

30% Decrease in Civilian Noncompliance through Training and Body-worn Camera Analysis

Research indicates that the mere use of body-worn cameras (BWC) does not substantially enhance police performance and accountability.¹ Automated BWC analytics, however, offer a way for departments to examine all their BWC footage in order to identify positive interactions that bolster professionalism training and rectify risky behavior as it happens, thus fulfilling the potential of BWCs.

Atwater Police Department in California utilized Truleo's BWC analytics to study two timeframes: the year 2021 before Atwater started actively using Truleo's analytics and the year 2022 after implementing Truleo.

Throughout 2022, Atwater reported a 75% time reduction in their internal affairs investigation process using Truleo. They emphasized the capability to rapidly pinpoint critical events and search as fundamental aspects of the enhancement in their review process.

The application of BWC analytics not only increased internal efficiency but also verified improvements in community outcomes. During 2022, Truleo analytics demonstrated a 30% decrease in civilian noncompliance compared to the prior year, indicating that the community's response to Atwater PD improved. Simultaneously, Truleo analytics revealed that officers were explaining their actions 2.5 times more frequently than in the previous period, illustrating that officers were embodying one of the main principles of procedural justice - giving explanations.²

Atwater PD attributes the enhancements to both:

1. The department's emphasis on de-escalation training over the past 36 months
2. The utilization of BWC analytics and the awareness throughout the department that interactions are being assessed for training and improvement.

The outcome is clear - BWC analytics can save departments time while also positively affecting community results.

“

We invested significant resources in body cameras, and Truleo helps us achieve a greater return on that investment for our community.

”

Chief Salvador

ATWATER POLICE DEPARTMENT

Key takeaways:

75%

reduction in internal affairs review time

30%

decrease in noncompliance

2.5X

increase in officer explanation

Results & Discussion

What is Civilian Noncompliance?

Patrol officers often give commands to civilians. Civilian noncompliance occurs anytime a community member interacts with a police officer and does not comply with provided commands. Noncompliance can be escalatory in nature but does not need to be. Civilian noncompliance can be seen and detected in interactions directly and indirectly.

A noncompliant civilian or an officer dealing with noncompliance may use direct phrases such as:

- Civilian: No I will not do that
- Civilian: I refuse to cooperate
- Officer: She's refusing to cooperate

Noncompliance may also be present in interactions indirectly. For example, if an officer repeatedly gives commands and the civilian does not comply, that is an indicator of noncompliance. An example of this might be an officer saying:

Officer: Get out of the car, get out of the car, this is the last time I'll ask you, get out of the car.

Why measure noncompliance?

Civilian noncompliance is a direct measurement of how community members react to officers' actions. Interactions with noncompliance are often interactions where the officer has an opportunity to de-escalate a situation. Thus, looking at how an officer handles noncompliance can provide information to supervisors for training & coaching and gives a department a metric for how the community responds to their officers.

Why reduce noncompliance?

Reducing civilian noncompliance benefits the department and the community in several ways.

REDUCING THE NEED FOR FORCE

Research has shown that when officers explain their actions, they receive better compliance from civilians and use force less.⁽²⁾ Reducing noncompliance with better training & coaching can reduce force across a department.

IMPROVING OFFICER SAFETY

When officers receive better compliance from community members, they are in fewer escalatory scenarios that could be unsafe.

IMPROVING COMMUNITY TRUST

Departments that reduce noncompliance by improving communication have direct evidence that community interactions with officers are improving.

How Truleo Measured Noncompliance

In this study, Truleo analyzed available BWC footage from two 12 month periods (the year 2021 and the year 2022) across 25 officers. Truleo's natural language processing models flagged noncompliance within BWC transcripts at a sentence level and calculated the total instances of noncompliance on a per video basis. The model then normalized the number of instances by the total duration of video to calculate the percentage of noncompliance officers experienced on average across interactions. Truleo's model flagged officer explanation and normalized in an identical way. Table 1 shows these normalized results.

Table 1. Summary of metrics from BWC analysis demonstrating reduction in noncompliance

Normalized duration of officer explanation and civilian noncompliance across videos of the two analyzed time periods. These metrics are unitless and can be considered a ratio of how often the label is present in spoken interactions.

	Normalized Duration of Officer Explanation	Normalized Duration of Civilian Noncompliance
2021	0.48	1.20
2022	1.21	0.83
Percentage Change	+151.1%	-31.1%

Methods

Data Collection and Analysis

The data for this study were collected via an API provided by the department’s evidence management system. Videos delivered via the API were fed through an audio extraction pipeline such that only the audio information of the video was retained in temporary memory for analysis. Audio was fed through machine-learned speech recognition models to obtain words and timestamps of valid speech in the audio file. Video files that contained only noise or silence were discarded during the audio analysis process.



DATA COLLECTION AND ANALYSIS

Many accuracy metrics are available for BWC analysis models, including precision, recall, f-beta, and conventional “accuracy”. For this study, precision was chosen as the metric of accuracy to be optimized across all models.

By nature, BWC videos will not capture all events as the quantity of video depends on an officer physically turning on their BWC. This puts an undetermined limit on recall, which is the ability of a model to correctly identify all events or labels that may have occurred in all known interactions. Late activation and early termination of BWC video by the officer can exacerbate these issues. Additionally, even in a recorded interaction, it is possible that an event occurs without verbal cues, such as a use of force.

Knowing that all interactions may not be captured, a comparative analysis can still be conducted assuming the characteristics listed above do not significantly change. In these comparative analyses, precision (the number of true positives discounting false positives, ignoring false negatives) is the best metric as relative values can be compared with confidence.



OFFICER IDENTIFICATION AND ACCURACY

Subsequent analysis on the audio was conducted to diarize the audio into anonymous speakers, and a language-based model was used to identify which of the anonymous speakers was likely to be the officer wearing the

camera. In testing, this model performed with an 85% level of precision. The remaining speakers were aggregated into civilian audio. The same model was used across all analyses, enabling confident comparisons of relative differences acknowledging that absolute numbers may be affected by precision errors.



NATURAL LANGUAGE PROCESSING EVENTS, LABELS, AND ACCURACY

After officer / civilian identification, the resulting text was analyzed via natural language processing (NLP) models that identified certain events and labels.

NLP models were trained from data sets where humans tagged segments of transcribed text with relevant events and labels, with a target inter-annotator agreement level exceeding 90%.

Events were output via an intent classification model taking a segment of text from 1 to 50 words from a single utterance of a single speaker and outputting a single label. Labels were output via either an intent classification model or a named entity recognition model that tags one or more words with a specific entity tag.

Events were defined as language that indicated an event occurred in a BWC interaction, whether from the civilian or the officer. The two events relevant to this study were “use of force” and “non-compliance”.

Language for both of these events could occur via either an officer or civilian. Use of force language was collected to cover the entire range of use of force, from de minimis force through lethal force. Some examples of language indicating use of force include “taser deployed” on behalf of the officer or “don’t tase me” on behalf of the civilian. Similarly, “you’re still refusing to cooperate” and “I won’t comply” represent the language of “noncompliance” from the angle of the officer and civilian, respectively.

Labels were classified as professional or rude language. Professional language was dissected into

the use of “polite” language and the use of explanation. Polite language includes the use of formality, gratitude, and politeness, such as “Mr. / Sir / Ma’am”, “Thank You”, and “Please”, respectively.

Explanation is defined as instances of officers explaining to a civilian why they are taking a certain action (such as a frisk, detention, or arrest) using more than 25 words.

Rude language is defined as profanity (whether directed or not - “f*** you” or “s***”, respectively), insults (racial slurs), or threats (“I’m going to kill you”).

In testing, the NLP precision for this study was over 90% for “use of force”, “noncompliance”, “threat”, “profanity”, “politeness”, and “explanation”.

Citations

- 1) **Lum, C. et al.**, “Body-worn cameras’ effects on police officers and citizen behavior: A systematic review”, Campbell Systematic Reviews 2020 (<https://onlinelibrary.wiley.com/doi/10.1002/cl2.1112>)
- 2) **Tyler, T.** “Legitimacy and Procedural Justice: A New Element of Police Leadership”, 2014 (<https://www.ojp.gov/ncjrs/virtual-library/abstracts/legitimacy-and-procedural-justice-new-element-police-leadership>)

