

## **DR. JOAN N. VICKERS**

**POSITION** Professor, Faculty of Kinesiology, University of Calgary,  
Calgary, Alberta, Canada. T2N 1N4

### **AREAS OF EXPERTISE**

Cognition, motor behaviour and gaze control in complex motor skills;  
perception-action coupling; visual attention and performance, decision  
making and decision training

### **CONTACT**

Phone: 403 - 239 - 5765 (home)  
403 - 220 - 3420 (office)  
Fax: 403 - 284 - 3553  
Email vickers@ucalgary.ca  
Web <http://www.kin.ucalgary.ca/nml/>

### **EDUCATION**

1984 Doctorate Educational Psychology, U. of British  
Columbia (interdisciplinary perception and cognition,  
educational psychology, motor learning and control)  
1976 Masters of Science, Faculty of Education, U. of Calgary  
(interdisciplinary education, kinesiology, psychology)  
1970 Certified Teacher Level 5, Province of Alberta  
1966 Certified Teacher Level 4, Province of New Brunswick  
1966 Bachelors of Physical Education, U. of New Brunswick

### **APPOINTMENTS**

1991 - Present Professor, Faculty of Kinesiology, U. of Calgary  
1996 - Present Adjunct Professor, Department of Psychology  
1987 - Present Director, Neuromotor Psychology Laboratory  
1994 - Present Course Developer & Instructor National Coaching Institute- Calgary  
1984 -1991 Associate Professor, Faculty of Kinesiology, U. of Calgary  
1980-1983 Lecturer, U. of British Columbia (Doctoral studies)  
1975- 1980 Assistant Professor and Women's Athletic Director, U. of Calgary  
1970-1973 Substitute Teacher, Junior and Senior High Schools, Leduc and  
Wetaskiwin Schools, AB  
1968-1970 High School teacher, Queen Elizabeth High School, Calgary, AB (  
1966-1968 Lecturer, Women's Athletic Director and Coach, Mount Allison  
University, Sackville, NB

### **AWARDS & HONORS**

- Visiting Professor, Faculté des Sciences du Sport de Marseille, France
- Invited Academic of the Year, Department of Sport Science, Chinese University of Hong,  
Hong, Hong Kong
- Visiting Professor, Universidade Estadual Paulista, Insitiuto de Education, Rio Claro,  
Brazil.
- Chairman's Award for Excellence in Psychological Research in Sport Science,  
International Olympic Committee (IOC), Atlanta, Georgia.
- Elected Member, American Academy of Kinesiology
- Young Scientist of the Year, Canadian Society of Psychomotor Learning and Sport  
Psychology.

## DESCRIPTION OF RESEARCH PROGRAMS

### **Cognition, Gaze and Motor Behaviour**

The goal of this research program is to understand how vision controls and modulates motor behaviour. One of the challenges in this area is to determine if visual invariants underlay expertise in sport and other physical activity areas. Invariants are aspects of one's gaze and/or motor behaviour that remain unchanged even as the context and other parameters may vary. A potential invariant of higher levels of athletic performance is a gaze called the "quiet eye". The quiet eye has four characteristics – it is directed to a critical location or object in the performance space; its onset occurs before the final movement common to all performers of the skill; its duration tends to be longer for elite performers; and it is stable, confirming the need for an optimal focus on one location or object prior to the final execution of the skill. For example in golf, elite putters have a quiet eye onset that occurs on the top or back of the ball before the backswing of the stroke and has a duration of 2-3 seconds that extends through the stroke and beyond contact. The processing of quiet eye information and the ability to self-regulate cognitive and emotional activity are key to the successful execution of motor skills, not only in sport but also in everyday activities like locomotion and in disorders such as ADHD (attention deficit hyperactivity disorder). Our research shows that focus is affected by anxiety and arousal. When a performer is anxious or upset, then their normal ability to attend is lost with negative effects on their quiet eye and performance. Another consideration for my research has to do with training implications. Given the importance of quiet eye location, onset and duration on performance outcomes, then quiet eye programs have been designed to train and enhance the control of the quiet eye in different sports, and researched in terms of their effectiveness in improving performance.

### **Motor Learning and Control: Decision Training In Sport**

The ability to make effective decisions, especially under conditions of stress, is a characteristic sought by all sports performers. decision training is a second major research area of my laboratory and is a comprehensive coaching model designed to improve the athlete's ability to make effective decisions when under competitive stress. A decision trainer assumes that the necessary perceptual and cognitive skills must be present before motor skills and tactics can be performed in a consistent and reliable way. For this reason, coaches and other professionals are taught how to design decision training practices that help the athlete learn how to better anticipate what is going to happen, to focus and attend to critical cues, to improve pattern recognition, to retrieve from memory the right responses at the right time, to solve problems in both new and old settings, and overall become a more effective decision maker in the field of play. Research in the gaze behaviour program plays a major role in decision training, as it provides valuable insights into how elite athlete control their focus and make decisions, that can be shared with others in the training context.

### **PEER REVIEWED ARTICLES**

1. Vickers, J. N., Reeves, M. A., Chambers, K. L. & Martell, S. T. (in press). Decision Training: Cognitive Strategies For Enhancing Performance. *Skill Acquisition in Sport: Research, Theory and Practice*. (Ed) Williams, A. M., Hodges, N. J., Scott, M. J., & Court, M. L. J. London: Routledge.
2. Brown, L. & Vickers, J. N. (in press). Temporal judgements, hemispheric equivalence, and inter-hemispheric transfer in adolescents with attention deficit hyperactivity disorder. *Experimental Brain Research*

3. Patla, A. & Vickers, J. (2003). How far ahead do we look when required to step on specific locations in the travel path during locomotion? *Experimental Brain Research*, 148: 133-138
4. Rodrigues, S. T., Vickers, J. N. and Williams, A. M. (2002). Head, eye and arm coordination in table tennis: An exploratory study. *Journal of Sport Sciences*, 20, 3, 171-186.
5. Vickers, J. N., Rodrigues, S. T. and Brown, L. N. (2002). Gaze pursuit and arm control of adolescent males diagnosed with attention deficit hyperactivity disorder (ADHD) as compared to normal controls: Evidence of dissociation in processing short and long-duration visual information. *Journal of Sport Sciences*. 20, 3, 201-216.
6. Holland, M.A., Patla, A. E. & Vickers, J. N. (2002). "Look where you are going! Gaze behaviour associated with maintaining and changing direction. *Experimental Brain Research*, 143: 221-230.
7. Williams, A. M., Vickers J. N. & Rodrigues, S. T. (2002). The effects of anxiety on visual search, movement kinematics, and performance in table tennis: A test of Eysenck and Calvo's processing efficiency theory, 24, 4, 438-456.
8. Harle, S. & Vickers, J. N. (2001). Training quiet eye (QE) improves accuracy in the basketball free throw. *The Sport Psychologist*, 15, 289-305.
9. Vickers, J. N., Rodrigues, S. T. & Edworthy, G. (2000). Quiet eye and accuracy in the dart throw. *International Journal of Sports Vision*, 6, 30-36
10. Vickers, J. N., Livingston, L., Umeris S. & Holden, D. (1999). Decision Training: The effects of complex instruction, variable practice and reduced delayed feedback on the acquisition and transfer of a complex motor skill. *Journal of Sport Sciences*. 17, 357-367.
11. Ota, D. & J. N. Vickers, J. (1999). The effects of variable practice on the retention and transfer of two volleyball skills in male club-level athletes. *International Journal of Volleyball Research*. 1, 1, 18 – 24
12. Patla, A. & J. N. Vickers (1997). When and where do we look as we approach and step over an obstacle in the travel path. *NeuroReport*. Vol 8, No 17, 3661-3665.
13. Vickers, J. N. & Adolphe, R. A. (1997). Gaze behaviour during a ball tracking and aiming skill. *International Journal of Sports Vision*. 4, 1, 18-27.
14. Adolphe R., Vickers, J. N. & LaPlante, G. (1997). The effects of training visual attention on gaze behaviour and accuracy: A pilot study. *International Journal of Sports Vision*. 4, 1, 28-33.
15. Vickers, J. N. (1996). Visual control when aiming at a far target. *Journal of Experimental Psychology: Human Perception and Performance*. 2, 22, 342-354
16. Vickers, J. N. (1996). Control of visual attention during the basketball free throw. *American Journal of Sports Medicine*. November. Supplement. 3,1, 93-97.
17. Vickers, J. N. (1996). Location of fixation, landing position of the ball and accuracy during the free throw. *International Journal of Sports Vision*, 3,1, 54-60.
18. Vickers, J. N. (1995). A methodology for coupling gaze in action. In B. Bardy, R. Bootsma & Y. Guaird (Eds). *Studies in Perception and Action III*. Hove & London: Lawrence Erlbaum, 367-370.
19. Vickers, J. N. (1995). Gaze control in basketball foul shooting. In J. Findlay, R. Kentridge & R. Walker (Ed). 528-541. *Eye Movements, Processes, Mechanisms and Applications*. Amsterdam: Elsevier Science.
20. Emes, C., Vickers, J. N. & Livingston, L. (1994). Gaze control of children with high versus low motor proficiency. *Adapted Physical Activity*. Tokyo: Springer-Verlag. 147-154.
21. Vickers, J. N. (1994). Psychological research in sports pedagogy: Exploring the reversal effect. *Sport Sciences Review Journal*. 3 (1), 28-40.

22. Vickers, J. N. (1994). The reversal effect. In A. Jewett, L. Bain & C. Ennis (Ed). *The Curriculum Process in Physical Education*. 348-353. Madison, Wisconsin: Brown & Benchmark.
23. Vickers, J. N. (1993). Toward defining the role of gaze control in complex targeting skills. In D. Brogan, A. Gale & K. Carr (Ed). *Visual Search 2*, 265-286. Bristol, Taylor & Francis.
24. Vickers, J. N. (1993). While Rome Burns: Meeting the challenge of the new reform movement in education. In Ed. J. Rink. *Critical Crossroads*. National Association for Sport and Physical Education, Reston, VA. 47-59.
25. Vickers, J. N. (1992). Gaze control in putting. *Perception*. 21. 117-132.
26. Livingston, L., Sandals, L. & J. N. Vickers. (1992). Monitoring the effect of color on performance in an instructional gaming environment via the analysis of eye movement behavior. *Journal of Research on Computing in Education*. 25, 27-45.
27. Vickers, J. (1992). While Rome burns. Meeting the challenge of the reform movement in education. *Journal of Physical Education, Recreation and Dance*. September, 80-87
28. Vickers, J. (1990). *Instructional Design for Teaching Physical Activity: A Knowledge Structures Approach*. Human Kinetics, Champaign, IL
29. Vickers, J. (1988). Knowledge structures of elite-novice gymnasts. *Journal of Human Movement Science*. 7, 4 - 72. North Holland: Elsevier Science.
30. Lashuk, M. & Vickers, J. (1988). The role of objectives in planning physical education programs. *International Journal of Physical Education*. March-April, 8-11
31. Gaines, B. & Vickers, J. (1988). Design considerations for hypermedia systems. *Microcomputers or Information Management* 5 (1): 1-27.
32. Vickers, J. & Gaines, B. (1988). A comparison of books and hypermedia for knowledge-based sports coaching. *Microcomputers for Information Management* 5 (1): 29-44.
33. Vickers, J. (1987). The role of subject matter in teacher preparation programs in physical education, *Quest*, 39, 174-178.
34. Vickers, J. (1986). The resequencing task: Determining expert-novice differences in the organization of a movement sequence. *Research Quarterly for Exercise and Sport*, 57, No. 3, 260-264.
35. Branda, A. & J. Vickers (1984). The implementation of the Canadian gymnastics development program by direct and indirect teaching methodologies, *CAHPER Journal*, May-June, 50, 5, 21-25.
36. Vickers, J. (1983). The role of expert knowledge structures in an instructional design model for physical education. *Journal of Teaching in Physical Education*, 2, (3), 17-32.
37. Vickers, J. & G. Sinclair (1984) The physical education teaching laboratory: An on-campus theory to practice interface. *Journal of Physical Education, Recreation and Dance*, October, 16-18.
38. Vickers, J. (1980) Amenorrhea, *Coaching Review*, 3, No. 16, 32-36.
39. Vickers, J., M. Lashuk & T. Taerum (1980). Differences in attitude toward the concepts male, female, male athlete, female athlete. *Research Quarterly for Exercise and Sport*, 51, 2, 407-416.

#### **In PROGRESS**

40. Vickers, J. N. (in progress). *Decision Training In Sport*. Champaign, IL., Human Kinetics Publishers.

#### **RECENT REFEREED ABSTRACTS AND PROCEEDINGS**

41. Vickers, J. N. , Rodrigues, S. T. & Edworthy, G. (1999). Quiet eye and accuracy in the dart throw. [Abstract]. Abstracts of the International Society of Biomechanics. X011, 819

42. Vickers J, Patla AE (1999). Object and travel gaze fixation during successful and unsuccessful stepping stone task. *Gait & Posture* 9(1): S3.
43. Hatfield, B. D., Hillman, C. H. & Apparies, R. & J. Vickers J. (1999). Expert performance states: psychophysiological perspectives in efficiency. [Abstract]. *Journal of Exercise and Sport Psychology*, 21, 55
44. Vickers, J, Williams, A. M. Rodrigues, S. T. Hillis, F. and Coyne, G. (1999) Eye movements of elite biathlon shooters during rested and fatigued states. [Abstract]. *Journal of Exercise and Sport Psychology*, 21, 116
45. Rodrigues, S. T., Vickers, J. N. & Williams, A. M. (1999). Two visual systems under temporal pressure in 3-d table tennis. *Journal of Exercise and Sport Psychology*, 21, 91
46. Vickers, J. N. and Patla, A. E. (1999). Object and Travel Gaze Fixation During Successful and Unsuccessful Stepping , *Gait & Posture* 9(1): S3
47. Vickers, J. N. (1998). A Hidden World Revealed: Direct measurement of the visual control of elite motor performers. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 49
48. Vickers, J. N. (1998). Vision-in-action (VIA): Direct measurement of eye movements, motor behaviour and ocular function of the moving subject [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 29
49. Vickers, Joan (1998). Decision training: A new approach to motor skills training that incorporates complex initial instruction, random variable practice and reduced delayed feedback. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 86
50. Rodrigues, S.T., Vickers, J. N. (1998). Eye-Hand Coordination in Table Tennis: Preliminary results. University of Calgary. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement* p. 91
51. Morey, R. S., Vickers, J.N. (1998). The use of the internet to enhance motor skill instruction. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 91
52. Ota, D., J. N. Vickers, J. (1998). The effects of variable practice on the retention and transfer of two volleyball skills in male club-level athletes. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 132
53. Vickers, J. N. & Adolphe, R. A. (1998) Ball tracking gaze behaviour of elite volleyball players during the serve reception and pass. [Abstract]. *Journal of Exercise and Sport Psychology: Supplement*. p. 119
54. Gaines, B. & Vickers, J. (1988). Hypermedia design. Proceedings of RIAO'88 Conference on User-oriented Content-based Text and Image Handling, 14-23, Boston.

#### **NON-REFEREED BOOKS, ARTICLES, PRESENTATIONS**

55. Vickers, J. N. (2004). *The quiet eye: it's the difference between a good putter and a poor one, here's proof*. GolfDigest, January, 96-ff.
56. Alda A. & Vickers, J. N. (March 19, 2002). On the Ball, A Quiet Eye. Television Broadcast, PBS Scientific American Frontiers, <http://www.pbs.org/saf/>,
57. Vickers, J. N. (2000). Decision Training: A New Approach in Coaching, Vancouver: *Coaching Association of British Columbia*.
58. Vickers, J. N. (2000). Motor behaviour, control and learning. *Vade Mecum*. 97-104, *International Council of Sport Science and Physical Education*, Berlin.
59. Vickers, J. N. (2000). Quiet eye in sport. *Dragon Fly: A Magazine For Young Investigators*. Arlington, VA: National Science Teachers Association, 2, 6 - 8
60. Vickers, J. N. (1999). Decision training: A new coaching tool. *Insight: The FA Coaches Association Journal*. 4, 2, 18-20. Hertfordshire, UK: The Football Association.
61. Vickers, J. N. (1996). Eye movements of accurate and inaccurate basketball free throwers. *Sports Vision*. 12, 1, 12 - 14.

62. Vickers, J. N., Bales, J., Allison, T., Jensen, M., Cluff, M. & Bowman L. (1996) Decision Training In Free Style Skiing. *National Coaching Institute: Calgary.*
63. Vickers, J. N., Bales, J., Davidson, M., Curry, J., Johnson, M. & Rennie T. (1996). Decision Training In Ice Hockey, *National Coaching Institute: Calgary.*
64. Vickers, J. N., Bales, J., Pike, R., Dolan, C., Lemieux, C. & Ryan G. (1996). Decision Training In Volleyball. *National Coaching Institute: Calgary.*
65. Vickers, J. (1991). Look and Launch. *GOLF Magazine*. October, 1991

#### **SELECTED ACADEMIC PRESENTATIONS**

66. Martell, S. T. & Vickers, J. N. (2002, October). *Quiet eye as an indicator of decision making in ice hockey*. Presentation at the Canadian Society for Psychomotor Learning and Sport Psychology, Vancouver, Canada.
67. Vickers, J. N. & Crews, D. (2002). Short-term memory characteristics of golfers: Findings from concurrent measurement of gaze and EEG research. Invited Presentation, *World Congress in Sport Science in Golf*, St Andrews, Scotland. July, 2002.
68. Vickers, J. N. (2002). Quiet eye in golf putting. Invited presentation to the *World Congress in Sport Science in Golf*, St Andrews, Scotland.
69. Vickers, J. N. (2002). Invited Speaker. Decision Training: A New Approach In Coaching, University of the Victoria, BC, International Coaching School. August 2001
70. McPherson, S. L. & Vickers, J. N. (2002). Problem representations of Olympic volleyball players during serve reception and set situations. 2002 *AAHPERD National Convention and Exposition*. San Diego, CA (April 9-13, 2002)
71. Vickers, J. N. (2001). Invited Speaker. Future of Golf Conference, University of Arizona.
72. Vickers, J. N. (2001). Invited Speaker. Decision Training: A New Approach In Coaching, University of the Victoria, BC, International Coaching School.
73. Vickers, J. N. & Patla, A. (1999). Object and travel gaze fixation during successful and unsuccessful stepping., 14th Symposium of the International Society for Posture Gait Research. University of Waterloo.
74. Vickers, J (1999). Eye movements of elite biathlon shooters during rested and fatigued states. North American Society Of The Psychology Of Sport And Physical Activity (NASPSPA). Clearwater, Florida.