Police Use of Force Post-Ferguson: Evidence from Dallas, Texas

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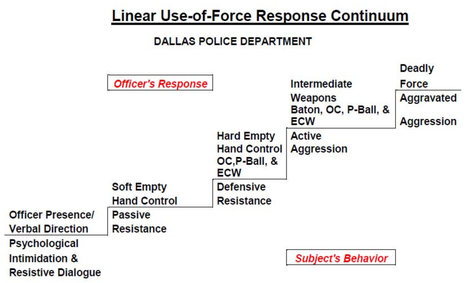
Abstract

In recent memory, the United States has been subject to many highly publicized protests against police departments in response to perceived injustices against civilian populations. One event, occurring in Ferguson, Missouri, may have provided the impetus for the so called, "Ferguson Effect." Collective wisdom suggests that the Ferguson Effect may have provided an impetus for increases in crime as well as attacks against police officers. To our knowledge, no study has examined whether the ratio of officer force to suspect resistance increased after post Ferguson. Furthermore, there is little research concerning whether local events (similar to the one observed in Ferguson) increase police force in the local area. Toward this end, we examine officer force and suspect resistance data from the Dallas (TX) Police Department to determine whether the ratio of force to resistance increases post Ferguson. Moreover, we explore whether officer force ratios grew after the shooting targeting police officers in Dallas in July 2016. The results from our study may provide greater insight as to how highly publicized incidents affect police use of force.

Data

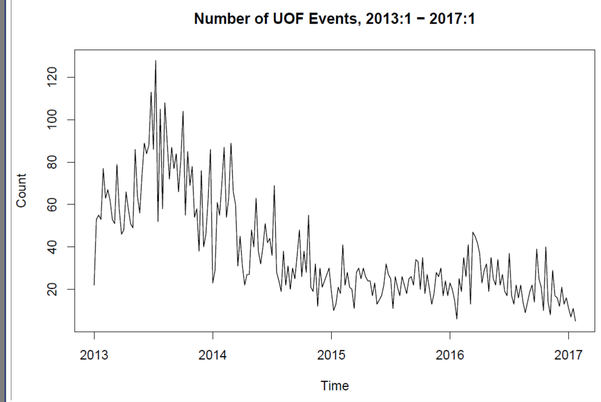
This study utilizes publicly available data from the Dallas Police Department, specifically, Response to Resistance Data for the years 2013 through early 2017. The dataset includes every reported instance of police response to resistance, excluding the use of deadly force, which appears in a separate dataset. For the purposes of this study, we focused primarily on two variables in the dataset: the type of resistance presented by the citizen during the encounter and the type of force initially used by the officer as a response to resistance. Both the type of resistance and the type of force for each encounter was placed along the continuum below, creating a five-point ordinal scale for each.

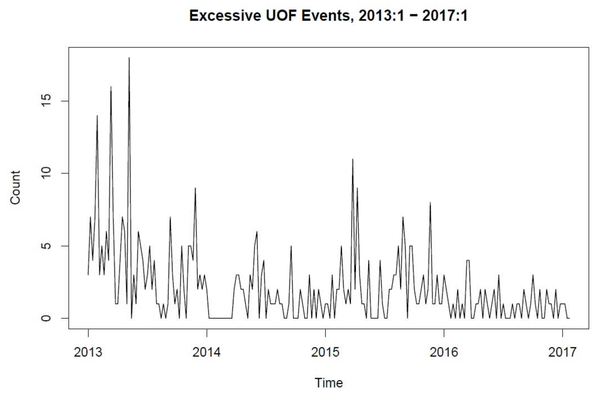


The department policy provides that officers should use the level of force that corresponds to the level of resistance presented by the citizen, but also allows the officer to exercise discretion in using force that is one level above that presented by the citizen. This policy is the basis of defining "excessive" force for the purpose of this study. Where F is equal to the level of force used by the officer and R is defined as the level of resistance presented by the citizen, force is considered excessive when:

$$F - R > 1$$

Descriptives





Methods and Results

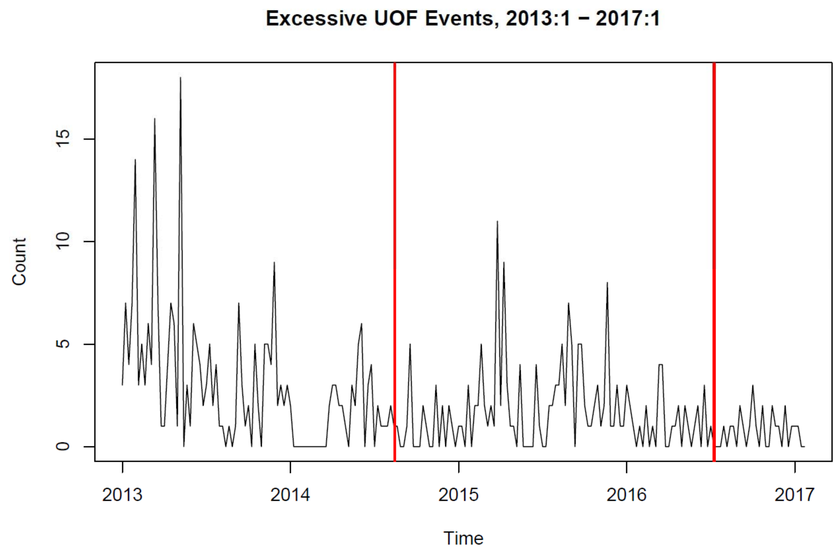
Our analytical technique is an extension of Hidden Markov Models (HMMs) know as Hierarchical Dirichlet Process - HMMs. This family of models are often used in signal processing, rainfall detection, and DNA sequencing. The main idea involves evaluating a time series of observations that are then used to classify observations into a latent states (i.e., regimes, categories).

An observation is assigned a probability distribution of occupying a particular state. Then, an observation is evaluated on its current position relative to the previous time period and decision is made regarding if the time series has entered a new state. The decision of moving to a new state is given through a transition probability; if there is a switch to a new state, then one can say a changepoint exists within a data series.

In this paper, our focal concern is excessive use of force incidents within a weekly time period. The HDP-HMM will evaluate each observation and decide on its membership in a particular state (e.g., High, Medium, and Low Excessive Force). If there are any observed changepoints, one should see a state change develop within the series. The uncertainty surrounding a switch to a new state is expressed through a probability distribution and can be presented graphically.

We treat our data as a series of overdispersed counts which motivates our use of a negative binomial distribution. While we do not know the correct amount of changepoints beforehand, our model allows for the consideration of potentially infinite changepoints. Accordingly, we allow the data to determine the length and duration of new estimated regime.

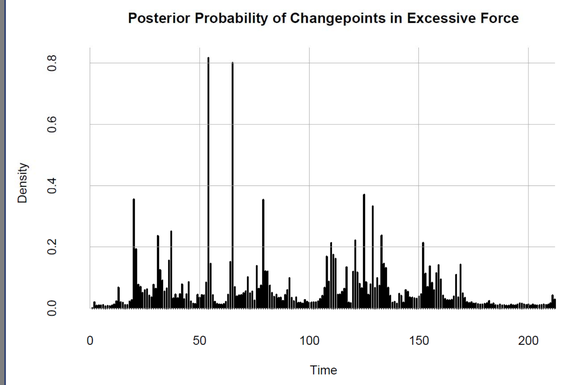
In the figure below, the count of excessive use of force events are aggregated weekly. The red lines correspond to the Michael Brown and Dallas shootings, respectively.



Findings

Our primary hypotheses state the potential for a Ferguson effect or a "Dallas" effect may produce substantive changepoints in the frequency of excessive use of force. To assess the veracity of this claim, we aggregated counts of excessive use of force at the weekly level from 2013 to the first week of 2017. During this time period, there were a total of 8,046 of use of force encounters, 449 of which we considered "excessive" (5.6 %).

It seems unlikely that any identified changepoint would dramatically deviate and change on the basis of one event; while there may very well be a "Ferguson" effect, the power of a Ferguson effect should not substantively alter the course of a police department's use of force for an extended period of time. To accomplish tackle this problem, we used a Bayesian Hierarchical Dirchlet Process – Hidden Markov Model using a MCMC chain of 750,000 iterations (discarding the first 250,000 observations).



In the above figure, the spikes show the probability of transitioning to a new regime (state) at any given period. Our results show two distinct changepoints in the series (probability greater than .50) early in 2014. There is no proposed shift in probability to a new regime throughout the duration of the series.

Our results suggest that there was neither a global Ferguson effect that substantively increased excessive use of force actions by Dallas PD. Further, the Dallas shooting did not exert a local effect in excessive use of force. The findings in this paper suggest that any notions of exacerbating effects of traumatic events do not yield an appreciable effect on excessive use of force.

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