

## From Wall Street to expertise development

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### Journal of Sport and Exercise Psychology

DOI:

[10.1123/jsep.2018-0169](https://doi.org/10.1123/jsep.2018-0169)

Published: 31/08/2018

Peer reviewed version

[Cyswllt i'r cyhoeddiad / Link to publication](#)

*Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):*

Lawrence, G., Jones, B., & Hardy, L. (2018). From Wall Street to expertise development: Predicting the rise and demise of talent investment by using machine learning to identify 'game changers'. In *Journal of Sport and Exercise Psychology: SUPPLEMENT: North American Society for the Psychology of Sport and Physical Activity* (s1 ed., Vol. 40, pp. S30) <https://doi.org/10.1123/jsep.2018-0169>

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**Title:** From Wall Street to expertise development: Predicting the rise and demise of talent investment by using machine learning to identify 'game-changers'

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Previous research exploring the development of expertise has typically adopted linear methods to identify precursors of expertise. These methods involve assessing statistical differences between groups of isolated variables by way of attaching importance to variables, e.g. deliberate practice hours and expertise level (Ericsson, Krampe & Tesch-Römer, 1993). However, confining the dynamic nature of expertise development to linear investigations alone is overly simplistic, and thus insufficient in identifying true precursors of expertise. Therefore, to better understand the multidimensional and dynamic nature and of expertise development, we used (non-linear) pattern recognition analyses on a set of 93 features obtained from a sample of 13 sub-elite and 15 elite (international) cricket spin bowlers. Our study revealed that 12 developmental features discriminated between the elite and sub-elite groups, with very good accuracy. The 12 features provide a holistic, multi-faceted development profile that is discussed in line with four major theoretical areas of development: Early Development; Pathway Milestones; Domain-specific Activity; Pathway Performance Indicators. Importantly, the discriminant validity of this new model was demonstrated by its ability to correctly classify data obtained from five unseen spin bowlers with 100% accuracy, thereby adding to its generalisability, and both theoretical and applied value.