ELSEVIER

Psychology of Sport and Exercise 9 (2008) 760–774

Psychology
OF SPORT AND EXERCISE

www.elsevier.com/locate/psychsport

Nonlinear judgment analysis: Comparing policy use by those who draft and those who coach

Michael E. Young

Department of Psychology, Southern Illinois University, Carbondale, IL 62901-6502, USA

Received 22 August 2007; received in revised form 13 November 2007; accepted 9 December 2007
Available online 23 December 2007

Abstract

Objectives: In the NBA draft, talent potential is assessed by a group of evaluators (e.g., coaches, personnel directors, general managers) who determine the order in which players are drafted, and talent actualization is assessed by a second group of evaluators (coaches) who determine how much time players spend on the court. This study examines the cue use by these two groups and considers the utility of a nonlinear assessment technique.
Method: The implicit policies used by talent evaluators were examined using both linear regression and nonlinear backpropagation.
Results: Although both groups heavily value scoring, discrepancies were observed among the other characteristics. The use of a nonlinear technique produced better cross-validated fits than linear regression, but the rank ordering of cue importance produced by both models was generally similar.
Conclusions: Players favored by draft personnel primarily become scorers whereas coaches value a wider range of skills. The nonlinear approach better captured the policies of groups of evaluators and should be used to assess potential incongruities among judges of talent.

Keywords: Basketball; Neural networks; Evaluation; Sport psychology

Introduction

Basketball fans frequently debate a number of issues that require the exercise of judgment: Who is the best player in the National Basketball Association (NBA), which player should be picked first (second, third, etc.) in the annual draft, and which team got the better end of the deal in a trade involving two or more teams? Methods of evaluating players abound, both for those already in the NBA and players who are being considered for the annual NBA draft.

A cadre of basketball professionals are involved in the evaluation of high school, college, and foreign players for the annual NBA draft. NBA scouts, coaches, general managers, and player personnel directors all have the opportunity to observe at least some of the players being considered for their team. Each judge may focus on different factors to determine their evaluation. A coach might want someone who can fill his need for

E-mail address: meyoung@siu.edu

1469-0292/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.psychsport.2007.12.004

a pass-first point guard to improve the flow of his preferred style of offense. A general manager could desire a player who will help sell tickets for the upcoming season. A personnel director might be most interested in a player's potential rather than his ability to contribute in his rookie season.

Unfortunately, the evaluation of NBA potential faces many obstacles. Collegiates under serious consideration often include those with only 1 year of college experience with the requisite difficulties of a small sample size, and they also vary in the quality of the conference in which their team plays. The evaluation problem is further exacerbated by the inclusion of players without North American college experience (high school seniors and foreign nationals) who often play by somewhat different rules (e.g., the required distance for a three-point shot or the width of the lane) and against weaker competition.

Given the natural barriers to evaluating NBA potential, I was interested in a different set of questions involving a comparison of the characteristics used by those who draft the players and those who utilize the players drafted (the coaches). This approach prompted three sets of questions. First, is there a better method of evaluating the overall quality of current NBA players by using characteristics associated with playing time (cf. Berri, 1999; Berri, Schmidt, & Brook, 2006; Camerer & Weber, 1999; Staw & Hoang, 1995)? Second, what types of players are preferred by those who do the drafting (i.e., what types of NBA players do high draft picks become?) and are these the types of players that receive a lot of playing time on NBA teams? Third, what is the differential utility of a nonlinear method of answering these questions when compared to a linear method (multiple regression)?

Identifying judgment policies

The assessment of cue utilization in the description of a judgment policy most commonly relies on multiple regression. This method is ideal when the observed relationships are linear, interactions between cues are absent, and the cues are (at most) weakly correlated. When the relationships are more complex, however, more complex analyses may be required. For example, Cooksey (1996) described the addition of quadratic terms to the multiple regression model to capture nonlinear relationships (also see, Hammond, Stewart, Brehmer, & Steinmann, 1975), and Brannick and Brannick (1989) added a scatter term as an additional regression predictor to determine if interactions were present. These approaches are targeted at detecting particular types of nonlinearities (quadratic, logarithmic, or multiplicative) and thus can miss the presence of other types of nonlinear relationships. The consideration of interactions complicates the modeling of judgment strategies (e.g., with five cues, there are 10 two-way interactions, 10 three-way interactions, five four-way interactions, and one five-way interaction), and multicollinearity makes it difficult to assess the independent contribution of each cue.

An alternative method of analyzing judgment policies that involve nonlinear relationships and interactions is to use a universal function approximator and to constrain the model's flexibility using cross-validation. Some neural network algorithms provide such a tool, but their use introduces new challenges to assessing cue utilization and validity. In order to evaluate their usefulness as the basis for modeling nonlinear judgment strategies, I developed linear regression models and neural network models of the judgment of basketball talent and investigated a method of assessing the contribution of a cue for each type of model.

Using these models of judgment policies, I compared the future characteristics of players preferred in the draft and the actual characteristics preferred by those who utilize the players drafted (the coaches). I was interested in one general judgment question, how similar is the coaches' policy to the draft personnel's policy, and a specific methodological question, what is the differential utility of nonlinear and linear methods of answering this question?

Earlier attempts to determine perceived player value have relied on coaches' picks for the All-Rookie Team (Berri & Schmidt, 2002) or player salaries (reviewed in Berri, Brook, & Schmidt, 2007). These studies reveal an almost exclusive reliance on a single cue—points scored. This type of single-cue decision making is prevalent in human judgment (e.g., the "take the best" heuristic, Gigerenzer & Goldstein, 1996; Gigerenzer & Todd, 1999) and may have utility in describing sports judgments (Bennis & Pachur, 2006).

Although a single cue, scoring, has an inordinate effect on All-Rookie Team voting and salaries, a coach making game-time decisions about who to play cannot rely on a single statistical category. Various player roles must be filled to have a functioning team. Although scoring is critical to success, so is ball handling (e.g.,