



# Content and Container: Exploring Possible Perspective and Audio Biases in Videos of Police Interventions

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## Abstract

The arrest and subsequent death of George Floyd are often cited as pivotal events in the evolution of police-citizen relationships. They were also the pinnacle of the “new visibility of policing” in that they were filmed by multiple cameras, and video recordings of the arrest of George Floyd played a central role in the trial of the police officer who killed Floyd. Although empirical work in other fields has repeatedly shown that how information is conveyed (the container) influences our perceptions and opinions sometimes as much as the information itself (the content), criminologists have largely neglected the effect of cognitive biases on perceptions of the police. The present study investigates both camera perspective and audio biases by reporting the results of three related viewings of controversial police interventions involving the use of force, filmed from the perspectives of a body-worn camera, a surveillance camera, and a cellphone. Results inconsistently support the existence of both biases but still point toward a concerning conclusion: technical features of the videos presented are associated with significantly different opinions. Implications for the public release of video footage are discussed.

**Keywords** Police · Body-worn cameras · Cognitive bias · Public opinion

## Introduction

The arrest and subsequent death of George Floyd are often cited as pivotal events in the evolution of police-citizen relationships. They were also the pinnacle of the “new visibility of policing” (Goldsmith 2010) in that they were filmed by multiple cameras, including police body-worn cameras, surveillance cameras located inside the store where Floyd was first seen, surveillance cameras outside neighboring stores and restaurants, and bystander’s cellphones. This abundance of video footage made it possible to re-enact much of the course of events, influencing public opinions and playing a central role in the trial of the police officer who killed Floyd.

Most of the literature on policing has focused on the effect that interactions between police and citizens have on general and specific perceptions of the police (e.g., Chermak et al. 2006). Although empirical work in other fields, such as cognitive psychology, has repeatedly shown that how information is conveyed influences our perceptions and opinions, policing researchers have largely neglected the effect of cognitive biases on perceptions of the police. How information is transmitted (the container) may matter as much as the information transmitted (the content).

This study investigated the impact of perspective and audio biases on opinions about specific police interventions. Two areas of literature are reviewed. First, an overview of work in cognitive psychology shows that since the 1970s researchers have consistently shown that our brains rely on various cognitive shortcuts (heuristics) and other tricks that bias our perceptions of the world, meaning that perceptions can be influenced by external factors. Second, how these insights have been applied in policing is reviewed. Some studies have suggested that the increased visibility of policing in recent years made possible by technological advances such as body-worn cameras (BWCs) may have a significant impact on opinions about police and police interventions.

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## What You See May Depend More on Perception Than Fact

In the 1960s and 1970s, psychologists such as Daniel Kahneman and Amos Tversky began studying cognitive bias and decision-making and found “that there are distinctive patterns in the errors people make” (Kahneman 2011, p.3). Subsequent research has thus focused largely on the effect of cognitive biases on error-introducing decisions. For example, a recent review of the literature on medical errors and diagnostic inaccuracies (Saposnik et al. 2016) found that “[o]verconfidence, lower tolerance to risk, the anchoring effect, and information and availability biases were associated with diagnostic inaccuracies in 36.5 to 77% of case-scenarios” (p.1). Cognitive biases have also been shown to be related to opinion formation, although this literature is somewhat less focused. For instance, an editorial in the *British Medical Journal* began with the statement that “[w]hat we hear is often very different from what we are told” (McKee and Stuckler 2010) and then discussed studies on diabetes, health policies, political messages, and media presentations that looked at how statements and situations had often been interpreted in ways that conflicted with the actual content. Also, research on cognitive biases suggests that several elements other than facts are crucial to the formation of opinions and decisions. For example, Berggren et al. (2010) found that Finnish political candidates who were physically attractive had a better chance of being elected, regardless of their competence and perceived trustworthiness, and suggested that this may be because the physically attractive are seen as more persuasive, tend to be treated better in social interactions, and often achieve higher occupational success (see also Langlois et al. 2000).

In criminology, the process-based model of policing (Tyler 2006) considers subjectivity to be central to the formation of opinions about policing. Basically, this model suggests that opinions about policing are based on direct and vicarious experiences. Tyler (2006) explains that direct and indirect (through friends, family, and so on) contacts with the police involve subjective information learning that impacts our perceptions. As Horowitz (2007) reminds, however, most individuals rarely come into direct contact with law enforcement, which implies that indirect experiences are salient in shaping perceptions about policing. Furthermore, Parry et al. (2019) suggest that “technology-mediated” experiences should also be considered, because (1) images of an increasing number of police interventions are available and (2) a small but growing literature shows that exposure to videos of interventions influences perceptions of the police, whether positively or negatively, depending on the nature of the encounter. Given that controversial interventions are more

likely to be publicized than positive and mundane encounters, it can be expected that the impact of increased public exposure to police interventions through media will have a generally negative impact on perceptions of policing (Pyrooz et al. 2016).

Applying available research on cognitive bias to policing also suggests that many judgments about police work may be influenced by subjective factors rather than based on objective information. For example, Kahan et al. (2009) looked at *Scott v. Harris* (2007), a court case that originated from a police intervention where a car chase ended with a police vehicle ramming the suspect’s car, causing it to crash and leaving the suspect permanently paralyzed from the neck down. The suspect sued, arguing that his driving had not been a significant threat to pedestrians and other motorists and therefore that ramming his car involved unreasonable risk that he would be seriously injured or killed. Kahan and colleagues showed dashboard camera footage of the car chase and crash to 1350 research participants and asked them to rate their level of agreement with several related statements such as, “During the pursuit, the motorist drove in a manner that put members of the public and/or the police at great risk of death.” They found that, while most respondents agreed with the Supreme Court’s decision that the motorist had been a major threat to society and therefore that the police officer had made the right decision, a significant percentage disagreed, agreeing instead with the first court decisions in which the motorist was found not to be a threat and that the ramming was therefore inappropriate. Not only did the video not speak for itself but individual characteristics were also systematically associated with specific perceptions (e.g., African Americans were more likely to believe that the motorist was not sufficiently a threat to justify the ramming). Kahan et al. conclude that “reactions to the Scott tape [were] shaped by various sources of value-motivated cognition” (p. 42).

Some elements in a situation are more controversial than others: in their study of “how people judge policing,” Waddington et al. (2017) found that ideas of non-compliance, danger, fairness, responsibility, and proportionality led to more heated discussions after participants watched footage of use of force situations. This may be interpreted as support to the idea that attitudes toward the police are malleable (Boivin et al. 2017a): many people do not have strong general opinions about the police but, when confronted with controversial interventions, can be influenced to take a positive or negative position about the police in general.

Lassiter and Irvine (1986) provide an extreme illustration of the effect of perspective on opinion, beginning a line of research that continues today. Twenty-four subjects were asked to view a re-creation of a police interrogation in which the suspect ultimately confessed to a crime. Participants were then asked whether they felt the depicted confession had been coerced or was voluntary. The question was

particularly relevant at the time as not only was the use of videotaped interrogations increasing but political and legal movements were beginning to push for the development of mechanisms to help avoid false confessions and wrongful convictions. Particularly relevant for the present paper is that the Lassiter and Irvine interrogation was filmed from three different points of view. Participants, who were not aware that there were different perspectives, were randomly assigned to watch one of the three versions. Respondents who viewed the version that focused on the suspect (recorded by a camera located behind the interviewing detective's shoulder) were less likely to agree that the confession had been coerced than those who saw the interrogation from the other perspectives (one focused on the detective and the other on both subject and detective equally). In other words, subjects who had seen the same interrogation but from different perspectives reported significantly different opinions. While Lassiter and Irvine's study is far from perfect, given for example its small sample size, later empirical research has confirmed the existence of a camera perspective bias present in evaluations of criminal cases (e.g., Landstrom et al. 2007; Lassiter et al. 1992, 2007; Park and Pyo 2012). The bias appears to hold even when participants are instructed to focus on the content of the interrogation and confession rather than individuals (Lassiter et al. 2002) and when the video evidence is shown to experienced judges and law enforcement experts (Lassiter et al. 2007). Discussions of a possible perspective bias have become more common in policing in recent years due to increased use of video footage, particularly of controversial police interventions captured on dashboard and body-worn cameras. The increasing visibility of police work has also led to investigation of other cognitive biases.

### Cognitive Biases and Their Impact on Public Opinions About the Police

There is no doubt that video footage has an effect. For example, Zimring (2017) argues that the infamous Rodney King tapes, rather than the actual beating by Los Angeles police officers, were ultimately responsible for significant changes in policy in the USA. Video footage also provides strong support in legal procedures: lawyers and prosecutors often report that video is the paramount type of evidence, seen as providing definitive proof of the presence or absence of specific behaviors (Granot et al. 2018). Finally, video footage is often presented as a way to rebalance the difference in levels of power in police-public interactions (Fan 2019; Stuart 2011).

All these arguments are based on the assumption that video footage is objective, that it presents facts and thus will be understood in the same way by all watchers—or, as Stoughton (2018) puts it, “that viewers will be able to

accurately interpret the recorded videos” (p.1405). The literature, however, does not support that assumption and, as seen in Kahan et al., challenges the idea that video footage will be viewed objectively (Kahan et al. 2009). In recent years, research on how this challenge affects policing has focused on two main positions, particularly because of the increased use of body-worn cameras (BWCs). The first position can be loosely summarized as the idea that video footage is, by definition, incomplete. Because it sometimes lacks important contextual information, can begin or end before the controversial elements are shown, depends on technical issues such as lighting, distance, perspective, and field of vision to ensure quality, and so on (Wasserman 2017; White and Fradella 2017), video footage can be disappointing for watchers looking for definitive information.

The second position is that even if video footage were objective, the viewing of the footage is subjective, i.e., how it is understood depends on many factors. Because the human mind tries to make sense of what is seen before the information can be “understood” by a watcher, there is a step between watching the footage and understanding it that is often ignored. The first step in this process is largely unconscious and thus difficult to neutralize, resulting in a series of systematic patterns of deviation known as “cognitive biases.” One of these biases, related to perspective, was investigated in relation to BWCs by Boivin et al. (2017b), who showed footage of two versions of a controversial police intervention—one filmed from a BWC and the other from a surveillance camera—to university students ( $n = 231$ ) and police cadets ( $n = 202$ ). Allocation of version was random, and an equal number of participants in each group watched either the BWC or the surveillance version of the intervention. Police cadets who saw the BWC version reported significantly more negative views of the lead officer than those who watched the surveillance version. The same difference was not found for the university students. Boivin et al. suggest that this difference can be explained by the different way distance was perceived by the two groups of participants, an explanation discussed in detail in a later paper (Boivin et al. 2020).

Other researchers have investigated camera perspective bias on opinions about ambiguous police interventions with similar results. Kalle and Hammock (2019) showed 103 undergraduate students one of 3 video versions of an interaction between police and a citizen that focused on the citizen, the officer, or both and found that participants who watched footage focused on the citizen (i.e., from a BWC) were not only more negative about the citizen's actions but also more positive about the officer's actions. As Kalle and Hammock report, “[w]hile watching the same video, different conclusions were drawn about what transpired, who was culpable, the character of the individuals involved, and the level of force used based on observers' focus” (p.132).

Participants did not even agree on what had been presented. In his doctoral dissertation, Hernandez (2020) showed that those who watched an interaction between police and citizen were more likely to assess the intervention as acceptable and justified when the camera focus was on the citizen rather than on the police officer, supporting the existence of a camera perspective bias.

Despite a limited number of studies and relatively small sample sizes, studies tend to support the existence of a camera perspective bias related to video capture of controversial police interventions. Another potential source of technical bias largely neglected by researchers in criminology and other fields is the effect of an audio track. For example, all three versions of the video used by Kalle and Hammock (2019) had been muted to avoid introducing confounding effects and thus did not include comments or ambient sounds. However, most video recordings include an audio track that might influence how events are perceived (Dyson 2009). The influence of sound has usually been found to be related to biases involved in priming and framing rather than the actual content. Sound can concentrate attention on specific elements of a video: for example, most watchers will pay attention to someone who is screaming, neglecting the simultaneous actions of surrounding actors (Conway et al. 2017). This, in turn, can affect how people judge a given situation, especially if the video footage is seen only once (Graziano 2019; Huey and Broll 2012).

Finally, new technologies, such as body-worn cameras, may lead to the polarization of opinions about police interventions. In their book about BWC, White and Malm (2020) demonstrate that what appear to be debates about BWCs often provide little space for change because those who hold various positions are unwilling to consider other options. A study conducted by Culhane et al. (2016) suggests that participants were more likely to judge that a shooting was justified when evidence was presented in video or audio format rather than text format. Several empirical studies suggest that video footage might simply confirm pre-existing beliefs, leading to polarized responses (St. Louis et al. 2019; Stoughton 2018). This commitment to a particular view may also lead to more emphatic endorsement of a particular position: decades of research on survey methodology have documented a phenomenon called “extremeness” or “extreme response style,” in which respondents tend to answer using the response that is provided at either end of a series of intervals. This phenomenon has been related to several demographic, personality, and structural factors, including survey mode and question order (de Leeuw et al. 2008).

## Current Study

The present study investigates both camera perspective bias and potential audio bias by reporting the results of three

related viewings of fictional controversial police interventions involving the use of force. Experimental conditions were considered carefully. Cognitive bias investigation lends itself to experimental design as, all other things being equal, one element will have a significant effect on an outcome. Two types of outcomes are investigated: the responses to the videos shown and the tendency to provide extreme responses. Four hypotheses, derived from the literature, are tested.

H1: Police interventions seen from the perspective of a body-worn camera will be judged more harshly than the same interventions seen from a surveillance camera.

H2: Police interventions seen from the perspective of a body-worn camera will be judged more harshly than the same interventions seen from a cellphone.

H3: Police interventions seen from the perspective of a cellphone will be judged more harshly than the same interventions seen from a surveillance camera.

H3a: Participants watching footage of police interventions recorded from the perspective of a cellphone will provide more extreme answers than those who watch from the perspective of a surveillance camera.<sup>1</sup>

H4: Police interventions will be judged more harshly when they are accompanied by negative comments about police work.

## Methods

The experiment was conducted at the Université de Montréal in February 2019. Student participants were recruited by research assistants located in a busy corridor of a building in the Arts Faculty. Volunteers ( $n = 216$ ), mostly undergraduate students, were brought to a lab dedicated to this research and seated in front of a computer equipped with a headset. Instructions were provided by a research assistant and remained visible on the computer screen throughout the exercise. Respondents were offered coffee and pastries after completing the questionnaire. Participants were assigned to one of six groups depending on their order of arrival in the lab and then viewed three fictional video vignettes about 1 min long. Table 1 provides some descriptive statistics of the sample.

Summary of the situations presented in the videos is provided below in the relevant sub-sections. In all cases,

<sup>1</sup> Hypothesis 3a could have been formulated the other way around (more extreme answers from participants who watch from the perspective of a surveillance camera) because, to our knowledge, no previous study has compared those two perspectives.

**Table 1** Sample description

Variable	Number of valid cases	Frequencies
Gender	<i>N</i> =214 participants	Male: 78 (36.4%) Female: 136 (63.6%)
Age	<i>N</i> =216 participants	15–24 years old: 165 (76.4%) 25–34 years old: 31 (14.4%) 35–44 years old: 12 (5.6%) 45–54 years old: 5 (2.3%) 55–64 years old: 3 (1.4%)
Highest diploma	<i>N</i> =216 participants	High school: 135 (62.5%) University: 81 (37.5%)

The education system is different in Quebec than in most jurisdictions: students pursue secondary education for 5 years, followed by CEGEP (Collège d'enseignement général et professionnel; "pre-university college") for 2 or 3 years (depending on the program), followed by undergraduate studies. For description, participants who obtained CEGEP and secondary diplomas were combined in Table 1.

participants viewed a domestic violence scenario, then a road scenario, and then the park intervention. This order was chosen to provide a progression in the level of violence depicted in the scenarios: the domestic violence scenario, in which the subject ends up handcuffed on the ground but without apparent injury, is less dramatic than the park scenario, in which a man apparently suffering from a mental health crisis is shot by an officer. After each video, participants completed a series of eight questions related to their opinion of the intervention. Respondents were allowed to watch each video only once and could answer the questions at their own pace; the whole process took between 4 and 23 min, with an average of 9 min.

The first item asked about their general opinion of the police intervention: "In the context presented in the video, the intervention was excellent, satisfactory, questionable, or blameworthy." Respondents then indicated their level of agreement or disagreement with five statements, using a 4-point scale ("strongly agree," "somewhat agree," "somewhat disagree," or "strongly disagree"):

1. Officers were justified in using force against the man.
2. The level of force used in the intervention was adequate.
3. The officer who used his firearm (or baton) against the man should receive a formal reprimand.
4. The officer who used his firearm (or baton) against the man should be required to take additional training at the police academy on use of force.
5. The officer who used his firearm (or baton) should be fired.

Another item measured the viewer's perception of the distance between the officer and a moving individual: "In your opinion, the officer (a) fired too late and put himself in danger; (b) fired in a timely way; (c) fired too early; (d) should not have used his firearm during the intervention."

Other items asked about respondent characteristics (age, sex, highest scholastic diploma obtained, and whether a relative or close friend was or had been a police officer) to ensure that the random allocation did not show any systematic selection biases.

As this study tested hypotheses related to both perspective bias and audio bias, the videos shown were versions of the same intervention filmed simultaneously with different kinds of cameras and from different perspectives. Three perspectives were studied, depending on the scenario: the interventions were filmed with an Axon Body 2 body-worn camera, an Apple Iphone 8, and/or a surveillance camera on the premises of the Quebec Police Academy. For the BWC and surveillance cameras, no additional soundtrack was added, so the footage included the original sound recorded by the device.

To make it possible to test hypothesis 2, an alternate soundtrack was recorded and superimposed on the Iphone footage, creating two Iphone versions of the domestic violence and road scenarios. The original and alternate soundtracks were narrated by the same research assistant to avoid any bias related to the voice. The wording was carefully scripted by the research team and superimposed by a professional videographer. Multiple versions of the alternate soundtrack were made and the one the research team felt was most realistic was used.

The study involved 216 participants, who each viewed and judged three interventions, for a total of 648 opinions (216 participants × 3 video vignettes).

## Analytical Strategy

Participants answered the same questions following each video vignette. For most questions, participants had four choices, in part to provide different options but also to force them to take a position (two choices were positive and two were negative).

**Table 2** Dependent variables

Variable	Choices for negative opinions (value = 0)	Choices for positive opinions (value = 1)
Overall assessment	“questionable,” “blameworthy”	“satisfactory,” “excellent”
Officers should receive a written reprimand	“somewhat disagree,” “strongly disagree”	“somewhat agree,” “strongly agree”
Officers should complete mandatory additional training in use of force	“somewhat disagree,” “strongly disagree”	“somewhat agree,” “strongly agree”
The level of force used by the officer was appropriate	“somewhat disagree,” “strongly disagree”	“somewhat agree,” “strongly agree”
The officer who used his baton (firearm) should be fired	“somewhat disagree,” “strongly disagree”	“somewhat agree,” “strongly agree”
The officer should not have used his baton (firearm)	“the officer a) used his baton (fired) too late and put himself in danger; b) used his baton (fired) in a timely way; c) used his baton (fired) too early”	“the officer should not have used his firearm during the intervention”
Level of extremeness	Choices included in moderate opinions (value = 0)	Choices included in extreme opinions (value = 1)
Overall assessment	“questionable,” “satisfactory”	“excellent,” “blameworthy”
Officers should receive a written reprimand	“somewhat agree,” “somewhat disagree”	“strongly agree,” “strongly disagree”
Officers should complete mandatory additional training on use of force	“somewhat agree,” “somewhat disagree”	“strongly agree,” “strongly disagree”
The level of force used by the officer was appropriate	“somewhat agree,” “somewhat disagree”	“strongly agree,” “strongly disagree”
The officer who used his baton (firearm) should be fired	“somewhat agree,” “somewhat disagree”	“strongly agree,” “strongly disagree”

The distance item also had four choices but the “should not have used his weapon” choice turned out to be very popular, so all outcomes were dichotomized to reflect that the answer had been either positive or negative, as well as the “extremeness” of the answer. Table 2 lists possible outcomes. The allocation to the six groups—and thus which video versions were seen—was random, and analyses showed that it yielded equivalent groups. It was therefore unnecessary to control for individual characteristics, making it possible to conduct simple bivariate statistical tests. Bivariate analyses were also conducted to determine if there were significant differences between groups/conditions, but all tests were non-significant at the  $p < 0.10$  level, showing that the groups were equivalent.

## Results

### Scenario 1: Domestic Violence

A man and his female partner are arguing loudly at the entrance of their apartment. The man is standing on the sidewalk while the woman is outside, holding the door of the apartment. After a few seconds, two male police officers arrive on the scene and ask about the situation. The man shouts at the officers, aggressively asks them to leave, and then charges at one officer. That officer backs up, takes out his baton, and waits where he is while asking the man to

calm down and remain where he is. The man again charges at the officer, who strikes the man’s leg once and then handcuffs him.

The intervention was filmed from three perspectives: a surveillance camera close to the door of the apartment focused on the sidewalk where the intervention occurred, a BWC worn by the officer who used his baton, and a cellphone held by an unseen neighbor. Participants saw one of two cellphone versions of the intervention, one with a neutral soundtrack that had largely descriptive comments such as “now, two officers are arriving” and “the neighbors are arguing again,” and one with more “negative” comments such as “the police should not do that” and “he [the officer] is trying to hurt him [the man]!”.

This scenario was intended to test all hypotheses. Participants were assigned to watch a version of the intervention filmed from either a BWC, a cellphone (with neutral or negative comments), or a surveillance camera. Eighty percent of respondents felt that the level of force used was appropriate, regardless of the camera used to film the intervention or the perspective presented in the audio. Consequently, the number of negative responses by those who viewed the cellphone footage and heard audio with negative comments was too low to detect significant differences between it and cases where the audio linked with the cellphone footage contained neutral comments. Therefore, this scenario tested only perspective bias (H1, H2, H3, and H3a).

**Table 3** Opinions about a police intervention related to domestic violence

Number of observations	BWC = 75 Surveillance camera = 71 Cellphone = 70						
		Overall assessment	Officers should receive a written reprimand	Officers should complete mandatory additional training in use of force	The level of force used by the officer was appropriate	The officer who used his baton should be fired	The officer should not have used his baton
Percent very positive or positive	BWC	58 (77.3%)	11 (14.7%)	36 (48.0%)	58 (77.3%)	6 (8.0%)	12 (16.0%)
	Surveillance camera	56 (78.9%)	8 (11.3%)	19 (26.8%)	60 (84.5%)	2 (2.8%)	11 (15.5%)
	Cellphone	62 (88.6%)	6 (8.6%)	23 (32.9%)	59 (84.3%)	2 (2.9%)	9 (12.9%)
Phi value and statistical significance							
BWC vs surveillance		0.119	0.050	0.219**	0.091	0.169	0.007
BWC vs cellphone		0.149†	0.095	0.154†	0.088	0.113	0.045
Surveillance vs cellphone		0.019	0.045	0.067	0.003	0.001	0.038

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$

Table 3 presents the results of a series of bivariate analyses ( $2 \times 2$  crosstabs) that tested whether there was a perspective bias. Each pair of points of view (e.g., BWC vs surveillance camera) was tested separately, which means that a significant result—shown in the last three sections of the table—suggests that there is a difference in opinion related to the point of view.

As already mentioned, this scenario showed, by far, the highest levels of agreement with the statement that the level of force was appropriate, with 80% of respondents, regardless of camera point of view, providing similar responses. Still, three significant differences in responses were found, two between BWC and cellphone, and one between BWC and surveillance camera. All three results suggest that respondents who watched footage of the intervention from the BWC expressed harsher opinions about the intervention than those who watched footage from other points of view. This view is consistent with previous findings from the literature supporting a perspective bias, but it should also be mentioned that most differences (15/18) were non-significant.

Two relationships regarding choice of the response that the officer who used his baton should receive mandatory training on use of force, a soft negative consequence, reached statistical significance. Participants were more likely to report that they strongly agreed or disagreed with that statement if they had watched the intervention from the perspective of a BWC (48.0%) rather than from a surveillance camera (26.8%) or a cellphone (32.9%). Respondents were both more likely to “strongly agree” (about twice as often) and less likely to “strongly disagree” (about three times less often) with the statement if they had watched the BWC version (Table 4).

## Scenario 2: the Road

A man sitting in a car parked on the side of a rural road with loud and heavy music playing is seen screaming and hitting the steering wheel. Two male police officers arrive and park behind his vehicle. Both get out of their vehicle; one officer approaches the driver’s window and tries to make contact by repeatedly calling “Sir?”, but the man does not respond. The man then flings his door open, gets out of the vehicle, turns to hit the roof of his car with both hands, and then reaches inside his vehicle to pick up a long axe. He begins running toward one of the officers. Both officers fire their weapons, causing what appears to be serious injury—the man falls to the ground and stops screaming.

That intervention was filmed from two perspectives—a BWC worn by the officer who approached the vehicle and a cellphone held by an unseen bystander located a few steps in front of the man’s vehicle, on the other side of the road. The cellphone film of the intervention was presented in one of two versions, with neutral or negative comments.

Participants viewed either a BWC or a cellphone (with neutral or negative comments) version of the intervention. This scenario made it possible to test two hypotheses, H2 (BWC vs cellphone) and H4 (neutral vs negative comments). Table 5 shows results for the nature of outcomes (positive or negative), while Table 6 shows the results for the extremeness of the same outcomes.

While opinions about this intervention were more mixed, only one statistically significant difference was found, related to cellphone versions. Contrary to expectations, negative comments were related to more positive opinions about this

**Table 4** Extremeness of opinions about a police intervention related to domestic violence

Number of observations	BWC = 75 Surveillance camera = 71 Cellphone = 70					
		Overall assessment	Officers should receive a written reprimand	Officers should complete a mandatory additional use of force training	The level of force used by the officer was appropriate	The officer who used his baton should be fired
Percent extreme (very negative or very positive)	BWC	58 (77.3%)	11 (14.7%)	36 (48.0%)	58 (77.3%)	6 (8.0%)
	Surveillance camera	56 (78.9%)	8 (11.3%)	19 (26.8%)	60 (84.5%)	2 (2.8%)
	Cellphone	62 (88.6%)	6 (8.6%)	23 (32.9%)	59 (84.3%)	2 (2.9%)
Phi value and statistical significance						
BWC vs surveillance		0.019	0.050	0.219**	0.091	0.114
BWC vs cellphone		0.149†	0.095	0.154†	0.088	0.113
Surveillance vs cellphone		0.131	0.045	0.067	0.03	0.01

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$

**Table 5** Opinions about a police intervention on the side of a road

Number of observations	BWC = 70 Cellphone with neutral comments = 76 Cellphone with negative comments = 70						
		Overall assessment	Officers should receive a written reprimand	Officers should complete mandatory additional training in use of force	The level of force used by the officer was appropriate	The officer who used his firearm should be fired	The officer should not have used his firearm
Percent positive or very positive	BWC	30 (42.9%)	31 (44.3%)	45 (64.3%)	32 (45.7%)	14 (20.0%)	20 (28.6%)
	Cellphone (neutral of negative)	62 (42.5%)	66 (45.2%)	95 (65.1%)	58 (39.7%)	29 (19.9%)	33 (22.6%)
	Cellphone with neutral comment	25 (32.9%)	37 (48.7%)	49 (64.5%)	28 (36.8%)	14 (18.4%)	15 (19.7%)
	Cellphone with negative comment	37 (52.9%)	29 (41.4%)	46 (65.7%)	30 (42.9%)	15 (21.4%)	18 (25.7%)
Phi value and statistical significance							
BWC vs cellphone (neutral of negative)		0.004	0.009	0.008	0.057	0.002	0.065
BWC vs neutral cellphone		0.103	0.044	0.002	0.090	0.020	0.103
BWC vs negative cellphone		0.100	0.029	0.015	0.029	0.018	0.032
Cellphone negative vs neutral		0.202*	0.073	0.013	0.061	0.038	0.071

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$



**Table 6** Extremeness of opinions about a police intervention on the side of a road

Number of observations	BWC = 70 Cellphone with neutral comments = 76 Cellphone with negative comments = 70	Overall assessment	Officers should receive a written reprimand	Officers should complete a mandatory additional use of force training	The level of force used by the officer was appropriate	The officer who used his firearm should be fired
		Percent extreme (very negative or very positive)	BWC	20 (28.6%)	30 (42.9%)	32 (45.7%)
	Cellphone (neutral of negative)	40 (27.4%)	43 (29.5%)	55 (37.7%)	47 (32.2%)	55 (37.7%)
	Cellphone with neutral comment	20 (26.3%)	22 (28.9%)	29 (38.2%)	22 (28.9%)	25 (32.9%)
	Cellphone with negative comments	20 (28.6%)	21 (30.0%)	26 (37.1%)	25 (35.7%)	30 (42.9%)
	Phi value and statistical significance					
BWC vs cellphone (neutral of negative)		0.012	0.133*	0.077	0.118†	0.157*
BWC vs neutral cellphone		0.025	0.145†	0.077	0.159†	0.216**
BWC vs negative cellphone		0.000	0.134	0.087	0.087	0.114
Cellphone negative vs neutral		0.025	0.012	0.010	0.072	0.103

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$ 

intervention: about a third of participants (32.9%) who saw the cellphone version with neutral comments reported that they found the intervention excellent or satisfactory, while a little more than half (52.9%) who saw it from the same perspective but with negative comments also reported that they found it excellent or satisfactory. Responses to this video were therefore not associated with a perspective bias but an audio bias was found for one of the six indicators.

As shown in Table 6, six relationships reached statistical significance, all of which are related to perspective bias: participants who watched the intervention from the perspective of a BWC were more likely to express extreme positive opinions about reprimanding or firing the officer who used his firearm as well as that the level of force used was appropriate than respondents who watched the cellphone version. The difference is even more apparent for extreme negative opinions—BWC respondents were more likely to strongly disagree with the idea that the officer should receive a written reprimand or be fired as well as that he used an appropriate level of force. There were no significant differences between cellphone versions.

### Scenario 3: the Park

A man is seen talking to himself while rummaging in a garbage can located in a park in an urban setting. Two male police officers stand about 20 ft away, and one calls out to him. The man removes his hands from the garbage can, and it can be seen that he is holding a long kitchen knife. He responds to the officer, making it apparent that he thinks he is dealing with a demon. After a few seconds, he says the Devil is telling him to stab the demon and begins running toward the officers with the knife raised. Both officers fire their weapons, apparently causing serious injury as the man falls to the ground and stops screaming.

This intervention was filmed from two perspectives: a BWC worn by the officer who spoke to the man and a surveillance camera located on a nearby building behind the officers at an angle that makes it possible to see all individuals throughout the intervention. This scenario makes it possible to test one hypothesis, H1 (BWC vs surveillance camera). Table 7 shows results for the nature of outcomes (positive or negative), while Table 8 shows the results for how extreme opinions were.

**Table 7** Opinions about a police intervention in a park

Number of observations	BWC = 71 Surveillance camera = 145						
		Overall assessment	Officers should receive a written reprimand	Officers should complete a mandatory additional use of force training	The level of force used by the officer was appropriate	The officer who used his firearm should be fired	The officer should not have used his firearm
Percent positive or very positive	BWC	32 (45.1%)	31 (43.7%)	42 (59.2%)	33 (46.5%)	15 (21.1%)	25 (35.2%)
	Surveillance camera	47 (32.4%)	70 (48.3%)	105 (72.4%)	48 (33.1%)	44 (30.3%)	62 (42.8%)
Phi value and statistical significance							
BWC vs surveillance		0.123†	0.043	0.134*	0.130*	0.097	0.072

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$

Opinions about the park incident are also mixed. Three out of six relationships reached statistical significance: this time, participants were more likely to have positive opinions when they watched the intervention from the perspective of a BWC, reporting that the intervention was excellent or acceptable, the officer did not need additional training in the use of force, and the level of force used was appropriate.

None of the relationships reached statistical significance, indicating that no perspective bias was detected in strong opinions about the park scenario. Finally, opinions about the park scenario were in general comparable to those for the road scenario, but not as strong as those reported for the domestic violence scenario. For example, 28.2% and 27.8% of participants reported that they considered the interventions in the park and road scenarios to be excellent or acceptable, while that proportion increases to 41.2% for the domestic violence scenario, regardless of the perspective and soundtrack.

## Discussion

Haselton et al. (2015) define cognitive bias as “cases in which human cognition reliably produces representations that are systematically distorted compared to some aspect of objective reality” (p.968). Their review of recent empirical studies found that biases appear to be different for different individuals, depending on several factors, and that some have more important consequences than others. They conclude that cognitive bias should be viewed as a feature of the human mind, not an aberration. Cognitive bias is therefore not unexpected and should be studied in depth.

Two other features of Haselton et al.’s definition should be highlighted. First, cognitive bias is unconscious and therefore difficult to correct. This characteristic is also discussed by Lassiter and colleagues, who demonstrated how difficult it was to neutralize perspective bias, even for experts. Second, the presence of cognitive bias needs to be

**Table 8** Extremeness of opinions about a police intervention in a park

Number of cases	BWC = 71 Surveillance camera = 145					
		Overall assessment	Officers should receive a written reprimand	Officers should complete a mandatory additional use of force training	The level of force used by the officer was appropriate	The officer who used his firearm should be fired
Percent extreme (very negative or very positive)	BWC	21 (29.6%)	29 (40.8%)	32 (45.1%)	25 (35.2%)	32 (45.1%)
	Surveillance camera	40 (27.6%)	49 (33.8%)	61 (42.1%)	52 (36.6%)	52 (35.9%)
Phi value and statistical significance						
BWC vs surveillance		0.021	0.069	0.028	0.013	0.089

\*\* $p < 0.01$ ; \* $p < 0.05$ ; † $p < 0.10$

recognized and understood in relation to objective reality. Numerous empirical studies have shown that our understanding of crimes and expectations about the police are shaped in large part not by direct experience but by media representations and vicarious experiences (Parry et al. 2019; Surette 2011; Weitzer and Tuch 2005), meaning that the effect of cognitive bias should be of concern to researchers dealing with criminology and policing. This is particularly true because many people believe that seeing is believing—that their viewing of video evidence results in knowledge of what actually happened.

The current study supports the existence of a camera perspective bias and a bias related to audio tracks. Those biases are far from consistent, however. In the domestic violence scenario, the BWC version is consistently associated with more negative and more extreme opinions about the police intervention. The park scenario led to an opposite result: participants who watched the BWC version were more likely to report more positive opinions but as likely as others to report extreme answers. Finally, the road scenario is associated with an audio bias but not in the expected direction—negative comments are associated with more positive opinions. These sometimes-contradictory results still point toward a concerning conclusion: technical features of the videos presented (camera perspective, soundtrack) are associated with significantly different opinions. In other words, public opinions about police work are affected by the way the material is presented—both the content and the container matter when assessing police interventions.

Two implications of these findings for our understanding of police interventions are straightforward. First, in the context of the new visibility of policing, biases related to technical features of recording devices are likely to occur more frequently and should be studied carefully. Few studies of policing have taken cognitive psychology into account, although criminology could benefit from knowledge about both cognitive psychology concepts and the results of decades of studies on biases. While popular expressions such as “Seeing is believing” and “Video recordings show the truth” are prevalent, researchers in policing must recognize the potential problems in arriving at the truth and ensure that their opinions reflect scientific fact.

The second implication is that the multiplication of recording devices, such as body-worn cameras, means that there may be multiple recordings of the same situation competing to be the version that provides definitive information. The current study suggests that perspective and audio biases become crucial when these versions are not filmed under the same conditions—which is likely to be the case for most interventions. In an interesting test, “Police body cameras: what do you see?”, designed by law professor Seth Stoughton and published online by the New York Times, readers are invited to watch footage of a police

intervention filmed by a BWC. Most readers believe that the footage shows a fight between a male police officer and a male citizen. But a second recording of the same situation, filmed from a different perspective, shows that the two individuals are actually dancing and never touch one another. Two recordings of the same situation are open to completely different interpretations, one that could lead to problems for an officer and negatively impact public opinions about law enforcement, while the other is amusing and inconsequential.

Of course, the Stoughton test is an exaggeration: both videos were designed to lead the reader to an interpretation that can be recognized as wrong when alternative evidence is available. But what if the second video—where we understand that both men are dancing—was not available? Or of so poor quality that it did not correct the first, mistaken, interpretation? In the Stoughton test, the dance video shows the limitations of a device. In another example, suppose that in one video an officer appears to be kicking someone lying on the ground, while in another recording of the situation he seems to be helping the person stand up. Which interpretation is correct? The officer might say that he was trying to help, not hurt, the other person, while viewers might believe that in saying this he is hiding the truth. The discussion assumes that both videos are “objective”—that anyone looking at them would have the same understanding of the situation. Cognitive psychology strongly suggests that that assumption is wrong. We should expect that at least a part of the public will be critical of police behavior and suspicious about any story that comes from authorities.

## Conclusion

The current study, the Stoughton test, and the existing literature do not support the popular belief that video recordings always provide definitive information about any given situation. While they may provide important accounts of a situation, as in the George Floyd case, expectations about their value, and thus about the devices that provide video footage such as body-worn cameras, appear to have reached unrealistic levels that could harm initiatives for their use. Following an exponential rise in studies of the deterrent effect of body-worn cameras (see Lum et al. 2020), researchers and policymakers have recently started looking more closely at the recordings produced by BWCs (e.g., Makin et al. 2021; Sytsma et al. 2021). Studies like the one presented here strongly suggest that video footage from BWCs cannot provide definitive evidence in all situations, all the time. In some cases, it may even have a negative impact on the police-public relationship that the device was originally intended to improve. Other studies are needed to further investigate possible perspective biases and to specify the

conditions and contexts in which BWC footage should be released.

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## Declarations

**Ethics Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Consent to Participate** Informed consent was obtained from all individual participants included in the study.

**Conflict of Interest** The authors declare no competing interests.

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