

Visual motor rehearsal

The Effects of Mental Imagery on Athletic Performance

by Annie Plessinger

What is Mental Imagery?

Mental imagery, also called visualization and mental rehearsal, is defined as experience that resembles perceptual experience, but which occurs in the absence of the appropriate stimuli for the relevant perception (plato.stanford.edu/entries/mental-imagery/). Whenever we imagine ourselves performing an action in the absence of physical practice, we are said to be using imagery. While most discussions of imagery focus on the visual mode, there exists other modes of experience such as auditory and kinesthetic that are just as important. However, for the purposes of this paper, only visual imagery will be discussed for it is the most relevant mode concerning athletic performance.

Claims

Visual imagery advocates purport that this technique increases energy and avoids injuries as well. Not only will visualization improve athletic performance but the ads also claim that it will enhance motivation and overall enjoyment of the sport. Peak Performance Sports looks to sell tapes that has the "latest methods in sports psychology", one of them being mental imagery, which will elevate your game to a new level. The tapes will increase confidence, focus and self-composure which will in turn, improve your athletic performance. These tapes can work for any type of athlete, whether they are professional, amateur, or of a junior status. Jacksonville has a sports counseling center which teaches imagery along with other sports psychology techniques. At this center, they allege to reduce performance anxiety, deal with mental trauma sustained during and after injury, and help you with recurrent past images of terrible performances that athletes cannot seem to forget, such as the double fault on match point or the missed catch for the winning touchdown.

The Importance of Mental Imagery

Many sports such as golf, tennis and skating, not only require physical skills, but a strong mental game as well. Most coaches preach the line that sports are 90% mental and only 10% physical. Especially in sports where hundredths of a second or tenths of an inch separate the champions from the mediocre athletes, an extra edge can be extremely crucial. Hence,

numerous athletes are turning towards mental imagery to take their game to the next level. Different uses of imagery in sport include: mental practice of specific performance skills, improving confidence and positive thinking, problem solving, controlling arousal and anxiety, performance review and analysis, preparation for performance, and maintaining mental freshness during injury.

How to Implement Mental Imagery

There is no correct way to practice mental imagery. It is all left up to individual preferences and the present circumstances. It can be done on or off the field, very short (within a few seconds or minutes), of a long duration, sitting up, lying down, in complete silence, with a stereo, eyes closed or they can be open. A shorter version of imagery is best implemented during match play. For example, a tennis player may take a few seconds to visualize him or herself hitting the perfect serve in the place where he or she wants. Or a quarterback can go through a play in his mind just before calling the play. Longer, specific guided visualizations are usually designed for a quiet room prior to competition. In this case, the player should be in a relaxed and receptive state in order for the image to go deeply into the mind. It is recommended to do visualization two or three times per week. Another way that many athletes practice imagery is during bike rides, lifting weights, rowing, etc. Since one is exerting physical energy while doing mental rehearsal, it helps facilitate actual competition (Porter, 22-23). Some individuals are better at forming pictures in their heads than others. Or some people may excel in certain sensory experiences and not others.

Studies

During the 60's and 70's, the studies conducted on mental imagery were rather inconsistent due to different confounds such as lack of subjects and reliable controls. In addition, researchers used a variety of skills because they were not exactly sure what the subjects should do when they engage in mental practice. Hence, some were more likely than others to work with mental practice which varied the results. However, now there is sufficient reliable evidence that suggests imagery rehearsal can sometimes improve motor performance in a variety of sports. Feltz and Landers conducted a meta-analytic to examine 60 studies in which mental practice was compared to control conditions. Their analysis yielded 146 effect sizes with the overall average effect size of .48 positing that mental imagery practice "influences performance more than no practice," but consistently less effective than physical practice. On average, the effect sizes were larger with the studies which used cognitive tasks. Overall, the cognitive rehearsal conditions showed a better performance, about 1/2 of a standard deviation unit. (Paivio, 22-29)

In 1992, Anne Isaac conducted a study which examined the influence of mental practice on sports skills. While most of the previous studies on this topic showed positive effects of mental

rehearsal, they were not performed in actual field context using subjects who learned actual sport skills rather than just novel motor tasks. Isaac eliminated this problem in her experiment. She also tested the hypothesis of whether people who have better images and control over their images result in better performances. Isaac tested 78 subjects and classified them as novice or experienced trampolinists. Then she further divided the two groups into an experimental and control group. She also classified the subjects as either high or low imagers based on initial skill level. Both groups were trained in three skills over a six week period. In order to prevent confounds, the imagery group was unknown to the experimenter until afterwards. The experimental group physically practiced the skill for 2-1/2 minutes, which was then followed by 5 minutes of mental practice. Lastly, an additional 2-1/2 minutes of physical practice followed the mental practice. Meanwhile, the control group physically worked on the skill for 2-1/2 minutes, which was then followed by 5 minutes of a session trying a mental task of an abstract nature, such as math problems, puzzles, and deleting vowels. Then, 2-1/2 more minutes were spent physically working on the skill again. The outcome of the experiment was as followed: there existed a significant difference in the improvement of the high and low imagers. In both novice and experimental groups where the initial skill ability was similar, the high imagery groups showed significantly more improvement than the low imagery group. Furthermore, there was a significant difference between the experimenter and control groups. Not surprisingly, the experimental group had significantly more improvement than the control group. This study posits that despite the level of skill (beginner or experienced) visual imagery proves effective. (Isaac, 192-198).

In a recent experiment conducted by Roure et al, they found six specific autonomic nervous system (ANS) responses that correlated with mental rehearsal, thereby improving sports performance. The subjects were placed into an imagery group and a control group. The task measured in each group was based on their ability to pass an opponent's serve to a given teammate, in the sport of volleyball. The experimenters measured the variations of the ANS during the motor skill and during the mental rehearsing sessions. The ANS parameters tested included: skin potential and resistance, skin temperature and heat clearance, instantaneous heart rate, and respiratory frequency. The results of the test revealed a strong correlation between the response in the actual physical tasks (both pre- and post-test volleyball) and during the mental imagery sessions. There existed a difference in the skills between the imagery and the control group, the former being the better. In addition, no clear difference was present between the pre- and post- tests in the control group. This study showed that mental imagery induces a specific pattern of autonomic response. These include: decreased amplitude, shorter duration and negative skin potentials when compared to the control group. As a consequence of the ANS, the imagery group was associated with better performance. In light of this experiment, Roure suggested that mental imagery may help in the construction of schema which can be reproduced, without thinking, in actual practice (Roure, 99-108).

Not only does mental imagery seem to enhance athletic performance, but it has been shown to enhance intrinsic motivation as well. A study in 1995 tested who would spend more time practicing a golf putting task and who would result in having higher self efficacy. Thirty nine

beginner golfers were grouped into an imagery or control group. For 3 sessions, both groups were taught how to hit golf balls. The imagery group practiced in an imagery training session designed for this specific golf skill. As a result, the imagery group spent significantly more time practicing the golf putting task than the control group. In addition, the subjects in the imagery group had more realistic self-expectation, set higher goals to achieve, and adhered more to their training programs outside the experimental setting (Martin, 54-69).

How Mental Imagery Works

The reason visual imagery works lies in the fact that when you imagine yourself perform to perfection and doing precisely what you want, you are in turn physiologically creating neural patterns in your brain, just as if you had physical performed the action. These patterns are similar to small tracks engraved in the brain cells which can ultimately enable an athlete to perform physical feats by simply mentally practicing the move. Hence, mental imagery is intended to train our minds and create the neural patterns in our brain to teach our muscles to do exactly what we want them to do (Porter, 17).

Sports psychologists have attempted to understand the exact mechanisms that cause mental imagery to work. Numerous theories exist, but sports psychology lacks a single theory which completely explains the effectiveness of mental imagery. A recent model, which also places importance on psychophysiology, goes even further by including a specific meaning for an image. This model is know as Ahsen's Triple Code Model of imagery (ISM). According to Ahsen there are three fundamental parts to an image. The first part is that the image itself must be a centrally arousing sensation so it is more like the real world. It has all the attributions of a sensation, the only difference is that it is internal. This image provides the imager with so much realism that it can enable him or her to interact with the image as if it were the real world. Secondly, there exists a somatic response. Therefore, the very act of imaging results in psychophysiological changes in the body. Finally, the third part of the image is the actual meaning of the image. Every image has a significant meaning and that specific meaning can imply something different to each individual. Since every person has a unique background and upbringing, the actual internal image can be quite different for each individual, even though the set of imagery instructions are the same (Murphy, 153-172).

Conclusion

After reading through numerous studies, visual imagery seems somewhat promising and beneficial. Although it is not as beneficial as physical practice, visual imagery fairs better than no practice at all. Hence, a program with physical practice combined with mental training seems to be the best method. Virtually all of the studies show that mental training improves motor skills. More recently a lot of studies go even further and prove that visual imagery can improve various skills related to sports in actual field contexts. Visual imagery seems to be

beneficial to anyone who wants to improve at their sport. Whether you are a recreational athlete or a professional does not matter. The benefits of mental imagery have proved successful at any level. So if you are a professional looking to break into the top, or a club player who simply wishes to defeat his/her friend, I recommend incorporated mental imagery along with physical practice. Not only can mental imagery improve specific motor skills but it also seems to enhance motivation, mental toughness and confidence, all which will help elevate your level of play.

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