

The Vicious Circle Involved in the Development of Yips:

A Commentary

Paul Glazier

Centre for Sport and Exercise Science, Sheffield Hallam University,
Collegiate Campus, Sheffield, S10 2BP, UK
Email: paul@longdrivegolf.co.uk

INTRODUCTION

The term the ‘yips’ is a colloquialism that refers to the debilitating movement disorder characterised by the production of perceived involuntary movements (often described anecdotally as ‘jerks’, ‘tremors’, ‘spasms’ and ‘twitches’) that occur during the course of executing a motor behaviour requiring fine control. This affliction reportedly affects between 12% and 28% of golfers [1], of which most are experienced single-figure handicap amateurs or professionals, and costs, on average, 4.7 strokes per 18 holes [2]. Although it is still unclear what exactly causes the yips, most academics and practitioners believe that psychological (e.g., anxiety) and/or neurophysiological (e.g., focal dystonia) factors are largely responsible for this behavioural phenomenon [3].

Previous reviews of the yips [3, 4] have highlighted the general paucity of studies that have considered the underlying biomechanical mechanisms and processes that physically cause this debilitating affliction. The study of Marquardt attempted to redress this balance, but was only partially successful in achieving this aim. In this commentary, I highlight some of the main issues arising from the target article, how they impact on the study and what lessons can be learned and applied to future research in this area.

PROCESS- VERSUS PRODUCT-ORIENTED APPROACHES TO THE YIPS

The apparently novel feature of the study of Marquardt was that kinematic analyses were used for the first time to describe putter motions of golfers who were apparently affected by the yips (however, see [5]). Although the SAM PuttLab system is a very impressive measurement tool that is capable of producing a plethora of useful variables related to the 3-D motion of the putter, it is debatable how informative these variables are in the context of the current study. Rather unsurprisingly, the main findings of this study were that golfers who supposedly had the yips tended to exhibit greater error and variability in their putting strokes for a number of key variables

compared to those golfers who do not have the yips and that this error and variability apparently increased with the severity of the yips. While this data may be of interest to a point, the emphasis on describing outcomes generally fails to inform us about the underlying mechanisms and processes that cause the outcomes. It is clear that for substantive progress to be made in this area, product-oriented research designs need to be superseded by process-oriented research designs [6, 7]. Future experimentation needs to focus on explaining the 3-D motion of the putter *in relation to* changes in joint couplings, grip forces and muscle activation parameters of upper body limb motions. Only then will the physical mechanisms causing the yips be revealed and inferences about the underlying neurophysiological processes be made.

USE OF BIOMECHANICAL ANALYSES IN THE DIAGNOSIS OF THE YIPS

Although measuring the kinematics of putter motions for specific golfers might be useful in the diagnosis of the yips, relying *solely* on these measures, as Marquardt did, is potentially dangerous and could further adversely affect putting performance. Just because the golfers studied by Marquardt exhibited yip-like symptoms, it does not necessarily mean they had the yips, especially considering the following evidence:

- (i) The literature suggests that the yips tends to manifest during very short putts - typically in the 2-6 ft range [2, 8] that golfers expect to hole. However, in the study of Marquardt, all putts were struck from a distance of approximately 13 ft.
- (ii) The general consensus among academics and practitioners is that the yips tend to manifest under pressurised situations when the golfer is likely to be feeling anxious [3, 4]. As the golfers in the study of Marquardt were only requested to strike a series of putts on a practice green under what appeared to be a low pressure situation, anxiety was unlikely to be a major factor during performance. The absence of any substantial anxiety appears to suggest that the movement artefacts displayed by the golfers were unlikely to be the yips. This point also appears to contradict Marquardt's suggestion that the yips is not a neurophysiological disorder, therefore, by implication, it must be a psychological disorder.
- (iii) The majority of golfers who suffer from the yips tend to be professionals or low handicap players [3, 4], not higher handicap players like those who participated in the study of Marquardt (average handicap 16.6 strokes). Marquardt also claimed to have witnessed in other data collection sessions many novices who exhibited severe yips.
- (iv) Perhaps most tellingly, Marquardt remarked at various junctures during the target article that a number of golfers with mild and severe yips were not aware that they had a problem. Considering the abundance of anecdotal reports describing the yips as 'jerks', 'tremors', 'spasms' and 'twitches' [e.g., 1], it would be remarkable and surprising if golfers could not distinguish between what was simply poor technique and the yips. With this and the other points raised above in mind, it seems highly likely that golfers in the study of Marquardt were suffering from the former rather than the latter.

Clearly, to be able to diagnose whether a golfer has the yips with any degree of certainty, it is important that a battery of psychometric, biomechanical and neurophysiological tests are used. Suggesting that a golfer has the yips when there is no conclusive evidence is only likely to cause further anxiety leading to further deterioration of putting performance.

CONSTRAINTS ON MOVEMENT COORDINATION AND CONTROL IN PUTTING

Marquardt used information processing theoretical concepts (e.g., open loop control, motor programs, feedback, etc.) derived from cognitive psychology to explain movement control during putting and provided a rather unconvincing explanation of the yips claiming that “the original movement program is still active but is superimposed by a second and conflicting movement program” (p. 73). Furthermore, Marquardt had difficulty explaining the task-specific nature of the yips and how a slight change in the specific requirements of the task can have a large impact on movement dynamics.

A potentially more useful explanatory framework is offered by dynamical systems theory. Here, patterns of coordination and control are an emergent property of self-organising dynamics and the confluence of constraints impinging on the golfer [9]. It is well-established that small quantitative changes in, for example, task constraints can lead to large and significant changes in coordination and control [10], which could explain why the yips seem to disappear when the golf ball is occluded or fixed to the ground or if the hole is removed or replaced with a symbolic target like a tee.

The adoption of a dynamical systems theoretical framework could also be useful in helping to explain some of the physical phenomena related to the yips. For example, Adler et al. [11] reported ‘abnormal’ co-contractions in the wrist flexor-extensor muscles of yips affected golfers compared to normal controls. This finding was interpreted by the authors as being evidence of focal dystonia, but this need not be the case. Bernstein [12] famously referred to the process of “freezing” degrees of freedom during skill acquisition where joints are “rigidly, spastically fixed” (p. 108) through muscle co-contraction during the initial stages of learning so that they allow no or very little movement and, therefore, limbs become more controllable. As the learner progresses, there is a gradual release of the ban on the degrees of freedom enabling the performer to exploit passive motion-dependent forces and produce flexible and adaptive movement solutions. The recruitment or suppression of mechanical degrees of freedom is not uni-directional, but is dependent on the confluence of constraints on action [13]. Thus, the existence of muscle co-contraction might simply be a result of the intentional constraints of the golfer attempting to consciously control the putting action rather than some underlying pathology, especially considering that a greater internal focus of attention is typical in stressful situations [14, 15].

CONCLUSION

The study of Marquardt unfortunately failed to make a substantive contribution to the literature and our understanding of the yips. Future research needs to adopt a process-rather product-oriented approach, use a range of different analysis techniques to more

conclusively diagnose the yips and also adopt a theoretical framework that could help explain the underlying causative mechanisms and processes.

REFERENCES

1. McDaniel, K.D., Cummings, J.L. and Shain, S., The “Yips”: A Focal Dystonia of Golfers, *Neurology*, 1989, 39, 192-195.
2. Sachdev, P., Golfers’ Cramp: Clinical Characteristics and Evidence Against it being an Anxiety Disorder, *Movement Disorder*, 1992, 7, 326-332.
3. Smith, A.M., Adler, C.H., Crews, D., Wharen, R.E., Laskowski, E.R., Barnes, K., Bell, C.V., Pelz, D., Brennan, R.D., Smith, J., Sorenson, M.C. and Kaufman, K.R., The ‘Yips’ in Golf: A Continuum Between a Focal Dystonia and Choking, *Sports Medicine*, 2003, 33, 13-31.
4. Kingston, K., Madill, M. and Mullen, R., Yielding to Internal Performance Stress? – The Yips in Golf: A Review with a Commentary from a Player’s Perspective, in: Thain, E. ed., *Science and Golf IV: Proceedings of the World Scientific Congress of Golf*, Routledge, London, 2002, 268-283.
5. Filmlater, M., Noizet, P-A., Pöppel, E. and Murthi, B.P.S., Motor Strategy Disturbances in Golf: The Effect of ‘Yips’ on the Movement of the Putter Head, in: Crews, D., Lutz, R. eds., *Science and Golf V: Proceedings of the World Scientific Congress of Golf*, Energy in Motion, Inc., Mesa, AZ, 2008, 352-359.
6. Weinberg, R.S., Anxiety and Motor Performance: Where to From Here? *Anxiety Research*, 1990, 2, 227-242.
7. Gould, D., Greenleaf, C., Krane, V., Arousal-Anxiety and Sport Behavior, in: Horn, T. ed., *Advances in Sport Psychology 2nd edn.*, Human Kinetics, Champaign, Illinois, 2002, 207-241.
8. Smith, A.M., Malo, S.A., Laskowski, E.R., Sabick, M., Cooney III, W.P., Finnie, S.B., Crews, D.J., Eischen, J.J., Hay, I.D., Detling, N.J. and Kaufman, K., A Multidisciplinary Study of the ‘Yips’ Phenomenon in Golf: An Exploratory Analysis, *Sports Medicine*, 2000, 30, 423-437.
9. Newell, K.M., Constraints on the Development of Coordination, in: Wade, M.G. and Whiting, H.T.A., *Motor Development in Children: Aspects of Coordination and Control*, Martinus Nijhoff, Dordrecht, 1986, 341-360.
10. Newell, K.M., On Task and Theory Specificity, *Journal of Motor Behavior*, 1989, 21, 92-96.
11. Adler, C.H., Crews, D., Hentz, J.G., Smith, A.M. and Caviness, J.N., Abnormal Co-Contraction in Yips-Affected but not Unaffected Golfers: Evidence for Focal Dystonia, *Neurology*, 2005, 64, 1813-1814.
12. Bernstein, N.A., *The Coordination and Regulation of Movements*, Pergamon Press, Oxford, 1967.
13. Newell, K.M. and Vaillancourt, D.E., Dimensional Change in Motor Learning, *Human Movement Science*, 2001, 20, 695-715.
14. Masters, R.S.W., Knowledge, Knerves and Know-How: The Role of Explicit Versus Implicit Knowledge in the Breakdown of a Complex Motor Skill Under Pressure, *British Journal of Psychology*, 1992, 83, 343-358.
15. Hardy, L. and Mullen, R., Performance Under Pressure: A Little Knowledge is a Dangerous Thing?, in: Thomas, P.R. ed., *Optimising Performance in Golf*, Australian Academic Press, Brisbane, 2001, 245-263.