

# Efficacy of Police Body Cameras for Evidentiary Purposes: Fact or Fallacy?

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Police body cameras have become a hot topic of discussion, both in the media and in law enforcement. There is a general 'societal opinion' running repetitively in the media<sup>1</sup> that these devices will solve the scientifically unsupported problem of widespread abuse by police officers. Law enforcement managers seem to agree with the potential resolution, as we find more and more agencies testing or fully deploying body worn cameras in response to the Michael Brown shooting in Ferguson. A modicum of information from law enforcement has shown some benefits of police video cameras (in car & body), and we support the implementation of these devices. Our concern lies in the lack of interest and education on the differences between the mechanisms involved – specifically the human being and the camera. Each sees the environment differently, processes differently, and recalls the information differently. The aspects of the human experience in comparison to a camera are vitally important during police use of force investigations.

Currently, the most prominent data on body worn cameras and use of force comes from a study conducted at the Rialto Police Department (Ca.).<sup>2</sup> The Rialto study showed dramatic drops in both use of force incidents, and citizen complaints over the course of one year. Rialto's study does not stand alone. The Mesa Police Department (Az.), in their 2013 evaluation of body cameras, also found similar drops in citizen complaints against officers.<sup>3</sup> A 2014 USDOJ meta-analysis of the data on body worn cameras is also supportive, while also pointing out that empirical evidence is lacking.<sup>4</sup> Unfortunately, none of these studies mention the potential disparity between what a camera shows and what a police officer actually sees and perceives.

While we fully support the use of body worn cameras, we have concerns regarding a basic lack of understanding of the inherent differences between technology, and the human experience, which can be devastating for both a law enforcement entity, and the officer(s) they employ. Cameras, and the subsequent 'reproduction of events' they provide, are both fact and fallacy. Cameras deliver 'facts' in the recorded portrayal of events from the myopic viewpoint of the lens. This viewpoint is from a **fixed position**, whether head mounted, chest mounted, or from 20 feet away. The fallacy of video is that it may only tell a portion of the story. Consider how easy it is to mislead by telling only a portion of the truth. Clearly, 'halve truths' are acts of deceit, and while a camera does not intentionally lie, the halve truths of a camera lens must be weighed heavily against other evidence in order to find a whole, irrefutable truth.

The most important evidence, both from our scientific standpoint, and from the US Supreme Court's Graham v. Connor ruling,<sup>5</sup> must be the officer's perception of the event. When considering the use of

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<sup>1</sup> <https://www.ncjrs.gov/pdffiles1/nij/176330-1.pdf>

<sup>2</sup> <http://www.policefoundation.org/sites/g/files/g798246/f/201303/The%20Effect%20of%20Body-Worn%20Cameras%20on%20Police%20Use-of-Force.pdf>

<sup>3</sup> [http://repository.asu.edu/attachments/134979/content/Roy\\_asu\\_0010N\\_13803.pdf](http://repository.asu.edu/attachments/134979/content/Roy_asu_0010N_13803.pdf)

<sup>4</sup> <https://ojpdiagnosticcenter.org/sites/default/files/spotlight/download/Police%20Officer%20Body-Worn%20Cameras.pdf>

<sup>5</sup> <https://supreme.justia.com/cases/federal/us/490/386/>



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body camera evidence, it is imperative to understand the difference between visual acuity and perception. Visual acuity is the clarity of vision, the ability to detect and truly 'see' the fine detail of objects in one's visual field. Perception, in contrast, involves the process of not only detecting an object in a general sense, but also comprehension of the object's significance. Depending on the quality of a lens, a camera may have perfect visual acuity, but a camera has no perception whatsoever. Therein lies the difference between the human eye and the camera - only the device with the brain has the ability to perceive and process the significance of the incoming data.

It is indisputable fact that a camera neither perceives the environment, nor experiences stress and subsequent arousal. Because of a lack of arousal and perception, there can be little context in replaying simple video. While video provides grounds for second guessing performance, it can be devastatingly deficient in providing the perspective that is fundamental in judging a use of force incident. Where is the officer's level of fear expressed in the video? How can officer perceptions based on training, experience, and environmental factors be part of the body camera footage review? The answer is obvious: Fear based on perception at a particular moment in time cannot be recreated. An officer lives the event, whereas a video (photograph) is the illusion of a literal description of how the camera 'saw' a piece of time and space."<sup>6</sup>

## **Physiology of the Human Visual Experience**

To comprehend the fallacy of the camera as a fully accurate documentation of an event, we must understand the physiology of the human visual experience, and compare it to the capability of the camera. First, we must recognize that although objects may be within our visual field, they may not always be perceived at a conscious level. Whether or not individual objects in one's visual field are actually seen or perceived depends on specific, dynamic factors, involving issues related to age, line of sight, visual acuity, the limitations of peripheral vision, expectancy, the task being performed, and the character of surrounding activity and other visual distractions. The subconscious brain also rejects a lot of the incoming bandwidth, sending only a small fraction of its data on to the conscious brain.

Exploring this in more depth, we accept that the camera can provide HD quality at all its viewable angle(s), while the human eye falls far short in relative performance. The physiology of the eye ensures that a similar HD version of acuity is only available within the 1-2 degree angle of the Fovea, with vision sharply decreasing towards the periphery<sup>7</sup>. A better appreciation of the foveal field of view can be gained through this demonstration: Hold your thumb out to arms-length and close one eye. Focus on your thumb nail and you will notice the clarity found in just the nail. Without looking away from your thumbnail, try to see the details within your environment to the right or left side of your small visual field. This simple test, and the science behind it, is verifiable proof that the camera wins over the eye in the area of field and visual clarity, but there is much more to consider.

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<sup>6</sup> <http://www.cti-home.com/wp-content/uploads/2014/01/The-Camera-verses-the-Human-Eye.pdf>

<sup>7</sup> [http://www.faa.gov/pilots/safety/pilotsafetybrochures/media/pilot\\_vision.pdf](http://www.faa.gov/pilots/safety/pilotsafetybrochures/media/pilot_vision.pdf)

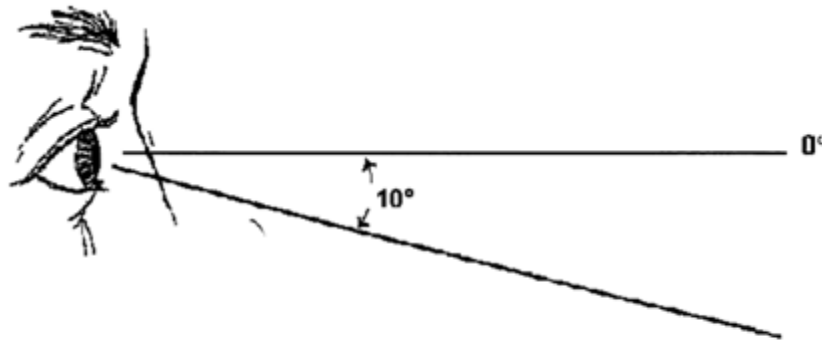


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Visual perception must occur before reaction can take place, and the analysis of what an officer perceives or does not perceive in their surrounding environment, must take into account that most objects in our visual field are perceived below the conscious level. A simple example is walking. **Normal line of sight during the walking process is about 10 degrees downward from horizontal.** (See Figure 1) This means that objects at or near one's feet, to the far left or right, or overhead, must be seen in peripheral vision, a relatively poor means of perceiving detail.



Source: U.S. Department of Defense. *Human Design Criteria for Military Systems, Equipment and Facilities*, 31 December 1974.

Having demonstrated this shortfall in our vision, one may wonder how we are able to see as well as we do. The answer lies within the eyes' rapid movements when constantly scanning the environment. These scanings take place about 3 times every second, and are referred to as visual saccades.<sup>8</sup> Saccades provide near foveal vision throughout the environment. One critical fact about saccades is that they must momentarily fixate for a minimum of 100 milliseconds on an object in order for the brain to perceive and store the information. This concept is often referred to as *visual attention*, and is a form of sampling. The eye is in constant motion, and because human beings will only 'visually attend' to aspects of their environment based upon an individual need – we may not perceive or attend to other aspects of our environment, even if they are well within our visual field. Let's provide some context to that statement by watching this [video](#).<sup>9</sup> Once again, while the camera clearly has the data on film, the vision that incorporates physiology is not seeing all that is there.

Let's look concisely at some of the law enforcement body camera options and how they "see" the world, by comparing their field of view (FOV) at a distance of 30 feet, with that of the human eye:

- The "VIEVU" has variations, but its best model has a 95 degree field of view. At 30 feet the FOV is 66 feet, or 33 feet left and right of center.

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<sup>8</sup> [http://cvcl.mit.edu/SUNSeminar/Henderson\\_03.pdf](http://cvcl.mit.edu/SUNSeminar/Henderson_03.pdf)

<sup>9</sup> <https://www.youtube.com/watch?v=ubNF9QNEQLA>



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- The “BODYCAM” has a 170 degree field of view. At 30 feet the FOV is 685 feet, or 342 feet left and right of center.
- The “WOLFCOM” has 120 degree field of view. At 30 feet the FOV is 104 feet, or 52 feet left and right of center.
- The “FIRSTVU” and AXON” have 130 degree fields of view. At 30 feet the FOV is 130 feet, or 65 feet left and right of center.

In human vision, the normal useful field of view (or UFOV) is the visual area over which information can be extracted at a brief glance, without eye or head movements.<sup>10</sup> The limits of this area are reduced by poor vision, difficulty dividing attention, and/or ignoring distraction, and slower processing ability. Generally UFOV size decreases with age,<sup>11</sup> most likely due to decreases in visual processing speed, reduced attentional resources, and less ability to ignore distracting information.<sup>12</sup> Under optimal, normal stress situations, the visual field of attention in human vision is approximately 55 to 60 degrees, or at 30 feet, approximately 33 feet total. **However, we must consider the context of a use of force event and the resulting increases in stress / arousal to our optimal vision.**

As we stated earlier, the camera experiences no stress, and therefore has no resulting decreases in visual capability. Conversely, while involved in a critical incident, the effects of stress on an officer’s vision can be dramatic and sometimes devastating. (Add footnote for CTI Visual Calculator) Stress is often simply described as an individual’s comparison between the task load, and their ability to successfully deal with that load. Arousal is easily defined as the body’s physiological response to stress. Use of force incidents are chaotic and violent, typically causing high levels of arousal. This drastic increase in arousal activates the limbic system’s fight or flight mechanisms, in turn causing hormones and neurotransmitters to be released throughout the body. These hormones and neurotransmitters are both a help and a hindrance to our survival experience. We can become stronger and more focused, but also lose fine motor skills and make incorrect decisions.

Specifically relating to our visual abilities, stress does not decrease our FOV, but does cause our UFOV to narrow. Under moderate to high stress we process information in our parafoveal region. This region is an angle of 3°-10° off center. An approximation of the ten degree parafoveal visual field is a circle with a four-inch diameter - about the size of the lid on a 1 lb. coffee can - held at arm's length. This stress / arousal reaction is called **peripheral narrowing**. Additionally, selective visual attention may occur, causing saccades to stop while the eye fixates on an important aspect of the environment (hand in waistband), and ignoring other aspects clearly within our view. **We will not perceive or remember these ignored aspects of the environment; something a camera would be sure to capture in total.** The

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<sup>10</sup> Ball, K., V.G. Wadley, and J.D. Edwards, Advances in technology used to assess and retrain older drivers. Gerontechnology, 2002. 1(4): p. 251-261.

<sup>11</sup> Sekuler, A.B., P.J. Bennett, and M. Mamelak, Effects of aging on the useful field of view. Exp Aging Res, 2000. 26(2): p. 103-20.

<sup>12</sup> Ball, K., V.G. Wadley, and J.D. Edwards, Advances in technology used to assess and retrain older drivers. Gerontechnology, 2002. 1(4): p. 251-261.



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difference here again, is the perception specific to the human experience. What a human being under acute stress sees, hears, feels, along with the perspective from previous training and experience, provide context to a use of force event and are all outside the ability of a camera to reproduce. One cannot recreate perspective, stress, arousal, and attention through a camera.

So far we've discussed the physiology of the human eye in comparison to the mechanisms of a camera and the profound differences between the two, based on human physiology. The next element of great importance is memory! The camera provides a simple reenactment of events from its mechanical view, without change to its mechanism by stress. A camera simply lays down images on film that can be replayed over and over again. The human memory is a weave of events and specific experiences, stored in different areas of the brain and tenuously attached to one another. The camera playback is linear. The human memory pattern is a complicated web of anatomy, physiology and psychology that must be mined for information. Once again we must consider stress and arousal in this comparison.

A grand difference between human memory and camera playback is that the camera is not affected by stress. The camera will simply impart its view into digital media without a hormone such as cortisol blocking those signals.<sup>13</sup> In the human, cortisol is released during high stress fight or flight type situations, inclusive of OIS and other uses of force. Cortisol can have severe effects upon memory, blocking pathways and ensuring a memory is stored in a fractionated manner, or in some cases – never stored at all. Obviously, an officer who doesn't remember, or who has an account different than the camera provides, will begin an uphill battle against those who are uninformed. The IACP has publicized its understanding of memory loss under stress, and promotes post OIS scene walkthroughs in order to increase memory between 20 to 40 percent.<sup>14</sup> This is a progressive, yet controversial standpoint, as is video review.

There are certainly good arguments, for both positive and negative aspects of reviewing video. As previously discussed, one problem originates with the myopic view of the camera. An officer may find it difficult to mesh his own memories with what a camera may capture. This may cause confusion or unintentional erroneous accounts of what occurred (confabulation).<sup>15</sup> Also, on a much smaller scale, there is the possibility that an officer may intentionally change his account, based on video. While this viewpoint cannot be ignored, we believe in the integrity of officers, and the weight of a totality of evidence, leaning the scales in the appropriate direction.

One of the most positive aspects of reviewing video is its ability to refresh the officer's recollection, by opening memory pathways, and linking events that the officer does remember which can be invaluable. The process is similar in some ways to cognitive interviewing, and how the procedures allow for deeper

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<sup>13</sup> <http://www.sciencedaily.com/releases/1999/06/990617072302.htm>

<sup>14</sup> [http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display\\_arch&article\\_id=2213&issue\\_id=102010](http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=2213&issue_id=102010)

<sup>15</sup> <http://www.aele.org/video.html>



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memory retrieval through developing “memory tracks”.<sup>16</sup> There’s ample support for the scene walkthrough as a method of enhancing the memory of officers involved in OIS.<sup>17</sup> A review of video, although not specifically addressed, can seemingly offer all the positive outcomes of a scene walkthrough in refreshing memory, and assist the officer in providing a more thorough statement of fact.

Deploying cameras in police cars and on individual officers is a positive step forward. Studies have already shown that use of force decreases and fewer citizen complaints are received; officer’s professionalism has increased, and some experts say the camera increases officer safety. As stated, we support this position and believe all officers should be using this technology. However, an under-examined area of great concern is the need for a full comprehension of the strengths and limitations of the non-mechanical human being wearing the device. People are not mechanisms and they function completely different than a machine. There will be variations between what the human sees and what the camera records. Those discrepancies are where our training focus lies, and where education in the science of human behavior is the key. Human performance education is a proven method to reduce liability to departments, and to save officers from criminal prosecution or unwarranted discipline.

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<sup>16</sup> [https://www.psych.ucla.edu/sites/default/files/documents/other/Current\\_CI\\_Research.docx](https://www.psych.ucla.edu/sites/default/files/documents/other/Current_CI_Research.docx)

<sup>17</sup> [http://www.policchiefmagazine.org/magazine/index.cfm?fuseaction=display\\_arch&article\\_id=2213&issue\\_id=102010#7](http://www.policchiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=2213&issue_id=102010#7)

