Evaluating Syngeries Between Sports Info Solutions and Athletic Intelligence Quotient

Introduction

Sports Info Solutions (SIS) has been collecting data back to 2010 that brings objectivity to previously quantifiable elements of the game of basketball allowing for more detailed evaluation of NBA Draft Prospects. Similarly, the Athletic Intelligence Quotient (AIQ) has been providing unique insights into players' cognitive abilities to professional sports teams since 2012. With both groups looking to bring clarity to difficult to assess aspects of basketball, we believe there are obvious synergies with the data we have each collected. To demonstrate the potential value of both datasets, we explored the relationship between the two.

Data

Between the 793 players that have taken the AIQ assessment since 2011 and the 789 players that have been evaluated by SIS, there was an overlap of 318 players spanning across 12 NBA Drafts. The highest concentration is in more recent drafts, but we chose to keep all players to preserve the sample size. Within this sample we zeroed in on two categories of particular importance - Position and Draft Range (Lottery, Late First Round, and Second Round).

Draft	Count		Draft	Count		Position	Count	Draft Group	Count
2022	79		2016	20		Ball-Handler	99	Lottery	68
2021	58		2015	15		Big	82	Late First	83
2020	39		2014	4		Wing	137	Second or Undrafted	167
2019	34		2013	3					
2018	35		2012	2					
2017	28		2011	1					

We can see above that have a relatively even split among positions and the expected distribution of each Draft Group given the number of selections in each of those groups.

We removed 2 players with incomplete AIQ data, and we evaluated the remaining sample for both univariate and multivariate outliers, and we removed the one datapoint that tested as a multivariate outlier, and Winzorized the remaining univariate outliers to be capped at 2.5 standard deviations above/below the mean.

Analysis

In evaluating the relationship between these two datasets, we first tested for significant correlations between the composite metrics from both datasets, select Skills and Subskills from SIS and the 4 validated Cattell-Horn-Carroll cognitive abilities listed in the tables below.

SIS Skills & Subskills	AIQ Factors
Advanced Passing	Visual Spatial Processing
Basketball IQ	Reaction Time
Cutting Relocating	Decision Making
Defensive IQ	Learning Efficiency
Off Ball Engagement	
Off Ball Def Playmaking Instincts	
Passing	
Passing Influence	
Shot Selection	
Off Ball Defense	
Off Ball Def Weakside Contests	

We tested all possible relationships and found a number of significant correlations. We looked at each relationship on it's own and also while controlling for draft pick. Additionally, we looked for significant relationships within positional groups and draft groups. We'll review the results with respect to each AIQ factor below.

Visual Spatial Processing

Visual Spatial Processing had the most significant relationships within the population, correlating with Off Ball Weakside Contests, Off Ball Defense, and Shot Selection. The largest correlation was with Weakside Contests ($r=0.176$, $p=0.002$) followed by Off Ball Defense ($r=0.152$, $p=0.007$) and Shot Selection ($r=0.151$, $p=0.007$). Off ball defense relationships were even stronger among second round picks and undrafted players with Off Ball Defense ($r=0.194$, $p=0.012$) and Off Ball Defensive Playmaking Instincts ($r=0.186$, $p=0.016$). Thus

it appears that players with lesser physical gifts may rely more heavily on their visual spatial processing to be successful in managing their off ball defensive responsibilities. Surprisingly, there was a significant negative correlation between Visual Spatial Processing and Passing Skill ($r=-0.112$, $p=0.013$), which does not line up with natural intuition but this could be the by-product of positional tendencies.

Reaction Time

Among all of the AIQ Factors, Reaction Time had the fewest number of significant relationships with SIS Skills and Subskills. There were no significant relationships across the population, but within the group of Bigs, there was a positive relationship with the Cutting and Relocation subskill ($r=0.282$, $p=0.010$) This demonstrates that among Bigs, their reaction time can be indicative of their ability to take advantage of cutting opportunities on the offensive end.

Decision Making

Among the population, Decision Making had a significant relationship with Cutting and Relocation ($r=0.152$, $p=0.007$), which aligns with idea that a cut or relocation requires a player to be decisive and intentional with their movement to improve their team's chances of scoring. However, it had many more significant relationships within the subgroups. Within the group of Ball Handlers, it had a significant relationship with Advanced Passing Subskill ($r=0.205$, $p=0.042$) and Shot Selection ($r=0.210$, $p=0.044$). Among Bigs, decision making was significantly correlated with Cutting and Relocation ($r=0.295$, $p=0.007$), Passing ($r=0.244$, $p=0.027$), and Shot Selection ($r=0.308$, $p=0.005$). The relationship between decision making and shot selection is one that matches up well with intuition, and seeing the relationship with passing components and Decision Making is reassuring against the negative correlation with Visual Spatial Processing. In general, these findings also line up with findings from current AIQ research, which indicates that decision making was significantly correlated with passing efficiency, among other NBA metrics.

Learning Efficiency

Learning Efficiency has a significant relationship with Cutting and Relocation ($r=0..114$, $p=0.044$) as well as Off Ball Engagement ($r=0.119$, $p=0.014$). Learning Efficiency also showed 4 significant relationships within the Second Round group with SIS Skills and Subskills - Basketball IQ ($r=0.160$, $p=0.039$), Defensive IQ ($r=0.159$, $p=0.040$), Off Ball Defense ($r=0.155$, $p=0.045$), and Off Ball Engagement ($r=0.157$, $p=0.025$). As mentioned above, it may be that players with lesser physical talents also use their learning/recal of game strategy, technique, etc. to achieve success. The number of relationships here highlight the potential value of AIQ for evaluating the ability of Second Round and Undrafted players. This can be a valuable asset for teams as they attempt to build their team through the draft.

Summary

Overall, we found significant relationships between the 4 AIQ Factors and a number of SIS Skills and Subskills. The number of relationships, even though the magnitudes of the correlations were small, highlights the value the data can bring. SIS has been proven to provide insight into some of the critical details of draft prospects' basketball ability that are not captured by standard performance statistics alone. Similarly, AIQ's unique measurement of cognitive abilities has now been shown to correlate with both traditional performance stats (e.g. PER) as well as the new wave of NBA metrics capture by SIS. Ultimately, even minor advances in the understanding of basketball performance are important. Through our analyses, we have shown a small, but significant piece of the equation. Having measures, such as these, that can assess competence across different areas of the game can be extremely valuable in making team-building decisions.