



Predicting success in the National Basketball Association: Stability & potential



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ABSTRACT

Objectives: To create a more rigorous model of early career success among players in the National Basketball Association (NBA) using growth mixture models. To test the extent to which NBA careers can be predicted by variables that represent past performance and variables that might represent untapped potential.

Design: Archival data was collected from measures taken at the pre-draft NBA combine and publicly available data on college and NBA performance.

Method: The first three years of players' NBA careers from 2001 to 2006 draft classes were analyzed using a growth mixture model with collected variables predicting latent class. The estimated parameters were then used to forecast the 2007 to 2010 draft classes. Draft order was also predicted with the same variables.

Results: NBA player skill formed 3 latent classes of players; only one class performed well in the NBA. Membership in the strongest class was only predicted by age, quality of college program, and players' college performance. Latent class probabilities predicted NBA career trajectory slightly better than draft order in both the estimation model and in the forecast model. NBA draft order was predicted by the same variables as well as arm span and agility.

Conclusions: None of the variables analyzed supported an "untapped potential" hypothesis. There is clear evidence for roles of training environment and the stability of skill. The data is consistent with views of deliberate practice and skill acquisition and appears to be consistent with data showing the benefits of being identified as talented, such as the Matthew effect.

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In professional team sports, where a large amount of money is at stake, identifying players who are the most likely to contribute to a team's future success is important. This is particularly true during the transition to a higher level of competition such as from college to professional sports. During this time, the competition improves and scouts and general managers attempt to use information about players' past performance and attempt to measure their future potential. There is a high financial incentive for teams to identify players with the potential for success beyond what is indicated by their past performance (Berri & Schmidt, 2006). The focus of this paper is to examine factors that are most likely to contribute to early career success among professional players in the National Basketball Association (NBA) and to better understand the factors available on draft day that significantly predict players' future performance.

Before and during the draft, teams' primary objective is to identify players who will perform at a high level and make immediate contributions. Selecting the right player in a draft can increase the value of a franchise by millions of dollars (Hausman & Leonard, 1997). The opportunity to make an early draft choice is so valuable that NBA teams appear to reduce their effort to win games once they have been eliminated from the playoffs, thereby improving their probable draft position (Walters & Williams, 2012).

During the draft process, teams' general managers, coaches, and scouts examine many variables. Chief among these variables is players' previous performance. Teams are particularly interested in players who have distinguished themselves at lower levels of competition such as high school, college, club, semi-professional, or other professional leagues. In addition to this obvious marker of skill, there are other factors that are taken seriously such as players' height, arm span, vertical leap, hand size, and agility. To develop clear hypotheses about which factors are most predictive of future performance, it is important to understand general observations about how skill develops across domains.

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Searching for talent

When studying skill, and particularly when forecasting changes in skill, terms are often theoretically loaded. For example, talent can be viewed as one's current level of skill or, perhaps, how skilled one could be given optimal training conditions. Within the context of this paper we will define "talent" as a player's potential ceiling of performance. More specifically, we will not define talent by previous performance alone. It is worth noting that talent accounts also argue that talent may not represent different ceilings of performance but rather the ability to learn more quickly, or some combination of the two. For the sake of simplicity, we will simply define talent as different ceilings of performance.

Prior to the NBA draft, talent should have partly manifested itself through previous performance (e.g. there is no evidence to our knowledge of players with no previous basketball experience being drafted). Therefore, we will use "untapped potential" to refer to the idea that two equally skilled individuals, could be different distances from the limits of their talent. When scouts are examining players for the NBA draft, they are attempting to not only identify those with proven performance but also players with greater untapped potential. We will use the term "skill" to refer to a player's current level of performance. In sum, talent can be conceptualized as containing two components, current skill level plus untapped potential. With this conceptualization, scouts and managers in the NBA look to identify individual differences in talent (value) by taking into account current skill levels and identifying factors that they believe are representative of untapped potential.

Each year NBA teams are looking for untapped potential when they discuss their draft pick. The term "upside" is often used to refer to a player's ceiling and is used commonly to defend decisions. For example, when discussing the surprising number one draft pick of Anthony Bennett in 2013, Cleveland Coach Mike Brown stated, "He's got long arms ... he has a lot of upside" (Finnan, 2013). Even when discussing 2012 number one draft pick Anthony Davis who, as a freshman, was the consensus player of the year, helped lead his team to the national championship, and lead the NCAA in win shares, Hornets General Manager Dell Demps noted, "his offensive upside is great" (Associated Press, 2012).

One of the complications of research on superior performance is that it is difficult to partial out talent from various environmental influences. For example, several studies have demonstrated the "season-of-birth effect" or "relative age effect" which shows that individuals are born before the age cut-off in their selected sports are more likely to reach professional levels, ostensibly because they happen to be older and therefore more physically and cognitively developed, on average, than others in their cohorts. Coaches identify these players as being more talented and offer them more opportunities to improve their skill. This effect has been identified in hockey, soccer, baseball, gymnastics, and other sports (see Musch & Grondin, 2001 for a review). Athletes identified as talented also tend to have access to the best coaches and trainers, as well as parents or guardians who are committed financially and personally to their success (Bloom, 1985). Similarly, Merton (1968) summarized a wide body of evidence demonstrating Matthew effects such that, even unearned, opportunities and positions could generate lasting benefits to a person's professional success.

One of the clearest sources of skill is deliberate practice within the domain. Studies have consistently found that world-class performers engage in massive amounts of practice in many cases these individuals practice 4–5 h every day for several years (Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005; Ericsson, Krampe, & Tesch-Römer, 1993). In studies across domains, between 40 and 60% of the variance in skill could be explained by deliberate practice history (Charness et al., 2005; Ericsson et al.,

1993). When identifying skill, one must primarily look to the amount of practice and its associated competitive outcomes to pinpoint those individuals who are most likely to excel.

Finally, the idea that there are individual differences in the limits of skill acquisition has been popular in the academic and sports literature, at least since Sir Francis Galton performed the first systematic studies investigating such possibilities. By examining families of eminent individuals and measuring simple characteristics such as reaction time, Galton concluded that those who were particularly talented could achieve much higher levels of performance than their less talented counterparts (Galton, 1869/1979). The idea of this potential based on measurable basic abilities persists to this day, and seems to guide many of the decisions made by NBA teams when drafting players.

Based on this information, scouts may either rely on previous performance, which we will argue is consistently related to future performance given reasonable temporal proximity, or on perceived untapped potential; factors that are assumed to uniquely relate to their ability to adapt and prosper at the next level of competition. For scouts, it is important to note that a variable is only interesting if it is systematic and predictable by an observable metric. Fig. 1 shows a theoretical model that we believe guides researchers and general managers when forecasting NBA talent. Ericsson et al. 1993 showed that skill progresses through a series of power functions with plateaus giving way to increases in performance at transitional periods. Deliberate practice accounts propose that the individual differences in improvement rates after transitions are primarily due to practice activities and access to improved training resources. Untapped potential accounts would attribute at least part of any discovered individual differences in improvement rates to athletic characteristics of the type measured during the combine.

Stability of performance

The development of reliably superior skill takes place across years or even decades of gradual improvement (Ericsson et al., 1993). When skill is plotted against time it is clear that there are dramatic early increases over a relatively short amount of time, but as skill increases the gains become more and more slight. Therefore, when examining high-level players, performance at any two temporally close events should be highly correlated.

Chess gives us one of the clearest examples of this type of improvement. Chess is particularly attractive to skill researchers

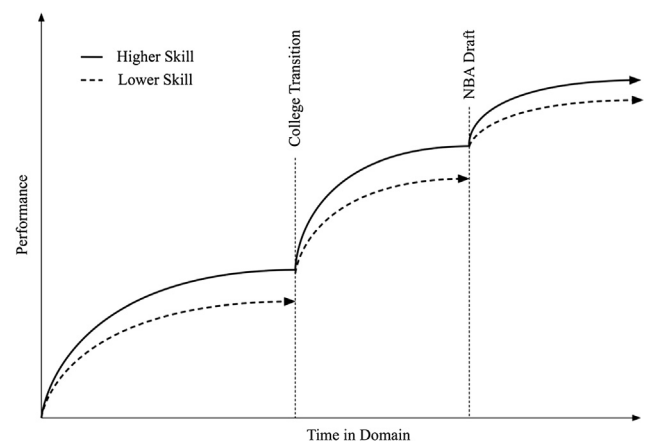


Fig. 1. Shows the trajectories of a group of hypothetical players. Only higher skilled players make transitions from one level of play to the next, at which point, the individual differences among them determine value to the team. According to the "untapped potential" hypothesis, part of the differences in skill at each level can be accounted for by athletic variables measured at the combine.

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