata (data about data)

- Recommendation: standardized, machine actionable

Provenance (especially if you are combining data)

Intellectual property rights

- Open access means specific licenses

Access policy

Long term preservation

# Where to share?

FAIR data

- Findable, Accessible, Interoperable, Reusable

Put your data where it will be

- Found by others
- Preserved in the face of technological change
- Safe for provenance and confidentiality
- Uniquely and persistently identified
- Cited

# LINKAGE LIBRARY

Maintaining datasets to support the data linkage community

# LINKAGE LIBRARY

Enable researchers to share linked (or linkable) data and linkage strategies

- Algorithms, code

Compare approaches across projects, datasets, disciplines

- Improve linkage practices
- Improve transparency

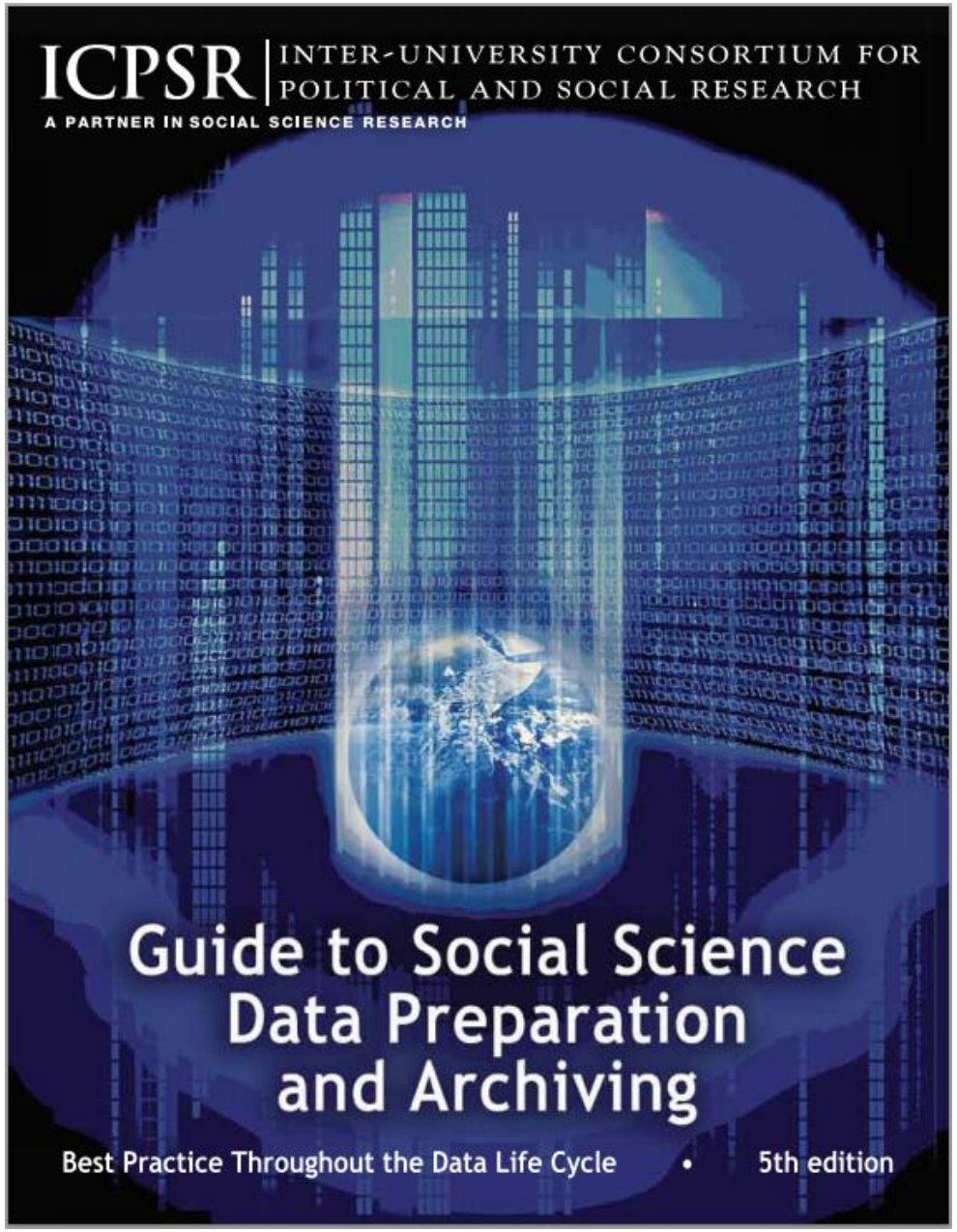
Build data community

- Threaded commenting among community members

# When to prepare?

Now!

**A well-prepared data collection "contains information intended to be complete and self-explanatory" for future users.**

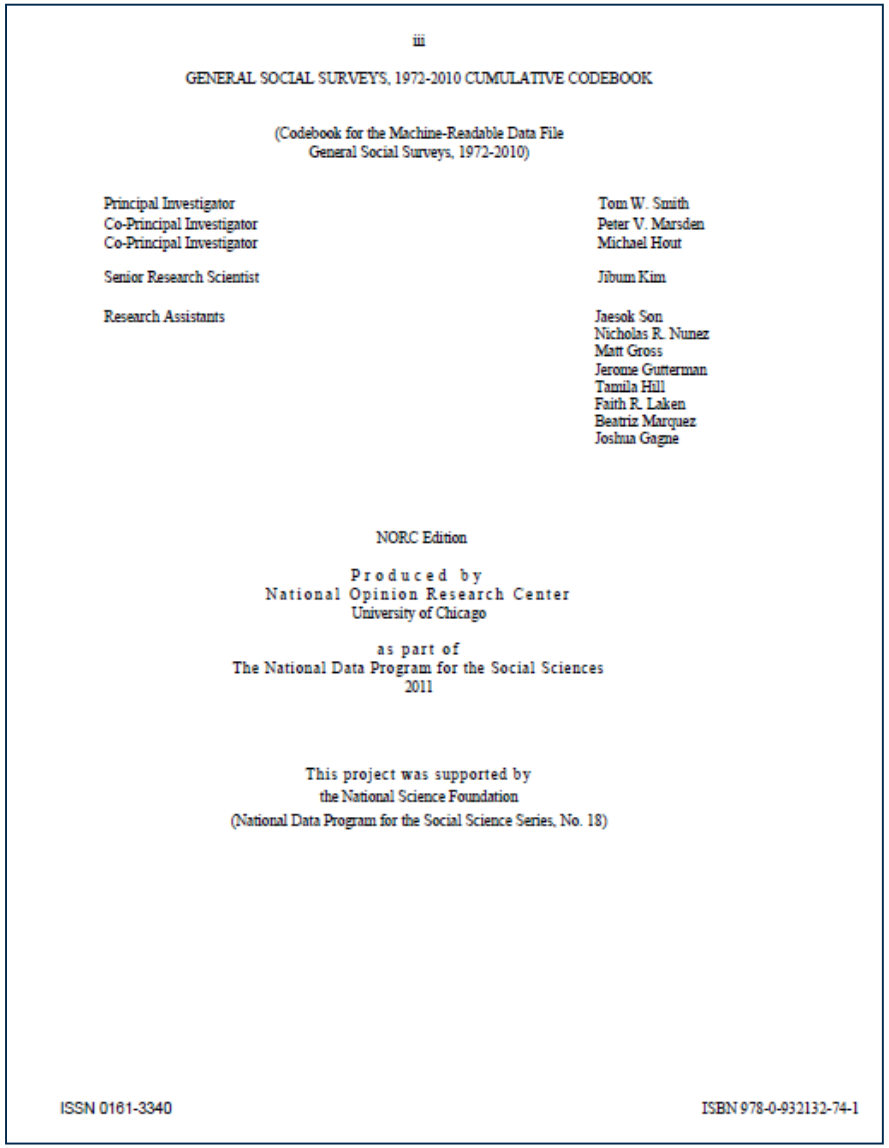



http://www.icpsr.umich.edu/files/ICPSR/access/dataprep.pdf


http://www.data-archive.ac.uk/media/2894/managingsharing.pdf

Is the data collection complete, accurate, and well-documented?

# Documentation



iii

GENERAL SOCIAL SURVEYS, 1972-2010 CUMULATIVE CODEBOOK

(Codebook for the Machine-Readable Data File
General Social Surveys, 1972-2010)


| | |
|---|---|
| Principal Investigator | Tom W. Smith |
| Co-Principal Investigator | Peter V. Marsden |
| Co-Principal Investigator | Michael Hout |
| Senior Research Scientist | Jibum Kim |
| Research Assistants | Jaesok Son<br>Nicholas R. Nunez<br>Matt Gross<br>Jerome Gutterman<br>Tamila Hill<br>Faith R. Laken<br>Beatriz Marquez<br>Joshua Gagne |



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# Essential Descriptive Elements

Basic front matter

Variable level details

Methodology

# Documentation: Front Matter

Title

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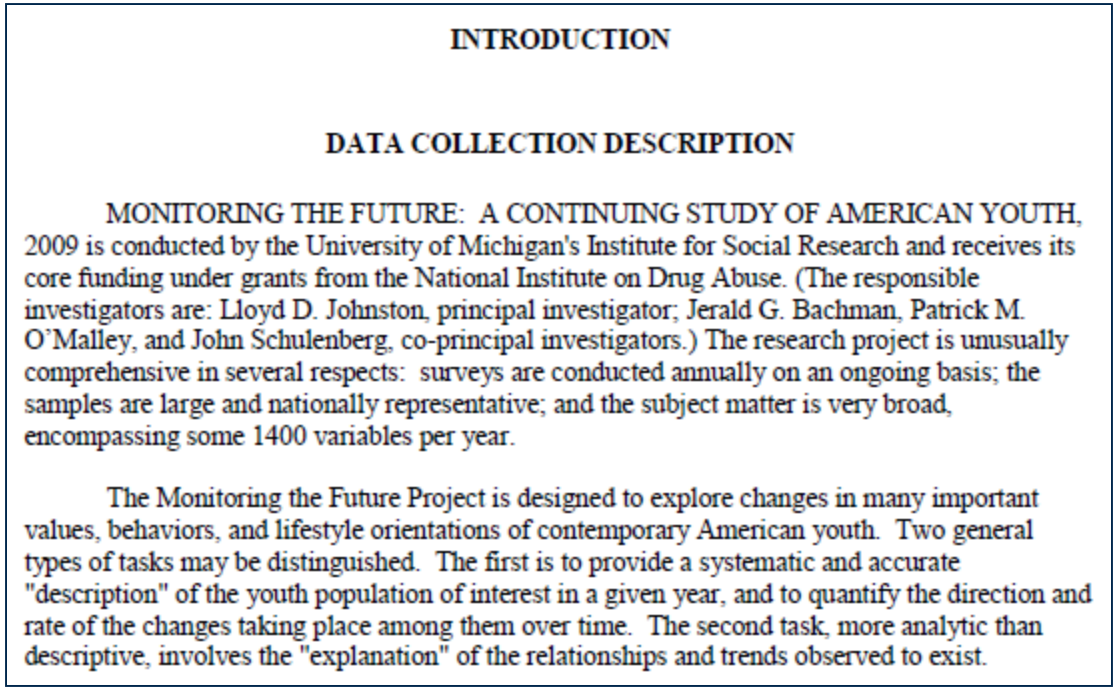
Principal Investigator(s)

# Documentation: Front Matter



**INTRODUCTION**

**DATA COLLECTION DESCRIPTION**

MONITORING THE FUTURE: A CONTINUING STUDY OF AMERICAN YOUTH, 2009 is conducted by the University of Michigan's Institute for Social Research and receives its core funding under grants from the National Institute on Drug Abuse. (The responsible investigators are: Lloyd D. Johnston, principal investigator; Jerald G. Bachman, Patrick M. O'Malley, and John Schulenberg, co-principal investigators.) The research project is unusually comprehensive in several respects: surveys are conducted annually on an ongoing basis; the samples are large and nationally representative; and the subject matter is very broad, encompassing some 1400 variables per year.

The Monitoring the Future Project is designed to explore changes in many important values, behaviors, and lifestyle orientations of contemporary American youth. Two general types of tasks may be distinguished. The first is to provide a systematic and accurate "description" of the youth population of interest in a given year, and to quantify the direction and rate of the changes taking place among them over time. The second task, more analytic than descriptive, involves the "explanation" of the relationships and trends observed to exist.

## Description

*Monitoring the Future: A Continuing Study of American Youth (12th-Grade Survey), 2009*. Johnston, Lloyd D., Jerald G. Bachman, Patrick M. O'Malley, and John E. Schulenberg. Monitoring the Future: A Continuing Study of American Youth (12th-Grade Survey), 2009 [Computer file]. ICPSR28401-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2010-10-27. doi:10.3886/ICPSR28401.v1

# Documentation: Variable-level Details

| Frequency | Code | Response | Variable Name | Type/ Length |
|---|---|---|---|---|
| 19. On average, what percentage of the students in 1993 who were enrolled in each grade at the beginning of the school year were retained in the same grade (that is, held back) for the next school year? *(For any grade that is not included in your school, circle "N.A.")* (WRITE IN PERCENT) | | | | |
| a. 7th grade | | | **A19A** | num 3 |
| 33 | 0 | No 7th grade students retained. | | |
| 51 | | % of students who were retained—range 01-30% | | |
| 80 | 997 | legitimate skip/not applicable. School does not have this grade or is an ungraded school. | | |
| 8 | • | missing | | |

*National Longitudinal Study of Adolescent Health (Add Health), 1994-1995* (National Longitudinal Study of Adolescent Health (Add Health), Wave I School Administrator Codebook. http://www.cpc.unc.edu/projects/addhealth/codebooks/wave1/index.html

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Variable Label

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# Documentation: Variable-level Details

Question Text

| Frequency | Code | Response | Variable Name | Type/ Length |
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# Documentation: Variable-level Details

Values

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# Documentation: Variable-level Details

Value Labels

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# Documentation: Variable-level Details

Missing Data

| Frequency | Code | Response | Variable Name | Type/ Length |
|---|---|---|---|---|
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# Documentation: Variable-level Details

Summary Statistics

| Frequency | Code | Response | Variable Name | Type/ Length |
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| 8 | • | missing | | |

# Documentation: Variable-level Details

## Constructed Variables

15. Siblings

Variable name: **sibname1 - sibname7**

*Siblings name*. Information about siblings was submitted to the Pension Board when a recruit needed to prove his age in order to receive an age-dependent pension. Sibling names were collected from family Bibles and other sources. If the Pension Board conducted a census search, the generated document also contained siblings' names and ages. Sibling names were also extracted from affidavits and depositions. This variable was cleaned according to the rules for names (see General Information, V.A.2). Comments included the relationship of the sibling to the recruit, especially in the cases when it was a step- or half-sibling, as well as dates and places. SIS and BRO were expanded to SISTER and BROTHER, and 1/2 was changed to HALF.

ILTOT31 – Illegal Activities – Wave 3

The total score was calculated by taking the mean of the z-scores of the following items: ril2ar, ril4ar, ril6ar, ril7ar, ril8ar, ril11ar, ril13ar, ril14ar, ril15ar, ril17ar, ril22ar. Eight of the 11 items need valid responses for a score to be calculated. To address the skewed distribution of the scale, a transformed score was computed by adding 1 to the mean and taking the natural log of that value.

# Documentation: Variable-level Details

Notes

```
H00034.00    [H40-SF12-2]                                    Survey Year: 2002

             SF12 - ASSESSMENT OF R'S GENERAL HEALTH

In general, would you say your health is ....

NOTE: SF-12(r) Health Survey (Medical Outcomes Trust)
(c) Medical Outcomes Trust and John E. Ware, Jr., All Rights Reserved
SF-12(tm) (QualityMetric, Inc.)

    1232       1 Excellent
    2111       2 Very Good
    1531       3 Good
     563       4 Fair
     145       5 Poor
  -------
    5582

Refusal(-1)            6
Don't Know(-2)         0
TOTAL =========>    5588   VALID SKIP(-4)    7098     NON-INTERVIEW(-5)       0

Lead In: H00033.00[Default]
Default Next Question: H00035.00
```

Skip Patterns

# Documentation: Methodology

Sample design: A description of how the cases that appear in the study were selected, including details about target populations, sampling frames, sample sizes, sampling errors, and sampling methods.

Data collection procedures: The methods used to collect the data (e.g., telephone, mail, computer-assisted). Where applicable, this includes the exact instructions and protocols used by interviewers when they collected the data.

Data processing: The activities and quality checks performed on the data collection to generate the final data products from the raw collected data. If files were merged , a full description of the process should be provided.

# Documentation: Methodology

Weighting: Where applicable, a description of the criteria for using weights in the analysis of a data collection, including how the weights were created, all weighting formulae or coefficients, a definition of their elements, and an indication of how the formulae are applied to the data.

Confidentiality issues: Where applicable, a discussion of any confidentiality issues in the data, as well as the steps taken to mitigate disclosure risk.

# Other Documentation

Questionnaire

User Guide

Handbook

Manual

Report

Table

User Agreement

Errata

# Useful Resources: Description

ICPSR, “Guide to Codebooks”
http://www.icpsr.umich.edu/files/deposit/Guide-to-Codebooks_v1.pdf

Institute for Health and Care Research Quality Handbook
http://www.emgo.nl/kc/codebook/

Princeton University Data and Statistical Services, “How to Use a Codebook”
http://dss.princeton.edu/online_help/analysis/codebook.htm

UCLA Social Science Data Archive, “Codebooks”
https://web.archive.org/web/20120601083002/http://dataarchives.ss.ucla.edu/tutor/tutcode.htm

# Key Learnings

Ensuring reproducibility will increase the impact of your research

Reproducibility requires sharing data and code

- Where it is preserved and accessible
- Where it is documented and discoverable

Sharing data and code is facilitated by a DMP

ICPSR

# Data Jeff wants you to share!


CORE TRUST SEAL