Data Visualization Process

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SCHOOL OF APPLIED SOCIAL SCIENCES
CASE WESTERN RESERVE
UNIVERSITY

Begun Center for Violence Prevention
Research and Education

Workshop Discussion Points

Two Part Series: Feb 11 and Feb 25

Today

1. Why Visualize?
2. CWRU Marketing Rules
3. Process Guidelines
4. Process in Action

February 25

1. Bring questions
2. Workshop ideas
3. Learn more about presentation and data tools

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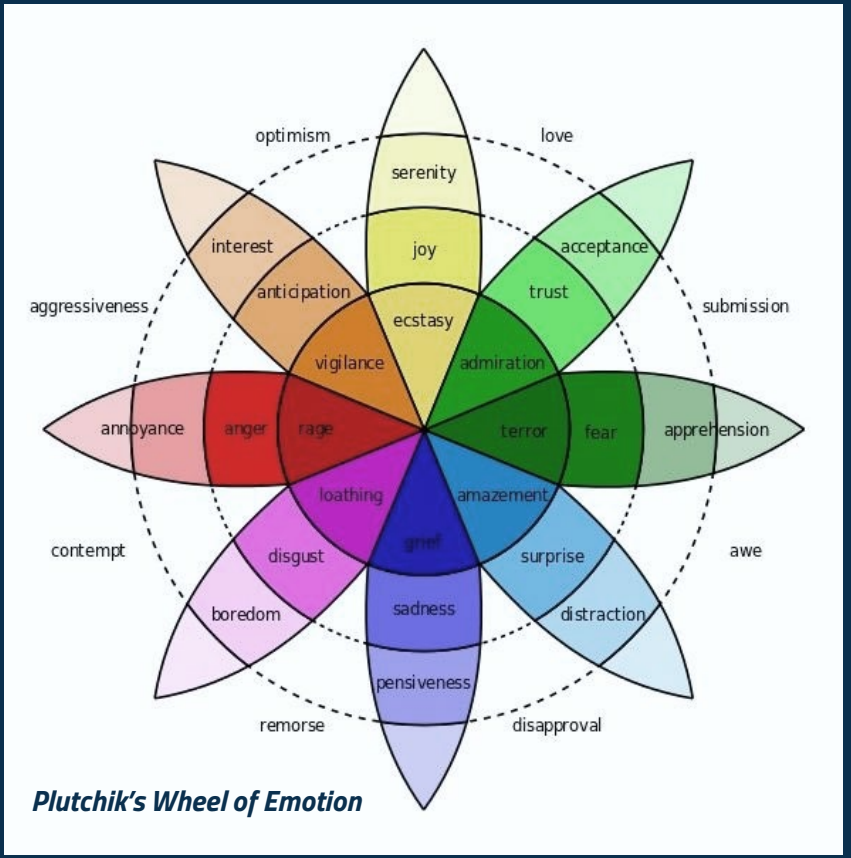
Why Visualize?

Why Visualize?

Colors and pictures conjure emotion and increase engagement

Visuals enhance learning in both presenter and participants.

What will this visual say about my data?



Plutchik's Wheel of Emotion

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"Readers have culturally defined expectations about what different colors mean. Violating such expectations makes graphs, maps and other illustrations more difficult to decipher..."

Tom Patterson, Knowable Magazine[1]

"Visualizations can reveal patterns, trends and connections in data that are difficult or impossible to find any other way."

Bang Wong, creative director of MIT's Broad Institute.[1]

An Article Worth Reading: "Why Scientists Need to be Better at Data Visualization"

Why Visualize?

Your participants will represent a variety of learning styles

Visual	Auditory	Read/Write	Kinesthetic
Prefers: Images, Maps, Graphics	*Prefers:* Listening, Speaking, Mnemonic devices, Repetition	*Prefers:* (Words), Notetaking, Reading	*Prefers:* Tactile, Hands-On

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Poll Question I

CWRU Marketing Rules

Know Your Guidelines & Contacts

- **Visual Guidelines**
  - University Marketing and Communications
    - Here
  - Mandel School
    - Here
- **Contacts**
  - University Marketing and Communications
    - marcominfo@case.edu
    - Contact Us Page
  - Mandel School
    - Melanie Klass: Internal Communications Manager
      melanie.klass@case.edu

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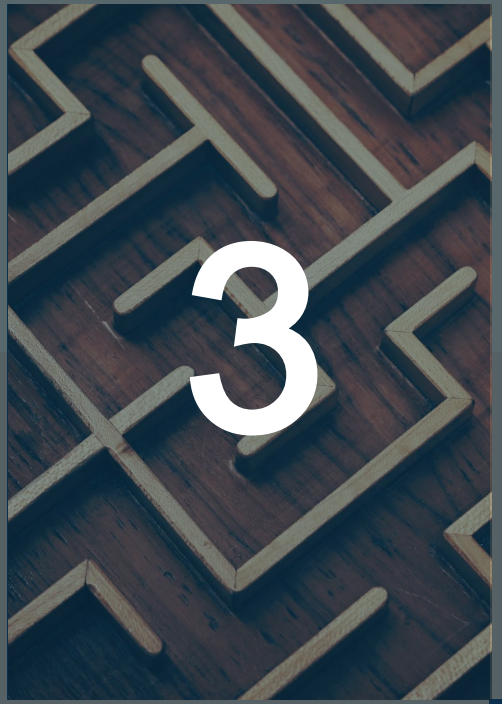
Visualization Process Guidelines



Visualization Process
Part I

1. Consider Type of Request
2. Consider Logistics
3. Choose Tools
4. Choose Template & Color Scheme

Part I

1. Consider Type of Request

Report?
Infographic?
Presentation?
Publication?

2. Consider Logistics

Time?
Venue?
Audience?
Devices Available?

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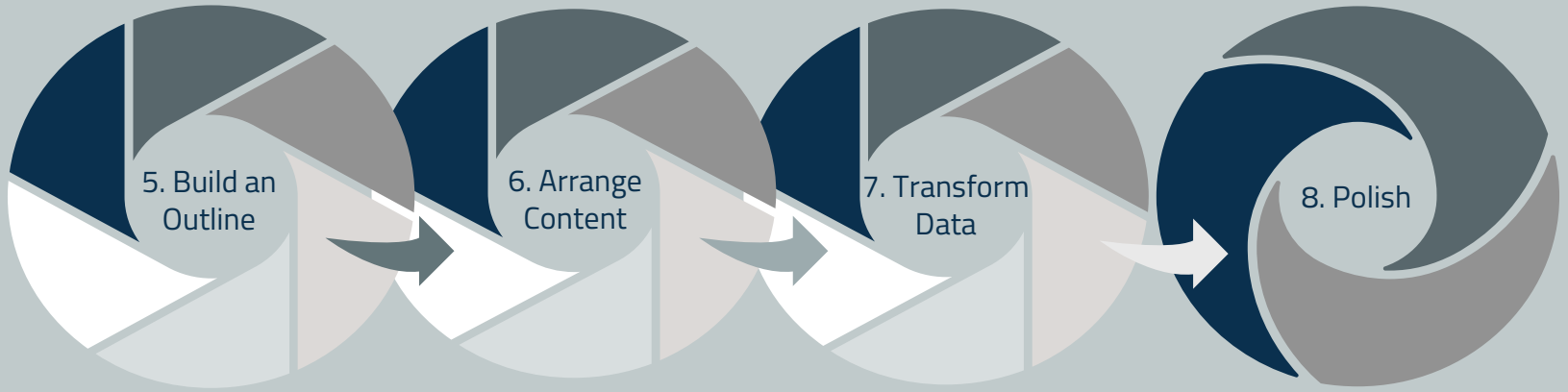
Visualization Process
Part II



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Process in Action

Example

Task: Adapt a meeting agenda with preliminary data findings into a presentation.

1. Consider Type of Request
2. Consider Logistics

Presentation (in person)
30-40 minutes
Large Conference Room
Fellow Scholars
Computer & Projector

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3. Choose Tools

Presentation Tools: What does each tool offer for my task?

Download templates from:
SlidesCarnival
AllPPT.com
Easy to use/Adaptable
Desktop/Offline

Download templates from:
SlidesCarnival
Easy to use/Adaptable
Web-based/Download

Design-forward
Free/Pro Versions
Customizable
Takes practice
Web-based/Download

Design-forward
Free/Pro Versions
Takes practice
Not for all audiences

Primarily used for
infographics, posters,
etc.

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Poll Question II

3. Choose Tools (continued)

Data Tools: What does each tool offer for my task?

IBM SPSS Statistics 23
Production

Stats
Descriptives
Graphs/Charts
Requires Practice

Variety of Graphs & Charts
Minimal practice

Brings datasets together
Mapping capabilities
Visually Appealing
Requires Practice*

ArcGIS

Brings datasets together
Mapping capabilities
Visually Appealing
Requires Practice*

i2

Shows networks/relationships

Not as visually appealing

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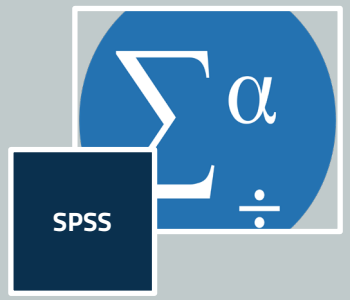
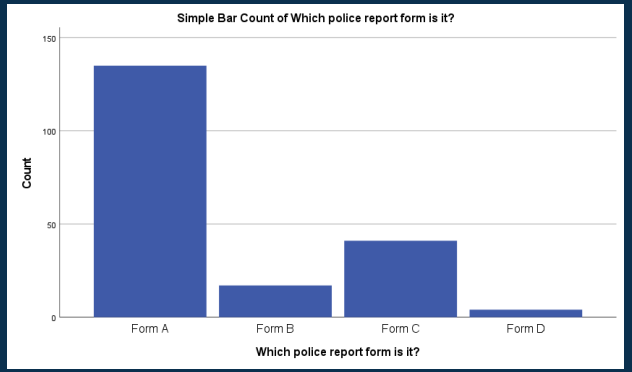
3. Choose Tools (continued)

What does each tool offer for my task?



Which police report form is it?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Form A	135	67.5	68.5	68.5
	Form B	17	8.5	8.6	77.2
	Form C	41	20.5	20.8	98.0
	Form D	4	2.0	2.0	100.0
	Total	197	98.5	100.0	
Missing	System	3	1.5		
Total		200	100.0		



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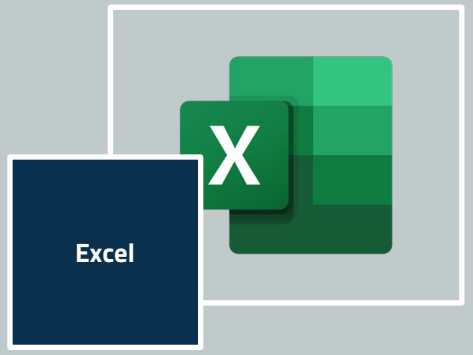
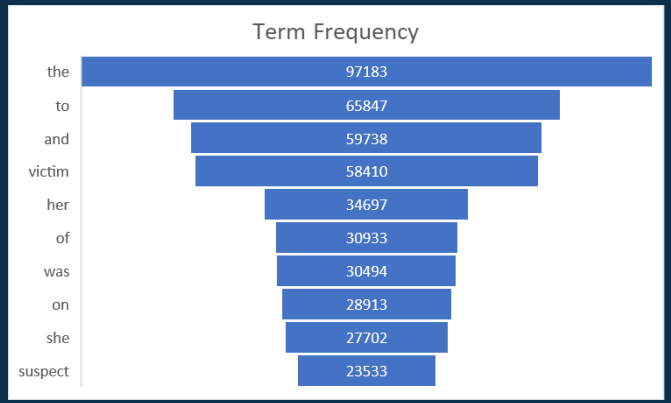
3. Choose Tools (continued)

What does each tool offer for my task?



item	term frequency	document frequency
the	97183	3027
to	65847	3030
and	59738	3029
victim	58410	3018
her	34697	2906
of	30933	2986
was	30494	3009
on	28913	3004
she	27702	2892
suspect	23533	2599



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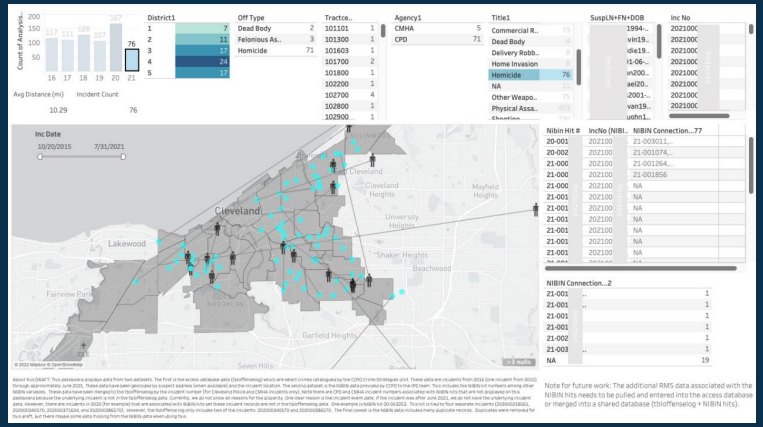
3. Choose Tools (continued)

What does each tool offer for my task?

Tableau

Susp_Coded	ConfirmedCCPO	OffenseCityCoded
Name	Yes	Cleveland
Name	.	Cleveland
Name	Yes	
Name	.	
Name	Yes	
Name	Yes	
Name	.	
Name	.	
Name	Yes	
Name	Yes	

ArrestCoded.7	OffType.1	OffType.2
	Weapons Violations	Felonious Assault
	CCW	CCW
	CCW	Felonious Assault
	Felonious Assault	Felonious Assault
	Robbery	Robbery
	Felonious Assault	CCW
	Felonious Assault	Felonious Assault
	Robbery	Robbery
No	Felonious Assault	Weapons Violations



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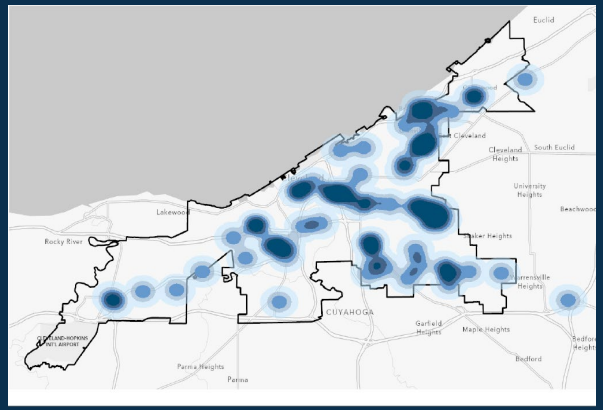
Resource at the Mandel School (Begun Center):
Ryan McMaster, rxm739@case.edu

3. Choose Tools (continued)

What does each tool offer for my task?

ArcGIS



Heat Map of Juvenile Runaway Sexual Assault Locations

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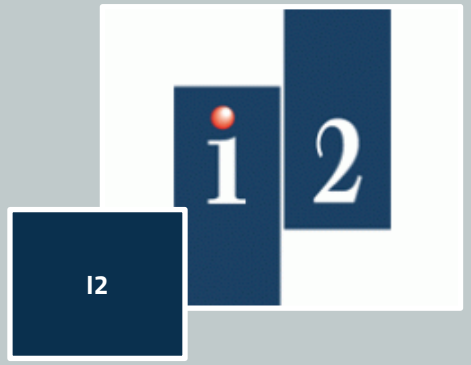
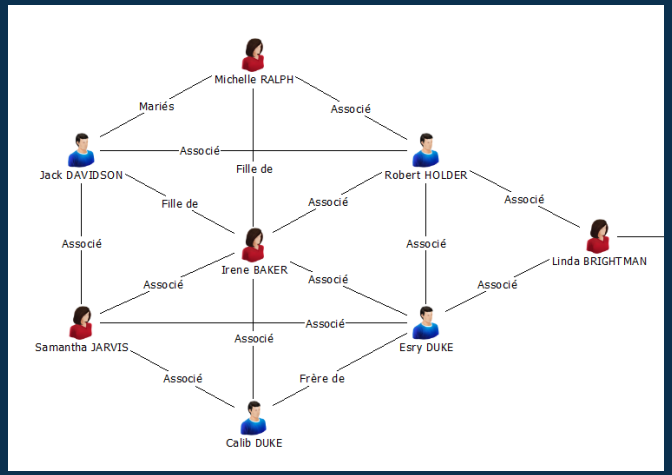
Dani Sabo, dnb31@case.edu

3. Choose Tools (continued)

What does each tool offer for my task?



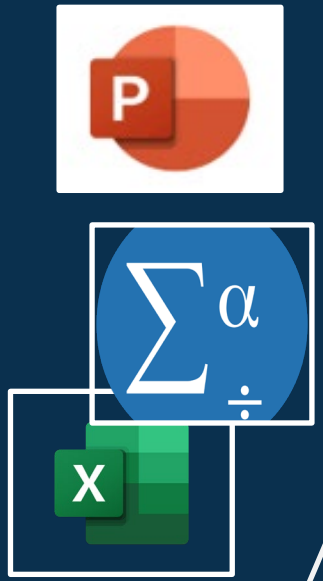


Example – not CWRU data

Poll Question III

Example

Task: Adapt a meeting agenda with preliminary data findings into a presentation.



Presentation Tools:
- Use the provided PowerPoint template

Data Tools:
- SPSS
- Excel
- (some in PDF form)
- (other specialty software)

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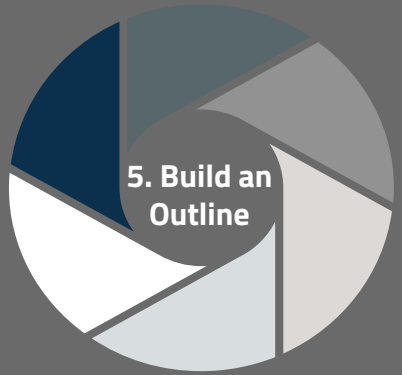
4. Choose Color Scheme & Template

Presentation Tool: PowerPoint

Example:
Provided with a template from group that requested presentation

Visualization Process:
Part II



Adapt my content to fit the task:

Advisory Board Meeting

Agenda, Progress Updates, & Discussion Questions

NIJ Grant 2018-VA-CX-0002

September 8, 2021, 1-3 pm (virtual)

Welcome

Introductions

- Rachel and the CWRU Team
- TA&M Team
- Advisory Board Members

Documents sent beforehand

- List of meeting attendees
- Grant at a Glance
- Data examples

Any questions?

Progress Update and Questions

1. Data Extraction & Cleaning
    a. Process
    b. Discrete Fields
    c. Archiving
2. Analyses
    a. Descriptives & Word Clouds
    b. Merging with Other Datasets
    c. Early analysis of the 1132 (Batch 1)
    d. SVM Analysis (bi and uni grams)
    e. Sentiment Analysis
    f. Runaways & Juvenile Victims
3. Deliverables
    - Protocol detailing the information extraction process for police reports
    - An open-source, adaptable sentiment reference lexicon
    - A list of signals and combination of signals that predict less successful investigations and prosecutions
    - A training protocol(s) for officers and detectives

New Presentation Outline:

1. NIJ Project Summary

2. Data Extraction, Conversion, & Cleaning

a. Process

b. Discrete Fields

3. Preliminary Analyses

a. Descriptives & Word Clouds

b. Text Classification

c. SVM Analysis

d. Sentiment Analysis

e. Runaways & Juvenile Victims

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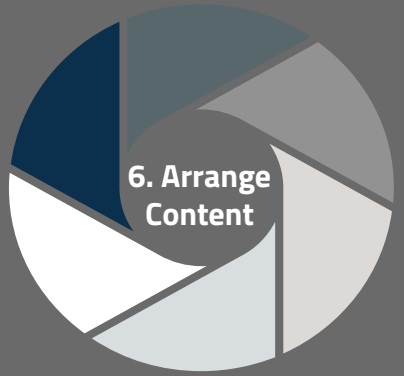
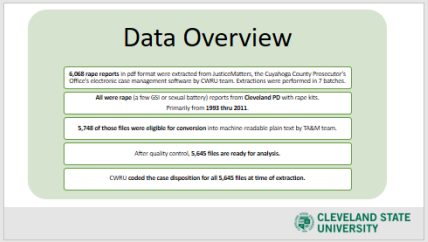


- From a bird's eye view, what do I want this presentation to look like?
- How do I best explain the processes involved?
- How do I best layer slides so that when I show data it makes sense?

Some Key Questions:



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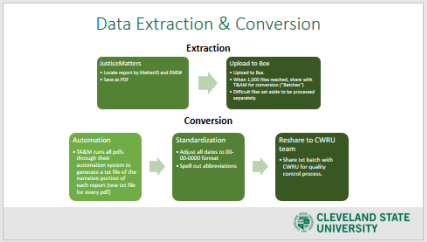

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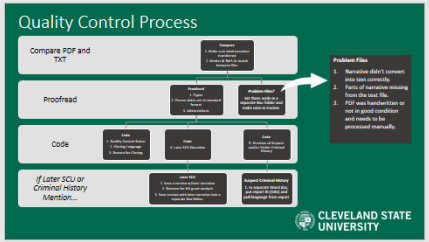

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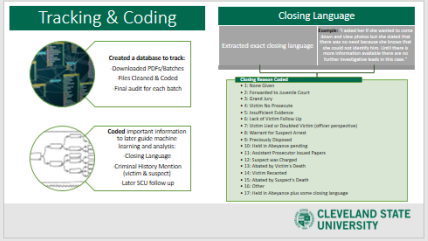

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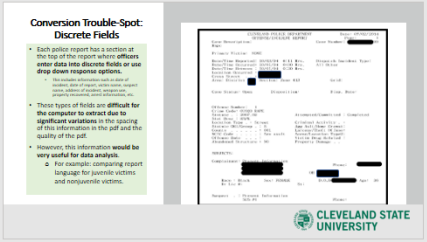

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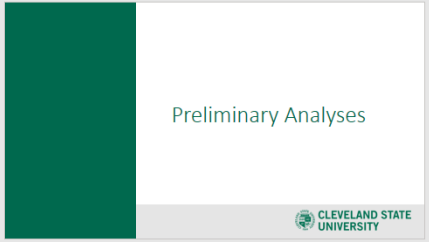

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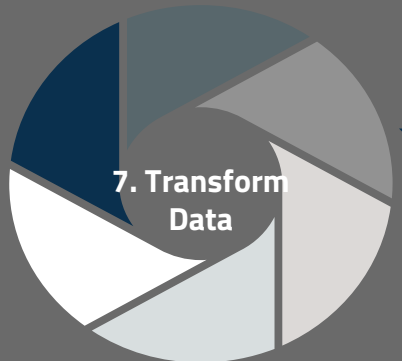
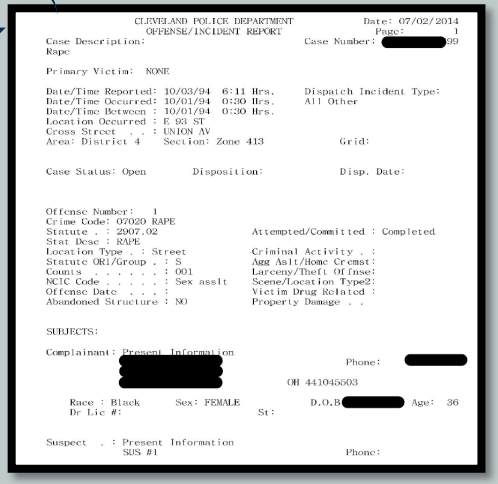


7. Transform Data

Which data specifically do I want to include?



CLEVELAND POLICE DEPARTMENT
OFFENSE/INCIDENT REPORT

Date: 07/02/2014
Page: 1

Case Description: Case Number: [redacted]99
Rape

Primary Victim: NONE

Date/Time Reported: 10/03/94 6:11 Hrs. Dispatch Incident Type:
Date/Time Occurred: 10/01/94 0:30 Hrs. All Other
Date/Time Between : 10/01/94 0:30 Hrs.
Location Occurred : E 93 ST
Cross Street . . : UNION AV
Area: District 4 Section: Zone 413 Grid:

Case Status: Open Disposition: Disp. Date:

Offense Number: 1
Crime Code: 07020 RAPE
Statute . : 2907.02 Attempted/Committed : Completed
Stat Desc : RAPE
Location Type . : Street Criminal Activity . :
Statute ORI/Group . : S Agg Aslt/Home Crcmst:
Counts . . . . . : 001 Larceny/Theft Offnse:
NCIC Code . . . . . : Sex asslt Scene/Location Type2:
Offense Date . . . : Victim Drug Related :
Abandoned Structure : NO Property Damage . .

SUBJECTS:

Complainant: Present Information
[redacted] Phone: [redacted]
OH 441045503

Race : Black Sex: FEMALE D.O.B [redacted] Age: 36
Dr Lic #: St:

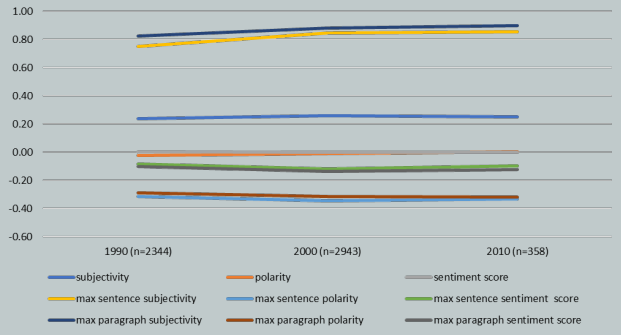
Suspect . : Present Information
SUS #1 Phone:

file_name	subjectivity	polarity	sntmnt_score	max_sentence_subjectivity	max_sentence_polarity
M510-7681_RMS93-6459	0.25740740740740736	-0.045502645502645496	0.0012761215490797546	0.6	-0.25833333333333333
M5108734_RMS93-30551	0.16774663451878646	-0.009714687562788826	0.0021652868756536943	1.0	-0.2875
M511-7400_RMS11-3121	0.1545084175084175	-0.04145791245791246	0.005577199811729463	0.6	-0.1875
M512-3940_RMS04-1274	0.22762012012012015	-0.06903903903903907	0.0099896101328807	0.5583333333333333	-0.5
M512-7072_RMS95-3253	0.4083333333333333	0.002777777777777777	0.012278623385546538	0.75	-0.22499999999999998
M5122768_RMS95-98208	0.25139384920634916	-0.006192956349206354	0.007849553270822825	0.72	-0.4
M5127648_RMS94-17353	0.2448870056497175	-0.049265536723163875	0.0024282052903108193	1.0	-0.23750000000000002
M513-7029_RMS98-7911	0.3353070175438597	0.010526315789473684	0.0075970996943521135	1.0	-0.30000000000000004
M5134679_RMS98-37151	0.27607478149852043	-0.05896421845574314	-0.011475124764864734	0.75	-0.5

Which form(s) do I want to show the data in?

I want to show process and development.
I'll start with showing the raw data and progress to analysis.

Figure 2. Sentiment Metrics by Decade



More Questions:

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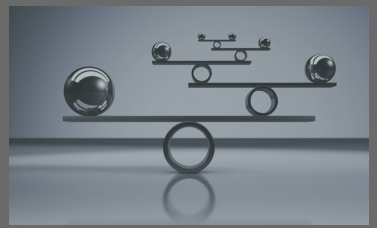
8. Polish

A Final Check:

- Font consistency
- Logo presence
- Aesthetic
- Overall content flow
- Revisit trouble spots



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Questions?

Resources

Data Visualization

At the Mandel School
Begun Center:

- Joanna Klingenstein *Jek150@case.edu*
- Dani Sabo *Dnb31@case.edu*
- Ryan McMaster *Rxm739@case.edu*

Marketing & Guidelines

At the Mandel School
Internal Communications Manager

- Melanie Klass: melanie.klass@case.edu

University Marketing and Communications

- marcominfo@case.edu
- Contact Us Page

Workshop II: February 25

Bring questions

Workshop Ideas

Learn more about data and presentation tools

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