Is Use of Force Learned Behavior?

DEVYANI GAURI
KALEEM AHMED
JAMES WILKINSON

THE GLORIOUS BOOMERS

Table of Contents

01

Theme

Theme

Police behaviour will dynamically change as a result of multiple factors that often play a pivotal role in many officers “unlearning” good practice traits. We hypothesize that use of force is a learned behaviour amongst police officers.

“These findings [regarding network dynamics] shed new light on the importance of the trust required to sustain co-offending collaborations, on the criminal opportunities provided by a covert network as conventional turning points in one’s criminal career.”

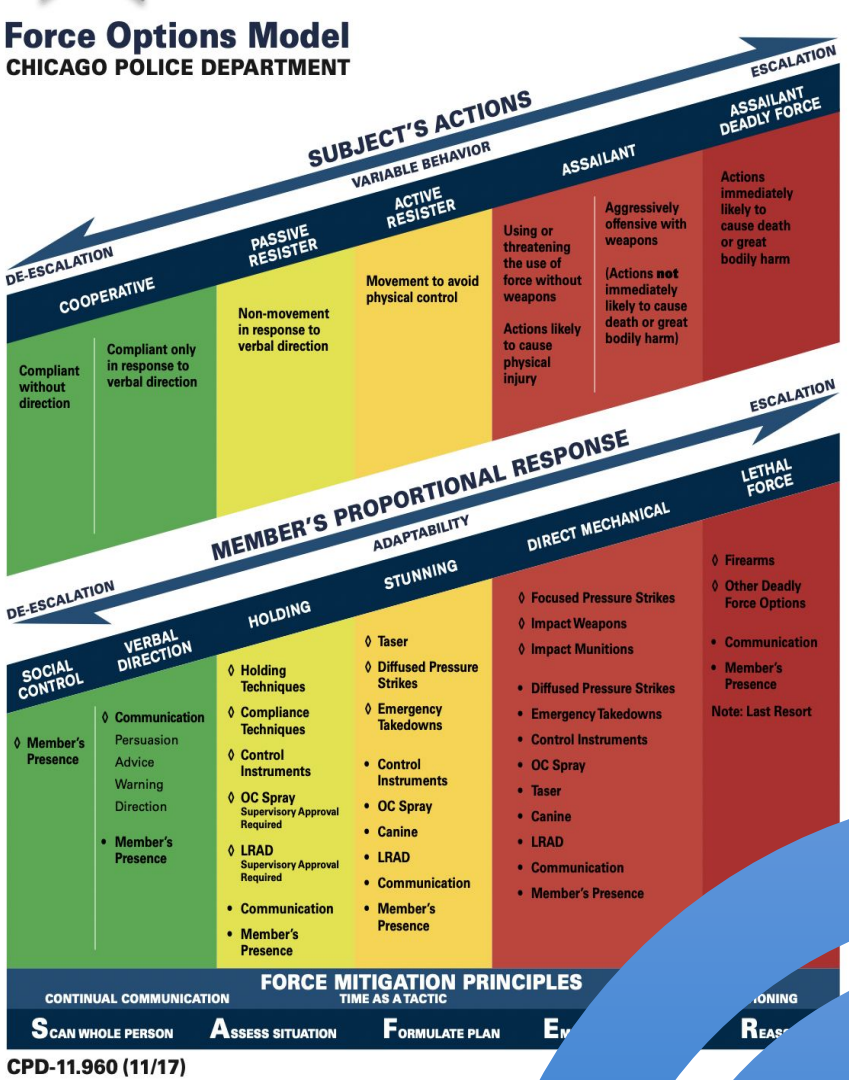
Charette et al. (2017)

Theme: Datasets

We mainly use the CPDB's TRR (self-reports) and complaints (citizen/other officer reports) datasets:

- Incidents involving police officers
- Type of force used
- Officer seniority / time in the force

We determined severity of force using the severity grading chart by the Chicago Police Department



Theme: Scope of Analysis

To determine how an officer's use of force changes over their career, we used the following:

Variation in FREQUENCY of forceful incidents at different seniority levels

Change in SEVERITY of the force across seniority levels.

We focus our analysis strategically on the time an officer has spent in the force in general as well as relative to when incidents happen.

We make our analysis more granular by initially defining them as rookies (<1 year experience) and non-rookies (>1 year experience), and then subsequently expand the analysis in time buckets of their careers year over year.

02

Findings

Relational Analytics (SQL)

The Basics

What is the average (most common) use of force across the police force?

Verbal commands is the most common use of force.

What is the most common (modal) use of force for rookie officers vs for non-rookie officers?

Amongst rookies the most common use of force was Physical Force (Holding).

For non-rookies it was Verbal Commands.

Frequency of TRRs	Rookie (<1y in force) TRR s	Non-rookie (>1y in force) TRR s
Physical Force - Holding	1449	55901
Verbal Commands	1344	61410
Member Presence	1265	58426
Physical Force - Stunning	1212	56341
Other Force	193	8831
Physical Force - Direct Mechanical	141	10703
Chemical	54	3837
Taser (Use)	54	5484
Impact Weapon	29	1760
Taser Display	13	785
Firearm	9	1014
Chemical (Authorized)	2	111

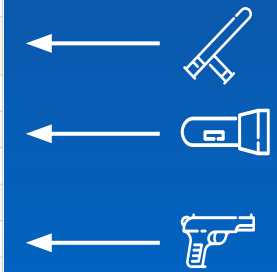
Counts of all TRRs by force type

Relational Analytics (SQL)

Signs of Evolving Behavior

What proportion of TRR reports are attributed to each force-type for junior officers? How does this compare to non-junior officers?

Frequency of TRRs	Rookie (<1y in force) TRR s	% of TRRs	Non-rookie (>1y in force) TRR s	% of TRRs	Increase
Physical Force - Holding	1449	25.1%	55901	21.1%	-15.9%
Verbal Commands	1344	23.3%	61410	23.2%	-0.4%
Member Presence	1265	21.9%	58426	22.1%	0.6%
Physical Force - Stunning	1212	21.0%	56341	21.3%	1.3%
Other Force	193	3.3%	8831	3.3%	-0.3%
Physical Force - Direct Mechanical	141	2.4%	10703	4.0%	65.4%
Chemical	54	0.9%	3837	1.5%	54.8%
Taser (Use)	54	0.9%	5484	2.1%	121.3%
Impact Weapon	29	0.5%	1760	0.7%	32.2%
Taser Display	13	0.2%	785	0.3%	31.6%
Firearm	9	0.2%	1014	0.4%	145.5%
Chemical (Authorized)	2	0.0%	111	0.0%	20.9%



There are **significant increases** in certain types of force between junior and non-junior officers.

Data Exploration (Visualization)

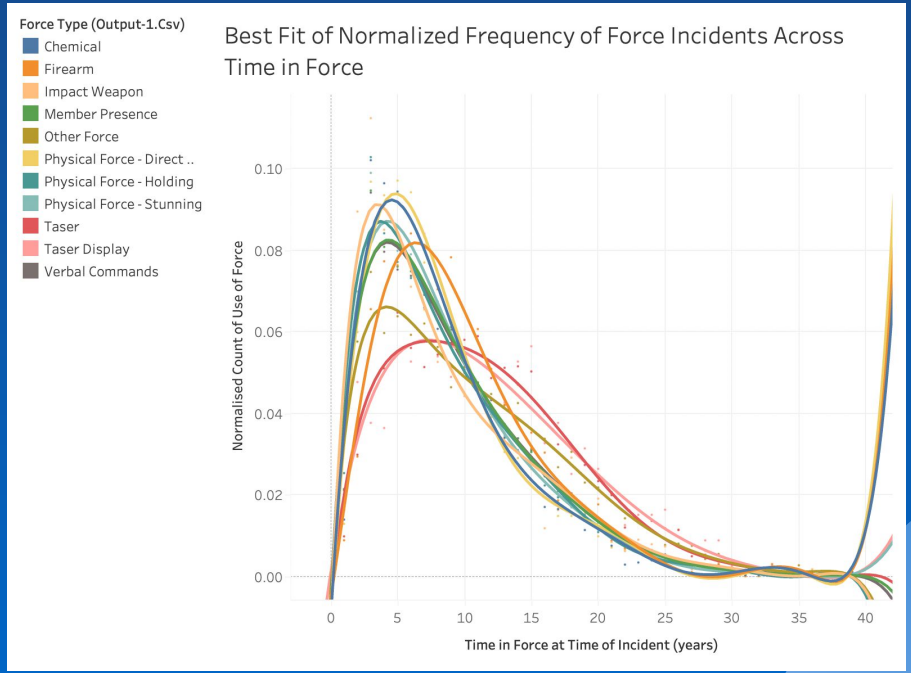
How are TRRs of different types of force distributed amongst officer seniorities?

Occurrence of TRRs are generally grouped to occur around 5th year in force.

Verbal Commands peak earliest.

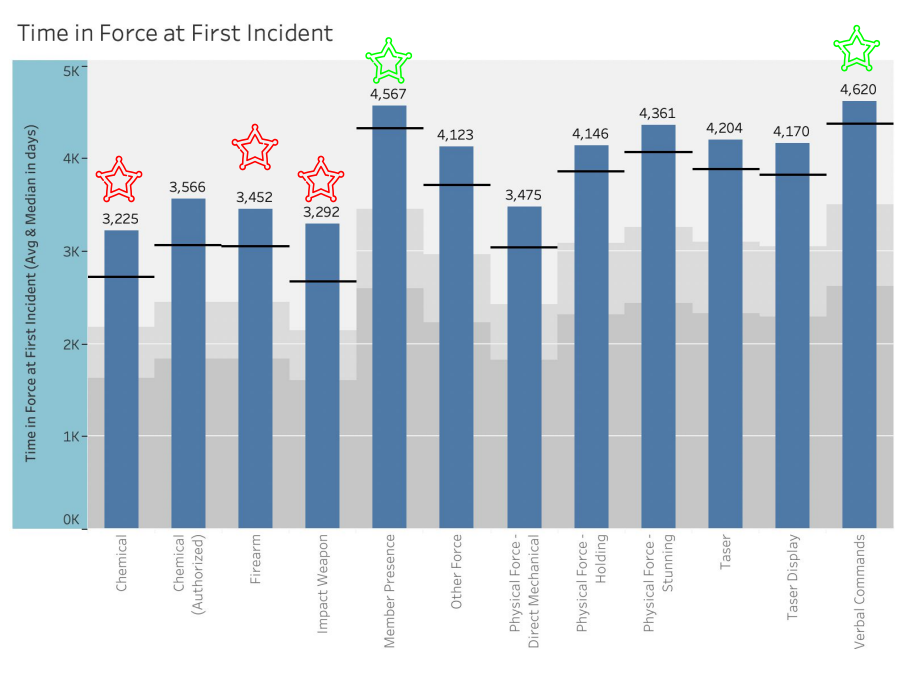
Firearm use is skewed to slightly more senior officers.

Taser use is most heavily distributed to more senior officers.



Data Exploration (Visualization)

Amongst officers that had filed a TRR regarding use of force, what was the average time these officers had spent in the force at the time of the first TRR report?



Average time in force at time of first TRR incident = 3225 to 4620 days

Takes less time to use more severe use of force and more time for a less severe use of force.

Mean time > Median time → suggests positively skewed distribution

Interactive Visualisation

What proportion of TRRs are attributed to each type of force across time spent in the force?

Interactive Visualisation

How does time in a unit change officer behaviour?

Nodes = Officer ID
Edges = Joint TRRs
Attributes = Type of Force Used

Graph Analytics

Using TRR records that officers are involved in together, can we examine the types of force officers used?

src	dst	
31795	32105	22
2798	31576	18
17634	29992	17
1444	29209	16
7195	11634	15
8628	18384	15
15273	22392	14
8428	26304	13
27669	29670	13
31898	32428	12
27222	29008	12
61	972	12
13143	26941	12
4484	22216	12
4078	24736	12
10291	15845	11
32141	32291	11
26018	29454	11
22709	26435	11
3305	31782	11
10135	15873	11
464	5501	10

dtype: int64

Figure 1: Officers and the number of times they co-offend with a particular officer

	id	force_type	max_count
18269	31795	Physical Force - Holding	85

	id	force_type	max_count
18653	32105	Physical Force - Holding	79

	id	force_type	max_count
18131	31576	Physical Force - Holding	56

	id	force_type	max_count
1661	2798	Verbal Commands	42

	id	force_type	max_count
17281	29992	Member Presence	37
17282	29992	Verbal Commands	37

	id	force_type	max_count
10047	17634	Member Presence	26
10048	17634	Verbal Commands	26

Figure 2 (a-c): The Most Used Force For The Top 3 Pairs of Co-offending Officers

A large number of officers that co-offend come together because they are in the same units. However, we see that some officers move through units and still co-offend with the same officers.

Nodes = Officer ID
Edges = Joint TRRs
Attributes = Seniority

Graph Analytics

Can we examine an officer's misconduct network based on the seniority of the officers they are involved in uses of force with?

Top 1%

Police Officers/Field Training Officers

Bottom 1%

Sergeants, Lieutenants, Police Officers, Field Training Officers

This makes sense because police officers are often first responders to crime scenes, however we find that the officers that co-offend a lot use mild to moderate force ranging from verbal commands to physical force.

Natural Language Processing

Do complaints against officers get more negative over time during their career?

Bin	Time in force	Number of records	Means	Medians	Standard deviation
0	0 years - 5 years 7 months	482	- 0.763613	- 0.95205	0.425798
1	5 years 7 months - 10 years 9 months	481	- 0.800647	- 0.95490	0.358609
2	10 years 9 months - 16 years 6 months	481	- 0.781778	- 0.93200	0.362523
3	16 years 6 months - 39 years 5 months	482	- 0.737321	- 0.89410	0.401559

03

Conclusions

Conclusions

1

Police behavior surrounding misconduct is dynamic, and follows trends

2

Police officers do not exhibit high levels misconduct when they first join the force.

3

Levels of police misconduct increase as police spend more time in the force

4

Exacerbating the gravity of these findings, the severity of misconduct increases as officers become more senior (as determined by different types of force).

In other words, misconduct is a learned behavior.

04

Future Research

Future Research

Natural Language Processing

Obtain a bigger dataset to validate our findings

Statistical Testing

Perform tests like t-tests to obtain trends

Machine Learning

Use Neural Networks and/or clustering to classify and predict officer behavior

Thank You

Do you have any questions?