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Disembodied Perspective: Third-Person Images in GoPro Videos

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***Abstract**: Used as much in extreme-sports videos and professional productions as in amateur and home videos, GoPro wearable cameras have become ubiquitous in contemporary moving image culture. During its swift and ongoing rise in popularity, GoPro has also enabled the creation of new and unusual points of view, among which are "third-person images". This article introduces and defines this particular phenomenon through an approach that deals with both the aesthetic and technical characteristics of the images in question. An analysis is presented of the peculiar and unfamiliar appearance of third-person images, in which the head of the user remains fixed in space while the world around it moves independently. Technical descriptions are provided to explain why the perception of the world presented in third-person images differs so radically from our own "first-person" mode of perception. Throughout the article, descriptions and analyses of GoPro videos are supported by parallels to theories of movement and perception in the cinema, specifically Vivian Sobchack's film phenomenology.*

Created with extreme-sports athletes in mind, since its inception in 2004 the GoPro camera has quickly become an integral part of modern media culture. Its affordability, small size, mounting versatility and wide field of view have allowed it to be placed virtually anywhere and capture the world from hitherto unseen vantage points. Although this device is primarily known for its standard first-person views created by placing the camera on one's head, more recently, with extreme-sports athletes striving to experiment and capture images that appear as extraordinary as the stunts they perform, unique styles of videography have emerged. One type of image, in particular, is produced by attaching the camera to, but away from, the user's body while simultaneously shifting its focus back onto its wearer, thus creating a unique, disembodied view I call—borrowing from video game terminology—a "third-person perspective". Focusing on this unusual point of view, this article examines the physical placement of the GoPro relative to the body of its user in order to accomplish two objectives: firstly, to describe the way in which the camera and those who wear it typically perceive the world and, secondly and more importantly, to determine what makes these new third-person images and their mode of perception so radically unconventional.

A relatively new product and cultural phenomenon, the GoPro has been the subject of little academic scholarship thus far; as a result, this article takes a from-the-ground-up, hybrid approach, which I call "techno-aesthetic". This methodology gives equal importance to technological and aesthetic aspects of the images studied, specifically insofar as the former inform our understanding of the latter. The first section of the article considers the aesthetic qualities of GoPro videos, both in their typical first-person point of view and in the more unusual third-person variant. The second section presents a detailed account of the physical relationship between the GoPro camera and its user; through technical descriptions, this section illustrates the fundamental differences between first-person and third-person GoPro videos, as well as their respective modes of perception.

Throughout the article, the term "user" refers to any person who operates the camera, even when that person is the viewed object within the video, as is the case in the third-person arrangement discussed in the article. The word "subject" will be employed when referring to a hypothetical human subject, whose mode of perception serves as a point of comparison when defining the GoPro's unique perception of the world.

Aesthetics

Images produced by the GoPro display certain unique characteristics, creating an easily recognisable visual style. Firstly, this camera features an extremely wide "fish-eye" lens (with a 170º field of view); secondly, the GoPro is able to record footage at speeds of up to 240 frames per second, making even the fastest movements appear smooth; thirdly, as a result of its small image sensor, the camera can easily capture deep-focus images, meaning that both foreground and background elements tend to remain in focus at all times. With these three factors working together, the GoPro can compensate for jarring movements with relative ease, which is especially useful when the camera is mounted to its user's body. Most commonly, GoPro users achieve this unique style by attaching the camera to their head; however, this was not always the case.



Figure 1: The original GoPro Hero camera was a wrist-worn, waterproof, 35mm photo camera developed by Nick Woodman in 2004. (© Philippe Bédard 2015)

When Nick Woodman launched the GoPro in 2004, it was intended as a wrist-mounted, 35mm photo camera. His aim was to enable surfers to capture their activities from their own points of view, without the need for dedicated sports photographers who, in any case, would only be able to capture them from an external perspective. Hence the GoPro was initially developed as a wrist-worn waterproof camera that would allow athletes to lift the device to their eye and take a shot, securely and easily (Figure 1). However, with the release of the third-generation GoPro (the Digital HERO 3) in 2007, users began to experiment with camera placement. As Bradford Schmidt and Brandon Thompson recount,

> Nick [Woodman] had the idea to strap his digital wrist camera to the roll bar of his car to record video of himself driving on the track. As soon as Nick stepped back and saw his wrist camera mounted in this new way, a lightbulb turned on and Nick suddenly realized that GoPro could be much more than just a wrist camera company. (6)

At this point, GoPro users started mounting the camera in different positions, including, what soon became the most common one, on the user's head (Figure 2).



Figure 2: One of the most common placements of a GoPro is on top of the helmet. This ensures it can see everything the athlete sees. (© Philippe Bédard 2014)

Capturing images from the user's head allows these cameras to represent a subjective point of view, such as the one seen in the video "GoPro: Cliff Hucking Argentina". As Schmidt and Thompson describe, "[t]he human head is an ideal camera-mounting location … The near eye-level view simulates the human perspective and gives a viewer the immersive sensation of seeing another's point of view" (48). Through the terms they use, Schmidt and Thompson evoke the process of *identification*, which, as for instance Katherine Thomson-Jones explains, is central to our understanding and our appreciation of narrative films since it "explains why we enjoy watching films" (115), constituting "one of the primary ways in which we engage with characters" (105). Although the images discussed in this article are taken from extreme-sports videos rather than narrative films, I argue a similar process of immersion and identification still takes place. While some theorists treat identification as "pathological and thus undesirable and dangerous" (Thompson-Jones 136), this article considers identification with the athletes on screen to be a positive act of emotional and visceral engagement between a viewer and what he or she sees; a process that can be beneficial to the experience of these videos. With this in mind, it is important that a first-person camera placement, such as the one Schmidt and Thompson describe, offers the viewer a taste of what it *feels* like to do what these athletes do.

For the purposes of this article, identification will be understood in terms of the "intimate experience" that Jennifer Barker describes in her book *The Tactile Eye* and that she contrasts with the "distant experience of observation, which the notion of cinema as a purely visual medium presumes" (2). The viewer, therefore, will not be considered here as the passive or submissive spectator described, for instance, by apparatus theory, but rather as an

active participant in the experience of GoPro images. Furthermore, GoPro videos differ from the notion of cinema that Barker opposes in another key area: the way in which they are connected personally to those who capture them. For instance, in an article for *The New Yorker*, Nick Paumgarten recounts an anecdote about his then ten-year-old son skiing with a GoPro on his head:

> Even though the camera was turned outward, filled mainly by the sight of the terrain sliding past, it provided, more than anything, a glimpse into the mind of a dreamy and quiet boy … I didn't need a camera to show me what he looked like to the world, but was delighted to find one that could show me what the world looked like to him. *It captured him better than any camera pointed at him could*. This was a proxy, of sorts. (51; emphasis added)

Paumgarten's description aptly captures the sense of embodiment and immersion produced by GoPro cameras. His observation implies that these images hold a strong indexical link with the user's personhood; indeed, even if an individual is not seen on screen, he or she can still point to first-person GoPro images they have captured and declare: "that's me". The image, in other words, represents the user behind the camera. Similarly, I suggest, following Schmidt and Thompson, that the GoPro's point of view allows viewers to see through another's eyes, therefore offering the potential for a vicarious identification with the athlete's experience.

That being said, what makes the GoPro's experience of the world sufficiently similar to the user's own experience that the former can stand in for the latter? In response to this question, we can consider the first-person mounted GoPro as an illustration of Vivian Sobchack's theory that "camera movement echoes the essential motility of our own consciousness as it is embodied in the world" (317). Inspired by existential phenomenology, Sobchack argues that viewers originally perceive the similarities between a camera's movements and our own because it displays two unique qualities that characterise human experience: embodiment and intentionality. Sobchack suggests that viewers recognise the embodied nature of camera movement in "the finite and perspectival focus of the camera, [and in] its situatedness in the world as an implicitly embodied and functional subject" (321). For Sobchack, embodiment is a part of what allows us to understand camera movement in human or organic terms, instead of as those of a nonhuman, mechanical entity. In the context of this article, embodiment will simply refer to the quality of moving images that foregrounds the camera's position in physical space, relative to its environment. As for intentionality, Sobchack qualifies it as the "invariant *structure* of consciousness, its nonmonadic nature, its essential status of always being *in relation,* of being *directed toward* an object *of* consciousness" (321; emphasis in original). While Sobchack's use of intentionality is closer to the original meaning of the term in phenomenology—as the part of consciousness that drives a subject towards the object of its interest—this article builds from this definition and instead uses intentionality to indicate the force behind camera movement that instigates it. Therefore, from its original relation to the movements of a subject's consciousness, intentionality will refer here to the displacements of the camera in terms of their origin, direction, and intensity (i.e. how, where and why does the camera move towards or away from the object of its gaze).

To put it in simpler terms, intentionality will be understood throughout this article as the source and quality of a camera or user's movements, while embodiment will refer to the origin of both their views, as each is situated in the world. These two concepts, although

distinct from one another, can and often do work in tandem, in which case they imbue in camera movement a certain human quality (Sobchack 320). For instance, while the GoPro is in reality submitted to the user's movements—it is, after all, attached to his or her head—the fact that we perceive in its movements both embodiment and intentionality creates the illusion that it can move freely and independently. This quality of first-person GoPro videos is perfectly captured in examples such as "GoPro: Spine Ride with Tanner Hall", "GoPro: Martin Söderström is ALIVE!", or "GoPro: Tanner Hall's Double Backflip".

"The most beautiful aspect of GoPro", Schmidt and Thompson argue, "is that its versatility is only limited by your imagination" (74). Among other developments, this versatility led to the creation of several innovative camera mounts such as the gnarwhal. Taking its name from "the ubiquitous action sports noun *gnar*, and the elusive horned whale of the Northern Seas, the *narwhal*" (Schmidt and Thompson 74; emphasis in original), this mount creates an image that keeps the head of those who wear it frozen at the centre of the frame, while the world around it now moves uncontrollably; an effect Schmidt and Thompson call "comical" (74). The gnarwhal and other similar mounts consist of attaching the camera in front of the user's helmet using an extension rod, with the GoPro lens facing the user. Beyond the device itself, the focus of this article lies in the unusual images produced by such mounts. This perspective is an extremely recent phenomenon in film and video, since the weight, size and field of view of previous cameras precluded them from being attached in front of someone's head. Because it is so new, there is no established term in the vocabulary of moving image studies that can adequately describe this type of image. For the purposes of this article, I will use the expression "third-person", which I import from video game terminology. Similar to GoPro videos, the third-person in video games refers to the point of view of a disembodied observer that is attached to, but outside of, the protagonist on screen and which stands in for the viewer/player. This third-person perspective is typically opposed to the more traditional first-person view (again in both cases), which allows the viewer or player to see the world through the eyes of their on-screen counterpart. Instead of trying to convey the subjective experience of the character/user—which would promote the vicarious identification of the player/viewer—the third-person view moves outside of the character/user and places him or her in relation to the surrounding environment. Nonetheless, a third-person perspective in video games remains tied exclusively to a single character that the player controls; it is distinct from the point of view of a narrator who would remain distant, detached and objective. Despite the absence of a viewer's agency in relation to the image of the subject seen in third-person GoPro videos, this perspective is still physically removed, yet tied to, and focused on, a single subject. Unlike video games, in which the camera is a virtual entity capable of fluidly shifting its relationship to the character, the third-person GoPro is fixed in place, typically in front of the user's head, rigid and unmoving (Figure 3). This perspective is perfectly illustrated in the videos "GoPro: Ski Flying With Anders Jacobsen" and "GoPro HD: Things You Shouldn't Say While Mountain Biking".

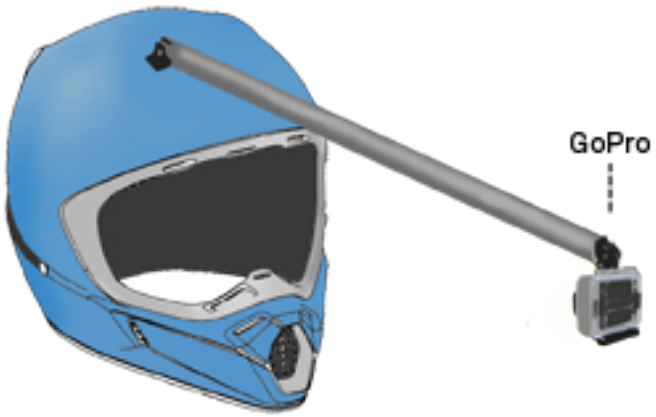


Figure 3: The third-person perspective found in a number of GoPro videos is produced by a camera attached in this position, by using for example a "gnarwhal" mount. (© Philippe Bédard 2014)

There are many reasons why GoPro users might choose to capture images of themselves *in action* rather than their perspective of this action (for instance, one could look at the contemporary importance of the selfie to explain this phenomenon), but this discussion is beyond the scope of this article. Instead, I will focus on the aesthetic characteristics of these images, as well as the new mode of perception that is created in third-person images when users turn the camera's gaze back onto themselves.

As a result of the characteristics of the camera mentioned earlier, gnarwhal-type camera mounts position the head of the user at the centre of the frame, resulting in a very peculiar aesthetic. As Schmidt and Thompson write: "The gnarwhal offers an intense view of the subject's face, capturing reactions and emotions like a traditional close-up. If framed well, the athlete's entire body is in view, along with the surrounding environment" (74). This is the case, for example, in "GoPro HD HERO camera: Base Jump Clip", the first video to use this mount according to Schmidt and Thompson (74). While the extreme wide-angle lens can create a strong foreshortening effect, especially when paired with shorter extensions between the camera and the helmet, the GoPro's small sensor ensures that both the head in the foreground and the environment in the background remain equally in focus. In addition to this, since the GoPro is firmly attached to the user's head, any movements made are perfectly replicated by the camera, which is entirely subordinated to his or her movements. This is in stark contrast to the apparent freedom of the camera in first-person point of view. On the one hand, the first-person GoPro "simulates the human perspective" and the appearance of freedom of movement attached to it (Schmidt and Thompson 48). This impression derives in part from the fact that the camera's embodiment and intentionality make its movements appear as those of a living, conscious subject. On the other hand, the third-person GoPro is unable to move itself. Instead, it is fixed in place in front of a single point of interest on which it remains focused; that is, the camera is locked on the user's face, which, as a result, is completely stationary at the centre of the frame while the rest of the environment moves around it. Aesthetically, this might call to mind a bobblehead if it were to function inversely, with its head fixed in space while the body moves independently beneath it (Schmidt and Thompson 74). Here again, Andrew Shipp's "GoPro HD: Things You Shouldn't Say While Mountain Biking" is a perfect example of this strange effect.

Technical

On first viewing, third-person GoPro images can appear quite disturbing, even nauseating. In their experience of using these perspectives in their own productions, Schmidt and Thompson recount that "the majority of the audience scratched their heads, wondering, 'How'd they do that?'" (77). Indeed, there is something particularly unusual about seeing the world from this third-person perspective that tends to cause a sense of unease in viewers, partly due to their inability to fully grasp the nature of the image: a natural reaction for us who see the world from a first-person perspective. With that in mind, how might we explain the discrepancy between the GoPro's third-person mode of perception and our own, subjective perception of the world? In order to determine the elements that make the former so fundamentally different from the latter, this section focuses on the physical relationship between the camera and the body of the subject to which it is attached, offering detailed technical descriptions of both first-person and third-person images. References to the field of view, optical alignment, orientation and relative camera movement contribute to create a thorough account of the material qualities of both sets of images.

When the GoPro is attached in a first-person arrangement (i.e. on the user's head, looking in the same direction as the user) what types of movements can it perform and how does it perceive the world as a result? On the basis of a Cartesian understanding of space, we identify certain displacements that an unimpeded subject can make through space, either vertically or horizontally, on various axes. Given the correct conditions, a combination of these movements allows the subject to move in virtually any direction, to any point in space. In addition to these potential displacements through space, there are further movements that the subject—specifically, his or her head—can execute.

The three movements that fit this requirement are the rotations that can be performed around the X, Y and Z axes—in other words, the roll, tilt and yaw movements, or any combination thereof. While a subject can move *through* space in hypothetically any direction, these rotational movements can be performed by a stationary subject who simply turns his or her head. The fundamental movements of the subject's head can be done at potentially any point in time and space, dictating how he or she perceives and interacts with the world. Similarly, when the GoPro is attached to the user's helmet, its movements are submitted to the same basic rotations. As a result, the GoPro in first-person arrangement views the world in much the same way as the user who wears it. Figure 4 represents the field of view of both entities; the cone of vision, projected outwardly from the centre, is the product of their gazes and varies constantly according to the object of their interest at any given instant.

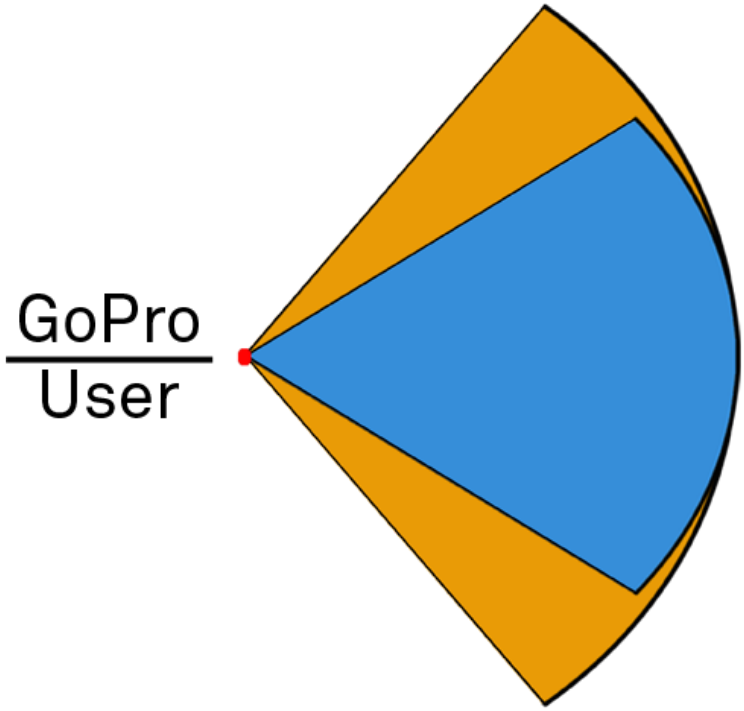


Figure 4: The first-person GoPro (in orange), sees what the user sees (in blue) and moves through the world according to the user's fundamental movements. (© Philippe Bédard 2015)

If we add to this representation the basic movements of the subject—the fundamental rotational movements described previously—the resulting schema now presents a full sphere (Figure 5). As with the representation of the cone of vision in Figure 4, this figure shows a point at the centre standing in for the user, or the GoPro, and an outer layer traced by the projected line of their gazes. This two-dimensional representation stands in for the three-dimensional reality of this subjective mode of perception, which, we should note, is never as perfect and complete as this image makes it seem. Nevertheless, such a model describes what this article considers the fundamental way in which a subject perceives the world—that is, from a central position.[1]

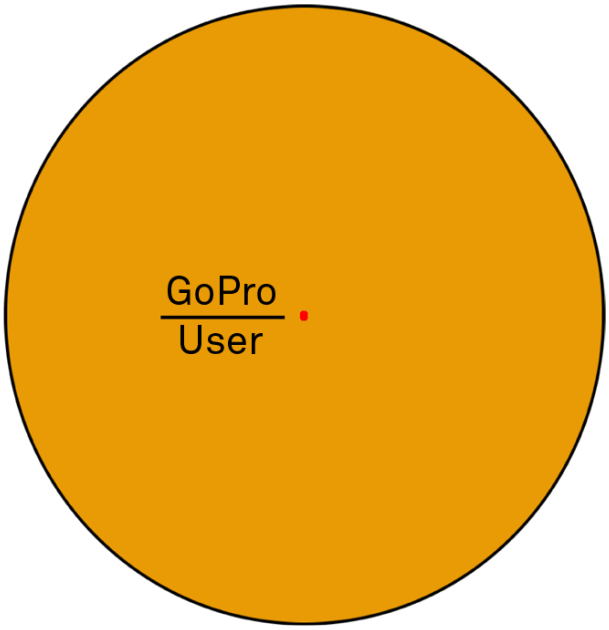


Figure 5: Adding the fundamental rotational movements of the subject to our representation of the first-person mode of perception reveals a hypothetical sphere defined by the gaze of both entities (both in orange) projected outwards from their central position. (© Philippe Bédard 2015)

It is because of this central position—and because the movements and gaze of the subject appear to come from within and to be directed outwards—that I call this mode of perception "centrifugal". In other words, this mode of perception is characterised by its centrality and by the forces it projects outwards, with this centrifugal perception illustrated by the gaze of the subject, or of the GoPro, that is cast onto the surrounding environment.

While a number of authors have suggested that the photographic apparatus perceives the world in a radically different way from the human subjects who operate it (Shaviro 29–30; Vertov 15; Bresson 26; Benjamin 29–30), I argue that in a majority of cases a camera views, and moves through, the world in a manner that resembles human vision and mobility; it does not generally present a mode of perception that is completely incomprehensible to viewers. Indeed, Sobchack writes, "although capable of physical feats of vision and movement beyond the capability of human eye and body, the camera is originally understood [by viewers] as inhabiting and expressing space humanly rather than mechanically" (320). As a result, Sobchack argues, our experience of camera movement "is a relatively 'invisible' one—particularly if we are used to viewing narrative rather than experimental films" (318).[2] In the case of first-person GoPro videos, this invisible quality allows viewers to perceive the images on screen as the direct representation of the user's point of view; in turn, this supports the potential for vicarious identification that Schmidt and Thompson praise in GoPro videos (48).

However, as previously suggested, this is not true of all GoPro videos. Sobchack notes: "Usually we are not consciously aware of camera movement as such … Indeed, it exists for us much as does our own physical movement in the world. It is taken for granted and presupposed except insofar as it becomes problematic" (318). Effectively, everything changes when we consider GoPro videos that include third-person images, since their unusual point of view challenges the viewer's subjective mode of perception.

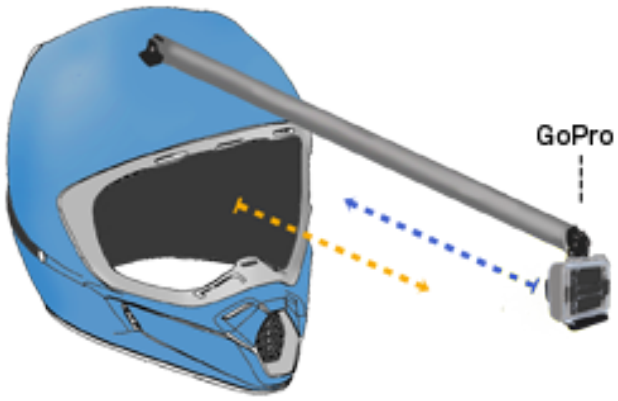


Figure 6: In the third-person arrangement, the GoPro is displaced and reoriented towards the user. Their fields of view, instead of being aligned, are opposed to one another. (© Philippe Bédard 2014)

When a user places his or her GoPro in a third-person arrangement (Figure 6), the displacement of the camera, which is rigidly fixed to the helmet and rotated 180 º towards the user, becomes the source of all the unique qualities of this unusual perspective. Indeed, this displacement and reorientation means a significant portion of the frame is occupied at all times by an element that, relative to the eye of the camera, does not appear to move. In the resulting image, therefore, the head of the user becomes an immovable point in the centre of the frame around which the entire world moves. In addition to the aesthetic peculiarity that results from the reorientation of the camera, an ontological shift also occurs. Indeed, if the first-person GoPro appears free to move independently—in part because we perceive both embodiment and intentionality in its movements—the third-person GoPro loses this apparent freedom of movement as it remains fixed to, and focused on, the user's face. In this new scenario, the camera's movements *are* the user's movements; the GoPro is distinctly subordinated to the user's movements.

On the one hand, the "finite and perspectival focus of the camera" still allows us to situate the camera in the world (Sobchack 321); this has not changed between first- and third-person perspectives. That is, despite its new relationship to the user's body, the third-person GoPro still produces an image whose qualities allow us to recognise it as embodied in the world. On the other hand, the camera also appears to lose all traces of intentionality, this characteristic we normally perceive in a camera's movement that shows it as meaningfully directed and which refers in this article to the quality of its movements, the force that drives it forward (Sobchack 321). The third-person GoPro does not appear to move itself with purpose; rather, it *is moved* by the user to whom it is attached and who now inherits the camera's ability to intentionally move towards an object of interest. In other words, while the third-person image is still embodied in the world similarly to first-person images, it has been stripped of the intentionality behind its movements. This separation of the two characteristics creates some potentially undesirable effects, such as the movement of the GoPro appearing unnatural and even being nauseating for some. One might explain this result in terms of the separation of certain cues (e.g. visual, kinaesthetic, tactile, and labyrinthine) that normally work together to ensure equilibrium, but which can also result in motion sickness if they are mismatched (Reason 820; Bordwell 21).

This division of embodiment and intentionality—that is, between the camera's apparent position in space and its freedom of movement, of which it has been stripped—also

results in the viewer having to remain distant from the image. Firstly, because this separation means the camera no longer moves as we do, and thus is not an adequate substitute for human perception and, secondly, because the separation prevents the natural identification of the viewer with the point of view of the camera—and by extension with the user's perspective. Furthermore, in this arrangement the camera remains fixed outside the body. As a result, third-person images also impose a physical distance between the viewer and the image—by way of the camera's own physical distance to the user's body—in addition to the perceptual distance, which I will now analyse.

As opposed to the first-person example, third-person images no longer feature an alignment of the camera lens with the field of view of the user (Figure 4)—which would allow us to substitute one for the other, enabling the viewer's vicarious identification. Instead, third-person images form a *clash of gazes* and a clash between modes of perception (Figure 7). As noted previously, the discrepancies between the modes of perception found in first- and third-person images stem from the displacement and reorientation of the camera from the former physical arrangement to the latter.

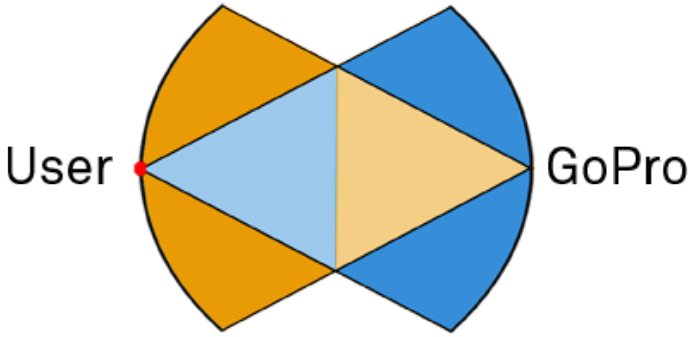


Figure 7: This third-person arrangement creates a clash of gazes, as opposed to the alignment thereof in the first-person arrangement. The subject remains the centre of this representation and continues to move and perceive centrifugally, while the GoPro is now forced to move and see the world in a centripetal fashion. (© Philippe Bédard 2015)

The centrifugal mode of perception of both the user and the GoPro in the first-person set-up is defined by the forces that are projected outwards from within the user, such as its gaze. Conversely, as a result of its displacement in the third-person position—and specifically because its lens is turned back onto the user to whom it is attached—the GoPro is no longer subjected to the centrifugal force that moved it thus far, but rather now by a centripetal force that comes from the outside, towards the centre. Indeed, by adapting the representation of the first-person point of view in Figure 4 (which I called subjective or centrifugal because of the perceived centrality of the human subject), it is possible to create a diagram of this third-person arrangement (Figure 7). This model shows the user, who still perceives the world from the centre outwards. However, the third-person-mounted GoPro now looks from the exterior towards the centre—considering that the head of the user still represents the centre. Thus, the analogy of centripetal force to describe the basic mode of perception of the GoPro in third-person mode is appropriate. This centripetal force emphasises another difference between the more typical use of the GoPro as placed on the user's head, and the GoPro in third-person mode. In the former case, the camera and its user are in alignment, or at least as close as possible to an alignment between the camera's eye and that of the user; most significantly, both share the same spatial orientation. This,

however, is no longer the case in third-person images since the GoPro now moves in ways that differ fundamentally from the user to whom it is attached. For instance, consider a stationary user with a GoPro attached in a third-person arrangement at a distance of thirty centimetres and focused on the user. The user rotates clockwise for one quarter-turn, and the GoPro moves as a result. While the user stays in the same point in space despite its rotation—having only changed its orientation—the GoPro will now be in a completely different position. Moreover, from the perspective of the GoPro, neither itself nor the user's head will have moved. Instead, through its centripetal mode of perception, the camera will see the world moving around the user. In other words, this is the reverse of the way the world is seen through the subjective, centrifugal mode of perception.

Interestingly, this discrepancy between centrifugal and centripetal modes of perception also means the user cannot easily predict how the GoPro in third-person position will perceive his or her movements. Since a centrifugal mode of perception is standard for a human subject, the user has no point of reference for understanding the world as seen through the eyes of a centripetally perceiving camera. This is also true of the viewer who normally identifies with the perspective of the user through the eyes of the camera. Third-person images offer those who view them the chance to look at the world from an entirely new perspective, to see it in a wholly different manner. While some viewers might welcome this opportunity, it seems many are simply nauseated or discomforted by this unusual view of the world. In time, I suspect our experience of centripetal images in GoPro videos will begin to influence our own perceptual apparatus and allow us to view and interact differently with the world around us. Among other changes this might foster, we might learn to understand how differently the world can be seen from outside our typical, centrifugal mode of perception.

Regardless, some might still doubt that there is in fact a difference between centrifugal and centripetal modes of perception. Another thought experiment should lay these doubts to rest. Imagine once again a subject who is stationary. Instead of a third-person GoPro being attached to his or her helmet at a distance of thirty centimetres and positioned looking back at the subject, another person now wears the GoPro on their head, facing the subject. Although the GoPro worn by the second person (now the user) is no longer physically attached to the head of the subject, it otherwise remains in exactly the same position, distance and orientation as in the previous experiment. The subject once again proceeds to rotate clockwise for one quarter-turn. The GoPro on the user attempts to rotate around the subject while also trying to maintain its original distance, position and orientation relative to that subject throughout the motion. In other words, the goal of the user is to replicate as best as possible the type of centripetal movement performed by the third-person GoPro in the previous experiment. This means the user should also try to move according to all the minor imperfections that are inherent to the centrifugal movements of the subject throughout its rotation. However, even if the subject were to move in exactly the same way—imperfections and all—the resulting movement would be completely different for the GoPro now worn by the second person. This is due to the absence of a rigid physical connection between the subject and the GoPro. The camera—which in the present experiment is independent of the subject and now moves centrifugally with the user wearing it—cannot possibly be submitted to the exact movement of the subject, with all its imperfections; such a perfect replication is unattainable through human, centrifugal movement alone. As I suggested previously, this is because in a third-person arrangement, the camera's centripetal movements *are* the user's movements; the movement is *transferred* from the user to the GoPro, not simply *replicated* by the latter in reaction to the former's movement. The imperfections now found in the movement of the second person, which are its own and not

those caused by the original subject, will betray the GoPro's autonomous, centrifugal movements. This relative independence, in turn, will cause the GoPro's perspective in this second experiment to be automatically labelled as a first-person point of view.

Third-person images are certainly characterised by the absence of relative movement between the camera and the head of the user to whom it is attached. Indeed, as a result of this unique physical relationship, the third-person GoPro creates an image in which the head of the user becomes an immovable point at the centre of the frame, independent of the body and the world around it. In other words, the centripetal mode of perception presents a complete reorganisation of the world within the confines of the image. This derives from the technical characteristics necessary for the creation of this image and explains why GoPro third-person videos might be so nauseating to centrifugally-perceiving viewers, unaccustomed to this peculiar point of view.

To conclude, the aim of this article has been to describe the points of view captured by GoPro cameras in order to determine what makes the images they create so unusual. While it may not be possible to identify a specific reason as to why GoPro videos are so unsettling to viewers, the interpretation based on centrifugal and centripetal modes of perception presented in the article offers one way of answering the question.

The analysis of GoPro cameras and the videos they produce could proceed in various directions. One could choose to focus on questions of embodiment and subjectivity and look at the different ways in which these are articulated within first- and third-person GoPro videos. Alternatively, third-person images could be studied in greater detail. For example, one could look at the history of third-person images in moving image media, such as the invention of the SnorriCam and its use in Darren Aronofsky's *Pi* (1998) and *Requiem for a Dream* (2000). Additionally, one could look more precisely into the reasons that have led users to turn the camera back onto themselves, possibly, as stated earlier, by touching on the contemporary importance of the selfie in online media. Regardless, the descriptions found in this article will hopefully facilitate any future discussion of the unusual points of view found in GoPro videos, and encourage other scholars to look into this new and important topic.

Notes

[1] Some readers might consider this subjective model to be limited and strictly anthropocentric. Nevertheless, I do believe the two modes of perception described in the article reaffirm the stability and accuracy of this subjective account of human perception. As such, and although it would be possible to take a different, nonanthropocentric approach, this is how perception will be understood throughout the article.

[2] Experimental films such as Michael Snow's *La Région Centrale* (1971) aptly demonstrate how a camera can move through the world if it is detached from the direct control of a human operator. If a camera is free to explore space on its own terms, it can open up to the viewer an entirely new vision of the world. This, however, remains the exception rather than the norm.

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