

Shattuck_jo_SAB571_Unit_10_assignment

Ten 1-2 page reviews of Journal Articles. All are numbered #1 to #10.

#1 “Expertise, attention, and memory in sensorimotor skill execution: Impact of novel constraints on dual-task performance and episodic memory.” This review is of a report by Beilock, Wierenga, and Carr.

These experiments in the report focused on the variables that affected performance of sensorimotor skills. It seem to provide an explanation of how new tasks are learned, how they are mastered, and what part of brain participates in each. It also studied how well the subjects could remember specific parts of their performance. The results lead me to offer a summary of the process, and parts of the brains involved, in learning and performing a skill.

Learning a skill, say putting a gold ball, for the first time involves very conscious processes; there are self- commands like grip the putter, bend the knees, relax the shoulders. Performing the skill after developing the muscle memory (defined as expert level), involves a different part of the brain, the unconscious, which is what apparently ‘takes over’ in experts when they report performing the skill the best.. But when actively invoking the conscious parts of the brain during the performance of the skill, the effectiveness goes down, as if the conscious part is interfering with the already established unconscious neuro-motor pathways. This analogy can be used: two people driving the same car, one has a brake, and the other has an accelerator.

Also, when skills were performed unconsciously without invoking conscious activity, the subject could not remember specific parts of their performance. When the skill involved conscious activity, (like adding a slightly different variable) their memories of specific attempts were accessible.

This research should lead to further experiments designed to pinpoint how subjects best perform certain skills, and how other variables involving the conscious and unconscious parts of the brain affect performance. Then professionals in human performance fields can train subjects to recreate those conditions to improve performance in real tasks.

Beilock, Sian L., Sarah A. Wierenga, and Thomas H. Carr. "Expertise, attention, and memory in sensorimotor skill execution: impact of novel task constraints on dual-task performance and episodic memory." Quarterly Journal of Experimental Psychology: Part A: Human Experimental Psychology 55.4 (Oct 2002): 1211(30). General OneFile. Gale. US Sports Academy. 17 Nov. 2008

#2 "Muscle Up " This review is on an article on Bow and Arrow Hunting Magazine, 2005 by Joe Bell. This article provides an explanation for, and tips to achieve the 'flow' in laymen's terms for bow hunting skills. Though the author doesn't actually use the words flow state or zone or pps (peak performance state) anyone with any knowledge of sports performance knows this is the subject.

He does an excellent job of explaining the why and how of the model of PPS works without being too complex. The only most scientific terms he uses are “conscious, unconscious, mental memory, shot repetition, programming, mental training, auto pilot, repetition, absorbing and programming your subconscious mind.

The reader gets a feel for what a perfect flowing release is like through his very technical descriptions of the exact technique for every phase of the draw, aim and release, including breathing technique, rhythm and trigger placement.

In the guide part, Bell offers three steps, “How to make it work” , “Execution: what to look for?” and finally “ How long does it take? “ Bell suggests using eyes closed shooting to ‘chisel’ the feeling into muscle memory. He doesn’t explain why, only saying” it will stop your mind from ‘aiming’, when in fact, by shutting out certain stimuli, he allows more awareness in the other senses through a compensatory effect, and therefore allows more involvement of the subconscious. In summary his section can be ,” paraphrased by “ Do it right slowly, then do it a lot. Then do it occasionally as a ‘reminder’ between regular practice sessions.”

Bell, J. (2008, August). Muscle Memory Up!. *Bow & Arrow Hunting*, 46(6), 50-55. Retrieved November 16, 2008, from SPORTDiscus with Full Text database.

#3 “PRACTICING WITH VENUS WILLIAMS” This article was short but invoked a few questions about how the elite athletes do and should practice. Venus Williams recreates game situations in practice to try to ‘get used’ to them while in a game. This is a very widely accepted method in sports coaching. She recreates the pressure of missing a first serve, and of very long cross court/line rallies.

The question is: what method transfers best to optimal performance in actual competition. At the elite level, or expert level, should one’s practice be conscious execution with intent to perfect the skill, or should the elite athlete practice letting the unconscious take over while doing the skills. One could make arguments for both, depending if the player was performing the skill incorrectly, or learning a new skill or a combination of both.

This question makes me think of an experiment I would like to conduct on two groups of elite athletes in a skill based sport. One group practices specific skills using conscious execution, the other group practices only on letting the unconscious do it. The problem is how to measure conscious versus unconscious involvement. Perhaps there are no truly measurable units, but instead we use contrast measurements.(a ratio or percentage) A questionnaire will measure the athlete’s perception of how involved her sub conscious mind is, compared to her conscious mind, in performing the task. The question is: What is a person’s normal ratio in everyday tasks. For example, when the task is getting into your car, fastening your seatbelt, and turn the key, the ratio may be 80/20 (80 percent unconscious, versus 20 conscious).

It would seem that asking the question immediately following the task would produce the most accurate results, within the subject knowing which task will be referred to.

Other questions to be asked are, "Is it possible to do something else that doesn't require direct visual skills, when you visualize? Is it possible to visualize dribbling a basketball while you are dribbling a basketball?"

Subjects should go through a simple test of everyday tasks so they can determine accurate ratios. These results should be compared to other athletes doing the same tasks to get a baseline measurement to help athletes become aware of their self-awareness. Another helpful tool is survey of perception of level of conscious and unconscious involvement.

Robson, D. (2006, March). PRACTICING WITH VENUS WILLIAMS. *Tennis*, 42(2), 36-36. Retrieved November 16, 2008, from SPORTDiscus with Full Text database.

#4 The article, “The Dynamics of Decision Making in Penalty Kick situations in football [soccer]” uses an ecological dynamics approach to studying the penalty kick. In this situation, ‘ecological’ refers to the organisms, (the players) and their environment, and the ‘dynamics’ refers to how each change in variable may or may not affect the other players behavior and environment. The details studied included, 6cm-9cm offset from center of the goal keeper, visual gaze of the kicker and keeper, time lapse before reactions, angle of the run-up, perceived perceptions of ability of kicker and keeper, perceived size of keeper relative to the goal and almost every other variable that exists or that can change during a less than 2 second long penalty kick.

The study also uses the dyadic approach to study the degree of connectedness of the keeper and kicker by applying certain restraint to reduce the number of variables, but it acknowledges dyadic limitations. This study is fascinating because it “freezes” in time, all the actual decisions, reactions, and perceptions that occur during every second of football, and studies it with extreme details. It makes one appreciate the complexity of not only a two second, two player interaction, but also the multiple 22 player interactions that occurs in football game lasting 60 minutes.

The abstract states intention to suggest other experiments to advance research on how to best practice the penalty kick, and presumably improve results.

Lopes, Araujo, Peres, Davids, Barrieros, “The Dynamics of Decision Making in Penalty Kick Situations in Football[soccer]” Open Sports Sciences Journal, 2008, Vol 1, p24-30

#5 The experiment detailed in the article, “ Effects of Lower- Extremity and Trunk Muscle Fatigue on Balance” illustrates that dynamic balance (balance tests involving movement) is not affected significantly by muscle fatigue, except in a backwards direction, when compared to static balance tests(balance tests where subject is standing still) which are more affected by fatigue of both lower extremity and trunk fatigue. The implications of these results would suggest different training techniques for different sports which involve different balance demands. For example Archery demands static balance, while racquetball demands dynamic balance.

Not surprisingly, a similar study done previously by Cetin, Bayramoglu and Dileck, that was referred to in this study, related a positive correlation between muscle strength and balance scores. Another study by miller and Boyd, found that fatigue in ankle, knee, hip and abdominal muscles significantly affect balance scores more the fatigue in other muscle groups. The study acknowledges its limitations in the form of uncontrolled variables such as subject motivation, concentration, fatigue-other than study induced, emotional state, time of test and relationship with the tester.

According to the article, two forces affect the deterioration of balance scores. First, the fatigue decreases the maximum output of the muscles to execute the corrections, and second, the motor neurons are not correctly processing the pro-prioception of the joints locations in space.

Effects of Low Extremity and Trunk Muscle fatigue on Balance” Open Sports Medicine Journal, 2008, Vol 2, p 16-22, Cetin, Bayramoglu, Aytar, Surenkok, and Yemisci

#6 Gabriele Wulf wrote the article “ Attentional Focus Effects in Balance Acrobats” It was published in Research Quarterly for Exercise and Sport. This article was fascinating to me, because, as a coach, I am constantly experimenting with different verbal commands to guide my students to perform a skill correctly. In my 20 years of experience, I can support all findings of this article through anecdotal accounts of teaching specific skills to specific level students. When teaching relatively low experience students a new skill, constant repetitive reminders on low level focus cues are more effective in training skill to be automatic (the muscle memory.) When the students are of the highest level,(world ranked professionals) and I am teaching a variation of a skill, I need only to give one or two low level cues about the process. Then within minutes, when they are successful, I find myself switching to higher level cues automatically.

Also, as a world class athlete, I can relate my personal performances and correlate that to my level and spectrum of focus. During my most performances matches, I clearly remember having ‘no focus’ or a focus on a very high level effect.

As stated in the article, there is a lot of research correlating focus direction with performance; this is one of the first to use the highest level athletes that compare results to other studies done with novices and experts.

The interesting note was that group told to use their ‘normal’ focus, (no instructions) did just as well as an external focus group. This leads me ask about those performers’ exact focus during the test. In other words, what does their ‘normal’ focus involve? The article suggests their focus is external focus.

One inherent, unavoidable weakness in the study, is that high level performers (the world class athletes in general) are usually very self aware; they probably already have higher than average mind control. The act of focusing itself, is a skill. Perhaps this study should be done with a group of non-athletic people (i.e. chess players or math geniuses). If the results come out the same, then lets study the non-athletes 'normal' focus cues and compare it with the athletes focus cues. Perhaps we will learn something new about focus.

Gabriele Wulf (2008). Attentional Focus Effects in Balance Acrobats. *Research Quarterly for Exercise and Sport*, 79(3), 319-25. Retrieved November 17, 2008, from ProQuest Nursing & Allied Health Source database. (Document ID: 1556721711).

#7 Applications of Confidence Limits and Effect Sizes in Sport Research, by Eric Drinkwater makes a very good point about the merging of science data on to the coaching field. It seems many experiment use a standard deviation (a way of simplifying data) of .05 as a standard to determine is a result is statistically significant. Drinkwater argues that this may not always be the most effective way to present the, as it leaves out general information that a coach, in particular could use to make decisions. Part of the problem Drink water addresses in the natural disconnect between the lab and the athletic field. Since the art of coaching involves a lot of immeasurable, instinct driven-decision, and science, especially statistics, involved very clear delineations, the media of cross communications between the two fields could use some clarity. The author proposes publishing a range, called confidence limits, on data collected the field to help coaches make decisions with all the data.

Here is a simplified example of how this may work. A football coach needs to pick a field goal kicker to win the game. One kicker, Bill, is reported to have missed half his attempts in the past year at this yardage. Kicker Bob, has made all of his at this yardage in the last 3 months. Obviously, the coach needs to make an informed decision, but the missing information is that Bill attempted 180 kicks in his career, and hit 60 of them, but Bob only tried 30, but has an injured foot, so he missed the first 10 months of the season.

In effect, the author is suggesting to give a broader range of information so coaches can interpret the data to make their decisions based on individuals or teams situations, instead of applying the same statistical rules to make conclusions. Let the coaches have more information.

Drinkwater, Eric, "Applications of Confidence Limits and Effect Sizes in Sport Research", The Open Sports Science Journal, 2008, 1, 3-4 School of Movement STUDIES, Charles Sturt University, Panorama Avenue, Bathurst, NSW Australia, 2795

#8 The basic query behind the article “Effects of Intermittent versus Continuous Training on Speed, Jump and Repeated Sprint ability in Semi Pro Soccer Players” is this: “Is it best to train how we play?” (Rather...to train the exact skills we perform to match the exact demands of the sport,) or should we break down the skills into smaller ‘pieces’ and train them separately. In this case, the sport is soccer, and the experiment tested the effects of intermittent versus continuous training on speed, vertical jump and repeated sprint times.

The experiment used 34 semi-pro soccer players, was 12 weeks long, and involved 20 and 40 minutes per session. Both intermittent (INT) methods and continuous (CONT) methods showed initial values in all three tests, but the INT methods showed even more substantial improvements in repeated sprint times. Testing of the athletes occurred in the 1st, 6th and 12th weeks of the test. To avoid inconsistent variables, tests were conducted at the same time of the day, and athletes always took the same rest day.

In the two methods of training, the Intermittent consisted of the a 15 min warm-up, a 20 min training intervention with various sprint intervals, and small side games during 40 minutes. The continuous methods were based on time motion analysis data. The drills were performed continuously to simulate game like play, and consisted of 15 minute warm-up, 20 min continuous session and small sided games during 40 minutes.

The sprint testing used photoelectric cells for precise timed measurements, the vertical jump used flight time, and the repeated non linear sprints used 7 34.2 meter sprints with precise recovery times in between.

Since soccer involves repeated bursts of speed, the expected results would suggest INT training method would be most beneficial for the sport, and indeed they did. Both methods maintained the baseline values over the 12 weeks, but the INT method appears to be more effective in training these semi-pro athletes for the demands of soccer.

Effects of Intermittent or Continuous Training on Speed, Jump and Repeat-Sprint Ability in Semi-Professional Soccer Players, Aguiar, Abrantes, Macas, Sampaio, Ibanez. The Open Sports Sciences Journal, 2008, I, 15-19

#9 This article by Genter, McGraw, Gonzalez, and Czech focuses on the popular topic of pre-action routines in closed skills. This particular experiment specifically, targets tennis serves by 4 elite level players. It finds, contrary to other studies, that presence of a pre-serve routines do not enhance the effectiveness of the serves. It specifically states a 3% increase in performance of those *without* observable pre-serve routines.

There are some weaknesses in this study. For example, it studies only 4 tennis players. It compares a routine to superstition, but doesn't define what exactly superstitious behavior is, or how it differs from a pre serve routine, stating only that a disruption in "purposeful behavior" causes inconsistency.

Surprisingly, the effect of pre-performance routines and of superstitious behavior differed little (performance worsened when neither was conducted before shooting). Purposeful behavior, whether based on superstition or on a structured pre-performance routine, resulted in consistent and effective performances.

The study does acknowledge that any mental imagery routines and affirmations are not visible to the observers, and therefore not accounted for in the study. I think its biggest flaw, is that it doesn't include any second attempts. It would seem to be unwise not to include second service attempts in the study. Because in first serve attempts, often players after attempt a more difficult to return serve,(harder, lower, more spin etc) and therefore inherently a lower percentage serve. One valuable attribute of the study is that it records information in real time, during the highest level of competition. The most basic way to make this study more valid is to

increase tenfold the number of subjects studied, to include all serve attempts, and record both first, second, and combined serve percentages.

Gentner, Gonzalez, McGraw, Czech An Examination of Pre-service Routines of Elite Tennis Players, ISSN: 1543-9518

#10 The article “Advances in the application of information technology to sport performance” covers many different types of technology used to provide scientific data as feedback to athletes. It discusses the uses, benefits, and cautions of these different methods of delivery of feedback. It compares many aspects of feedback including the timing of when and how the feedback is delivered in relation to the skill, the type of feedback, the environment (during competition or practice) and the relative experience and skill level of the athletes, and the skill being reviewed.

Specifically, it covers visual feedback,(video-taping), automatic tracking systems software, (of players, teammates movements, opponents movement), training in three dimensional virtual environments (simulators), vibration conditions, and temporal feedback (having to do with timing) and tools used to aid performance in aiming sports, such as forced platform and force transducers, and the use of eye movement tracking technology. All these are useful tools.

Most of the techniques and technologies had a common theme, which was breaking down the skill into smaller increments so it becomes simpler to examine and improve separately. The final goal, of course, is to put the skills together, so that the end result is better performance of the skills collectively during competition. In one case, the act of using simulators to mimic controlled competitive situation actually encouraged the athletes to use different body and brain

systems, functions and skills to achieve success than the skill they were trying to train to improve. (see Table tennis). This was an unexpected negative side effect of the simulator.

Indeed having feedback is crucial. It helps us filter the unwanted effects of our behavior from the desired effects. Imagining shooting free throws in a magic room where as soon as you release the ball, everything goes black and all noise is eliminated from the room. When the shot was over, the ball magically appeared in front of you, but you didn't know whether or not your shot was good. That would be a zero feedback situation. What exactly then, would you be practicing? Or, can you imagine the other extreme. After every free throw, you were whisked away to examine at a 10 page summary of your pulse, blood pressure, respiratory rate, eyeball focus point, the speed and rotation of the ball, forward thrust of the wrist at release, force of impact of the ball against the rim and countless other bits of information. As a coach, my first instinct would be to discard the irrelevant information, and process only the useful stuff. But how do we know what is the useful stuff? That is what the best coaches determine for each athlete in each situation. With the accessibility of these new tools, coaching and teaching will require a new skill, information management.

The conclusion of this review quotes "For general purposes of motor learning, the impact of basic external **feedback** and collateral technologies--from simple video movies to complex simulators--are of major importance and should be seriously considered in the normal practice scheme".

Author(s):Dario G. Liebermann, Larry Katz, Mike D. Hughes, Roger M. Bartlett, Jim McClements and Ian M. Franks.
Source:[Journal of Sports Sciences](#) 20.10 (Oct 2002): p.755(15). (9575 words) From *General OneFile*.
Document Type:Magazine/Journal
Bookmark:[Bookmark this Document](#)