Can monkeys and ballet dancers help us improve bowling performance?

Why not?

by Joe Slowinski

Remember, as a child, when you would attempt to emulate a bowler after watching them on the ABC telecast of the Professional Bowlers Tour every Saturday afternoon? I fondly remember attempting to reproduce the effortless approach of Marshall Holman or the power steps of Mark Roth.

Recent research on how we learn suggests that there was something actually going on in my brain when I watched each Hall of Famer bowl as well as when I attempted to replicate their motions at my local bowling center in Portland, Maine. Specifically, this new brain research suggests some very powerful truths about the relationship of viewing in human minds and the complex movement of our bodies.

In this article, I will discuss these findings as well as make some recommendations on a new but effective training process based on this new information. I call this process the Visualization Training Cycle for Bowlers (VTCB). I believe strongly that this process will help improve your game as well as those you coach.

As a coach, I have attempted to foster an appreciation of the art and science of visualization. Ideally, I want my bowlers to improve their performance on the lanes as well as perform under pressure.

Moreover, I attempt to incorporate a visualization process as part of a training regimen to improve the biomechanical movement of my athletes. This is not unusual. Many coaches advocate improving one's mental game...including the use of visualization. Yet, recent brain research suggests that the process of visualization could be far more important than we previously thought.

From the new findings, it is apparent that visualization could be rooted in a physiological process as well as psychological one. Specifically, many people believe that the recent discovery of mirror neurons, an area of the brain that controls complex motor activity, promises to do for psychology what DNA did for biology.

On a note of interest, the recent research findings associated with mirror neurons began with some very smart monkeys and a very lucky scientist. In the early 1990s, Italian researchers discovered something very unusual about the brain of rhesus macaques monkeys. While the monkeys were wired to read brain waves, researchers would place peanuts in front of the primates. When a monkey reached for and grabbed an item of food placed in front of it, the machine connected to its brain would make a crackling sound, indicating to the scientist that a

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brain wave reading was being measured.

As with many discoveries, a serendipitous discovery led to this eureka moment. During the research, a researcher picked up a banana, in visual view of the monkey, to eat it. Amazingly, when the scientist did this motion, the monkey's brain registered a reading in the same location of its brain as if it was itself picking up a banana. What University of Parma faculty had accidentally discovered was the fact that specific brain cells are active when an action is either performed or simply viewed by a monkey. Since the monkey's brain registered a motion while viewing it, they called these brain connections mirror neurons. This truly gives validity to monkey see, monkey do.

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What about humans?

But, how does this finding impact how a human brain works? In an effort to answer this question, Daniel Glaser and his University College London colleagues compared the brain activity of dancers from the Royal Ballet as well as experts of the Brazilian martial arts form Capoeira and participants untrained in dance. Researchers were curious if the level of training of an individual viewing an action related to how the mirror neurons responded in his or her brain.

Participants in the study watched short video clips, approximately 3 seconds, of both ballet and Capoeira. Participants remained motionless in a MRI scanner, which measured their brain response while watching the dance clips.

Interestingly, the brain waves of both sets of expert dancers in the study showed more activity in the area of the brain in which the mirror neurons are located, as compared with the novice control group participants.

In essence, Glaser and his team had discovered that mirror neurons are selective based on the skills an individual possesses. Specifically, these findings illustrate that the complex motor center of your brain responds differently with more activity when viewing actions that we are skilled at doing. Glaser refers to this as your "personal motor repertoire".

With this finding, I believe we can improve the process of visualization to be more effective in improving bowling performance. Since Glaser and his team discovered that mirror neurons are more active in those trained to perform specific highly skilled motions, viewing athletes who are skilled in correct motions could be very important. And, due to the link between skills and viewing actions, the structured viewing of elite bowlers in a training process can both reinforce as well as build skills more quickly.

True, some readers might be thinking that this is not new. Many athletes have viewed and emulated world-class athletes to improve performance. I agree. Yet, great coaches with this new process could help their athletes with much more purposeful visualization training protocols that will enhance training while maximizing time and efforts. Clearly, the

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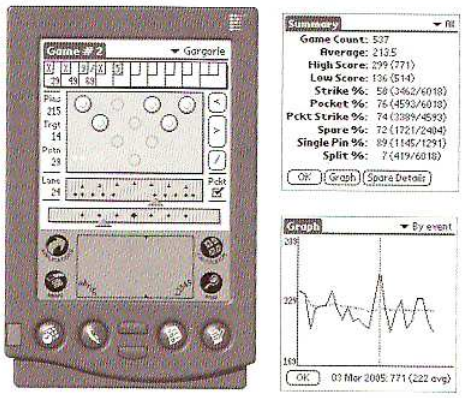

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connection between mirror neurons and skilled complex movement can be utilized to improve performance in bowling.

What about bowling?

Before I share the details of the Visualization Training Cycle for Bowlers, I want to introduce readers to a process entitled Visuo-Motor Behavior Rehearsal (VMBR). A brief introduction to VMBR will help the reader better understand the recommendations that I propose in this article. VMBR, as a training process, has been used successfully in the past to support improved performance by athletes. Specifically, research indicates that performance was improved with Visuo-Motor Behavioral Rehearsal, in a number of sports including golf, track and field, tennis, karate and basketball.

VMBR involves proceeding through three phases. First, an athlete would begin with a relaxation phase in which he attempts to put himself into a state of mind in which mental imagery and visualization is maximized. Second, the athlete would then proceed into the act of visualization. Finally, the athlete would perform the visualized skill immediately under realistic conditions.

VMBR could be more useful with the introduction of a coach identifying specific and correct movements. As you can imagine, visualization of skills in an individual's mind that are not properly performed can lead to the reinforcement of poor execution of such critical items as timing or release skills. So, if a coach can aid a bowler in identifying proper technique in others, then this will reinforce the development of improved technique in the developing bowler. This is what the Visualization Training Cycle for Bowlers intends to do.

With the recent findings associated with mirror neurons, a new process can be adopted to improve performance. This process might recall Sybervision to some readers. Sybervision produced a videotape in the past, "Perfect Form Bowling: Sybervision-Holman/Petraglia." The tape leads viewers through scene after scene, viewing the movement and motion of Marshall Holman and Johnny Petraglia. As the promotion claims, "The Sybervision super slow motion sequences, unique computer-enhanced imagery, and graphics help you to identify the subtleties of movement that will help rapidly improve your bowling technique."

Although there is some value in the Sybervision materials, I recommend a training process that embraces coaching, visualization and actual performance that support the findings in both the mirror neuron research as well as VMBR. In essence, this training process extends the VMBR techniques and creates a bowling process that incorporates the reality of mirror neurons. And, Bowlers Map could be utilized effectively in this process.

Training

The Visualization Training Cycle for Bowlers will lead you or your bowlers through a focused and systemic visualization and physical practice process. For effectiveness, I recommend the following once-a-week training process to improve performance in one's physical game. I encourage more frequency, but once a week will support the development of your bowlers.

1. (5 minutes) View a highly skilled professional bowler or world-class bowler who possesses fluid motion and good timing. The coach and/or bowler should view the video while pointing out specific movements that are required for good timing. Ask questions to the bowler. For example, ask questions to activate the connection between the proper motion and connecting it with their mirror neurons. Where are their elbow, knee and heel on the pushaway? What direction do they push the ball away? What direction is the follow-through? Be concrete with the questions and comments. Focus on the starting position, pushaway and release. These are items in which the bowler has more control.

2. (5 minutes) View the same segment again without discussion. This will provide the individual with another opportunity to process the information while viewing. Instruct the bowler to repeat the questions to himself.

3. (10 – 15 minutes) Have the bowler bowl. Instruct him to think about the questions and repeat the actions. Use video tape or Bowlers Map to review.

4. (5 minutes) Set the stage for visualization through a relaxation process. Ask the bowler to close his eyes and focus on his breathing. You can also utilize progressive muscle relaxation techniques, meditation or similar techniques.

5. (5 minutes) Have the athlete visualize the world-class athlete again. Immediately after visualizing the world-class athlete, have the bowler visualize himself performing these physical movements.

6. Repeat the entire process for a total training time of one hour. In the second cycle, ask the bowler not to think about the questions as he bowls.

In the beginning, if the bowler is unfamiliar with the visualization process, the coach needs to help them both store and retrieve images. At the beginning of the actual bowling, ask your bowler to register sounds, smells and sights of the bowling center. Ask specific questions while they look around the bowling center. What colors are the masking units? What reflections do you see on the lanes? What sounds do you hear?

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In the first weeks, spend time on obtaining details for recall. During the first few visualization training sessions, it will be important to ask questions when they bowl as well. Where do you feel the ball? How does it feel at the point of release? Think about your pre-shot routine and the specific actions you take. Look at your target? Visualize a good shot. More information will lead to more vibrant memories and the ability to more easily recall this information.

Each coach should feel free to add in training elements when discussing the world-class bowler. Specifically, each coach should help identify weak components of their bowler's game to emphasize during the Visualization Training Cycle for Bowlers. For example, if you are working on advanced targeting, then incorporate this into the viewing process as well as the individual's visualization. Through this process, the bowler is reinforcing correct movements into his or her visual script and personal motor repertoire. Moreover, this helps build clarity in recalling the movements for use in visualization training at home.

In bowling, we have a need for more specific recommendations for the implementation of a training program utilizing visualization. For those with a wide bowling library, you know that visualization content of some of the most popular books is often the shortest section.

But, there is hope. The recent discovery of the connection between mirror neurons and complex performance movement can impact bowling positively and help bowlers of all developmental levels improve. With the introduction of video emphasizing world-class timing and execution, I believe strongly that the pace of development and improvement will be shortened greatly. The Visualization Training Cycle for Bowlers will help you improve your game or aid in the development of your bowlers.

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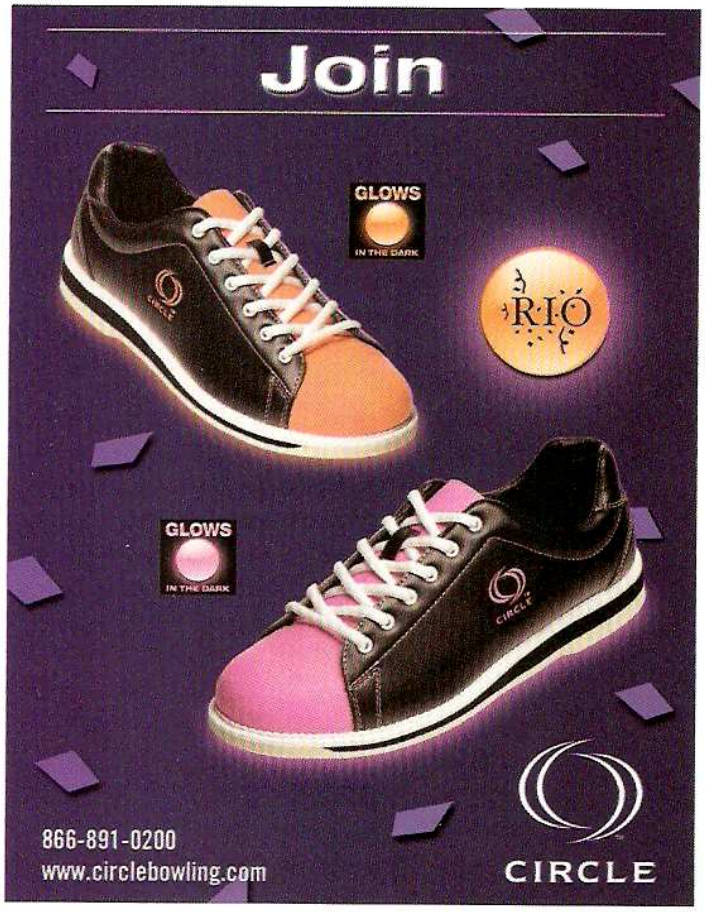
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