Seeing the Offenders’ Perspective Through the Eye-Tracking Device: Methodological Insights From a Study of Shoplifters

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Abstract
This article examines the utility of a novel tool for conducting offender-based research: the “eye-tracking device” (ETD), which is designed to identify what a person sees in the center of his or her vision. First, we review prior research using the ETD. Second, we detail the advantages and troubles we encountered when using it to study simulated shoplifting in retail outlets among 39 active offenders. Benefits of using the ETD include video recording what participants look at, which may serve as quantitative or qualitative data, and, when coupled with a questionnaire, the video footage may be used as a memory prompt and source of verification. Thus, using the ETD should reduce two sources of measurement bias: participants’ limited recall and intentional fabrication. However, limitations of the ETD are that it may inaccurately record what participants see in their peripheral vision and its physical structure makes some participants feel more inconspicuous than usual, both of which are pertinent to criminals’ attempts to avoid apprehension. The peripheral vision problem limits the quantitative output’s validity, whereas the physical structure concern potentially diminishes the generalizability of results. We conclude by discussing the implications of our findings for theory and research.

Keywords
eye-tracking device, wearable technology, offender-based research, offender decision making, shoplifting

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Introduction

Offender-based research involves analyzing information collected directly from law-breakers (Bernasco, 2010; Copes, Jacques, Hochstetler, & Dickinson, 2015). There are several methods of obtaining such data. Among the most common is to survey offenders. This method serves as the basis of many works, most famous being Hirschi’s (1969) Causes of Delinquency. The advantage of surveys is they allow researchers to statistically analyze the causes, correlates, and consequences of offending. For instance, Osgood, O’Malley, Bateman, and Johnston (1989) found that as people age, they are significantly less likely to shoplift, which is the crime under focus in this article.

A limitation of surveying offenders is that the highly structured, closed-ended nature of quantitative questionnaires inhibits the collection of detailed descriptions. Yet such descriptions provide valuable insight into offenders’ motivations and techniques of crime commission. To obtain this information, criminologists interview criminals or collect their autobiographies. Prime examples are Shaw’s (1930) The Jack-Roller and Sutherland’s (1937) The Professional Thief. In the latter, “Chic Cromwell” describes some of the tips that shoplifters tell each other, including “Never grift on the way out,” “Look out for the red-haired saleslady—she is double-smart,” and “The lunch hour is the best time to work that spot” (Sutherland, 1937, p. 210).

Of course, retrospective data—quantitative or qualitative—have their own set of limitations. Foremost among them is that such data have uncertain validity due to participants’ memory decay and dishonesty. After all, it is human nature to forget and to manipulate the truth (Gottschall, 2012). One way researchers combat this problem is by independently observing crime in situ (see, for example, Jacques & Wright, 2015). Yet this procedure is, at best, risky and, at worst, unethical—depending on whom you ask (cf. Goffman, 2014; Kotlowitz, 2014).

A way to observe offenders but avoid the aforementioned problems is to rely on pictures and video footage (Collins, 2008; Levine, Taylor, & Best, 2011). For example, Dabney, Hollinger, and Dugan (2004) observed 105 shoplifting incidents by using the store’s closed-circuit television system (CCTV). This method allowed the researchers to draw conclusions about the demographic makeup of the store’s shoplifters, as well as their techniques of stealing. But the problem with this method is that the offenders’ perspective is left unrecorded.

To tap into the offenders’ perspective while mitigating risk, ethical quandaries, and memory decay, researchers use hypothetical scenarios to simulate lawbreaking (Nee et al., 2015; van Gelder, Otte, & Luciano, 2014). This can be done with quantitative and qualitative methods. An example of the former is a study that entailed showing photographs of houses to burglars and non-offenders to determine whether they differed in recognition of “burglary relevant” environment changes (Wright, Logie, & Decker, 1995). Qualitative simulation-data have been collected, for instance, by having shoplifters browse through a store while narrating their shoplifting-related thoughts into an audio recorder (Carmel-Gilfin, 2011; Weaver & Carroll, 1985).

A criticism of simulation research is that the resultant data may have limited external validity, which is a problem we will examine in the “Discussion” section. For now,
we want to point to another problem that affects most retrospective, observation, and simulation research: offenders may be acting on unconscious cues that are therefore left unrecorded. Yet there is a growing literature suggesting that unconscious decision making affects criminological behavior (see, for example, Harris, 2007; Smith & Alpert, 2007).

Every method of collecting data from offenders has pluses and minuses. Thus, the goal of researchers working in this field should not be finding the “perfect method.” Rather, their goal should be to keep trying new procedures of data collection and, in turn, to share not only substantive findings but also insights into the method’s benefits and limits (van Gelder & Van Daele, 2014). In this way, offender-based researchers help each other learn what “tools” are available, their strengths, and problems. Toward that end, in this article, we report the good and bad parts of our experience studying shoplifting by using an eye-tracking device (ETD): a tool designed to precisely identify what a person sees in the center of his or her vision, both consciously and not.

As detailed below, our study entailed recruiting active shoplifters to simulate shoplifting in retail outlets while equipped with an ETD; immediately after the simulation, we asked shoplifters to answer closed-ended (i.e., “survey”) and open-ended (i.e., “interview”) questions about their background—including prior shoplifting experience—and the simulation. Thus, our objective was to combine the benefits of different data collection methods to offset their respective limitations. Yet, we came to discover that our ETD was limited in ways that precluded reliable quantitative analyses based on the data it produced. However, the reason our ETD proved imperfect was not simply a design flaw; it was also due to how shoplifters sought to minimize their risk of apprehension. Moreover, our study illustrates the importance of mixed-method research, as only by interviewing participants did we learn of the ETD’s limitations.

This article is organized as follows: First, we describe the ETD and review prior research using it. Next, we describe the method we used in our shoplifting study. Then we draw on our qualitative data to illustrate the benefits and limits of the ETD for studying offender decision making. We conclude by discussing the broader relevance of our experience.

The ETD

Broadly defined, the ETD is a kind of wearable technology that records and pinpoints what an individual observes at the center of his or her vision.1 Thus, ETD video records what was, until recently, unobservable phenomena: precisely what another person’s eyes look at over time, consciously and unconsciously. Although the ETD is a novel methodological tool in offender-based research, it has been used extensively in other fields, including psychology and economics (Duchowski, 2007).

Mele and Federici (2012) provided an overview of ETDs used in psychological research, including types of devices, the experimental tasks for which they are best suited, and the theoretical approaches guiding their use. The ETD has been used in experimental psychology to examine visual search tasks, reading, natural tasks, scene viewing, and other forms of cognitive processing. For example, Shimojima and Katagiri
Economists have used the ETD to study how consumers choose products and brands in different types of displays and print advertisements. Clement (2007) used an ETD to track the buying decisions of 61 adult participants in a large Danish supermarket and found that 90% of consumers make a purchase after only examining the front of a package and without having the product in their hand. Van Loo, Nayga, and Seo (2013) tracked the visual movements of 81 adults as they chose between several brands of coffee and found that 14% did not attend to the price of the items when making their decisions and about 30% of the participants did not attend to the products’ sustainability labels. Similarly, Reutskaja, Nagel, Camerer, and Rangel (2011) used an ETD to record the visual search process as 41 participants chose from a set of snack items. Their results suggest that the positioning of items impacts participants’ decision making, as they looked first and most often to items placed in certain positions on the display and were more likely to choose those items at this location.

Economists also have used the ETD to better understand the deterrence process, specifically whether label warnings affect individuals’ product selection. Thomson and Fulton (2007), for example, examined 63 adolescents’ visual attention to and recall of responsibility and moderation messages in alcohol advertisements. They found that these messages were the least frequently viewed textual or visual areas of the advertisements. Among participants who fixated at least once on a warning, only 20% were able to recall its message. Similarly, Krugman, Fox, Fletcher, Fischer, and Rojas (1994) compared the attention given to new versus existing warnings on cigarette advertisements viewed by 326 high school students. They found that new warnings were better able to attract the attention of participants but not necessarily better at holding attention and that recall of existing warnings was based more heavily on familiarity than novelty.

In terms of research related to criminology specifically, few studies have been conducted using the ETD. Extant studies primarily focus on improving the detection of deception among criminals and eyewitnesses. The majority of these studies are concerned with incorporating the ETD into the Concealed Information Test (CIT), which is considered the most validated polygraph questioning method available (Krapohl, McCloughan, & Senter, 2009). CIT tests are typically constructed by asking the subject to repeat a list containing one “target item” (an aspect relevant to the crime scene) and five control items that are irrelevant. The subject’s response to saying the target item versus the others is evaluated using the polygraph machinery. One challenge of the CIT is that it requires polygraph examiners to identify target items familiar to a guilty person but unfamiliar to an innocent person (Proudfoot, 2013). However, recent studies have demonstrated that deceptive subjects exhibit specific ocular tendencies—such as longer fixation, greater pupil dilation, and a reduced blink rate—during a polygraph examination even without the presence of target items (Perth, Kim, & Gamer, 2013; Proudfoot, 2013; Schwedes & Wentura, 2012). By making use of the ETD during the CIT, deception can be assessed through the subject’s eye movements, with or without target items (Proudfoot, 2013). Similar results were found in Walczyk and
colleagues’ (2012) study of 145 adults. Participants watched videos of actual crimes and were randomly assigned to either lie or tell the truth in response to related questions. The ETD data revealed that participants’ giving truthful answers consistently exhibited more eye movement than those in the lying condition.

To our knowledge, only one other published study has explored the methodological possibilities of ETD technology with actual criminal offenders. Neveu, Trottier, Goyette, Rouleau, and Renaud (2011) compared the responses of 29 child molesters and 27 control participants to photos of children and adults. The researchers tracked participants’ eye movements while measuring sexual arousal through penile plethysmography (PPG). Their findings indicate that, compared with the control group, the sex offenders had greater penile response to the children photos but a smaller response to the adult photos. The authors argue that the data collected from the ETD supplement the use of the PPG because it allows researchers to assess avoidance techniques that can falsify PPG results. For instance, offenders may intentionally avoid looking at the photos they find arousing, thereby reducing their PPG responses. The ETD safeguards against this possibility by recording, and thereby confirming, that the photos were actually looked at, as well as the amount of time they were viewed.

A Study of Shoplifter Decision Making Using an ETD: Method and Data

We used the ETD to study 39 active shoplifters. Our focus was offenders’ decision making: what they choose to do in the store, why, and to what effect. Participants wore the ETD as they simulated shoplifting in retail outlets. We used the ETD to record what participants looked at as they navigated the stores and made decisions about what to steal and how. Thus, we literally and figuratively tapped into the “offenders’ perspective” through the ETD.

Participants and Recruitment

The 39 participants were recruited using purposive sampling and snowball sampling (see Jacques & Wright, 2008). The purposive sample was created by having a trained graduate student recruit students from college classes. Subjects were also recruited from a subject pool bank in the Department of Psychology at the same university. The initial participants were then asked to inform their associates (e.g., friends, family) about the study and to contact us if interested in cooperating. Each participant was remunerated with US$75.

Participants were mostly White (56.4%), were male (71.8%), were currently employed (51.9%), and had obtained no higher than a high school diploma (92.3%). The average age was about 24 years old (range = 18-56). During an interview (the procedure for which is described below), we asked each participant about his or her prior shoplifting experiences. Participants had shoppedlifted 7.95 times on average over the previous 6 months; three was the modal number of stores shoppedlifted. The average number of items shoppedlifted at a single time was two, with an average value of US$45.
Participants most commonly targeted discount stores (66.7%), followed by grocery stores (48.7%) and department stores (46.2%); less common targets were drug stores (15.4%) and gas stations (15.4%). They typically stole food (41.0%), clothing (30.8%), health and beauty products (25.6%), electronics (25.6%), and alcohol (5.1%). Nearly one third of the sample had been caught shoplifting by an employee, and one fifth had been arrested for this crime.

The ETD

As noted above, there are several models of the ETD. The model we used consists of two very small cameras mounted to a pair of black glasses with no lens. It collects real-time visual and audio data through a dual camera system paired with a microphone. One camera is projected outward and records the wearer’s line of sight, while another camera is projected toward the wearer’s right eye and records this eye’s movement. The camera projected outward records the visual process as the wearer scans what is in front of him or her, whereas the camera projected inward records the distance between the movements of the other eye’s gaze. The camera system thus simultaneously records the movement of one eye and the direct gaze of the other eye. The cameras are wired by a small cord to a laptop computer connected to a backpack-like device. Software is used to combine the two recordings into a single image that displays a reticle—that is, “crosshair” or fixation cross—on what a person is specifically looking at within his or her direct line of sight during any given millisecond. The recorded images with the crosshair superimposed can be watched as a contemporaneous video. Each millisecond of the video may be used as a quantitative or qualitative datum.

The ETD we used is slim, weighs about 5 pounds, and is inconspicuous to persons more than 10 feet away, as from that distance, it looks like nothing more than someone with glasses wearing a backpack. Compared with other versions of the ETD, the advantages of the “backpack model” are it alleviates movement constraints present in earlier head-mounted models and reduces the tracking problems of the remote versions (for details, see Jacob & Karn, 2003).

Data Collection

The ETD-recorded simulations occurred at four stores of two nationally known chain retailers (i.e., two store locations of each retailer) located in the Midwest United States. Simulations occurred during regular weekday store hours, and the research team spent 2 days at each site. Only security personnel and a few selected employees (e.g., manager on duty) were aware of the ongoing study. To protect participants, management agreed not to arrest or to prosecute any participant for prior unsolved crimes or for stealing merchandise while participating in the research study.

Each participant was instructed to arrive at a predetermined store’s main entrance at a particular time. Upon arrival, he or she was greeted by a research team member and then escorted to a private interview room (e.g., employee break room, storage room) that was off-limits to employees and other customers during interviewing. After obtaining verbal
consent, the ETD was fitted to the participant, and the participant was brought back to the outside of the store’s main entrance. Once there, the team member mentally primed the participant by telling him or her (a) to shoplift as he or she normally would; (b) no employees—“except the manager”—or customers know of their role in the research and thus someone may attempt to apprehend them for shoplifting if spotted offending; and (c) should this occur, to cooperate with the individual, as the manager would immediately free them of any criminal wrongdoing. Next, the participant proceeded inside the store to simulate shoplifting. The simulation was complete once the participant exited the store. Stolen items were inventoried and later returned to the store by the researchers.

After completing the simulation, a research team member escorted the participant back to the interview room to begin an interview. First, participants were asked close-ended questions about their demographic characteristics (e.g., age, highest level of education attained, employment history), criminal involvements besides shoplifting (e.g., drug use or commission of offenses such as assault), and criminal record (e.g., number of times arrested and imprisoned). Second, participants were asked closed- and open-ended questions about previous shoplifting experiences (e.g., types of stores usually targeted, items typically shoplifted, and techniques used to shoplift). The final part of the interview involved the participants’ watching their respective eye-tracking video on a computer screen with the research team. The video was watched frame by frame like a movie, but stopped or rewound as needed. While watching the video of their shoplifting in the store, the participants were asked to describe how and why they made specific decisions as they moved through the store. Research team members also asked questions to clarify what participants described. Each narrative was audio and visual recorded. Once the interview was completed, a research team member escorted the participant out of the store.

The Utility of the ETD for Studying Shoplifter Decision Making

We now turn to providing qualitative examples of how the ETD is a useful tool for collecting empirical data pertinent to shoplifter decision making and that of offenders broadly. Then we discuss the methodological and technological limitations of the ETD for studying shoplifter decision making. A broader lesson of our experience is that mixed-method research is advantageous, among other reasons, because it can help to uncover the limits of various data collection methods and thereby guard against disseminating what are in fact invalid results. As explained below, only by pairing a qualitative interview protocol with the ETD video recording did we learn of the ETD’s (current) major pitfall for quantitatively studying shoplifter decision making. Had we not discovered this limitation, we would have likely wound up unknowingly disseminating invalid findings.

Benefits of the ETD

The obvious benefit of the ETD is that it creates a video (and audio) recording that precisely displays what a participant looks at in their direct line of sight. This is especially
important because seeing is not always a conscious process. For example, we recorded four instances in which a participant clearly attends to a security device but had no recollection of doing so in the post-simulation interview. One such case is the following:

Interviewer: Do you remember looking at the [security] TV?
Participant 8: No.
Interviewer: No? Do you think it’s weird that the eye-tracker says you looked at it but you don’t remember it?
Participant 8: Could be, yeah. I don’t know, it’s just maybe I wasn’t paying attention to everything I was looking at.
Interviewer: So, you think it’s possible to not pay attention to something you’re looking at?
Participant 8: Maybe you just don’t, you know, register it.

In another instance, a shoplifter looked at a single camera on two occasions but only remembered the first time:

Interviewer: You know why you looked at it again?
Participant 7: I don’t remember looking at it the second time. I know for sure I looked at it the first time just ’cause I was coming out of that, out of one part of the aisle and I just, it caught my eye and I was just looking at it.
Interviewer: So, you don’t really remember this then?
Participant 7: I don’t remember this part at all, no.
Interviewer: Would you say you are looking at it though?
Participant 7: Yeah. Oh yeah. I was, took a double check, it looks like . . . Yeah, I mean, it’s just all kinda passive.

While it may seem unimportant whether someone remembers looking at a security television or double-taking a security camera, it is an open question whether such seemingly minor events affect offenders’ decision making. For instance, unconsciously seeing one’s image in the store television or looking at a camera may make a potential shoplifter more cognizant of the risks involved in thievery and thereby deter it or shape how it is executed. The ETD is designed to allow such possibilities to be empirically tested by recording what individuals look at—both consciously and unconsciously—rather than rely on their recall for data collection.5

The second benefit of using the ETD relates to the first: An interviewer can play back the video alongside the participant as he or she narrates the decision making process. While doing so, the interviewer also can ask further questions to obtain more details about what the participant was thinking or doing. Used in this way, the recording serves as a valuable memory prompt and source of verification during the administration of a questionnaire.6 As such, the ETD should reduce two sources of measurement bias: (a) those due to participants’ limited recall when reconstructing events and (b) intentional fabrication while describing an event. Consider the
following example in which a participant uses the video to narrate an interaction he had with an employee over an item he wanted to steal despite it being locked in a security case:

Participant 23: I’m telling her [the employee] which one [item] I want and in my mind, I’m laughing like, “Yeah, I got this.” And once she unlocks it, I’m like, “Yeah!” Like, “That’s the one I want.”

Interviewer: And that was two hundred and . . .

Participant 23: Ninety-nine dollar. Like, “Get this for me!” And she showed me how it’s done. She pushed the magnet on there so I learnt that and when she passed it to me, she’s gonna hand it to me, and I said, “Well, I got other things I gotta do.” She actually hands it to me and say, “Oh, I can take care of it up here.”

Interviewer: So, she wanted to pay for it in the electronics.

Participant 23: Right. [She said,] “Well, I got to take care of it back here but I can hold it for you.” Says, “I can hold it for you.”

Interviewer: So, you agreed to let her hold it?

Participant 23: Right. Now, I’m putting her on that, now I’m about to go get something else ’cause she’s focused on that and I figured if anybody watching me, all the cameras I seen, [they’ll be like,] “Oh, he’s gonna buy something. They ain’t on me no more.”

Later on, this same subject described the technique he used to exit the store without being apprehended:

Participant 23: And I peep, peep my decoy, that’s my decoy right there, so I know I’m about to hit this corner, and I grab that, that’s my decoy, see. It’s the same size package I got.

Interviewer: Okay, and what is it? Just a puzzle or something?

Participant 23: Whatever. It’s the same size. Grab it. Got it right there. Put them together, turn the corner, bang, right there.

Interviewer: Now you’re heading for the door.

Participant 23: Got it. Now I’m heading toward the counter ’cause I want to be around the employees. But I still got this package in my hand that they saw we walked from the back with.

Interviewer: Now, you got the decoy out and the camera in your pocket, or in your coat.

Participant 23: Right, it’s concealed.

Interviewer: And you put that in your coat before you picked up the decoy or at the same time you picked up the decoy?

Participant 23: No, I had it, I had the decoy in my hand and you do a sleight of hand, you just, so it looks like you had the same amount of stuff in your hand.

Interviewer: Okay. Now, what is your exit plan? Are you gonna, are you definitely gonna turn the decoy over to them or are you just gonna . . .
Participant 23: Right, ’cause you don’t want to set it down, ’cause they be like, “Why he put that over there? He grabbed that somewhere else.” You gonna take it right up to a employee that looks like a duck.

Interviewer: What do you mean, “a duck”?
Participant 23: I mean, somebody who can’t like wrestle you or you know somebody has that look, you can tell they only get $7 an hour. They don’t care. They just waiting for the day to get over with.

Without the aid of a video to prompt memory, it is far more difficult for a participant to vividly and accurately describe interactions on a second-by-second basis. Moreover, whether an interaction actually occurred as described by a participant cannot be independently confirmed unless it is video and audio recorded. Equally important from a methodological standpoint is that such a recording not only serves as a method of verification but also deters participants from distorting their descriptions in the first place.

The third benefit of the ETD is the product of the first two: aiding researchers’ ability to determine how and, perhaps, why people properly or improperly use various techniques. By technique, we mean a specific action guided by a particular goal-oriented strategy (Jacques & Reynald, 2012). Typically, offender-based research focuses on successful acts of crime commission (see, for example, Copes, Hochstetler, & Cherbonneau, 2012; Jacobs, 2012). A few of our participants, for instance, described how they avoid being caught on tape pocketing an item. Participant 6 explained:

Usually at the moment when I pocket something, guess you can try to say I try to pocket it like, either, like if it’s like the camera is on this side, I pocket it on this [other] side. Basically keep my body in between the item and the camera.

When Participant 3 picked up the to-be-stolen item while in view of a camera, he claimed to be unconcerned about its presence because:

I . . . didn’t have any intentions to put it in my pocket there so I wasn’t worried about that camera being right there . . . You pick something up, you walk around with it, you keep shopping as if you would normally do. . . . [T]hen slip it in your pocket when you have cover from a shelf away from a camera or something like that, or not by a camera.

Research that is solely interview-based is unable to verify whether such preventive techniques are properly executed. As the following quote demonstrates, offenders may perceive themselves to have made a sly move when in fact they put themselves at risk:

Interviewer: So, that’s a camera there, right?
Participant 4: Right there?
Interviewer: Yeah.
Participant 4: Yeah.
Interviewer: You never looked at it?
Participant 4: Never looked at it, never even seen it. . . . That’s crazy. I never even noticed it. . . . I don’t think, did I put the tape in my pocket right here?
Interviewer: Yeah.
Participant 4: Yup. So, it was the like camera saw me then.
Interviewer: Why’d you decide to do it there?
Participant 4: ’Cause I thought that it was a great [spot], I thought it was the area where there wasn’t any cameras.
Interviewer: So you’re surprised to see that camera right above you?
Participant 4: Yeah, I didn’t even, I didn’t even pay attention to it.

By using an ETD or another type of video-recording device (e.g., a CCTV camera) to collect data, it is possible to record offenders’ “moves”—good and bad—and, in turn, interview them about why particular moves are made. Among other ways, such findings may prove useful in determining why criminals make mistakes, and thereby provide social control agents with insights into how to spur such errors.

**Limitations of the ETD**

Because the ETD is designed to video record what individuals consciously and unconsciously look at, one of our initial research goals was to determine the rate at which shoplifters spot security cameras and whether this affects the number of items stolen. Once the study was underway, however, it became apparent from the qualitative portion of our post-simulation questioning that the ETD has a technological limitation: difficulty recording what a participant sees with their peripheral vision. This is important because, as Participant 14 explains, “You don’t have to look directly at them [cameras] to see [them].”

On several occasions in the post-simulation interview, participants recalled looking at cameras but the ETD did not record them doing so. In other words, the crosshairs that represent what a participant is looking at did not pinpoint a security camera that the participant was fairly sure of having looked at. When we probed participants about this discrepancy, several noted that perhaps the reason for this is they look at security cameras by using their peripheral vision:

Interviewer: Okay, when you walk in and your eyes do dart up immediately, but you really didn’t catch sight of anything. Did you see any security devices or cameras up front?
Participant 18: I did see that camera right there.
Interviewer: Okay, but you didn’t look at it. See what I’m talking about? The crosshairs right here, you never go up to that camera.
Participant 18: Usually I use my peripherals. I have pretty good peripheral vision so I can kinda see that, and then I saw a couple cameras on that, in this general area over here. I remember seeing cameras near the middle of the aisle over here. It’s pretty hard to see on here, but I’m pretty sure that’s a camera right behind that pole back there.

Another participant verifies this:

Participant 34: I’m looking at cameras now.
Interviewer: It looks like you’re looking at whatever that section name is there.
Participant 34: No, I’m looking at them cameras. So, you saying, if I was to look at the cameras, the x [crosshairs] is supposed to be on the cameras?

Interviewer: Yeah, and now you’re right on the sign.

Participant 34: Yeah, but I can see the cameras, too. . . . Just take my word for it, I was looking at it. . . . I guess by it being like up there and me walking, you know what I’m saying, and me being back from it, I can see the cameras.

From such discussions, we concluded that the ETD was not providing reliable measurements of whether our participants saw security cameras inside the store as they traversed it. Therefore, we decided that the most prudent course of action would be not to publish our quantitative findings because we could not be sure of their validity. Note that had we simply run the simulations and assumed the ETD readings were correct, the quantitative results of our research would have likely been invalid without us knowing it. Yet by including a qualitative component in the research, we discovered that, at present, the ETD is imperfect. Thus, our study serves as an example of how simultaneously using quantitative and qualitative data collection methods improves the research endeavor as a whole and protects against misleading, overconfident, or overly simplistic results (for other examples, see Du Bois, 1899; Laub & Sampson, 2003; Weisburd, Wyckoff, Ready, Eck, Hinkle, & Gajweski, 2006).

The “peripheral vision problem” led us to ponder why other ETD studies, specifically those using lens-free glasses, have not faced the same pitfall. We think the explanation likely has to do with differences in how shoppers and shoplifters go about achieving their respective goals. When most shoppers are inside a store looking for merchandise, they do not actively use their peripheral vision to locate items. They may catch something out of the corner of their eye, but there is no good reason to actively use peripheral vision given that looking straight ahead is generally more effective. Shoplifters, however, have a good reason to use their peripheral vision: to avoid detection as a shoplifter. As Participant 2 explained:

I noticed this camera out at my peripherals, but I never look exactly at them ‘cause it always kinda, if you look dead on at the camera and someone’s actually watching the camera, they’re probably thinking, “What the hell’s he looking at?”

Another example is the following:

Participant 24: See, those are the cameras I’m looking at.

Interviewer: I didn’t see you look at any of the cameras. Maybe you can point it out here. See, the crosshairs never really hit it and you’re kinda looking at the horizon there but you don’t actually [look] . . .

Participant 24: I guess I’m kinda looking more like, if you’re walking, I’m kinda looking in advance, I guess. I’m looking at what I’m about to be walking into. I’m looking ahead so even though it looks like I’m looking straight, I’m also looking at the ceiling all the way by the
TVs and I’m just kinda scoping out, see those right there, but, yeah, I feel like giving it away would be, with you know, my head tilted.

Participant 3, as well, detailed why peripheral vision is an important part of his offending repertoire:

A lot of times when I’m doing that kind of stuff, I utilize my peripheral vision. If you’re looking dead-on at the camera, there’s a loss prevention guy watching the cameras [saying], “Why the hell is this guy looking up at the cameras if he’s just everyday shopping? Why does he give a shit if I have cameras or not?” But if I use my peripherals, if I don’t look head on, that kind of suspicion’s not there, and, yet, I still notice. ‘Cause right now [referring to the video recording], that’s all in my peripheral vision. I can still see those cameras. Even though I might not be focused on them, I see them.

If peripheral vision was not a problem for the ETD, we would have been able to quantitatively test whether spotting cameras affects stealing. However, the generalizability of our conclusions would have been somewhat tempered by another limitation of the ETD that relates to its physical design. We learned of this problem by asking participants whether they shoplifted as they normally would during the simulation; 20 of our 39 participants reported “yes,” 17 reported “kind of,” and 1 said “no.” Four participants said they acted only kind of normal during the simulation due to being “affected by camera glasses.” Participant 2 said:

I just felt like a fool. I felt like more people were paying attention to me because I had the stuff on than if I was just like a regular customer, [in which case] nobody would probably even look my way.

Participant 14 joked that “[I] felt uncomfortable because . . . I looked kinda like a cyborg.” And Participant 9 reported, “Obviously I had this, you know, these huge glasses on my head, so everyone was looking at me, so that was kinda weird.” The ETD is small, but it is not unnoticeable from within several feet. Common sense suggests that a person wearing a pair of glasses with no lenses connected to a computer backpack will peak shoppers’ and employees’ interests. Yet unlike our participants, subjects in ETD-based studies of shopping need not worry that wearing the device would result in them being apprehended and punished.

Discussion

As reviewed above, the ETD has several advantages for offender-based research. The most substantial and unique benefit is recording what persons wearing the ETD look at each millisecond, which may serve as a unique form of observation data. Moreover, the recording may be used as a memory prompt, source of verification, and to determine how, why, and to what effect people use particular offending techniques. Yet the ETD has limitations, too, and these seem to be especially pronounced when used in
offender-based research as compared with shopping research, as such studies have not reported the same problems.

Theoretical and Technological Implications of the ETD’s Limitations

The limitations of the ETD became evident from our participants’ reporting the use of peripheral vision to spot cameras and feeling self-conscious due to how the ETD appears to persons who are nearby. Although using peripheral vision and feeling self-conscious present methodological problems attributable to the ETD’s technological deficiencies, these “problems” are theoretically useful because they serve as evidence of offenders’ rational preference for not provoking social control agents.

Offenders draw on five broad strategies to prevent being socially controlled by police, loss prevention agents, and other people (Jacques & Reynald, 2012). One such strategy of offenders is provocation reduction, which is intended to minimize another person’s impetus to exert social control. The reason the ETD’s limitations became apparent in our study is because shoplifters are motivated not to provoke social control. In practice, this involves not arousing attention by doing such things as using peripheral vision to spot security cameras. In addition, the reason some participants reported acting only “kind of” normal during the simulation is that they felt uncomfortable sporting a contraption that arouses attention. In effect, then, the limitations of the ETD are useful insofar as they provide empirical support for the notion that offenders seek to avoid social control by making use of provocation-reducing techniques.

Another way the ETD limitations are useful is by pointing to how this technology should be improved. A potential conclusion of the issues we raised is that the ETD is not much more useful for data collection than the standard methods. Given the ETD costs upward of US$15,000, it may not be cost-effective to use it. At present, there is arguably some truth to that statement. Still, the ETD does collect a novel form of data—literally a subject’s visual perspective—that sheds new light on some issues (see, for example, Lasky, Jacques, & Fisher, 2015). Although it has theoretically meaningful technological limitations, these problems should be fixable.

The peripheral vision problem could be overcome by improving the cameras and concomitant software to capture more than the center of a person’s gaze. This advancement would allow for offender-based researchers to reliably collect valid quantitative data suitable to hypothesis testing. The self-conscious problem could be alleviated simply by making the EDT smaller. This improvement would increase the congruency between how people act on a “normal basis” and how they act while wearing the ETD, which is important for producing generalizable findings. There is no reason to think these modifications could not be achieved in the relatively near future, assuming, that is, technology developers are motivated to do so.

Such technological advancements would help to solve some research questions but likely raise many others that could not be answered with even the vastly improved technology. This would be a scientific and technological “problem” and yet exactly what offender-based research, and criminology broadly, may need. As Collins (1994) stated, “It is a tinkerable research technology that gives rise to a stream of discoveries”
Put differently, the interactive process between research and technology improves both: the technology allows for new research discoveries, while the new discoveries suggest what technological improvements are needed before further discoveries can be made.

**Future Research**

Despite the current limitations of the ETD, it holds substantial promise for improving offender-based research in the immediate. In theory, its potential uses are countless, but in practice, we conjecture the ETD will prove most useful for studying decision making. Our own study, described above, serves as an example of how that could be done with offenders: have them put on the ETD, simulate a crime, and administer a post-simulation questionnaire.

Of course, the ETD also could be used in studies of police officers and non-offenders, such as potential victims and bystanders. While wearing the ETD, officers could simulate a police-citizen encounter, and non-offenders could simulate protecting themselves or others in a mock dangerous environment. The questions that could be addressed by having people wear the ETD include, for instance, what do individuals (not) look at when making decisions about whether and how to commit a crime, use force against a suspect, cross the street to avoid contact, or intervene as a bystander? Why do people look at some visuals rather than others? And how does seeing some things but not others consciously or unconsciously shape behavior?

A reasonable criticism of a simulation-based research is that simulated experience has limited external validity. It is hard to address this critique because it is difficult to show if it is true. In part, the difficulty is due to a methodological limitation that the ETD is meant to overcome: unconscious or unmemorable decision making that cannot be recalled by a respondent or directly observed by a researcher. After all, the ETD would be unnecessary if subjects were able to recall perfectly how they acted or if researchers could perfectly observe behavior. Yet because those feats are likely impossible, it is challenging to empirically determine the degree to which non-simulated experience is different from simulated experience. However, perhaps one way to circumvent this problem is to incorporate another form of video technology into research: CCTV cameras could be used to record non-simulated and simulated actions, and then researchers could analyze the two types of behavior to see whether and how they differ. This procedure would shed light on the extent to which simulations produce generalizable data.

Perhaps the most practical and ethical forward path is to continue having participants simulate different experiences while wearing the ETD. Of course, not all simulations are made equal; some are more real and ethical than others. It is not particularly clear to us, for instance, how an assault, robbery, kidnapping, or homicide simulation could unfold in a realistic and ethical manner. However, it is easy to imagine allowing property thieves to simulate crime on pre-defined targets in a way similar to how the retail stores participated in our study (see Nee et al., 2015). For example, researchers collaborating with the police or other groups (e.g., private security firms) could allow...
burglars and auto thieves to target certain homes and vehicles. The findings from such studies would likely produce limited harm but significant insights into what affects offending, including how to prevent it.

As researchers gain expertise in running simulations, the realness of the simulations will likely improve, as well. For instance, we learned from our shoplifting study how the simulation could be made more genuine. Recall that we greeted each participant at the store’s main entrance and then escorted the individual to a private interview room. At the time, we viewed this as a practical necessity, but with experience, we began to appreciate that bringing someone to a backroom automatically produced a less than normal situation for employees and participants alike and that this may affect the simulation. Thus, in future research, we recommend similar studies to meet participants off-site, fit them with the ETD, and then drop them off at the research location. By doing so, participants and others would have had less certainty as to who is “in on” the research, and therefore may be more likely to act normal. These will, in turn, advance the quality of data produced as well as the development and testing of theory.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by a private organization that wishes to remain anonymous.

Notes

1. For further details on the use of wearable technology in social science research, see, for example, Chalfen (2014).

2. The researchers’ institutional review board approved the study.

3. No participant was stopped and accused of shoplifting by an employee or bystander, although a few employees mentioned to us in side conversations that they suspected—but did not witness—shoplifting by participants.

4. Qualitative data were analyzed with the aid of a software package, NVivo Version 10. First, the files were coded with identification “tags” corresponding to our broad interests. Then, these broad tags were read through to create smaller tags that classified narrower areas.

5. As we discuss in the “Limitations of the ETD” section, the eye-tracking device’s (ETD) limitations were magnified by the ways in which shoplifters evade apprehension.

6. For research on memory decay, see, for example, Kaasa, Morris, and Loftus (2011), as well as Loftus (1997).

7. At present, Google’s technologically advanced glasses, Google Glass, are suffering a similar problem. As noted in a New York Times article, “Though Google employees have been spotted wearing them in the San Francisco Bay Area, they receive strange looks, for example, from a bartender who made fun of his Glass-wearing patrons” (Miller, 2013, p. B1).
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