

Attachment 11**Evaluation of the article “Biomechanics of lethal force encounters—officer movements” by W. Lewinski published in *The Police Marksman* magazine (2002).**

This article contains the statement: “Until we understand and measure the variety of biomechanical motions that officers perform in lethal force encounters, it’s difficult to isolate the more complex and profound psychological dynamics, such as perception and judgment time” (middle of second paragraph).

The statement above assumes that processing related to perception and judgment do not occur during biomechanical motions—that is, they can be separated in time from these biomechanical motions. However, it is general knowledge in the perception/attention literature that these processes occur in parallel, they are not discrete processes that can be separated. This is an example where the goal of the research is based on flawed assumptions and reflects a lack of understanding human information processing.

The article also contains the statement: “However, the reaction times, sight times, and movement times need to be studied, because often they are the only things officers do in shooting situations. Sometimes they form the components of more complicated motions and need to be fractioned out if we are to more fully understand the more complex motions. For instance “lag time” is comprised of a variety of things including movement time.”

It is not clear here why fractioning out these action plans needs to be done to understand the “more complex motions”—which by the way, is never defined. According to the literature on action planning (e.g., Rosenbaum, 1980; 1984; Jeanerod, 1997) actions are hierarchically structured and initiating the component of the action at the top of the hierarchy typically leads to execution of the actions that follow that structured in the action plan. Also, action components that occur late in the action plan affect how actions are executed early in the action plan—suggesting that actions plans consist of integrated as opposed to separable components. In other words, once you decide to act, the action plan as a whole is carried out—it is not carried out in a piecemeal fashion. Again, it is difficult to parse actions into separate components because these components are not discrete—they are activated in a continuous fashion. That is, as you are executing one component of the action plan you are preparing for the next action component. Also, overlap can occur between two different action plans—planning to shoot someone in the right leg and then planning to shoot someone in the left leg. While executing the action to shoot the right-leg, preparing to execute the action in the left is beginning to occur.

The article further states that: “The primary purpose of this study is to measure the time it takes to do certain motions. This is not the definitive study of the movements and times of officers lethal force encounters. However, it is very comprehensive. While the complete research design and a full analysis will not be presented here, it is important to know that a variety of measurements were taken on 68 officers from different sections of the Los Angeles Police Department” (top of third paragraph).

The statement above that “this is a very comprehensive study” cannot be evaluated because the research design and analyses are not available—However, the way in which this sentence is written

misleads the reader in believing it is comprehensive because measurements were taken from 68 LAPD officers. The intentional or unintentional, misleading statements that occur in Lewinski's research are also present in statements made by Lewinski in his declaration (See section 3 of this declaration). That is, the convoluted way in which ideas are described can give the false impression that the ideas are logically connected.

The article further states at the end of paragraph three and beginning of paragraph four: "... components of the movements officers perform in shooting situations or they directly replicated these movements. For instance, the officers performed movements that **allowed me to separate reaction time, movement time, and sighting time.**"

There are several problems with the logic of the statements that these different mental and motor processes can be separated out in time when recording only reaction time. First, based on the perception-action literature, one's reaction time to "shoot" would include movement time and sighting time. Second, there is no research or logic laid out to suggest that the movements the officers performed should allow Mr. Lewinski to separate "reaction time, movement time, and sighting time". How did these movements "allow" him to separate reaction time? Third, the connection between the following two statements does not make sense: Mr. Lewinski states that officers made movements typical to that in shooting situations, and then says, "for instance" they performed actions consistent with shooting situations. Fourth, there is no mention as to how he was able to separate out reaction time, movement time, and sighting time—no mention of methodology or special measures that might allow one to do so. He describes using a PACT timer from the onset of the stimulus to the time of pulling the trigger, and that is all. As mentioned earlier, there are no behavioral measures that can separate cognitive processes from time to respond. In some studies, one can separate information such as stimulus evaluation time from onset of motor processing in the brain—but this requires psychophysiological measures (EEG measures sensitive to evoked response, electrical potentials measured over different areas of the scalp—reflecting onset of activity in different brain areas corresponding to stimulus evaluation and motor processing). The psychophysiological measures clearly show an overlap in activating motor and other perceptual/cognitive processes. Finally, again, the idea that motor components can be analyzed separately to figure out the overall time dedicated to each process when these actions are carried out together is flawed. Time is actually saved when carrying out these actions together, because the process of one component of the action can begin before the next is completed. In the perception-action literature it is well known that information is processed in a continuous fashion, and not in a discrete fashion. Lewinski is using what is called "subtraction logic" which assumes that processes are discrete—one process finishes before another can begin. Under this faulty assumption, one assumes that by subtracting out the time it takes to execute one action, you can figure out the time it takes to do others. This idea, originally promoted by Donder's (1968-1969) has been shown to be incorrect (e.g., see McClelland, 1979).

One other comment of importance to this study. While time to execute each of the components identified by Mr. Lewinski (moving, sighting, pulling the trigger) cannot be accurately obtained (particularly using behavioral measures), the relative time to do one action or all of these actions in combination can be measured—that is, claims can be made in terms of which combinations may take

more or less time to execute (e.g., sighting + pull trigger vs. just pull trigger with no sighting). However, that is not the purpose of the study described in the paper. The primary purpose of this study is to measure the time it takes to execute different activities. This study not only makes claims based on unreliable data, but the data reported are not directly linked to the purpose of the study. In fact, the results highlighted by Lewinski in this paper, do not address the purpose described in the paper, and do not contribute to the overall goal of separating out motor processes from perceptual/cognitive processes – he focuses on data that does not address the purpose. The failure to link data to the relevant question proposed would be sufficient for rejection in a peer-reviewed journal. It also shows that the data used to support his original premise is invalid, and hence is unreliable.

In summary, this study is invalid and unreliable. In my opinion, this study questions the ability of Mr. Lewinski to apply relevant and reliable data to answer a question or support an argument. **That is, if one cannot report relevant and reliable data to answer a question posed in one's own research study, how can one trust that this person can apply relevant and reliable data to support conclusions he has drawn from the current case. The loose connections between data and one's premise can lead to misleading, inaccurate, and unreliable statements/conclusions.**