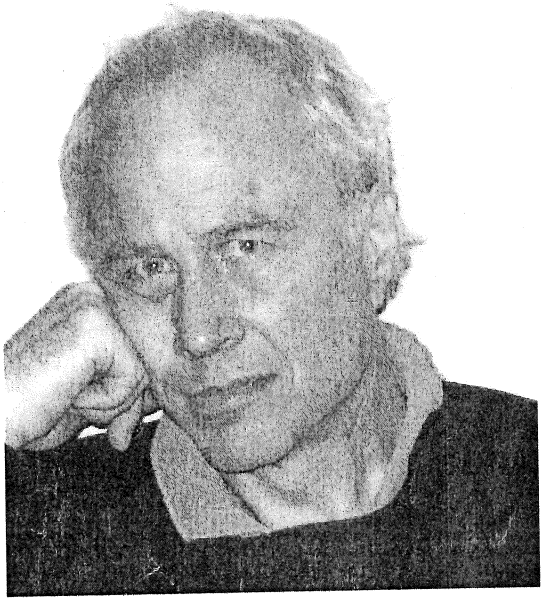
Geoffrey R. Loftus



University of Washington

Department of Psychology, Box 351525

Guthrie Hall, Room 222

Seattle, WA 98195-1525

email: gloftus@u.washington.edu

CV

Research

Psychology 317-318: Statistics

Other Information

January 8, 2021

To: Mr. John Monaghan
From: Geoffrey R. Loftus
re: Report: State v. Arcadio Nova

I. Qualifications and background

My name is Geoffrey R. Loftus. I am Emeritus Professor of Psychology at the University of Washington in Seattle where I have taught since 1972. My area of expertise, in which I have been working for approximately 50 years, is human perception and memory.

My professional experience includes, among other things, co-authorship of 8 books and approximately 110 articles, presentation of approximately 160 invited addresses in 9 countries, 41 years of continuous grant funding from the National Science Foundation, the National Institutes of Health, and other funding agencies, assorted journal editing, assorted government grant reviewing, and assorted consulting. This experience is described more fully in my CV which can be found at,

http://faculty.washington.edu/gloftus/CV/CV.html

Over the past 36 years, I have been qualified and testified at trial as an expert in perception and memory in approximately 475 cases These cases have been tried in superior courts in 55 counties across 16 states in the U.S. (including New Jersey), in U.S. Federal courts in 11 cities (including Newark), in U.S. Military court in Sigonella, Italy, and in Canadian court in Winnipeg, Manitoba.

II. Fact summary

My understanding of the facts of this case is limited because my ability to acquire relevant documents has been limited. Following are facts I'm aware of by reading police reports and watching a police video of a photo lineup administration.

On July 3, 2013, a DirecTV installer visited 43 Ellison Street, Apt #3, Paterson, New Jersey to install DirecTV. While there, he asked the 8-year old alleged victim to assist him. During the course of his interactions with the alleged victim, the man allegedly blindfolded her and sexually assaulted her. the alleged victim described the assailant as having "a little bit of brown or black hair and no facial hair." She did not notice any marks on his face.

Arcadio Nova became a suspect in the case because he was the individual hired by the alleged victim's mother, Dulec DeLeon to do the work.

On July 15, 2013, the alleged victim's social worker administered to the alleged victim a sequential photo lineup with Mr. Nova as the suspect. I do not have information as to whether the social worker did or did not know which lineup member was the suspect. Upon being shown Mr. Nova's picture the alleged victim immediately identified him as the man who had assaulted her.

III. Scope of and rationale for testimony

Had I testified at Mr. Nova's trial, I would have discussed, at minimum, topics relevant to human memory that comprise the numbered list that appears below. Before going through these topics however, I would like to clarify what I do and do not testify about at trial[1].

When I testify, I do not, as a matter of course, issue judgments about whether a particular witness's identification of a suspect in the case at hand is correct or incorrect[2]. Accordingly I do not interview or otherwise analyze witnesses. Instead, I provide information to the jury about the scientific bases of various relevant aspects of perception and memory. The hope is that jurors can eventually use this

---

[1] I note that this issue applies not only to me, but to any memory expert who might have testified at Mr. Nova's trial, as discussed in more detail elsewhere (e.g., Buckout, 1974; Loftus & Ketcham, 1991; Penrod & Cutler, 1995).

[2] A witness's identification of a suspect is correct if and only if the suspect is guilty. Thus, commenting on the correctness of the witness's identification would, *ipso facto*, be tantamount to commenting on the suspect's guilt or innocence. This would be entirely inappropriate: the legal rules of evidence, scientific ethics and basic logic all agree that judgment of a suspect's guilt or innocence should, from any perspective, be based on *all* case evidence, of which eyewitness identification is only a part.

information as a tool to help them carry out their job of assessing the reliability of, and accordingly the weight to be given to, whatever eyewitness memory is relevant in the case. The connection between my testimony and the facts of the case is often delineated via hypothetical questions from the defense attorney and/or from the prosecuting attorney. Normally, I do not mention case participants by name when I testify; to the degree that I do so in this report, it is only for the purpose of articulating the relevance to this case of the testimony that I would have provided at trial.

My primary purpose in testifying is to provide the trier of fact with scientific information about how human perception and memory are known to operate, along with a definition of what it means for a memory to be *reliable*. The hope is that the trier of fact, having heard such expert testimony, is better equipped (a) to evaluate the perception/memory evidence in the case, (b) to come to a principled, scientifically based conclusion about the reliability of whatever witness memory is offered as evidence in the case, and (c) to determine accordingly how much weight to give such memories in coming to their conclusion about whether to convict or acquit the defendant.

Had the jurors in Mr. Nova's trial heard this kind of expert testimony, they would have been equipped to evaluate in a reasonably informed and principled fashion the implications of the alleged victim's photo lineup identification of Mr. Nova as the man who assaulted her. More generally, in order to evaluate the weight that should be accorded a witness's identification a trial, the trier of fact must consider what prior circumstances are consistent with a witness's identifying a suspect that, if accurate, would be strongly favorable to the prosecution case and detrimental to the defense case[3]. There are two possibilities.

- The first possibility is the one that is most intuitively obvious to lay people including jurors: the witness's identification of the suspect should be given heavy weight in their evaluation of the defendant's guilt or innocence, i.e., that the identification implies that the suspect is likely the person who committed the crime.
- The second possibility is that the suspect is *not* the perpetrator who was viewed by the witness, but that the witness identified him as the perpetrator nonetheless. This second possibility is not at all obvious to jurors. However, decades of scientific research have demonstrated the circumstances under which it can occur. Because, as I will describe below, these circumstances characterized this case it would have been very to have explained them to the jury.

Finally, I wish to re-emphasize that any assertions on my part which suggest unreliability on the part of an eyewitness who identifies some suspect should *not*, *ipso facto*, be taken to imply that the defendant is innocent—it implies only that the trier of fact should view the eyewitness evidence with appropriate caution in deciding whether or not to convict the defendant.

IV. Testimony Specifics

Bearing all this in mind, the factors that would have comprised my testimony in Mr. Nova's trial are those described in the numbered list below. I note for the record that all information that I discuss is generally accepted in the field of Psychology (see, e.g., Kassin, Ellsworth, & Smith, 1989; Kassin, Tubb, Hosch, & Memon, 2001; Schmechel, O'Toole, Easterly & Loftus, 2006). The information has been gathered over the past century primarily using controlled laboratory research as a means of identifying basic scientific laws. Such research has typically been funded by research grants from national agencies which, in the U.S. for example, would include the National Science Foundation, and the National Institutes of Health, along with military research arms such as the Air Force and the Naval offices of scientific research. The results of such research studies have been published in peer-reviewed journals mainly in the fields of Biology, Computer Science, Neuroscience, and Psychology, as well as in the premier cross-discipline journals, principally *Nature* and *Science*.

1. **A general theory of perception and memory**. Had I testified, I would have begun by describing a longstanding theory that describes how perception and memory operate. This theory has been described in many places, initially by Neisser (1967); see also Neisser & Hyman (1999), and applications of it to legal issues have been described elsewhere (e.g., Busey & G. Loftus, 2007; G.

[3] Or vice-versa as in, e.g., State of Alaska v. Korakahn Phornsavanh 3AN-13-06468CR, wherein I consulted and testified at trial for the State about the same general issues that I discuss in this report.

Loftus, 2010a, 2010b; E. Loftus, 1979; E. Loftus & Doyle, 1997). Briefly, three points are most relevant to legal issues.

- Initial memories of an event, based on what is often limited sensory information acquired as the event is taking place, are generally fragmented, disorganized, and incomplete.
- Based on subsequently acquired information about the event, referred to as *post-event information*, memory changes in such a way as to become more detailed, more coherent, more organized, and more complete—but, because post-event information is of generally dubious accuracy, *not* necessarily more accurate.
- The witness is not generally aware of which information in his or her eventual memory is based on the sensory data acquired during the event various potentially false post-event information acquired subsequently. As a consequences it is entirely possible for the witness's eventual memory to be strong, detailed, real-seeming, and confidence-inducing--but nonetheless potentially incorrect in important respects.

Relevant to the case at hand is that, for reasons to be described, the alleged victim likely began with fragmented and incomplete initial memories of assailant—and yet identified Mr. Nova from the photo lineup based on factors other than her memory of the assailant. The rationale for such a hypothesis is developed in what follows.

2. **Factors that would have diminished the alleged victim's ability to have perceived and memorized the assailant's appearance**. There are three such factors: the alleged victim was likely not paying attention to the assailant's appearance, the alleged victim was likely under high stress once the assault began, and the alleged victim did not have a great deal of available time to memorize the assailant's appearance.

Effects of attention on memory. Attention is a central focus of study in numerous scientific fields; for detailed accounts see, among many other articles, Moray (1969), Norman (1976), Sperling & Melchner (1978), Bundesen (1990), Loftus, Hanna, & Lester (1988), Pashler (1998), Reinitz (1990).

Attention is a critical component of the human brain whose purpose is to filter from the vast amount of information from the world that impinges on the brain at any given instant, that information that is *relevant* to the task at hand from that information that is *ir*relevant to the task at hand. Attention is a serial process—an apt metaphor is that of an "attentional spotlight beam" that moves sequentially from one part of the witness's sensory world to another.

Any element of some event that is not attended to is lost to the witness; i.e., it is not remembered later on. A witness fails to pay to—and hence will not remember—some eventually important element of an event under either of two circumstances. The first is when the element is not relevant to the witness's task at hand. The second—in a sense the converse of the first—is when there are numerous elements of the event that are *all* relevant to the witness's task at hand, and thus compete for the witness's limited attention. In this latter kind event, the witness must sacrifice paying attention to some elements of the event (such as a perpetrator's appearance) in order to pay attention to other elements of the event that are potentially more important (such as those that are relevant to maintaining safety in the face of imminent danger).

Rather striking results, that underscore the critical relation between focused attention and later memory, issue from experiments on *change blindness* (see, e.g., Levin & Simons, 1997; Simons & Levin, 1998). These experiments demonstrate that, even when a witness engages in direct, face-to-face conversation with some person—as the alleged victim did with the assailant prior to when he began to assault her — the witness often will not recognize the person even seconds later—thereby demonstrating the requirement that a witness pay specific attention to a person's appearance in order to be later capable of identifying that person.

As noted, prior to the assault, the alleged victim had no reason to pay attention to the assailant. Once the assault began, however, the alleged victim would have had multiple things competing for her limited attention, principally relating to her safety. These attentional competitors would have included, for example, trying to keep herself from being hurt or killed, seeking help, looking for potential escape routes, and so on. In contrast to these immediately relevant attentional attractors, the assailant's appearance—while possibly relevant to any long-term goal that the alleged victim might

have had of eventually being able to identify him—would have been largely irrelevant at the moment and would likely have been allocated minimal, if any, of her limited attentional resources.

The final fact of this case relevant to attention is that the alleged victim, in describing the assailant, did not mention any distinguishing marks on his face such as a mole on his face. the alleged victim would likely have paid attention to such a distinguishing mark if she *had* attempted to memorize the assailant's appearance because such a mark would have been effective in distinguishing the actual assailant from any other candidate suspect. That Mr. Nova has such a mole and that the alleged victim did not mention any such mole therefore comprises evidence that Mr. Nova was not the assailant.

Effects of stress on perception and memory. Certainly the alleged victim had reason to be stressed once the assault began: she was in a horrifying position — blindfolded and sexually assaulted — where her fundamental well being was directly threatened.

Generally speaking, and contrary to popular belief, mental functioning during a high-stress experience is poorer than mental functioning during a moderate-stress experience (e.g., Baddeley, 1972; Berkun, Bialek, Kern, & Yagi, 1962; Morgan, Hazlett, Doran, Garrett, Hoyt, Thomas, Baranoski, & Southwick, 2004; Nourkova, Bernstein, & Loftus, 2004; Yerkes & Dodson, 1908).

It is noteworthy that lay people typically believe, incorrectly, that a vivid and accurate representation of a highly stressful event, replete with many details, is "stamped into a witness's memory" (e.g., Neisser & Harsch, 1999). This is perfectly in keeping with the scientific underpinnings, sketched above, of how human perception and memory work. Essentially, a stressful event eventuates in a strong, detailed, real-seeming, and confidence-evoking memory because a highly stressful event is also typically a *salient* event—i.e., an event that the witness subsequently thinks about, talks about, is interviewed about, possibly testifies about, and so on. Accordingly a stressful event is one in which (a) few accurate details about the original event are memorized to begin with, but (b) there is substantial opportunity for this originally minimal memory to be supplemented with post-event information that is of dubious accuracy. Accordingly the witness's eventual memory of a highly stressful event is one that *is* typically replete with details and other richly represented, real-seeming information—but information that, unbeknownst to the witness (and counterintuitive to a trier of fact) is potentially false in important ways.

Effects of duration on perception and memory. Although a matter of common sense, it is an important part of the whole picture to point out that, with short duration, less information is available to the witness as a basis of forming an original memory.

Somewhat less apparent to common sense is the concept of *functional duration*: typically only a fraction of the total duration comprising some event is available to the witness for memorizing what will later be relevant. When it is a perpetrator's appearance that is relevant, functional duration includes only that time during which the witness, simultaneously, (a) has the perpetrator in her field of view, (b) is paying attention specifically to the perpetrator's appearance (see "Attention" section above), (c) is under a degree of stress that allows adequate cognitive functioning (see "Stress" section above), (d) is sufficiently close to the perpetrator to be able to discern his facial features, and (e) is subject to various other necessary conditions as well. Even if an event itself lasts several seconds, the witness's functional duration for perceiving and memorizing the perpetrator's appearance can, therefore, be as low as zero[4].

3. **Definition of, consequences of, and examples of unreliable identifications.** As noted earlier in this report, had I testified I would have described to the jury when an identification by a witness of a suspect can be construed as reliable versus unreliable.

   In particular, any identification of a suspect by a witness can be construed as reliable only if, based on that identification, one can conclude that there had been a strong match between the witness's memory of the perpetrator whom she saw commit the crime and the identified suspect's appearance. Logically, if an identification is deemed to be unreliable it should not be used as evidence for

[4] It is to be noted that the alleged victim was blindfolded during part of the assault. Obviously the time she was blindfolded would not have been part of the functional duration available to her for memorizing the assailant's appearance.

assessing a defendant's guilt or innocence.

Had I testified, I would have described to the jury two reasons for questioning the reliability of the alleged victim's identification of Mr. Nova.

If the alleged victim's initial memory of the assailant was poor any subsequent identification of anyone would have been unreliable. The circumstances under which the alleged victim saw the assailant were poor for being able to memorize his appearance, as described in Point 2 above: her attention was likely not on the assailant's appearance, she was almost certainly under high stress, and she likely had relatively little functional duration available to adequately perceive and memorize the assailant's appearance. This should have given the jury reason to believe that the alleged victim did not begin with a clear memory of the assailant's appearance. Given this proposition, it would not have been possible for there to have been a strong match between the alleged victim's incomplete memory of the assailant and *anyone*—including Mr. Nova. In other words, given an incomplete initial memory of the assailant would have been sufficient to render any subsequent identification unreliable.

On the unreliability of the photo lineup. As I have discussed, the alleged victim's memory of the assailant was likely sketchy and incomplete when she identified Mr. Nova from the photo lineup. On what basis then might she have identified Mr. Nova?

There are two possible answers to this question.

- Despite reasons for the alleged victim's memory of the assailant having been poor, her memory of the assailant's appearance was sufficiently good that her identification was reliable, i.e., it was indeed based on a strong match between her memory of the assailant's appearance and Mr. Nova's appearance in the photo lineup.
- The alleged victim identified Mr. Nova because the photo lineup was biased against Mr. Nova in some fashion. This would constitute an *unreliable* identification, i.e., an identification that is *not* based on the match between a strong memory of the assailant and Mr. Nova's appearance in the lineup—and thus should have been given little if any weight by the jury in assessing Mr. Nova's guilt.

There is reason to question the first possibility based on factors described in Point 2. Accordingly, this issue warrants a discussion of lineups, the lineup bias, and, more generally, the circumstances under which lineups may lead to false identifications which in turn lead to false convictions. I proceed by first defining an unbiased lineup (see, e.g., Wells, 1993, 1995; Wells & Seelau, 1995; Wells, Small, Penrod, Malpass, Fulero, & Brimacombe, 1998; Wells, Semmler, & Brewer, 2004) and then describe certain aspects of the lineup procedure in this case.

Essentially a lineup is biased if there is anything about the lineup itself or the procedures by which the lineup is administered that would cause a witness to identify an innocent suspect with greater probability than the probability of identifying any (likewise innocent) filler.

In the present case, the following is relevant to lineup bias.

Double-blind procedures. I do not know whether the social worker who administered the photo lineup knew which lineup photo was of the suspect (Mr. Nova). For the moment, assume that she did. The following would then be relevant.

A lineup administered by an individual who knows the suspect's identity is potentially biased, as the officer is in a position to unconsciously or even deliberately provide information to the witness as to the suspect's identity in the lineup. I typically describe this form of bias within the context of the well known scientific principle of *double-blind procedures* (see e.g., Pietrowsky, Claassen, Frercks, Fehm, & Born, 2001 for an example in the traditional literature and Greathouse & Kovera, 2009 for double-blind procedures as applied to lineups). If a witness positively identifies a suspect from a lineup that is not double blind, one cannot rule out the possibility that the identification was based wholly or in part on information covertly or overtly provided by the lineup administrator, rather than on what is fundamentally important, *viz.*, the match between the witness's memory of the perpetrator and the suspect's appearance.

Potential bias in the photo lineup administered in this case. Whether or not the photo lineup was administered double blind, there are two aspects of the lineup administration that entailed Mr. Nova's picture being treated differently from the fillers' pictures — which could have biased the lineup

against Mr. Nova.

- Mr. Nova's picture was the fourth one shown. The social worker introduced the first three fillers by saying, "This is picture number [1, 2, or 3]" whereas she introduced Mr. Nova's photo by saying "I have picture number 4"; i.e., in that sense she treated Mr. Nova's picture different from the first three.
- When showing pictures 1-3, the social worker grasped each picture with her right fingers and thumb in the process of showing them to the alleged victim. However, as the social worker showed Mr. Nova's picture to the alleged victim, she subtly pointed to the center of the picture with her left hand. In this sense she not only treated Mr. Nova's picture slightly differently, but she seemed to indicate that Mr. Nova's picture was special.

V. Conclusion

Had the jury in Mr. Nova's trial heard testimony from an expert in human perception and memory, he or she could have been provided information relevant to the reliability of the alleged victim's identification of Mr. Nova from the photo lineup. This information would have comprised (1) information relevant to the quality of the alleged victim's initial memory of the assailant and (2) the intrinsic reliability of the photo lineup.

VI. References

Baddeley, A.D. (1972). Selective attention and performance in dangerous environments. *British Journal of Psychology*, 63, 537-546.

Berkun, M.M., Bialek, H.M., Kern, R.P., and Yagi, K. (1962). Experimental studies of psychological stress in man. *Psychological Monographs: General and Applied, 76*, whole.

Buckout, R. (1974). Eyewitness testimony. *Scientific American, 231*, 23 31.

Bundesen, C. (1990). A theory of visual attention. *Psychological Review, 97*, 523 547.

Busey, T.A. & Loftus, G.R. (2007). Cognitive science and the law: Moving science from the laboratory to the courtroom. *Trends in Cognitive Science*, *11*, 112-117.

Cherry, E.C. (1953). Some experiments on the recognition of speech with one and with two ears. *Journal of the Acoustical Society, 25*, 975-979.

Cutler, B.L., Penrod, S.D., & Dexter, H.R. (1989). The eyewitness, the expert psychologist, and the jury. *Law and Human Behavior, 13*, 311-332.

Cutler, B.L., Penrod, S.D., & Martins, T.K. (1987). Improving the reliability of eyewitness identification: Putting context into context. *Journal of Applied Psychology, 10*, 629-637.

Garrett, B.L. (2011). *Convicting the innocent: Where criminal prosecutions go wrong*. Cambridge: Harvard University Press.

Johnson, M.K. (1998). Individual and cultural reality monitoring. *Annals of the American Academy of Political and Social Science, 560*, 179-193.

Johnson, M.K. & Burns, C.L. (1981). Reality Monitoring. *Psychological Review*, *81*, 67-85.

Kassin, S.M. , Ellsworth, P.C. & Smith, V.L. (1989). The "general acceptance" of psychological research on eyewitness testimony: A survey of the experts. *American Psychologist, 44*, 1089-1098.

Kassin, S.M., Tubb, V.A., Hosch, H.M., & Memon, A. (2001). On the "General Acceptance" of Eyewitness Testimony Research. *American Psychologist, 56*, 405-416.

Laughery, K. R; Alexander, J.F, & Lane, A.B. (1971). Recognition of human faces: Effects of target exposure time, target position, pose position, and type of photograph. *Journal of Applied Psychology*. 55, 477-483

Loftus, E.F. & Ketcham, K. (1991). *Witness for the defense: The accused, the eyewitness, and the expert who puts memory on trial*. New York, St Martin's Press, Inc.

Loftus, E.F. (1979). *Eyewitness Testimony*. Cambridge, MA: Harvard University Press.

Loftus, E.F. & Doyle, J. (1997). *Eyewitness Testimony: Civil and Criminal*. Lexis Law Publishing.

Loftus, G.R. (1972). Eye fixations and recognition memory for pictures. *Cognitive Psychology, 3*, 525 551.

Loftus, G.R. (2010). What can a perception-memory expert tell a jury? *Psychonomic Bulletin & Review*, 17, 143-148.

Loftus, G.R. (2010). Processi Cognitive, testimonianza dell'esterto e teorie su eventi di pertinenza legale. *Sistemi Intelligenti, a. XXII, n. 2, Agosto 2*. (English Translation: Cognition, expert testimony, and theories of legally relevant events).

Moray, N. (1969). Attention in dichotic listening: Affective cues and the influence of attention. *Quarterly Journal of Experimental Psychology,* 11, 56 60.

Morgan, C.A. III, Hazlett, G., Doran, A., Garrett, S., Hoyt, G., Thomas, P., Baranoski, M., & Southwick, S.M. (2004) Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *International Journal of Law and Psychiatry, 27*, 265–279.

Neisser, U. (1967). *Cognitive Psychology*, New York: Appleton Century Crofts.

Neisser, U. & Hyman, I.E. (1999). *Memory Observed*: *Remembering in Natural Contexts*. Worth Publishing.

Neisser, U. & Harsch, N. (1999). Phantom Flashbulbs. In Neisser, U. & Hyman, I.E. *Memory Observed*: *Remembering in Natural Contexts*. Worth Publishing.

Nolen-Hoeksema, S., Fredrickson, B., Loftus, G.R., & Wagenaar, W. (2009). *Hilgard's Introduction to Psychology, Fifteenth Edition*. London, UK: Cengage.

Norman, D.A. (1976). *Memory and Attention*. New York: Wiley.

Nourkova, V., Bernstein, D.M., & Loftus, E.F. (2004). Altering traumatic memory. *Cognition and Emotion, 18,* 575-585.

Pashler, H. (1998). *The Psychology of Attention*. Cambridge, MA: MIT Press.

Reinitz, M.T. (1990). Effects of spatially directed attention on visual encoding. *Perception and Psychophysics, 47*, 497 505.

Schacter, D.L. (1995). *Memory Distortion*. Cambridge, MA: Harvard University Press.

Scheck, B. Neufeld, P., & Dwyer, J. (2000). *Actual Innocence*. New York: Doubleday.

Schmechel, R.S., O'Toole, T.P., Easterly, C., & Loftus, E.F. (2006). Beyond the ken? Testing jurors' understanding of eyewitness reliability evidence. *Jurimetrics*, Winter.

Simons, D.J., & Levin, D.T. (1998). Failure to detect changes to people during a real-world interaction. *Psychonomic Bulletin and Review, 5*, 644-649.

Sperling, G. & Melchner, M.J. (1978). Visual search, visual attention, and the attention operating characteristics. In J. Requin (Ed.) *Attention and Performance VII*. Hillsdale, N.J.: Erlbaum.

Thompson, J., Cotton, R., & Torneo, E. (2009). *Picking Cotton: Our memoir of injustice and redemption*. St. Martin's Press.

Yarmey, A.D. & Tressillian Jones, H.P. (1983). Is the psychology of we identification a matter of common sense? In S.M.A. Lloyd-Bostock & B.R. Clifford (eds.) *Evaluating witness evidence: Recent psychological research and new perspectives:* Chichester: Wiley.

Yerkes, R.M., & Dodson, J.D. (1908). The relation of strength of stimulation to rapidity of habit-formation. *Journal of Comparative and Neurological Psychology, 18*, 459-482.