Automating Body-Worn Camera Footage Review through AI: Baseline Attitudes from a Multi-Site Randomized Control Trial

Seth Watts[1], Michael D. White[1], & Aili Malm[2]

[1]Arizona State University, [2]California State University, Long Beach

Abstract

Body-worn cameras (BWCs) have been widely adopted as a tool to promote police reform. However, studies have shown that most of the footage recorded by BWCs (about 95%) is never reviewed or seen, which undercuts the core benefits of BWCs. AI-driven analytics may overcome this problem. One example is Truleo, which uses natural language processing to analyze the audio of footage and produce metrics of risk and professionalism. However, there is virtually no research examining its use and impact in policing. In the current study, we describe preliminary findings from ongoing randomized controlled trials testing the implementation and impact of Truleo in the Apache Junction and Casa Grande Police Departments. We draw on focus groups of officers, sergeants, and upper-level management and officer perceptions via surveys administered pre-deployment of the technology. We conclude with a discussion of policy implications related to the use of AI for BWC footage review, particularly with regard to how the technology may promote professionalism, intensify supervision, and increase organizational efficiency.

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1 Introduction

Over the last decade, thousands of law enforcement agencies in the U.S. have adopted body-worn cameras (BWCs) as a tool to show transparency, build community trust, and enhance accountability (DOJ, 2023; Hyland, 2018). The body of evidence on BWCs suggests they can sometimes lead to positive outcomes such as reductions in use of force and complaints (White & Malm, 2020), but those benefits are not consistently realized. For example, some studies have reported large declines in use of force (Ariel et al., 2015; Jennings et al., 2015), while others have found no effect (Lum et al., 2020; Yokum et al., 2019).

One potential explanation for the mixed impact of BWCs involves police departments' inability to review any more than a fraction of the footage recorded by officers. The failure to review the massive amount of BWC footage maintained by departments is a significant limitation that likely undermines the core benefits of BWCs that lead to improved officer performance (i.e., greater use of procedural justice, reductions in unnecessary use of force and complaints against officers). In plain terms, how can the footage have value if no one watches it?

Artificial Intelligence (AI) has the potential to overcome this problem through analysis of vast amounts of BWC video, audio, or both in near-real time. There are now multiple AI products marketed specifically for police, including Axon (Alcorn, 2020), Polis Solutions,[1] and Truleo,[2] and the technology has garnered significant attention among law enforcement agencies (Serrie & Daigle, 2023). Despite rapidly growing interest in the technology (see Lukens, 2024), there are virtually no rigorous, independent evaluations of any AI-driven BWC review product (for an exception, see Adams et al., 2024).[3] As a result, basic questions about the acceptance

[1] https://www.polis-solutions.net/technology
[2] https://www.truleo.co/how-it-works
[3] Adams et al. (2024) summarize preliminary results of an evaluation of Truleo in Aurora, CO and Richland County, SC, conducted by a research team from the University of South Carolina. Truleo has published two case study

and integration of the technology in law enforcement remain unanswered. For example, do officers support the use of AI analytics for BWC review? What are the perceived benefits and drawbacks of the technology? What are the primary challenges to its adoption and integration? Is their variation in perceptions of AI-driven review of BWC footage across officer characteristics? Officer acceptance of this technology is an important precursor to its successful deployment in the field. Given the quickly growing interest in AI-driven BWC analytics and its potential to influence important outcomes for the police, there is a critical need for rigorous research testing the acceptance and implementation of this technology.

The current study seeks to fill this gap through an examination of the experiences of the Apache Junction and Casa Grande Police Departments (both mid-sized Arizona agencies with 75-85 sworn officers), both of which adopted Truleo in spring 2024 as part of randomized controlled trials. We describe preliminary findings related to implementation of Truleo, drawing on focus groups of officers, sergeants, and upper-level management. We also examine officer perceptions of Truleo and related issues via surveys. The focus groups and the surveys were administered 1-2 months prior to the deployment of the technology. The findings presented here have implications for law enforcement agencies considering the use of AI-driven analytics of BWC footage.

2 Literature Review

2.1 The Diffusion of BWCs in Policing

BWCs have been a significant focus of attention among law enforcement agencies in the U.S. for just over a decade. In fall 2013, the Police Executive Research Forum (PERF) and

evaluations of its product in the Alameda and Atwater Police Departments. Both case studies employed a basic pre-post design. In Alameda, Shastry (2022) reported post-Truleo decreases in use of force (36%); unprofessional officer language (30%); and community member noncompliance (12%); and a 17% increase in officer explanations. The findings in Atwater were similar: reductions in internal affairs investigative time (75%); civilian noncompliance (30%); and a significant increase in officer explanation (2.5 times) (Truleo, 2023).

COPS Office held a conference to discuss “the recent emergence of body-worn cameras” (Miller et al., 2014: p. v). Interest in BWCs increased dramatically after a series of high-profile police killings of civilians in 2014–2015, as thousands of law enforcement agencies adopted the technology to show transparency, enhance community trust, and increase accountability (Hyland, 2018). The push for BWCs outside the police profession has been strong, including among community members (Sousa et al., 2018; White et al., 2017), civil rights groups (Stanley, 2015), and policymakers at the state and federal level. For example, nine states have mandated BWCs for all law enforcement officers (National Conference of State Legislatures, 2022), and in May 2022, President Biden issued an Executive Order requiring all federal law enforcement officers to wear cameras (The White House, 2022). Support for BWCs is also strong within the police profession itself (Neitzel, 2021; PERF, 2018; Smykla et al., 2016), though the level of support varies across departments and the specific issues.

The rapidly growing body of research on BWCs has also facilitated the diffusion of the technology. Much of the early research focused on the impact of cameras on use of force and complaints against officers, and several studies concluded BWCs could reduce those outcomes (Ariel et al., 2015; Jennings et al., 2015; Katz et al., 2014). Though the evidence on use of force is mixed (Lum et al., 2020), the research on complaints has been consistent. White et al. (2023a) reported that 28 of 35 studies document substantial reductions in complaints following BWC deployment. There is also a growing evidence base suggesting that the technology has evidentiary value for both the police and downstream criminal justice actors (Huff et al., 2023; Todak et al., 2024) and can enhance procedural justice and police legitimacy (Demir, 2019; McCluskey et al., 2019), though again, the evidence is mixed across studies. White & Malm (2020: p. 138) conclude, “In the end, BWCs are a tool, but they are an important tool. And they can be the right tool for helping police achieve a range of critically important objectives tied to their core mission.”

2.2 Officer Perceptions of BWCs

Researchers have also devoted significant attention to officer perceptions of BWCs, as their support for the devices (or lack thereof) can dramatically affect actual use of the technology (Young & Ready, 2015). Early research showed mixed officer support for BWCs. For example, in 2016 the Boston police union filed an injunction in federal court to stop the rollout of BWCs (Boss, 2018). Alternatively, Jennings et al. (2014) reported that 60 percent of Orlando police officers believed their agency should deploy BWCs to all officers (see also Mesa Police Department, 2013; Ready & Young, 2015; Roy, 2014). Officers in the Tempe (AZ) and Spokane (WA) Police Departments also reported positive perceptions of BWCs before and after deployment, though support was much lower among Phoenix police officers (Gaub et al., 2016). Gaub et al. (2020) reported positive attitudes among officers assigned to non-patrol specialty units (e.g. detectives, K9). Studies describe a number of officer concerns with the devices, particularly with regard to usability, privacy issues, and how BWCs would be used by supervisors to monitor their behavior (Gaub et al., 2017, 2020; Pelfrey Jr & Keener, 2016).

Gaub et al. (2023) summarized results from 44 officer perception studies, noting that attitudes are generally positive but vary considerably depending on the issue. Officers strongly believe BWCs will positively impact evidence quality, civilian complaints, and police/community relations. For example, Braga et al. (2017) found that most Las Vegas police officers agreed that BWCs would improve the relationship between the police and the community. However, officers are more negative about BWCs' impact on their discretion, use of force, and community member behavior (Gaub et al., 2023; Huff et al., 2020). Kyle and White (2019) found that officers in their multisite study disagreed that BWCs would increase civilian compliance with officer directives. These varied officer perceptions of BWCs are notable and likely impact use of this technology in the field. Officer perceptions of BWC-related innovations, such as the use of AI, are similarly important and demand scholarly attention.

2.3 Artificial Intelligence-Driven BWC Analytics

Police departments who have deployed BWCs ingest vast amounts of video and audio footage every single day. For example, in 2019 the Los Angeles Police Department recorded more than 4 million videos of encounters between their officers and community members (Uchida et al., 2022). Likewise, in 2019 the New York City Police Department produced approximately 130,000 new BWC recorded interactions each week (Garnett, 2021: p. 12). Several studies have demonstrated that only a small fraction of the footage recorded by officers is ever viewed by anybody. For example, Uchida et al. (2022) examined the flow of BWC footage into the Glendale (AZ) Police Department for one month. Though officers uploaded nearly 16,000 separate videos in one month, less than 5% of the footage was viewed internally or by someone outside the police department (e.g., prosecutor, community member).

The inability of departments to review the available BWC footage may explain, at least in part, the mixed evidence base. If BWCs are expected to change behavior through a civilizing effect, enhanced supervision, or basic deterrence, officers have to believe that their footage will be reviewed (Patterson & White, 2021). AI-driven BWC analytics have emerged as a potential solution to police departments' inability to view the enormous amount of footage recorded on officer BWCs. Some AI products focus on audio only by utilizing natural language processing (NLP), a branch of AI that has the capability to comprehend, digest, and manipulate text or audio (Amazon Web Services, n.d.). Its primary utility is that it can process and analyze an abundance of text or speech data in a highly efficient manner. Other vendors claim to analyze both video and audio.

Truleo, Axon, and Polis Solutions have all produced a form of AI-driven BWC analytics and there is a growing interest in the viability of this technology. For example, on August 22, 2023, the LAPD announced a new project with the University of Southern California to use AI to examine police officer language (Jany, 2023). In June 2023, Interpol and the United Nations

released a *Toolkit for Responsible AI Innovation in Law Enforcement*.[4] Serrie & Daigle (2023) reported that, by July 2023, 20 law enforcement agencies have adopted Truleo, which uses natural language processing (a branch of AI) to analyze audio from BWC footage and produce metrics of professionalism and risk for every BWC-recorded encounter.

However, there are few independent evaluations of the impact of AI-driven BWC analytics. Adams et al. (2024) recently released preliminary results from their evaluation of Truleo in Aurora, CO and Richland County, SC. They reported a significant increase (82%) in Truleo-measured high professionalism in Richland County, and a substantial reduction in unprofessional behavior in Aurora (57%).[5] Also, Truleo has produced two case studies which suggest the technology is associated with reductions in use of force, civilian non-compliance, and increases in officer explanation (Shastry, 2022; Truleo, 2023). These findings suggest that the technology could have an impact but there is a need for more independent, rigorous evaluations.

The use of AI-driven BWC analytics has raised concerns among numerous groups, most commonly centered on privacy for both civilians and officers (Carter, 2023; Porter & Ogdon, 2023). Civil libertarians have expressed concerns over how AI-driven BWC analytics may serve as another surveillance tool imposed on communities (Porter & Ogdon, 2023; Santos, 2023). Likewise, police unions in Seattle, Washington and Vallejo, California have pressured the police departments to halt the use of AI-driven BWC analytics (Carter, 2023; Sault, 2023). In Seattle, the police union president said that the department was “spying” on their officers with the use of AI-BWC driven analytics (Carter, 2023). Notably, the concerns raised about AI-driven BWC

[4] https://www.ai-lawenforcement.org/

[5] Both law enforcement agencies deployed Truleo via a three-pronged randomized controlled trial, with officers randomly assigned to a control group (no access to Truleo), self-auditing group (officers have access to their own Truleo data), and a supervisor-mediated group (officers do not have access to Truleo data, but their immediate supervisors do have access). In the Aurora study, the reduction in unprofessional behavior occurred with both treatment groups; in Richland County, the increase in high professionalism occurred with just the self-auditing group.

analytics are similar to the early concerns raised about BWCs more than a decade ago. Thus, perceptions of AI-driven BWC analytics among line-level officers is a critical component that must been assessed. Just as it was important to study officer perceptions of BWCs, it is now important to study officer attitudes about this new technology, as officer resistance will undermine its potential impact.

2.4 Perceptions of AI in Policing

There is limited empirical work on the perceptions of AI among law enforcement officers. One could hypothesize that the use of AI in a police department may be viewed positively as it can aid in efficiency and productivity. However, AI's role may not be seen as uniformly good (see Nazareno & Schiff, 2021). AI may be viewed differently depending on its intended use. The only paper to broach the question about officers' perceptions of AI within the context of BWC review suggests that perceptions of fairness may be hampered by automated feedback mechanisms (Adams, 2024a). Specifically, Adams (2024a) looks at how direct automated feedback produced by AI may negatively influence officers' perceptions of fairness, compared to traditional modes of supervisor feedback (e.g., generated via direct observation, manual review of BWC). The author reported that the traditional mode of supervisor monitoring is perceived to be fairer than AI-generated feedback. In fact, Adams (2024a) concluded that, "[…] algorithmic performance review is perceived as manifestly unfair, if not outright detrimental."

The present study seeks to add to this limited body of research by investigating the implementation of Truleo's AI-driven BWC analytics platform. We capture baseline perceptions of Truleo among officers, sergeants, and leadership in two mid-sized Arizona police departments via focus groups and surveys administered 1-2 months before the technology was deployed in the field. Both the focus group questions and survey items center around officers' knowledge of the technology, how they believe it will be used, and the perceived benefits and concerns associated with its use. We focus on three research questions: (1) What are officers'

baseline perceptions of Truleo? (2) What officer characteristics are associated with their perceptions of Truleo? And (3) What are the perceived benefits and concerns with use of Truleo?

3 Current study

3.1 Setting

The current study focuses on officers' baseline perceptions of Truleo in the Apache Junction and Case Grande Police Departments, both medium-sized police departments in Arizona. This is part of a larger multi-site randomized control trial (RCT) which include Casa Grande PD (CGPD) and Apache Junction PD (AJPD). AJPD and CGPD are approximately the same size, face many of the same organizational issues, and they are about 50 miles apart in the same state. The demographics of the officers in the agencies are similar, as are the communities. Specifically, both police departments employ between 75 and 85 officers. The city of Casa Grande has a population of approximately 63,743 with around 14.5% living in poverty. The city is predominately White (64.7%) and Hispanic (44.6%) (United States Census Quick Facts, n.d.-b). The city of Apache Junction has a population of 41,153 with an estimated 12.2% living in poverty. The city has a primarily White populace (82.5%) with 18% being Hispanic (United States Census Quick Facts, n.d.-a). Both departments adopted Truleo in early 2024 with Casa Grande implementing the technology on February 1st and Apache Junction implementing on March 22nd. Both implemented the technology to half their patrol force via an RCT.

3.2 Truleo's Platform

Truleo provides an AI-driven BWC analytics platform that automatically reviews BWC footage audio once the BWC is docked at the end of each officer's shift. Prior to the technology going live in a department, each officer goes through a voice printing process so that the algorithm can distinguish between officers and community members on scene. NLP reviews the

audio of each BWC activation and creates a transcript of the conversations. The accuracy of the transcribing and annotating process reportedly “exceeds 90%” (Shastry, 2022: p. 5). Then, the algorithm produces a variety of positive and potentially negative “flags” such as instances where an officer explained the situation, muted their BWC, attempted to de-escalate, used or threatened to use force, or a civilian’s expressed gratitude, among others. There are only two flags that require supervisor verification: Use of force, and impolite language that might be problematic (e.g., cursing, rudeness). When those two flags are surfaced by the algorithm, a sergeant must go into Truleo’s platform and review the specific flag to verify if a use of force occurred or if the officer engaged in impolite language. If the officer did use impolite language, the sergeant must then decide if it was problematic and worthy of a supervisory response. Additionally, Truleo has a measure of “high professionalism” which is an AI-generated tag that is applied to footage when an officer provides detailed explanation or refrains from threatening force, using force, or using any below standard language when a community member is escalated.[6]

4 Methods

4.1 Data

We developed a Qualtrics survey to capture officer perceptions on a range of topics, including Truleo’s technology, organizational justice, and perceptions of the department and their direct supervisor (see Appendix A1).[7] The survey primarily consists of Likert scale statements (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree) and takes approximately 10 minutes to complete. The survey was anonymous and voluntary. This was explicitly stated in both the internal email disseminating the survey and the preamble

[6] For more detail on Truleo’s metrics, see https://truleo.co/technology.
[7] For the current study, the authors’ University IRB approved the survey on November 1, 2023, and the full study on January 18, 2024 (STUDY00018951).

of the survey. Each department's leadership sent out the survey on our behalf with informed consent instructions. CGPD's survey was shared internally on December 14, 2023. AJPD's survey was shared internally on January 18, 2024. Both surveys were live for approximately 3 weeks with a reminder notification sent from upper-level management after one week. In Casa Grande, we had a 95% response rate (n = 67) while in AJPD, our response rate was 68% (n = 62).

Additionally, we also draw on data collected from focus groups conducted separately with (1) leadership, (2) sergeants, and (3) officers in each department (six total focus groups). CGPD focus groups took place in January 2024. AJPD focus groups took place in February 2024. The authors met with officers, sergeants, and upper-level management to discuss their perceptions of Truleo (see Table 5). The focus groups were semi-structured with guiding questions developed beforehand (see Appendix A2). The meetings lasted no longer than an hour and were typically 30 to 40 minutes in duration. We audio-recorded and transcribed the focus groups.

4.2 Analysis Plan

Our analytical plan follows the convergent parallel mixed method approach (see Creswell & Clark, 2017). We collect both survey data and focus group data simultaneously and then analyze the data separately to gain a comprehensive understanding of the correlates and themes related to Truleo. First, we examine survey data to capture baseline perceptions of Truleo, as well as the relationship between various officer demographic characteristics and perceptions of Truleo. To do this, we present descriptive statistics and correlation matrices of demographics and survey items focusing on Truleo. Quantitative analyses were conducted in Stata 17.0 (StataCorp, 2023).

To supplement the quantitative data, we present emergent themes from focus groups. Given that this technology is novel, we use an inductive coding method to capture themes.

Coding was conducted by two independent coders in NVivo and Atlas.ti. The two independent coders began by using the primary research question (RQ3) to guide the process of coding (Saldaña, 2021). Using a structural coding approach, the independent coders captured specific statements that would be categorized into broader themes. Following this process, a third coder reviewed the codes that were produced and compiled them to develop larger general themes that were categorized under perceived benefits and concerns of the technology.

5 Results

5.1 Officer Survey

Table 1 shows the sample characteristics for each police department. Most respondents, regardless of department, are assigned to patrol (61%-67%), officer rank (59%-74%), white (61%-76%), have no military experience (65%-77%), and are a part of a police union or association (91%-100%). The average age for both departments is 40 to 41 (40.08-41.12). Forty-five percent of AJPD respondents have a bachelor's degree or higher, while 33% of CGPD respondents have a bachelor's degree or higher. Females represent 10% and 6% of the sample for AJPD and CGPD, respectively. Also, on average, respondents have been working as a law enforcement officer for about a decade (9.09-11.42). The sample characteristics between departments are quite similar with differences in just four of the variables reaching statistical significance (e.g., percent Hispanic, high school degree, years working with a BWC, and being a union member; see Appendix B1).

[Insert Table 1 here]

Table 2 presents the baseline perceptions of Truleo. There are a total of 13 items focusing on Truleo. In the aggregate, respondents from each department generally have neutral perceptions of Truleo. For instance, the average response for the 13 items ranged from 2.43 to 3.45 for AJPD, and 2.27 to 3.29 for CGPD (recall that 3 = neutral). Notably, the perceptions do

not differ significantly by department. We ran a series of T-tests for the Truleo items with Welch's correction to test for department differences. None of the thirteen items reach statistical significance at an alpha level of .05. One item is marginally significant ($p < .10$): "[The Truleo system] will allow the department to publicize the good work done." Given the similarities between the departments, we pool the survey data to investigate correlates of perceptions towards Truleo.

[Insert Table 2 here]

Tables B3 and B4 show correlation matrices with Bonferroni corrections (see Appendix B). The primary focus here is to identify potential correlates of perceptions towards Truleo among officer characteristics, including sex, race, age, assignment, rank, being required to wear a BWC, education, military experience, and union membership status. Of the demographic characteristics in the matrices, two have statistically significant associations with any of the Truleo items: officer rank and being required to wear a BWC. The latter variable is a strong proxy for the former, as line officers and sergeants in both police departments are required to wear a BWC, while the higher-ranking officers are not. While these two variables are collinear, they do pick up on a couple different associations.

To further explore these relationships, Figure 1 displays the variation in perceptions of Truleo by rank and being required to wear a BWC. Officers tend to report neutral attitudes towards Truleo across the five different statements ranging from 2.55 to 3.19. However, upper-level management, and in one instance, sergeants, display more positive views of Truleo. The first three Truleo items indicate that line officers are more concerned about how Truleo will be used, compared to higher ranking officers. For instance, we see notable differences on three items: "[The Truleo system] will be used by supervisors to fish for policy violations" (Officers = 3.01 v. Lt and above = 1.88), "I am concerned about the department's use of Truleo" (Officers = 3.19 v. Lt and above = 2.81), and "[The Truleo system] will be used to punish officers" (Officers

= 2.83 v. Lt and above = 1.47). Just one item, "[The Truleo system] will be used by supervisors to fish for policy violations," shows a significant difference in perceptions between officers and sergeants (Officers = 3.01 v. Sergeants = 2.19).

Additionally, being required to wear a BWC was associated with several Truleo items, some of which overlap with rank (see Figure 1). Here, we will present the items that differ from the relationship with the respondent's rank: "[The Truleo system] overall, is a valuable addition to my work" (Required = 2.85 v. Not required = 4.00), "[The Truleo system] will improve the department's performance evaluation process (Required = 2.92 v. Not required = 4.00), "I understand how the department plans to use Truleo" (Required = 3.14 v. Not required = 4.23). The strong agreement with these statements among those not required to wear a BWC aligns with rank, as the higher-ranking officers 1) are not required to wear a BWC and 2) were involved in the decision to deploy Truleo.

[Insert Figure 1 here]

5.2 Focus Groups

Below we highlight themes that emerged from the focus groups with leadership, sergeants, and officers in AJPD and CGPD, focusing on the perceived benefits and concerns of Truleo (see Table 5 for the number of officers per focus group). Results from the focus groups are consistent with the survey findings described above.

[Insert Table 3 here]

5.2.1 Perceived Benefits

Participants from both departments generally noted improvements in efficiency and identifying good and bad policing as the primary benefits of Truleo. For instance, upper-level management highlighted the importance of being able to review 100% of the body-camera footage:

> We had our policy, it hit, like I said, 2 or 3 percent [of body-camera footage]. He brings up Truleo and came to me about it and said we're going hit a hundred percent of every body-

> worn camera footage… with AI. And we decided that that would probably make us better. (CGPD, Management A, January 2024)

Sergeants from both CGPD and AJPD explained how time consuming BWC review can be and that Truleo would change that:

> Just being able to do it a lot quicker, a lot more efficiently, and not only just quality assurance, but identifying the good things that we're not picking up on either. (CGPD, Sergeant D, January 2024)

> I mean we're all extremely busy and to be honest, you can't view everyone's files, there's no way you can. (AJPD, Sergeant C, February 2024)

> …I mean you're… making sure policy is being followed and what not, so I mean if you have something there that's telling you "Hey look—go right to this area to check it out" I think that's gonna…cut down time and make it easier. (AJPD, Sergeant C, February 2024)

With respect to identifying good and bad policing, management and a sergeant from CGPD discussed the utility of Truleo's flagging and feedback feature:

> And when they got something that comes back to them, "Hey, you've done a tremendous job on this,"…I think that re-establishes that in 'em, "Okay, maybe this is why I do this, and I do see good things from this," and it makes our good ones better. It makes our mediocre ones good. (CGPD, Management A, January 2024)

> I would like to see the good identified by the officers that we have, because I'm sure there's a lot of it that's happening that we're not able to see. (CGPD, Sergeant C, January 2024)

Similar sentiments were shared at AJPD:

> I think it's one of those things where - you would like to think as a supervisor, you have a pretty good grasp on those 'red flag' behaviors, and you are addressing them already…. I think it could definitely be a good tool to give guys opportunities like 'Hey, you're really escalating the situation here,' and giving them that training opportunity to see if you do see the change before you progress for more discipline. (AJPD, Sergeant C, February 2024).

5.2.2 Perceived Concerns

One of the primary concerns surrounding Truleo is that the implementation of AI is an added layer of oversight that was described a few times as George Orwell's (1949) "Big Brother" in *1984*. This is generally discussed as an uncertainty of how the technology operates and which behaviors are flagged, and how sergeants and command staff will use the Truleo-

generated data. Other officers noted that it does not impact them given the level of professionalism in their department and the fact that their actions are already recorded.

> We got [officers] saying "this is just big brother watching us. You'll just–y'all are just looking into getting somebody in trouble." (AJPD, Management B, February 2024)

> They're like, "Oh, here's another layer of security. We're being watched again, you know. First, we got body cams watching us, and now we got this." (CGPD, Sergeant B, January 2024)

> You always get that big brother feeling, right? But…Casa Grande Police Department is full of officers that are professional. I don't know of anyone that's really going to have any issues. So, I mean, it's just natural to have that feeling, like big brother's watching, but it's just- it's everywhere nowadays. (CGPD, Officer B, January 2024)

> What is it tagging as inappropriate? There could be situations where we're using foul language that's appropriate for those situations, you know? Or, like, how is that getting relayed to admin and then how are they going to view that? (CGPD, Officer A, January 2024)

An officer at AJPD expressed concern over how the technology may put officers at risk if they are worried about producing a "red flag":

> My concern is that officers are going to be concerned like "Oh I'm gonna get a flag" right? So, they don't come up to this [higher force] level when they need to. So, when they stay down there [at a lower level of force] that officer ends up getting harmed because they didn't get to the level they needed to. (AJPD, Officer B, February 2024)

5.2.3 Variation by rank

Similar to the survey findings, variation in perceptions by rank was evident in the focus groups. Sergeants and upper-level management uniformly discussed the benefits of Truleo. Any concerns raised by supervisors and management centered on how the technology would be received by officers. Officer reactions were more mixed. Some officers identified perceived benefits of Truleo:

> I think a benefit would be it keeps telling you, "Hey, you use foul language a lot," so maybe you just start watching the way you talk a little bit more, and now you're using it less in your everyday conversation. Something like that I can think of as a benefit. (CGPD Officer D, January 2024)

> If you're going above and beyond, or you're courteous to someone in a certain way…You're not going to go and [say] "Hey, Chief, look at this body cam." If it tags those

> for review and it goes to our supervisors, I think there's more opportunity for those recognizing some of the good work, too. (CGPD, Officer A, January 2024)

Most responses from officers, however, discussed neutral attitudes or concerns towards how Truleo operates:

> I know nothing about it whatsoever. (Officer C, AJPD, February 2024)
>
> If an officer has so many red flags on their file. How does that count against us like are we going to get fired because of this? (Officer C, AJPD, February 2024)
>
> I mean this is all -- it's going in a cloud somewhere and once you talk about how our voices being [printed] that concerns me. That's not super comforting, to be honest. (Officer A, AJPD, February 2024)
>
> We have body-worn cameras. Why do we need this? We have already so much oversight we have to deal with as police officers. (Officer A, AJPD, February 2024)
>
> I think on our level, I think nothing's going to change that much. (Officer C, CGPD, January 2024)
>
> You've just got to go with it. There's nothing new going on and you'll be fine. You know, at first we got the cameras, and everybody is kind of, "Shoot, there's cameras." It's the same thing, you know. (Officer C, CGPD, January 2024)

The reported perceived benefits of Truleo revolve around the ability to improve efficiency and identify good and bad policing. The reported concerns focus on how Truleo works and how it will be used by supervisors and upper-level management. Notably, the focus group data generally reflect the findings from the survey. The concerns and neutral attitudes are more prominent among officers than upper-level management.

6 Discussion

AI-driven BWC analytics has the potential to enhance supervision, increase organizational efficiency, and improve police officer behavior by fundamentally altering how (and how much) BWC footage is reviewed by police departments. However, officer acceptance of the technology is a crucial pre-requisite for successful integration of that technology in policing. We explored the baseline perceptions of Truleo – an AI-driven BWC analytics platform –among

sworn law enforcement in the Casa Grande and Apache Junction Police Departments, using data drawn from pre-intervention surveys and focus groups. The survey results suggest that attitudes are generally neutral towards Truleo in the aggregate. Further, perceptions do not vary significantly between the two police departments. There are, however, varying perceptions of the technology by rank and being required to wear a BWC (a proxy for a rank). Upper-level management displayed more positive views towards Truleo than officers. Sergeants' attitudes were "in the middle" though they were closer to officers than upper-level management. These rank-based differences emerged from both the surveys and the focus groups.

The more positive views of Truleo among higher ranked officers are not surprising, given that the leadership in both agencies made the decision to deploy the technology and participate in our evaluation of it. Upper-level management may also view Truleo more positively because the platform offers the potential to enhance transparency and accountability, increase organizational efficiency, and potentially improve the interactions among officers and community members. Most BWC footage is not reviewed or seen by anyone, thereby limiting (or even short-circuiting) the benefits of BWCs. AI-driven BWC analytics offers a solution to this problem by automating the review of all BWC footage produced, and higher-ranked officers are more acutely aware of this potential. Future research will determine whether Truleo and similar technologies can actually deliver on these perceived benefits.

The divergence in perceptions between upper-level management and line-level officers may also be explained by line officers viewing Truleo as another layer of oversight that will be used to monitor them in the field. This also helps explain the variation in perceptions by being required to wear a BWC. Moreover, this divergence in perceptions between line-level officers and upper-level management is not new. Studies assessing perceptions of BWCs have found similar heterogeneity between ranks (Snyder et al., 2019). BWCs are viewed by some officers as a tool for surveillance, and incorporating AI-generated analytics, which may be viewed as a

black box, could exacerbate those negative perceptions. It is unclear whether officers will become more supportive of AI-driven BWC analytics over time (similar to what occurred with BWCs), or perhaps skepticism will remain a consistent theme.

The rank-based differences also emerged in the focus group data. Officers are uncertain about how Truleo operates, how it will be used by the department, or they view it as just another layer of oversight. This may be partially explained by a lack of experience with the technology. Indeed, experience with new technology, such as BWCs, has been associated with fewer concerns and positive attitudes (Goetschel & Peha, 2017; Snyder et al., 2019). As we suggest above, experience with Truleo may lead to fewer concerns and more acceptance. It may also be the case that the integration of AI may be viewed more negatively as a monitoring mechanism (Adams, 2024a), which contributes to the variation in perceptions between line-level officers and upper-level management.

Last, it is important to highlight that line-level perceptions of Truleo were different from upper-level management, but overall, those perceptions were neutral, not negative. The same is true for the variation in perceptions by being required to wear a BWC (see Figure 1). The relative absence of negative attitudes about Truleo may be explained by the manner in which leadership in each department communicated with their officers about the use of Truleo (e.g., in both departments, the leadership actively communicated with officers, attended roll-call briefings to answer questions, etc.), as well as the general culture in those agencies. Though our findings suggest some officers still had concerns, the neutrality of attitudes about Truleo is notable. Additional research in other departments will provide insights on the uniformity of attitudes (or lack thereof) among officers who are exposed to Truleo, as well as the optimal methods for proper planning and engagement to reduce officer resistance.

7 Limitations

The current study suffers from several limitations that warrant mention. First, generalizability is a concern here as the data is derived from two mid-sized police departments in Arizona. Moreover, despite having above average response rates (see Nix et al., 2019), the sample of survey respondents is non-random. Focus group participants were also a non-random sample of sworn personnel from each department. Second, the use of inductive coding to generate themes lacks a pre-defined coding instrument, and this too can limit the generalizability. Third, data here represent perceptions and attitudes at one point and time and fail to capture how those perceptions may change over time. Nevertheless, the current study is among the first to report on officers' attitudes about AI-driven BWC analytics, and importantly, we report on these perceptions among a group of officers who were just a few months away from actually using the technology.

8 Future Directions

The current study focuses on general perceptions of Truleo and its implementation into AJPD and CGPD, and the results set the stage for numerous avenues of future research. Clearly, there is a need for research examining officer attitudes after they begin using the technology (including assessments of pre-post attitude change). Moreover, Adams et al. (2024) recently released results demonstrating the impact of Truleo on officer behavior, as measured by Truleo-generated metrics. We need much more research examining the impact of AI technology on officer behavior, including more traditional outcome measures such as use of force, complaints, and officer activity. Also, there are few studies on the limitations of AI-driven BWC analytics, as well as the metrics generated by the algorithms. For example, BWCs suffer from a number of shortcomings related to camera placement, audio and video issues (e.g., impact of ambient noise, close-quarter encounters), lighting, etc. (White & Coldren, 2017). It is unclear how the limitations with BWCs affect the processing of footage by AI. Moreover, the

measures of performance (both good and bad) generated by Truleo and similar technologies should be evaluated and validated by independent researchers.

There are a host of specific features of Truleo (and AI-BWC integrations more generally) that should also be evaluated. For instance, Truleo data can be used by a department in a number of ways. Should officers have access to their own Truleo data? Should their supervisors also have access? Research should investigate the optimal mechanisms for using the data generated by Truleo. Also, Truleo's ability to review 100% of the BWC footage produced could impact training around important issues such as de-escalation and stop and frisk. Additionally, AI-assisted report writing has the potential to save time, improve writing, and reduce civil liability (Adams, 2024b), though concerns have been raised by some scholars (see Ferguson, 2024's pre-print for a thorough review). Moreover, researchers should explore officers' perceptions of these specific aspects of the technology. AI-BWC integrations (and AI generally) are likely to spread rapidly in policing. Empirical research is critically important to providing a better understanding of the role and impact of these technologies on police departments, officers, and the communities they serve.

9 Conclusion

The present study suggests that the perceptions of Truleo are quite neutral in the aggregate at each police department but there is variation by rank and requirement to wear a BWC. Survey data indicate upper-level management view the technology more positively than line officers. The focus group data reinforce this finding and suggest that improvements in efficiency and the ability to identify good and bad policing are the primary perceived benefits. The concerns center around the uncertainty of Truleo, mainly, how it operates and how it will be used by the leadership.

Buy-in and support from line-level officers are crucial. A lack of buy-in will likely hinder the effectiveness of an intervention. For instance, low compliance rates in BWC activations are associated with negative perceptions of the technology (Young & Ready, 2015). Moreover, buy-in and support from line-level officers could help mitigate burnout and improve perceptions of organizational support (Adams & Mastracci, 2019; Drover & Ariel, 2015). Department leadership can reduce potential resistance from officers by actively engaging them in the planning and implementation process, keeping open lines of communication, and being transparent about the goals and operations of the program. If officers view automated feedback as unfair (see Adams, 2024a), ensuring line officers have voice in the implementation of AI-driven BWC analytics could improve their perceptions of fairness (Trinkner et al., 2016) and buy-in. As the implementation of AI-driven BWC analytics expands to other police departments, further exploration of officer perceptions is needed, as the successful deployment of such technology hinges on acceptance among those most directly affected by it.

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Table 1. Sample Characteristics by Department

	Apache Junction		Casa Grande	
	Mean	SD	Mean	SD
Role				
Patrol	0.61	(0.49)	0.67	(0.48)
Investigations	0.19	(0.39)	0.20	(0.40)
Administrative	0.15	(0.36)	0.11	(0.31)
Other	0.06	(0.23)	0.03	(0.17)
Rank				
Officer	0.59	(0.50)	0.74	(0.44)
Sergant	0.20	(0.41)	0.15	(0.36)
Lt and above	0.20	(0.41)	0.11	(0.31)
Race				
White	0.76	(0.43)	0.61	(0.49)
Black	0.06	(0.24)	0.03	(0.18)
Hispanic	0.08	(0.27)	0.30	(0.46)
American Indian/Alaska Native	0.04	(0.20)	0.00	(0.00)
More than one race	0.06	(0.24)	0.06	(0.24)
Education				
High school	0.25	(0.44)	0.47	(0.50)
Associate degree	0.29	(0.46)	0.20	(0.41)
Bachelor's degree	0.25	(0.44)	0.20	(0.41)
Master's degree	0.20	(0.40)	0.11	(0.31)
Doctorate or Professional degree	0.00	(0.00)	0.02	(0.12)
Female	0.10	(0.30)	0.06	(0.25)
Age	41.12	(8.94)	40.08	(11.98)
Years as an LEO	9.09	(7.81)	11.42	(8.87)
Required to wear BWC	0.85	(0.36)	0.91	(0.29)
Years working with a BWC	4.25	(3.29)	2.23	(1.62)
No military experience	0.65	(0.48)	0.77	(0.43)
Previously served	0.29	(0.46)	0.20	(0.41)
Currently serving	0.06	(0.24)	0.03	(0.18)
Union member	1.00	(0.00)	0.91	(0.29)

Mean, Standard deviation in parentheses; AJPD (n = 62), CGPD (n = 67)

Table 2. Perceptions of Truleo by Department

	Apache Junction PD		Casa Grande PD	
	Mean	SD	Mean	SD
"The Truleo system..."				
Will be used by supervisors to fish for policy violations.	2.64	(1.13)	2.76	(1.01)
Will help improve how I interact with the public.	2.64	(0.94)	2.82	(0.89)
Will help justify my on-duty actions.	2.92	(1.09)	3.21	(0.90)
Will improve how my colleagues interact with the public.	2.98	(1.05)	3.00	(0.86)
Will make my job more physically dangerous.	2.43	(1.07)	2.27	(0.92)
Will improve the department's performance evaluation process.	3.06	(1.06)	3.03	(0.89)
Will allow the department to publicize the good work done.	3.45	(0.99)	3.15	(0.92)
Will only be used to punish officers.	2.47	(0.97)	2.64	(0.92)
Overall, is a valuable addition to my work.	2.96	(1.19)	2.98	(1.02)
I understand how the Truleo system works.	3.21	(0.99)	3.24	(0.96)
I understand how the department plans to use Truleo.	3.23	(1.03)	3.29	(0.99)
I am excited to see how my performance is captured by Truleo.	2.96	(1.16)	2.95	(0.95)
I am concerned about the department's use of Truleo.	2.94	(1.17)	2.89	(0.96)

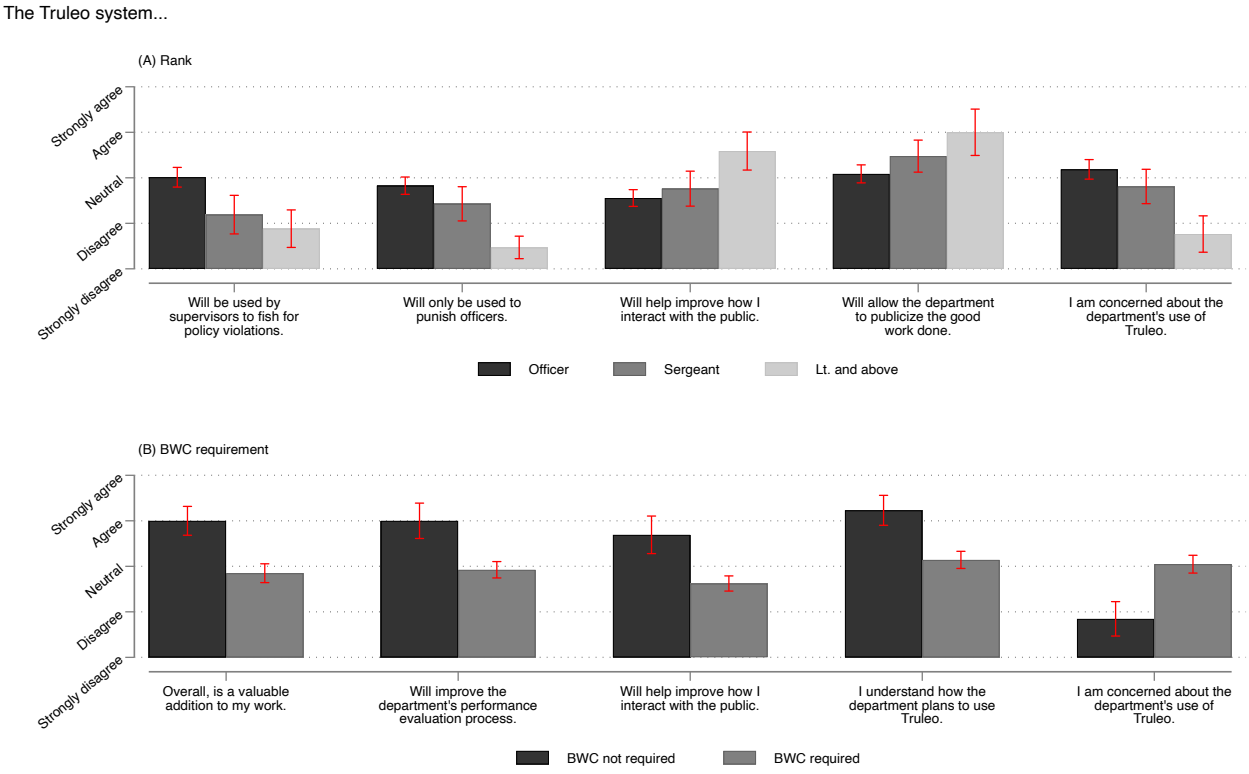
Mean, Standard deviation in parentheses; Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree); AJPD (n = 62), CGPD (n = 6)

Table 3. Focus Group Breakdown

	Apache Junction PD	Casa Grande PD
Officers[a]	3	4
Sergeants[b]	4	4
Upper level management[c]	2	2

[a]Identified as Officer A, B, C, D; [b]Identified as Sergeants A, B, C, D; [c]Identified as Management A, B.

Figure 1. Perceptions of Truleo by Rank and BWC requirement



Note: 95% confidence intervals displayed