



## Short communication

## Why did Tiger Woods shoot 82? A commentary on Toner and Moran (2015)



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## ABSTRACT

In a recent article, Toner and Moran (2015) argued that athletes need to pay conscious attention to body movements, and that an external focus of attention would not be effective for continued improvement at the elite level. Their arguments appear to be based on misunderstandings of the attentional focus literature. In this commentary, I clarify that adopting an external focus does not imply that performers are not aware of their body movements. Rather, an external focus (i.e., focusing attention of the intended movement effect) refers to the *preparation* of movement execution. I maintain that an external focus is necessary to optimize performance and learning at any level of performance.

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A few years ago, Aidan Moran, as editor of the *International Review of Sport and Exercise Psychology*, invited me to submit a review paper on focus of attention to the *International Review of Sport and Exercise Psychology*. I took that opportunity to delve into the extant literature, and my paper entitled “Attentional focus and motor learning: A review of 15 years” was published in 2013 (Wulf, 2013). The bottom line was (and still is): “The enhancements in motor performance and learning through the adoption of an external relative to an internal focus of attention are now well established. The breadth of this effect is reflected in its generalizability to different skills, levels of expertise, and populations, as well as its impact on both the effectiveness and efficiency of performance” (p. 99). Despite overwhelming empirical evidence, some people have remained skeptical. Claims have surfaced that the acquisition of complex movement patterns, such as gymnastics routines, makes it necessary to focus on body movements (Lawrence, Gottwald, Hardy, & Khan, 2011), or that “complete novices” (Peh, Chow, & Davids, 2011) must benefit from an internal focus. Additionally, in a recent paper Moran has revealed his skepticism with respect to expert performance, which is largely based on conjectures, case studies, and philosophers’ views (Toner

& Moran, 2015). Editors don’t always agree with the conclusions of papers they accept for publication (I speak from experience). But what has surprised me is the vehemence of the opposition – and most of all the level of misunderstanding of the attentional focus effect. It is the latter point that has motivated me to comment on Toner and Moran’s explications, under the assumption that there may be others who share some of the misinterpretations that are evident from their paper.

Let me first stipulate that I could not agree more with many, perhaps most, of the points Toner and Moran make. Of course, learning is never complete. Of course, learners – including experts – need to be aware of what they are doing. How else would continued learning be possible? Of course, adjustments or “corrections” are often necessary, or desirable, even at a high level of performance. And, of course, those would not be possible without bodily awareness. Clearly, elite athletes are typically acutely aware of their body movements. Otherwise, they would not be performing at an elite level.

Adopting an external focus does not mean that the performer is not aware of her or his body movements. (How would that even be possible?) It simply means the performer is focusing on the intended movement effect – while *preparing for the execution* of a ballistic skill (e.g., throwing or hitting a ball) or *during the execution* of a continuous skill (e.g., balancing, swimming, cross-country skiing). Adopting an external focus is related to the *planning* of the movement, but has nothing to do with the processing of intrinsic feedback or bodily awareness, or lack thereof (e.g., p. 11).

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Here is where I disagree with Toner and Moran: If movements are *not* planned in terms of the intended movement effect, but in terms of specific body movements, the outcome will always be less-than-optimal. More importantly, learning/improvement will be less-than-optimal. That athletes improve with an internal focus, as in the case studies cited by Toner and Moran (p. 11), is not surprising. Of course, people make progress – they are practicing with intent after all – even when they consciously try to control body movements. Just not optimally. Also, there is also no doubt that performers often need to make adjustments, and that their focus may shift back and forth among different aspects of the skill depending on where the “problem” appears to be, especially if they perform complex skills with high accuracy requirements (e.g., golf). I maintain, though, that those foci need to be external (e.g., hole, intended target, ball trajectory, club motion during backswing, club face angle) in order to yield optimal outcomes and improvement. Toner and Moran argue that a golfer who wants to change her movement form needs to focus on body movements (e.g., shoulder turn) to generate greater club-head speed and carry distance (p. 113). In contrast to this claim, we have demonstrated that a focus on body movements in golf is detrimental to movement form and outcome, compared with an external focus (An, Wulf, & Kim, 2013). Specifically, An et al. showed that directing (right-handed) golfers' attention to pushing against the “left side of the ground” (external) during the downswing, as opposed to shifting their weight to the left foot (internal) or no focus instruction (control), resulted in a greater increase in the shoulder-hip angle, higher maximum angular velocities of the pelvis, shoulder, and wrist, and increased carry distance of the ball. Thus, a simple change in the wording of (typical) instructions, designed to promote an external focus, affected whole-body coordination, and enhanced immediate performance and learning. A similar effect has recently been demonstrated for movement quality and quantity in gymnastics (Abdollahipour, Wulf, Psotta, & Palomo Nieto, 2015). These are just a few examples of the external focus advantage that so many experimental studies have shown across tasks, skill levels, age groups, etc. I am convinced that the enhanced movement effectiveness and efficiency seen when individuals focus externally applies to all human beings (not to mention other animals) – and high-level performers are not going to be an exception from that rule.

An example par excellence seems to be Tiger Woods. At the Phoenix Open in January 2015, Woods shot 82 – the worst round of his professional career. He explained it with a change he is trying to make to his swing pattern. Coincidentally, he is working with a new swing coach, Chris Como, a biomechanist by training. I am not privy to the instructions or feedback he is getting about his technique. But it is not difficult to imagine what type of feedback an athlete might receive that is based on detailed motion analyses. Toner and

Moran would presumably argue that his slump is just a necessary phase, and that Tiger's performance will eventually be better than before once he automatizes the new swing pattern. I dare to disagree. As golf coach Kendal McWade put it: “There is no doubt that Tiger has moved his attention internally. His coaches ... have convinced him that his body has to move more efficiently to produce better outcomes and then directed his attention accordingly. And in my opinion that is moving him further away from the Tiger he once was, and I'm not sure he will be able to find a way back ... I hope he does but I have my doubts” (personal communication, February 19, 2015).

I share those doubts, particularly because Tiger Woods – like presumably many athletes, coaches, and even movement scientists – seems to believe that mental and motor/physical aspects of motor performance are separable. When asked whether his chipping problem was mental, he responded “It is mental to an extent because the physical pattern is different. So obviously, the trust is not quite there. Yeah, it's mental to an extent but I need to physically get the club in a better spot”. As has been argued previously, motor performance is never a function of a pure “motor” system (Lewthwaite & Wulf, 2010). Rather, social-cognitive-affective-motor influences on behavior are always intertwined, and the attentional focus is a result of this interplay. Thus, what athletes direct their attention to when they prepare a movement will always affect their performance in a less-than-optimal (internal focus) or optimal way (external focus). Understanding the effects is key to successful performance and coaching. I am convinced that accomplished athletes or their coaches will be creative enough to think of relevant external foci that can be used to make technical adjustments.

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