The MagicMetric Coaching System in the NBA

Overview
The MagicMetric is a basketball player rating system created by two math majors who shared coaching duties on several Industrial and Church league teams. It is an Acronym for the Mays And Gantner Index of Contribution (MAGIC), so named for its co creators, Dick Mays and Jeff Gantner.

Dick and Jeff created the rating system primarily to rate the players on their own basketball team. But as a player rating system, this measure can also be used to rank the players in any league. This paper provides a complete ranking of all the NBA players for the 2011-2012 season. The casual reader may wish to go straight to the appendix for this listing. The rest of the paper is intended for readers with an interest in coaching.

The Magic Metric Coaching Systems, (a.k.a.) *Rotation System*, is a simple way to decide on player substitutions. It predefines the rotations to be used during the game, based on the Magic Metric player ratings. Although the Rotation System and the Player Rating are two separate ideas, they were conceived at the same time. Technically, the rotation system could be used with a different player rating system.

This paper examines the feasibility of actually using the rotation system in the NBA.

Introduction
The topic of how to rate the performance of basketball players has been the subject of many papers and more than a little controversy. TENDEX, by David Herron may have been the first such rating system. TENDEX used a linear system of weights; however, Mr. Herron used a subjective evaluation for the relative contribution of each stat. Dick and Jeff initially tried to use TENDEX as a rating system, but felt that it didn't quite have the right weights associated with the coefficients. Being math majors, they did their own analysis of the problem, which led to the coefficients used in the Magic Metric.

A separate paper addresses how the MagicMetric is derived from solving a system of linear equations. As it turns out the most important factor is the expected "points per possession" to properly determining the coefficients. Using an average points per possession of 1, the coefficients are approximately:

MM =.65REB + .9AST +.8BLK + STL +1.8FG2 + 3FG3 +.9FT – TOV - .65FGM - .5FTM

FG2 = 2 point Field goals made
FG3 = 3 point Field goals made
FT = Free throws made
FGM = Field goals missed.
FTM = Free throws missed.

And the other stats are rebounds, assists, blocked shots, and turnovers.

The expectation of 1 point per possession is reasonable good as a statistical measure of NBA and college players. When measuring high school players .8 points per possession (ppp) may a better measure. Youth basketball might have .6 or .5 points as an expectation, and a young girls team might be down as low as .2 points per possession. This paper explains the derivation and gives the coefficients for different values of ppp.

http://www.upct.es/~beside/Textos/MagicMetric.pdf

Limitations

The Magic Metric does not measure every statistical form of contribution. In particular, there are several ways players contribute that are not measured statistically. A player might screen an opposing player from a retrieving a loose ball headed out of bounds, but may not get credited for the rebound. A player taking a charge or forcing a jump ball might not get credited with a steal. Coaches using the magic metric to determine player value may want to add these categories to the basic formula. Taking a charge should be valued at least as much as a steal as it results in a change of possession.

Even though the metric does not measure every stat, it is still an excellent tool to measure the relative value of players on the same team. The missing types of contribution are missing for every player so the stats typically kept for a basketball game are sufficient to judge the *relative player's effectiveness* on the court.

Ranking NBA Players

The magic metric has more valid sources of criticism when used as a tool to rank players on different teams. The game pace of one team might result in more possessions per minute than another team. As the contribution tends to be related to the number of possessions, a player on a fast paced team may have a slightly higher metric than if he played on a team that featured more of a half court offense.

But suppose we do want to use the magic metric to rank NBA players.   What is the more valuable information, the Magic Metric per game, or the Magic Metric per minute? As it turns out, both are important measurements.

For several years website magicmetric.com analyzed all NBA and player performances on a nightly basis. Without corporate sponsorship, the site was shut down after four years, but some interesting lessons were learned.   The average NBA player had a performance rating of about .37 per minute (MM/min). However an average regulation game had a Total Magic Metric of 97 so the average contribution of players on the court was just above .4 per minute. 48 minutes * 5 players * .4 = 96.

How can the average contribution per player on the court be above .4 when the average NBA player is .37 per minute? The answer is simple. The better players play more minutes so the average per minute on the court is higher.

As a general rule of thumb, any player with a rating of .4/minute is a better than average player. A rating of .5 per minute is a candidate for the All Star team, and a rating of .6 per minute is a superstar in the league.   The very rare player, e.g. Shaq in his prime, has a rating above .7 per minute, and achieving this rating is almost a lock for MVP.

These stats were gathered some dozen or so years ago, around 1998-2003. How well do they hold up today? In the 2010-2011 season, no player achieved a MM/minute rating of .7. In 2011-2012, Lebron James had a metric of .74, and justly won the MVP. This same season six other players had a rating per minute over .6

Player	MM/Min	MM/game
Kevin Love	0.66	25.8
Kevin Durant	0.66	25.7
Chris Paul	0.63	23.1
Tim Duncan	0.62	17.6
Dwayne Wade	0.61	20.7
Dwight Howard	0.61	23.3

Table 1.

All of the players listed in Table 1 are recognizable superstars. But where is Kobe Bryant? Is Tim Duncan really a better player than Kobe? Kobe has a .57/minute contribution but plays 38.7 minutes per game for an average game contribution of 22.2. Tim Duncan only plays 28.6 minutes a game for a 17.6 per game contribution.

Fatigue plays an issue as a player increases their minutes on the court. It is doubtful that Tim Duncan could still sustain a rating above .6 per minute if he had to play 38 minutes per game.

People wondered why Lebron James seemed to disappear in the fourth quarter in last year's playoffs against Dallas, but one only has to look at the box scores to see he was on the court 90+% of the minutes. During the regular season LeBron played 38 minutes per game. During the finals with the Mavericks he averaged ^%^&%^ this may not seem like a but when viewed from a "minutes of rest" perspective, 12 minutes of rest is three times higher than four minutes of rest. It is not surprising that LeBron did not perform as well playing 45 minutes per game as he did during the regular season playing 38 minutes per game.

The fact that a players per minute rating goes down as the minutes on the court goes up seems indisputable. But how much rest does a player need to perform at his best? Tim Duncan is currently playing 28 minutes a game but still has a superstar per minute rating. What would Kobe's metric be if he were to play less minutes? What is the optimal number of minutes on the court. We don't have exact answers for any of these interesting questions, but we will address the issue when discussing the rotation system.

To determine the NBA's best players, we decided to take into consideration both the total contribution per game as well as the contribution per minute.

Table 2 shows our rating of the 30 best NBA players for 2011-2012

rank	Player	MM/g	MM/min	Mprod	Hoopstat ranking
1	L. James	27.95417	0.739528	20.6729	1
2	K. Love	25.8	0.661538	17.06769	2
3	K. Durant	25.66667	0.661512	16.97881	3
4	C. Paul	23.11901	0.629946	14.56373	6
5	D. Howard	23.26019	0.607316	14.12627	4
6	K. Bryant	22.21	0.573902	12.74636	13
7	D. Wade	20.68983	0.612125	12.66477	14
8	B. Griffin	21.14156	0.584021	12.34711	7
9	A. Jefferson	20.45462	0.599842	12.26954	8
10	D. Rose	20.695	0.586261	12.13266	19
11	R. Westbrook	20.61933	0.582467	12.01008	16
12	J. Smith	20.47254	0.575071	11.77317	12
13	A. Bynum	20.44167	0.574204	11.73769	5
14	L. Aldridge	20.60091	0.567518	11.69139	10
15	D. Nowitzki	19.45682	0.575646	11.20023	22
16	D. Williams	19.91455	0.54861	10.92532	28
17	C. Anthony	19.44	0.560231	10.89088	26
18	T. Duncan	17.64015	0.616789	10.88024	25
19	D. Cousins	18.19063	0.596414	10.84914	21
20	P. Gasol	19.84545	0.53205	10.55877	9
21	K. Garnett	18.34167	0.571391	10.48027	15
22	D. Lee	19.64825	0.528179	10.37778	11
23	P. Millsap	18.35588	0.55793	10.24129	17
24	K. Irving	17.50784	0.574028	10.04999	42
25	T. Parker	18.01912	0.556146	10.02125	37
26	M. Gortat	17.72803	0.554001	9.821346	18
27	G. Monroe	17.5	0.555556	9.722222	24
28	P. Pierce	18.27192	0.526568	9.621412	30
29	R. Rondo	18.89922	0.502639	9.499481	23
30	S. Curry	16.31538	0.580619	9.473017	53

Table 2.

Our rating is based on Mprod, which is the Product of MM/game and MM/minute. This gives equal weight to both the per game Magic Metric, and the per minute rating. For comparison purposes, the ranking from hoopstats.com is included. The hoopstat.com rankings are based on a statistic called Player Efficiency.

The top three positions are the same under both rating systems. But the Magic Metric rating system has Kobe Bryant, Dwayne Wade, and Derrick Rose in the top ten in place of Andrew Bynum, Paul Gasol and LaMarcus Aldridge. From our subjective point of view, there Magic Metric ranks seem more accurate. Not many general managers would trade the first three of these players for the second three. The appendix provides a complete ranking for all the NBA players in the 2011-2012 season.

The MagicMetric Rotation System

As a player rating system, the Magic Metric appears to have substantial merit in determining relative contribution of players. How can a coach use this information for the betterment of his team? One way is as a private tool to analyze performance, and provide coaching tips to individual players. If the turnovers are too high, a player may be advised to avoid dribbling into double teams. Another way is to share the metric openly with players. Players are competitive, and seeing their metric may motivate them to improve their individual performance and result in better overall team play.

A third way of using the metric is more controversial. We can actually use the metric to determine player substitution patterns. The idea is to maximize the total average contribution on the court by playing players with higher metrics more minutes than players with lower metrics.

This flies in the face of conventional wisdom, in which players are assigned a position, Center, Forward, or Guard. The Magic Metric Rotation System predetermines the player substitution pattern without any consideration for the "position" of different players. A group of players is chosen for the court based only on a relative sum of their contributions and it is expected that this group will be able to find a way to play together.

The substitution pattern does not take into consideration which of the opponent's players are on the court, or the game situation. A lot of armchair coaching is based on perception of defensive "matchups," and the coach is expected be influenced by which of the opposing players are the court. One high school coach, who started to use the rotation system caved into public pressure and began starting his best five players because he couldn't politically survive with a coaching system that did not require him to make game time substitution decisions. Parents can be a harsh jury.

It is easy to list a lot of objections to this method of coaching a basketball game. But the fact is, over about eight seasons of play in church and industrial leagues, the rotation system seemed to work very well. Our examples will attempt to explain why this is so. Table 3 illustrates a sample Magic Metric rotation system.

		1st Half				2nd Half				
Player	height	20:00	14:00	10:00	6:00	20:00	14:00	10:00	6:00	Playing Time
Adam	6'5	x	x		x	x	x		x	32
Bruce	5'10	x		x	x	x		x	x	32
Carl	5'11		x	x	x		x	x	x	28
David	6'4		x	x		x	x		x	24
Eli	5'8	x			x			x	x	22
Frank	5'11	x		x		x		x		20
George	5'10		x		x		x	x		18
Howard	6'1		x	x		x				14
Isaiah	6'0	x					x			10

Table 3.

Each twenty minute is broken into four substitution intervals, with the time on the clock shown at the top. The players are seeded based on their magicmetric/minute rating. The talent level is relatively even until the last rotation.

The last rotation is the only one in which the five best players are on the court at the same time. This rotation has been dubbed "The Finishng Five." Many players are accustomed to some prestige being associated with the "Starting Five," but it is the Finishing Five that is has the highest glory using the Rotation System.

Genesis of the Rotation System
The original idea behind the rotation system was to simply divide playing time among players in an industrial league in a manner that was fair. The focus was on remaining competitive, but not necessarily field the strongest team. The main reason the best five players were scheduled to play together at the end of the game, was to allow for more playing time for the lower rated players in the event of a **blowout**. Table 4 illustrates the playing time if either team has a large lead before the final rotation.

		1st Half				2nd Half				
Player	height	20:00	14:00	10:00	6:00	20:00	14:00	10:00	6:00	Playing Time
Adam	6'5	X	X		X	X	X			26
Bruce	5'10	X		X	X	X		X		26
Carl	5'11		X	X	X		X	X		22
David	6'4		X	X		X	X			18
Eli	5'8	X			X			X	X	22
Frank	5'11	X		X		X		X	X	26
George	5'10		X		X		X	X	X	24
Howard	6'1		X	X		X			X	20
Isaiah	6'0	X					X		X	16

Table 4. (blowout)

The rotation system was designed to remove griping about playing time. All players were objectively measured and given playing time based on performance. In a blowout, the playing time is fairly evenly divided between all the players.

The first season we used the rotation system, it was an immediate success. As expected, the rotation system almost completely eliminated any complaints over playing time. But counter to intuition, the team's winning percentage also improved remarkably.

Since we were playing our best players more minutes before we started using the rotation, our intuition was that we might not do as well as a team. However, we went from a team winning 30% of its games to a team winning 60% of its games. Why did this happen? There are many reasons for this improvement. Some are speculation some are supported with hard data. A paper seeking to explain the reasons for the success of the rotation system in recreational leagues can be found here:

http://www.upct.es/~beside/Textos/MMCoachingSystem.pdf

Analysis of player rotations
If the rotation system is good in a recreational league, might it also be effective in the NBA? We can examine the chief complaint lodged against the rotation system in the context of recreational league play, then we will look at actual NBA team lineups and examine what problems could arise, using the rotation system.

To illustrate the chief complaint we will create an imaginary team in which one of the rotations seems to be almost unworkable. Table 3 include players height for nine players, with the average height just under 6'. This is fairly typical for a Church or Industrial league.

This ensures a relatively competitive lineup for every rotation. At least three of the strongest five players are on court at the same time. In the above example, the players are listed in alphabetical order as strongest to weakest players.

A detractor may look at the rotation system and be appalled that in rotation 7 all of the players on the court are under 6' tall. How can this work in practice?

Let's give an imaginary Bio for the players, to examine in detail this problem.

Adam, the best player on the team. Kind of Kevin McHale type, a natural forward, but can play the center position as well. Best rebounder on the team and second best scorer.

Bruce, the best ball handler and shooter on the team. A natural point guard, smart and rarely makes mistakes with the ball. The leading scorer and only person who can create is own shot.

Carl, a fairly good ball handler and a good 3 point shooter. Also hits the boards fairly well, because of his leaping ability.

David a two hundred and fifty pound guy, who always plays center when in the game. He is the second best rebounder, but rarely shoots anything but a lay up.

Eli, a small guy who is very fast and hustles. Loves to cut back door for layups. Farily good ball handler. Not much of a rebounder

Frank, A decent Jack of all trades player. Slightly overweight, doesn't try to do too much with the ball, but a reasonable shooter if left open.

George, an older middle aged guy, who can't jump, and is a bit heavy which helps him boxes out well and push on defense. Tends to foul shooters rather than give up a layup.

Howard, a thin young player who can jump high, but doesn't like contact. Tends to hand out at the three point line to jack up a three, which he can hit 30% of the time. Doesn't like to play in the paint so he can't be a Power Forward or Center.

Isaiah. The coaches son. Youngest player on the team at 16. Doesn't take open shots for fear that he might miss. Collects an occasion rebound, and a decent on the ball defender. Pretty quick, but prefers to passes the ball rather than dribble.

In table five, we can take these player profiles and see what tradition position might be played by the players for each rotation.

rotation	Point Guard	Shooting Guard	Small Forward	Power Forward	Center	Relative height
1	Bruce 5'10	Eli 5'8	Frank 5'11	Isaiah 6'0	Adam 6'5	-2
2	Carl 5'11	Howard 6'1	George 5'10	Adam 6'5	David 6'4	+7
3	Bruce 5'10	Carl 5'11	Howard 6'1	Frank 5'11	David 6'4	+1
4	Bruce 5'10	Eli 5'8	Carl 5'11	George 5'10	Adam 6'5	-4
5	Bruce 5'10	Howard 6'1	Frank 5'11	Adam 6'5	David 6'4	+6
6	Carl 5'11	Isaiah 6'0	George 5'10	Adam 6'5	David 6'4	+6
7	Bruce 5'10	Eli 5'8	Carl 5'11	Frank 5'11	George 5'10	-12
8	Bruce 5'10	Eli 5'8	Carl 5'11	Adam 6'5	David 6'4	+0

Table 5.

First thing we notice, is we have short players in the forward positions for most of the game. It would be great to have a taller team, but isn't that always the case in a rec league? But we have the older, chunkier guys playing down low, rather than out on the perimeter, so Howard and Isaiah tend to play the guard positions, leaving the shorter, older, heavier guys, Frank and George to play down low.

The next thing we notice is, holy smokes, our center is 5'10" tall in the 7th rotation! We don't have a player over six feet tall during the whole rotation. How can we fix this?

We can juggle the rotation, create a different one, that doesn't have this problem, but how could this be done automatically?

There is actually a way to create a set of rotations for an optimally "balanced" team. The question is, what is what is the quantity we want to balance? The last column shows the team height, relative to six feet. We have three tall rotations, (2, 5 and 6). One very small rotation (7), and four rotations averaging within an inch of six feet. If we wanted to balance the rotation with regard to height, how could we do that?

As it turns out, there are many possible rotation possibilities. Is it feasible to try out all of the combinations to see which is most balanced? With the help of computers, there is a way to do this.

For practical purposes, rather than try to generate every possible rotation combination, we can create a set of rotations, all of which conform to some guiding principles, and then a computer can be easily be used to see which of these rotations is optimally balanced.

Here are some guiding principles we use for our rotations:

1) at least three of the five best players are always on the court.
2) five best players finish the final rotation
3) Top player gets at least 80% of the minutes
4) Lowest player gets at least 25% of minutes.
5) Higher ranked players get more minutes than lower ranked.

If we have 50 different rotations to choose from, the chances are good we can find one that is fairly balanced.

But is balancing a good idea? Trying to balance based on how TALL the players are is not a very good idea. The height of a player is not a very good measure of how BIG he plays.

A better measurement of balance is what we call HANDS, HEIGHT, and HOOPS. The MagicMetric metric can be broken down into these three separate components. HANDS, is composed of Assists, Steals, and Turnovers. HEIGHT is rebounds and blocks. And the scoring components are combined into HOOPS. An example breakdown for an NBA player might be .07 HANDS, .15 HEIGHT, and .2 HOOPS, for a .42 per minute rating.

It might seem to be a good idea to balance the lineup based on these components. But we don't know. In actual practice, the benefits of having an UNBALANCED rotation may outweigh the benefits of having a BALANCED rotation. The UNBALANCED rotations provide a different look to the opposing team. A small lineup may be very fast, while a BIG lineup may be great in the half court game.

In our experience over, eight seasons of play, ***the unbalanced lineups created by the rotation system seemed to a benefit rather than a detriment***. As the rotations change every four or five minutes, by the time the other team adjusts to a situation to take advantage of a player mismatch, the rotation is over and a different team is on the court.

In the first season on a Winder Church team, the situation illustrated in the example actually occurred. In the seventh rotation, all the players on the floor were under six feet tall. The opposing team had a four point lead and a 6'8" center, and conventional wisdom would not field this small lineup 10 minutes before the end of the game.

Dick Mays played the role of George in this game, and took on the task of guarding their tallest player for four minutes. Dick took Judo and had strong legs and spent the next four minutes pushing on their big man and fouling him when he got the ball down low. At the end of four minutes, the Winder Church team was still down by four points, and their big man was tired. The finishing five took the court for the final 6 minutes and Winder won that game by eight points.

It doesn't always work that well, but there is no sense in fixing an issue that might not even be broken. The unusual lineups that sometimes result from use of the rotation system may actually be an advantageous bonus, as it confuses opponents and changes the game flow in a somewhat unpredictable way.

<u>Player Fatigue and Optimal Minutes</u>

As long as we are talking about optimal rotations, we should address the problem of fatigue. There is no easy answer to how many minutes is optimal for any given player. In general, a player's metric/minute is probably going to be less if he plays every single minute of the game than if he gets some rest. But how much rest should he get? Does it depend on the individual player? How is it affected by age? Does it matter what player is substituted?

There are some statistical approaches that might bring some clarity to the issue. However, there are so many factors, that it is a very difficult problem to tackle quantitatively. In short, we have not done a formal statistical analysis of this problem. Instead, we suggest a qualitative guideline that the best player on the court should be playing 80% to 85% of the game. This qualitative measure is based a bit on personal experience, and a bit on observations from four years with the magicmetric.com site.

Alan Iverson averaged the most minutes per game when we ran magicmetric.com A.I. would often play close to an entire game. It was possible to look at games in which Alan played over 90% of the minutes and compare them to games in which he played under 80%, and there was indeed a statistical difference in performance per minute. However, the games where A.I. averaged more minutes, may have been against tougher teams. There are simply too many too many variables to make an easy analysis of this problem.

Our belief is based more on the subjective experience of Jeff Gantner. For eight seasons, on three different teams, Jeff played with the rotation system. At 6' 5", Jeff was always the best player on the team. There were many games where Jeff played as little as 80% of the minutes and a good number where he played more than 90%.

Unlike Alan Iverson, who played more or less minutes depending on the level of the competition, Jeff played more or less minutes depending on who showed up for the game. It was a recreational league, so we had rotations for 6, 7, 8, 9, 10 and 11 players. Rarely would everybody make it to a game. In the 9 man rotation, our top two players each played 32 of 40 minutes. In the 8,7 and 6 man rotations, Jeff's playing minutes would increase up to 34, 36, and 40 minutes.

In the 10 and 11 player rotations, Jeff still got 32 minutes, but our second, third, and fourth best player all received less playing time as we tried to provide everyone with at least 10 minutes on the court.

Our gut feeling was that the nine player rotation was close to optimal. With more players we started cutting too much into the productivity of our top players. Eight players was also a good lineup if the eight players were all our top producers. But once we got down to seven players, the fatigue of the additional minutes left our finishing five without as much gas to put games away in the closing minutes.

We think our gut feeling would apply to the NBA. 80-85% is 38 to 41 minutes of a 48 minute game. This season LeBron averaged 38 minutes a game and recorded an astounding .74/minute rating. But what did he average in last year's playoffs against the Mavericks? People complained that he disappeared during the 4th quarter of key games.

Lebron played 44 minutes per game and averaged a .45 MM/minute. This is much, much lower than we would expect, but at least a part of this lower productivity may be due to playing so many minutes. In contrast, Dwayne Wade averaged 39 minutes per game, (in the optimal zone) and had a .69/minute rating.

We do not believe that fatigue affects player performance as much as might be extrapolated just from Lebron's performance in the 2011 Finals. However, what is a reasonable model for the effect of fatigue? We think a player's overall metric might be affected by as much as 10% if he had to play 44 minutes versus 38.

So if LeBron averages .7 per minute playing 38 minutes a game, we might expect a 10% drop if he plays 44 minutes a game. So he can play 38 minutes at .7 but maybe when he plays 44 minutes his metric drops to a .63. His total game metric playing 28 minutes is 26.6, but playing 44 minutes he tallies, 27.7. That is only a 1.1 increase for 6 additional playing minutes. Since the average NBA player is .4 per minute, we could expect a 2.4 contribution if we gave these 6 minutes to other players. So even being really conservative, assuming the fatigue affects production by only 5%, we still get more production by substituting another average player for these minutes.

Our conclusion, ***More than 41 minutes per game is counterproductive in the NBA.***

The MagicMetric Coaching System

Before we move on to look at how the Rotation System might be used in the NBA, it's time for a few personal words about Coaching Philosophy. Thus far, the term MagicMetric Rotation System, and MagicMetric Coaching System have been used interchangeably. However, the MagicMetric Coaching System really has three components:

1) The MagicMetric Player Rating System
2) The Rotation System
3) The Dick Mays Coaching Philosophy

We have mentioned that the rotation system can be separated from the player rating system. In fact, one of our team players had a spouse coaching a girl's High School team and he asked to take the rotations home to show his wife. His wife liked it so much she started using it. Three years later she won a state championship using the rotations, but she seeded the players based on her own instinct rather than using the player rating system.

The third component of the Coaching System is the personal coaching philosophy of its creator, Dick Mays. Perhaps the biggest obstacle to using the Coaching System in the NBA would be a conflict of coaching philosophy. When the financial stakes are high, any form of "soft coaching," is likely to come under harsh criticism.

Dick developed his coaching philosophy during five years at the helm of the Winder United Methodist Church basketball team. The team was composed of many young players, and mentoring these young men was more important than wining basketball games. These coaching rules are:

1) No game time penalties for player mistakes
2) Developing player character is more important than winning games
3) Coaching feedback is given only with Likes and Adds

Coach Bobby Knight won three NCAA championships, and he was famous for scolding players, yanking them out of the game for mistakes. He once threw a chair across the court in a rage. This is not a coach who would want to adopt the rotation system. Knight believed in being actively involved in "coaching the game," and would never believe in a system that separates player substitutions from other game time decision. This "field general," mentality, with the coach actively calling the shots on the field of battle, is a popular coaching style, from youth leagues to the NBA. Appropriately, Bobby Knight was nicknamed "The General."

Mike Krzyzewski played under Bonny Knight at West Point, and was his assistant coach at Indiana. But unlike his mentor, Krzyzewski rarely displays emotional rage on the basketball court. Dean Smith, the long time coach at North Carolina has a similar coaching style, displaying a calm demeanor during games, no matter what the game decision. These two coaches have 6 NCAA championships between them, showing that there is more than one style of coaching that can be successful on the court.

Duke and North Carolina are two teams that regularly use a deep, nine/ten player rotation and both of these programs have been extremely successful. Either of these coaches might be open to using the rotation system as it already has similarities to the way they manage games. However, there are other coaches who prefer to keep their best players on the court a higher percentage of the time. As an example, Bobby Cremins, famous for playing as few as six players, would not be a good match for the rotation system.

The Dick Mays philosophy came partly from his experience directing plays, and studying acting. The rehearsal is the time to give performers feedback on their technique. When the show goes up, only positive feedback is of value. Players need their confidence boosted to give their best performance, and don't need to be worried about the coaches wrath. This is as true on the court as it is on the stage.

Players have earned their minutes, by their performance and conduct, and they know at game time exactly when and how long they will play. This allows players to take responsibility for their own performance. If they foul out, they lose their minutes; otherwise, baring injury, they get their minutes determined by the rotation.

What if a player is sick, or injured, or not at full strength? That becomes the player's call rather than the coach's. They have earned their minutes, but if they are less than 100% they may prefer to sit out the game, or play fewer minutes. There is nothing that trashes a player's rating more than playing a lot of minutes at a low level of play. Players wanting to keep their player rating high will voluntarily come out of a game instead of trying to play on a twisted ankle.

Conduct can affect a player's minutes. If a player receive a Technical Foul for almost any reason, or the coach deems that the player has committed a conduct violation, the player loses one spot in the rotation order for the next game. A second conduct violation results in 2 spots down on the rotation, and a third in suspension from a game. This was what was told to the players, however in many years of play, it was never necessary to penalize a player more than once.

A conduct violation also included any criticism of a teammate. Team players build up their teammates and any criticism of a mistake or anger expressed towards a teammate was a conduct violation.

Would this work in the NBA? How would Kobe react to losing his top spot for criticizing Paul Gasol? It would be fun to find out. The Magic Metric coaching system provides consequences for actions, but is never punitive in intent. It encourages players to take responsibility for their own productivity, rewards good play with more minutes, and treats all players equally.

Why wouldn't a professional NBA player want to play under this system?

An NBA Rotation

Using the same guiding principle, we can create a rotation for the NBA in which players get rewarded with more playing the better they perform. Then we can take some actual NBA teams, and see the positions in which the players might play using this rotation. Just as with the Recreational League, we will see that there are some unusually rotations that result. But how would such as system work in actual practice. Unless this paper finds its way across an interested NBA executives desk, we will probably never know.

Table 6 is a nine player rotation designed for four 12 minute quarters. It meets all five of our guiding principles.

1) At least three of the five best players are always on the court.
2) The five best players finish the final rotation
3) Top player gets at least 80% of the minutes
4) Lowest player gets at least 25% of minutes.
5) Higher ranked players get more minutes than lower ranked.

Nine player NBA rotation:

	1st Qtr			2nd Qtr				3rd Qtr			4th Qtr			Playing Time
Player	12	7:00	5:00	12	8:00	6:00		12	7:00	5:00	12	9:00	5:00	
	X		X		X	X		X	X	X	X		X	39
	X	X		X	X	X		X		X		X	X	38
	X	X	X		X	X			X	X	X		X	36
		X	X	X	X			X	X		X	X	X	32
		X		X		X			X	X		X	X	28
	X		X	X					X		X	X		22
			X			X		X				X		19
		X		X				X			X			14
	X				X					X				12

Table 6.

There are many other rotations that could be created meeting the same design goals. But this one looks as reasonable as any. We can take a couple an actual NBA teams and see how it would work with this rotation. For illustrate purposes, we will pick a likely contender for the NBA 2012 Championship. The San Antonio Spurs.

Table Seven shows the players with more than 100 minutes of floor time for the Spurs during the 2011-2012 season.   It is interesting to see that we have the top three players listed as Tim Duncan, Tony Parker, and Manu Ginobili. Two of the best backcourt players, and an All time great at Center.   The Spurs also have a slew of competent, forwards with six players in this position beating the .37 NBA average metric. It is no wonder they are a contender for the title.   But how do we cut the players to pick our optimal nine man rotation?

Here is where we get to play general manger. (Actually coach, since the GM gets us the team, and the coach get to decide how to play them.) *You did watch Moneyball?*

If we use the rotation system it will decide the lineups for us, but we need to insure we have the right mix of players. Or do we? What if we just pick the top rated nine players?

NBA Rank	Player	MM/g	MM/min	Mins	Height	Position
18	T. Duncan	17.64015	0.616789	1634	6’ 11	C/F
25	T. Parker	18.01912	0.556146	1923	6’ 2	G
38	M. Ginobili	14.18214	0.593395	792	6’ 6	G
95	T. Splitter	10.1553	0.543064	1121	6’ 11	F
123	D. Blair	9.76	0.483168	1363	6’ 7	F
138	K. Leonard	10.30417	0.42934	1534	6’ 7	F
143	P. Mills	7.484091	0.584695	261	6’	G
144	D. Green	10.09257	0.433157	1522	6’ 6	F
181	G. Neal	8.675	0.421117	1206	6’ 4	G
197	B. Diaw	8.6	0.396313	406	6’ 8	C/F
205	S. Jackson	8.481034	0.375267	500	6’ 8	F
214	R. Jefferson	9.306098	0.32653	1168	6’ 7	F
228	M. Bonner	7.174658	0.364196	1326	6’ 10	F
305	T. Ford	4.975	0.365809	101	6’ 0	G
395	J. Anderson	3.189474	0.295322	603	6’ 6	G
436	C. Joseph	2.32931	0.253186	266	6’3	G

Table 7

By looking at the total number of minutes played, we get some idea of the perceived value of players by the existing coaching staff. Richard Jefferson and Matt Bonner are logging significant minutes, but neither are listed in the top ten in our rating system. Patrick Mills, a native Australian is a very interesting newcomer with a .58 per minute rating. Even though the Spurs have two great backcourt players in Parker and Ginobili, it would be interesting to give Patrick Mills more minutes. It is doubtful his rating would remain that high if he were logging significant minutes. Tim Duncan might also object to playing 39 minutes a game. He is currently averaging 28. But hey, a system is a system, so we fill out our rotation with our top nine players.

	1st Qtr			2nd Qtr				3rd Qtr			4th Qtr			Playing Time
Player	12	7:00	5:00	12	8:00	6:00		12	7:00	5:00	12	9:00	5:00	
T. Duncan	X		X		X	X		X	X	X	X		X	39
T. Parker	X	X		X	X	X		X		X		X	X	38
M. Ginobili	X	X	X		X	X			X	X	X		X	36
T. Splitter		X	X	X	X			X	X		X	X	X	32
D. Blair		X		X		X			X	X		X	X	28
K. Leonard	X		X	X					X		X	X		22
P. Mills			X			X		X				X		19
D. Green		X		X				X			X			14
G. Neal	X				X					X				12

Table 8.

Here’s how the 12 rotations look, with relative height based on NBA average of 6’ 7.

rotation	Point Guard	Shooting Guard	Small Forward	Power Forward	Center	Relative height 6’7
1	Parker 6’ 2	Neal 6’ 4	Ginobili 6’ 6	Leonard 6’7	Duncan 6’11	-5
2	Parker 6’ 2	Ginobili 6’ 6	Green 6’ 6	Blair 6’7	Splitter 6’11	-3
3	Mills 6’ 0	Ginobili 6’ 6	Leonard 6’7	Splitter 6’11	Duncan 6’11	+0
4	Parker 6’ 2	Green 6’ 6	Leonard 6’7	Blair 6’7	Splitter 6’11	-2
5	Parker 6’ 2	Neal 6’ 4	Ginobili 6’ 6	Splitter 6’11	Duncan 6’11	-1
6	Parker 6’ 2	Mills 6’ 0	Ginobili 6’ 6	Blair 6’7	Duncan 6’11	-9
halftime						
7	Parker 6’ 2	Mills 6’ 0	Green 6’ 6	Splitter 6’11	Duncan 6’11	-5
8	Ginobili 6’ 6	Leonard 6’7	Blair 6’7	Splitter 6’11	Duncan 6’11	+7
9	Parker 6’ 2	Neal 6’ 4	Ginobili 6’ 6	Blair 6’7	Duncan 6’11	-5
10	Ginobili 6’ 6	Green 6’ 6	Leonard 6’7	Splitter 6’11	Duncan 6’11	+5
11	Parker 6’ 2	Mills 6’ 0	Leonard 6’7	Blair 6’7	Splitter 6’11	-8
12	Parker 6’ 2	Ginobili 6’ 6	Blair 6’7	Splitter 6’11	Duncan 6’11	+2

Table 5.

You know, you gotta be a real geek to analyze each of these rotations. I will leave it as an exercise for the interested reader. But, I kind of like this team’s chances, if Duncan doesn’t die of a heart attack. Some interesting lineups emerge.

Conclusion

It’s not very likely that any NBA team will buy into this unconventional approach. However, this paper might intrigue a High School or College coach enough to give it a try. Coaches may feel free to use any or all of this material without restrictions. But your experiences with the system are valuable. Please send experiences, both positive and negative to dick DOT mays AT gmail.com. Thank you.

Appendix: 2011-2012 NBA Player rankings based on product of MM/g and MM/min.

Rank	Player	MM/g	MM/min	MM Product
1	L. James	27.95417	0.739528	20.6729
2	K. Love	25.8	0.661538	17.06769
3	K. Durant	25.66667	0.661512	16.97881
4	C. Paul	23.11901	0.629946	14.56373
5	D. Howard	23.26019	0.607316	14.12627
6	K. Bryant	22.21	0.573902	12.74636
7	D. Wade	20.68983	0.612125	12.66477
8	B. Griffin	21.14156	0.584021	12.34711
9	A. Jefferson	20.45462	0.599842	12.26954
10	D. Rose	20.695	0.586261	12.13266
11	R. Westbrook	20.61933	0.582467	12.01008
12	J. Smith	20.47254	0.575071	11.77317
13	A. Bynum	20.44167	0.574204	11.73769
14	L. Aldridge	20.60091	0.567518	11.69139
15	D. Nowitzki	19.45682	0.575646	11.20023
16	D. Williams	19.91455	0.54861	10.92532
17	C. Anthony	19.44	0.560231	10.89088
18	T. Duncan	17.64015	0.616789	10.88024
19	D. Cousins	18.19063	0.596414	10.84914
20	P. Gasol	19.84545	0.53205	10.55877
21	K. Garnett	18.34167	0.571391	10.48027
22	D. Lee	19.64825	0.528179	10.37778
23	P. Millsap	18.35588	0.55793	10.24129
24	K. Irving	17.50784	0.574028	10.04999
25	T. Parker	18.01912	0.556146	10.02125
26	M. Gortat	17.72803	0.554001	9.821346
27	G. Monroe	17.5	0.555556	9.722222
28	P. Pierce	18.27192	0.526568	9.621412
29	R. Rondo	18.89922	0.502639	9.499481
30	S. Curry	16.31538	0.580619	9.473017
31	S. Nash	17.21129	0.544661	9.37432
32	T. Lawson	17.92059	0.514959	9.228376
33	J. Harden	16.89155	0.539666	9.115797
34	B. Jennings	17.81591	0.5047	8.991689
35	K. Lowry	16.9	0.52648	8.897508
36	M. Gasol	17.9875	0.492808	8.864388
37	C. Boozer	16.02431	0.537728	8.616724
38	M. Ginobili	14.18214	0.593395	8.415614
39	E. Ilyasova	15.155	0.549094	8.321523
40	J. Lin	14.86143	0.552469	8.210485
41	C. Bosh	16.86349	0.484583	8.171763
42	J. Wall	17.19394	0.474971	8.166617
43	R. Anderson	16.16061	0.498784	8.060654
44	A. Varejao	15.864	0.505223	8.014857

45	R. Hibbert	15.366	0.515638	7.923287
46	K. Humphries	16.57258	0.476224	7.892254
47	J. Noah	15.50821	0.508466	7.885395
48	E. Gordon	16.42222	0.476006	7.817084
49	J. Jack	16.23889	0.477614	7.755927
50	Nene	14.75641	0.517769	7.640409
51	A. Bargnani	15.79516	0.474329	7.492106
52	A. Stoudemire	15.65784	0.47448	7.429335
53	J. Johnson	16.31061	0.454334	7.41047
54	R. Gay	16.65625	0.444167	7.398151
55	A. Horford	15.50714	0.475679	7.376426
56	M. Ellis	16.22619	0.450728	7.31359
57	B. Lopez	14.07	0.517279	7.278121
58	J. McGee	14.08293	0.512106	7.211957
59	D. Gooden	13.74375	0.524571	7.209567
60	T. Chandler	15.43134	0.464799	7.172481
61	D. Granger	15.55903	0.458968	7.141102
62	A. Iguodala	16.03716	0.444243	7.124393
63	N. Pekovic	13.84255	0.514593	7.123282
64	K. Faried	12.79906	0.551683	7.061028
65	T. Evans	15.51032	0.452196	7.013701
66	M. Thornton	15.54412	0.44539	6.923198
67	J. Calderon	15.21981	0.448962	6.833117
68	M. Conley	15.41377	0.434191	6.692514
69	S. Ibaka	13.502	0.494579	6.677802
70	A. Jamison	14.75385	0.445736	6.576313
71	A. Bogut	14.10417	0.465484	6.565265
72	R. Rubio	14.78171	0.432214	6.388856
73	D. West	13.87763	0.458008	6.356061
74	D. Gallinari	14.045	0.445873	6.262287
75	K. Martin	14.015	0.443513	6.21583
76	G. Dragic	12.8053	0.483219	6.187765
77	G. Wallace	14.85357	0.414904	6.16281
78	L. Williams	12.75987	0.481504	6.143934
79	J. Singleton	11.59583	0.52949	6.139879
80	L. Scola	13.76667	0.43983	6.054988
81	S. Hawes	12.30612	0.488338	6.00955
82	N. Batum	13.49576	0.44394	5.991303
83	L. Deng	15.32	0.389822	5.972071
84	R. Stuckey	13.3	0.444816	5.916054
85	C. Billups	13.365	0.441089	5.895156
86	C. Kaman	13.08404	0.448084	5.862746
87	P. George	13.26645	0.440746	5.84713
88	A. Harrington	12.55141	0.463152	5.813205
89	N. Robinson	11.64412	0.497612	5.794251
90	J. Teague	13.87708	0.415482	5.765672
91	E. Brand	12.80694	0.449366	5.755011
92	J. Holiday	14.06623	0.408902	5.751713

93	Z. Randolph	12.68429	0.451398	5.725662
94	I. Thomas	12.05615	0.47279	5.700033
95	T. Splitter	10.1553	0.543064	5.514983
96	J. Bayless	11.10484	0.4892	5.432486
97	J. Terry	13.16194	0.4126	5.430617
98	T. Young	12.058	0.449925	5.4252
99	A. Miller	12.17466	0.442715	5.389901
100	C. Frye	11.81719	0.452766	5.350418
101	M. Dunleavy	11.83727	0.450086	5.327796
102	J. Nelson	12.56371	0.41328	5.192329
103	J. Barea	11.39146	0.452042	5.149422
104	S. Marion	12.5306	0.408163	5.114523
105	J. Dudley	12.57462	0.404328	5.084275
106	L. Ridnour	12.91509	0.391366	5.054535
107	D. Harris	11.84925	0.426232	5.050533
108	K. Walker	11.66288	0.428782	5.000836
109	G. Green	11.21774	0.445148	4.993561
110	A. Afflalo	12.92971	0.384813	4.975518
111	J. Thompson	11.31328	0.436806	4.941712
112	R. Felton	12.49	0.392767	4.905664
113	C. Landry	10.93659	0.448221	4.902004
114	S. Dalembert	10.41538	0.467058	4.864585
115	G. Henderson	12.66273	0.380262	4.815155
116	D. Augustin	11.85938	0.404757	4.800163
117	T. Ariza	12.55488	0.381607	4.791032
118	R. Sessions	12.15286	0.393296	4.779674
119	B. Bass	12.22183	0.390474	4.772305
120	R. Allen	12.59464	0.378218	4.763514
121	W. Matthews	12.68106	0.375179	4.757672
122	J. Farmar	10.0359	0.471169	4.728603
123	D. Blair	9.76	0.483168	4.715723
124	T. Williams	9.830556	0.479539	4.714138
125	E. Okafor	11.65741	0.40337	4.702254
126	J. Smith	11.58	0.404895	4.688685
127	J. Kidd	11.70192	0.399383	4.67355
128	J. Crawford	11.2	0.416357	4.663197
129	G. Hayward	11.925	0.390984	4.66248
130	D. Wright	11.16066	0.413358	4.613342
131	D. Favors	9.913043	0.458937	4.549464
132	J. Crawford	11.14531	0.406763	4.533503
133	N. Young	11.69	0.385809	4.510102
134	M. Camby	9.98	0.447534	4.466386
135	G. Hill	10.835	0.410417	4.446865
136	K. Thompson	10.39091	0.425857	4.425041
137	D. Collison	11.425	0.387288	4.424767
138	K. Leonard	10.30417	0.42934	4.423994
139	C. Maggette	11.00781	0.400284	4.406252
140	D. Jordan	10.81039	0.406406	4.393403

141	J. Johnson	10.50484	0.416859	4.379033
142	J. Smith	10.185	0.429747	4.376972
143	P. Mills	7.484091	0.584695	4.375908
144	D. Green	10.09257	0.433157	4.37167
145	M. Williams	10.67937	0.409171	4.369687
146	G. Vasquez	10.54924	0.408885	4.313431
147	B. Rush	10.65923	0.403759	4.303758
148	T. Booker	10.39	0.412302	4.283813
149	Z. Pachulia	11	0.388693	4.275618
150	D. DeRozan	12.23254	0.349501	4.275286
151	O. Mayo	10.61644	0.40062	4.253161
152	M. Williams	10.65159	0.394503	4.202086
153	E. Turner	10.69481	0.386094	4.129201
154	J. Redick	10.53	0.39	4.1067
155	D. West	9.9	0.414226	4.100837
156	R. Beaubois	9.246364	0.438216	4.051907
157	T. Gibson	9.123913	0.442908	4.041058
158	M. Chalmers	10.85068	0.371598	4.032095
159	C. Parsons	10.7381	0.375458	4.031702
160	A. Johnson	9.878906	0.406539	4.016164
161	H. Turkoglu	11.2069	0.358048	4.012605
162	A. Gee	10.76667	0.371264	3.99728
163	J. Richardson	10.85339	0.367912	3.993087
164	G. Ayon	8.892593	0.440227	3.914763
165	B. Wright	7.75566	0.503614	3.905862
166	M. Barnes	9.197973	0.41809	3.845578
167	C. Budinger	9.272414	0.413947	3.838288
168	T. Prince	11.20159	0.338417	3.790802
169	C. Delfino	10.39167	0.36462	3.789008
170	R. Hamilton	9.826471	0.385352	3.786648
171	B. Knight	11.03636	0.342744	3.78265
172	B. Gordon	10.08077	0.37475	3.777766
173	V. Carter	9.783846	0.385191	3.768647
174	C. Villanueva	7.2	0.521739	3.756522
175	M. Brooks	10.48929	0.356778	3.742351
176	C. Andersen	7.534375	0.495683	3.734658
177	L. Barbosa	9.153571	0.406825	3.723905
178	T. Allen	9.818462	0.376186	3.69357
179	E. Davis	9.231061	0.397891	3.672952
180	M. Beasley	9.208511	0.398637	3.670851
181	G. Neal	8.675	0.421117	3.653186
182	K. Seraphin	8.635965	0.419222	3.620383
183	K. Koufos	7.602941	0.475184	3.612795
184	M. Speights	8.741791	0.404713	3.537913
185	S. Brown	9.15339	0.386219	3.535213
186	B. Mullens	8.906923	0.395863	3.525923
187	G. Hill	9.932653	0.353475	3.510947
188	R. Foye	9.550658	0.367333	3.508272

189	A. Randolph	7.297059	0.48007	3.503097
190	C. Lee	10.28793	0.339536	3.49312
191	J. Jerebko	8.926563	0.389806	3.47963
192	L. Mbah A Moute	9.019767	0.38382	3.461966
193	G. Davis	9.181818	0.374768	3.441052
194	C. Watson	9.091818	0.377254	3.429924
195	E. Udoh	8.286957	0.412286	3.416599
196	L. Kleiza	8.583673	0.397392	3.411086
197	B. Diaw	8.6	0.396313	3.408295
198	C. Brewer	8.442424	0.396358	3.346222
199	K. Fesenko	4.333333	0.760234	3.294347
200	R. Fernandez	8.63871	0.377236	3.258834
201	M. Morris	7.953968	0.407896	3.24439
202	I. Shumpert	9.61	0.334843	3.217843
203	L. Fields	9.538732	0.337058	3.215103
204	A. Morrow	9.195161	0.348302	3.202689
205	S. Jackson	8.481034	0.375267	3.182652
206	D. Williams	8.212121	0.381959	3.136695
207	S. Novak	7.694068	0.407094	3.132205
208	M. Belinelli	9.639394	0.32347	3.118051
209	D. Brown	8.300769	0.373909	3.103728
210	C. Martin	8.441176	0.367008	3.097977
211	J. Lucas	6.837963	0.449866	3.076167
212	T. Thompson	8.525	0.359705	3.066482
213	C. Butler	9.465753	0.323063	3.058037
214	R. Jefferson	9.306098	0.32653	3.038718
215	A. Blatche	8.540385	0.354373	3.02648
216	K. Korver	8.119718	0.369078	2.99681
217	T. Hansbrough	7.923684	0.377318	2.989751
218	N. Vucevic	6.845192	0.436	2.9845
219	W. Chandler	8.86875	0.330924	2.934878
220	B. Udrih	7.20678	0.393813	2.838124
221	U. Haslem	8.199324	0.343068	2.812925
222	S. Telfair	6.41	0.430201	2.757591
223	M. World Peace	8.77	0.314337	2.756735
224	L. Allen	6.651923	0.410613	2.731363
225	C. Miles	7.451786	0.365284	2.722015
226	I. Mahinmi	7.056154	0.379363	2.676844
227	R. Williams	7.774242	0.343993	2.674285
228	M. Bonner	7.174658	0.364196	2.61298
229	D. Byars	6.925	0.376359	2.606284
230	A. Parker	8.05	0.320717	2.581773
231	I. Johnson	6.464754	0.399059	2.579818
232	B. Uzoh	7.55625	0.338845	2.5604
233	S. Williams	7.482759	0.340125	2.545076
234	J. Hill	6.315789	0.399734	2.524633
235	B. Haywood	7.210345	0.346651	2.499475
236	M. Okur	8.129412	0.304472	2.475181

237	R. Brewer	7.723239	0.319142	2.464811
238	K. Brown	7.122222	0.342415	2.438752
239	D. White	6.780172	0.358739	2.432314
240	T. Mozgov	6.107843	0.396613	2.422451
241	J. Maxiell	7.390769	0.327025	2.416968
242	P. Patterson	7.479688	0.3224	2.411454
243	D. Gibson	7.941429	0.303108	2.40711
244	R. Lopez	5.796875	0.414063	2.400269
245	S. Gaines	5.772807	0.41531	2.397504
246	C. Wilcox	6.416071	0.373027	2.39337
247	J. O'Neal	7.36	0.322807	2.37586
248	C. Jenkins	6.440196	0.368011	2.370064
249	D. Cunningham	6.242254	0.378318	2.361559
250	L. Odom	6.955	0.339268	2.359611
251	J. Leuer	5.336957	0.441071	2.353976
252	O. Casspi	6.953077	0.337528	2.346858
253	J. Vesely	6.62807	0.350692	2.324408
254	J. Howard	7.202128	0.321524	2.315654
255	J. Meeks	7.166667	0.321375	2.303189
256	T. McGrady	6.042241	0.37764	2.281793
257	A. Aminu	7.132576	0.318419	2.271145
258	K. Perkins	7.775676	0.291224	2.264462
259	A. Gray	6.102041	0.367593	2.243066
260	B. Davis	6.854545	0.326407	2.237371
261	B. Biyombo	7.188889	0.311207	2.237235
262	G. Stiemsma	5.433333	0.411616	2.236448
263	L. Sanders	5.257692	0.424007	2.229301
264	J. Flynn	5.880556	0.376959	2.216727
265	D. McGuire	6.2375	0.354403	2.210591
266	E. Kanter	5.36	0.40916	2.193099
267	M. James	4.881818	0.447873	2.186436
268	J. Harrellson	5.458537	0.395546	2.159103
269	W. Green	6.039655	0.355274	2.145731
270	J. Dyson	6.544444	0.327222	2.141488
271	K. Hinrich	7.388889	0.28976	2.141007
272	J. Williams	5.605814	0.378771	2.123321
273	M. Webster	7.164894	0.29607	2.12131
274	M. Miller	6.460204	0.327929	2.118489
275	D. Watkins	6.42	0.329231	2.113662
276	J. Salmons	7.568478	0.278253	2.105951
277	M. Harris	6.063462	0.346484	2.100889
278	M. Redd	5.627451	0.372679	2.097232
279	N. Collison	6.552778	0.319648	2.09458
280	O. Asik	5.659028	0.369871	2.093111
281	J. Pargo	5.201818	0.40014	2.081455
282	G. Forbes	5.54375	0.372064	2.062628
283	K. Martin	6.633962	0.309998	2.056517
284	E. Bledsoe	5.123529	0.400276	2.050825

285	R. Lewis	7.278571	0.279945	2.0376
286	A. Burks	5.676984	0.357043	2.026928
287	E. Watson	6.395	0.310437	1.985244
288	J. Fredette	6.07623	0.326679	1.984977
289	H. Warrick	5.34	0.370833	1.98025
290	S. Livingston	6.085345	0.323689	1.969756
291	A. Bradley	6.530405	0.29956	1.956247
292	T. Harris	4.710714	0.413221	1.946564
293	S. Jones	5.877273	0.330184	1.940581
294	J. Hamilton	4.251786	0.452318	1.923158
295	T. Sefolosha	6.362745	0.301552	1.918698
296	V. Radmanovic	5.340196	0.353655	1.888589
297	S. Williams	3.90625	0.482253	1.883801
298	S. Blake	6.668462	0.28137	1.876303
299	C. Wright	3.791667	0.492424	1.867109
300	C. Singleton	6.354545	0.292836	1.860841
301	T. Thomas	5.892593	0.313436	1.846949
302	F. Garcia	5.477551	0.336046	1.84071
303	J. Hickson	5.818571	0.316227	1.839988
304	J. Evans	3.632258	0.50448	1.832403
305	T. Ford	4.975	0.365809	1.819899
306	D. Greene	5.150943	0.350404	1.804913
307	R. Turiaf	5.025	0.358929	1.803616
308	C. Hayes	5.878704	0.306182	1.799956
309	A. Anderson	6.979412	0.257543	1.797498
310	K. Thomas	5.180189	0.343059	1.77711
311	J. Petro	5.276271	0.336068	1.773187
312	C. Aldrich	3.391379	0.521751	1.769454
313	S. Samuels	5.193519	0.339446	1.762917
314	L. Babbitt	4.845	0.361567	1.751793
315	J. Jeffries	5.489773	0.317328	1.742058
316	B. Walker	5.735938	0.295667	1.695927
317	R. Mason	4.732692	0.353186	1.671521
318	W. Bynum	4.816667	0.33683	1.622397
319	J. Tinsley	4.764634	0.340331	1.621553
320	J. Tyler	4.670238	0.345944	1.615639
321	S. Battier	6.166	0.261271	1.610998
322	E. Dawson	3.9625	0.404337	1.602184
323	J. Anthony	5.810135	0.274063	1.592343
324	B. Cook	3.921875	0.404317	1.585681
325	R. Bell	6.063235	0.259113	1.571061
326	W. Johnson	5.919231	0.261913	1.550323
327	M. Pietrus	5.701852	0.271517	1.548148
328	S. Mack	4.329688	0.354892	1.536573
329	G. Smith	3.6125	0.420058	1.51746
330	C. Smith	3.856383	0.389534	1.502191
331	J. Foster	4.377273	0.341974	1.496915
332	J. Childress	4.626471	0.319067	1.476154

333	V. Wafer	4.526471	0.323319	1.463495
334	D. Cook	4.851515	0.301336	1.461938
335	D. Carroll	4.935417	0.295534	1.458583
336	W. Ellington	5.260784	0.275434	1.448997
337	S. Alabi	3.539286	0.406814	1.439833
338	E. Maynor	4.666667	0.307018	1.432749
339	E. Boykins	4.44375	0.322011	1.430936
340	C. Eyenga	3.175	0.447183	1.419806
341	T. Murphy	4.67381	0.303494	1.418474
342	E. Williams	2.960417	0.477487	1.413559
343	D. Summers	4.423333	0.318225	1.407617
344	H. Whiteside	2.905556	0.484259	1.407042
345	B. Wallace	4.71371	0.298336	1.40627
346	R. Evans	4.487313	0.30947	1.388688
347	D. Jones	4.646479	0.297851	1.383959
348	A. Biedrins	4.659574	0.296788	1.382907
349	R. Price	4.45	0.309028	1.375174
350	D. Milicic	4.732759	0.290353	1.374172
351	L. Amundson	4.05	0.334711	1.355579
352	X. Henry	4.782222	0.282972	1.353234
353	D. Orton	3.635	0.370918	1.348288
354	M. Bibby	4.522727	0.295603	1.336932
355	S. Erden	3.976786	0.334184	1.328977
356	R. Balkman	3.3	0.402439	1.328049
357	A. Price	3.985417	0.332118	1.323629
358	J. McRoberts	4.159821	0.317544	1.320925
359	Q. Richardson	4.814151	0.271986	1.309381
360	C. Duhon	4.961765	0.262527	1.302598
361	E. Najera	4.002273	0.325388	1.302292
362	N. Cole	4.888194	0.264227	1.291592
363	J. Adrien	3.16875	0.40625	1.287305
364	L. Thomas	4.384524	0.292302	1.281603
365	D. Jones	3.221212	0.397681	1.281013
366	H. Haddadi	2.768421	0.461404	1.277359
367	B. Miller	3.513333	0.362199	1.272527
368	D. James	5.578571	0.225853	1.259938
369	D. Kennedy	6.05	0.205782	1.244983
370	T. Douglas	4.580769	0.269457	1.23432
371	N. Mohammed	3.645	0.331364	1.20782
372	J. Jordan	2.477273	0.48574	1.20331
373	A. Tolliver	4.556863	0.263402	1.200289
374	E. Clark	3.91	0.303101	1.185124
375	M. Almond	4.4375	0.265719	1.179126
376	M. Moore	4.45	0.264881	1.17872
377	A. Johnson	2.45	0.480392	1.176961
378	J. Davis	3.196667	0.367433	1.174561
379	Q. Pondexter	4.20493	0.26783	1.126206
380	M. Evans	4.010417	0.280449	1.124716

381	D. Fisher	4.794828	0.233894	1.121482
382	I. Smith	3.066667	0.365079	1.119577
383	J. Dentmon	4.4875	0.249306	1.118759
384	J. Przybilla	4.294444	0.258701	1.110979
385	J. Stone	2.920833	0.379329	1.107957
386	C. Fortson	3.5625	0.309783	1.103601
387	A. Daye	4.026829	0.273934	1.103085
388	V. Macklin	2.53913	0.430361	1.092743
389	M. Lee	3.623684	0.2831	1.025866
390	R. Jackson	3.373333	0.303904	1.025169
391	T. Outlaw	3.588462	0.280349	1.00602
392	D. Pittman	2.864865	0.345164	0.988849
393	J. Johnson	2.847222	0.343039	0.976708
394	H. Thabeet	2.71	0.351948	0.953779
395	J. Anderson	3.189474	0.295322	0.941921
396	D. Ebanks	3.85	0.243671	0.938133
397	J. Stackhouse	2.905	0.319231	0.927365
398	L. Harangody	3.192857	0.29026	0.926758
399	N. Smith	3.367045	0.273744	0.921707
400	J. Jones	3.351695	0.274729	0.920808
401	G. Arenas	3.063043	0.300298	0.919827
402	T. Harris	3.491667	0.258642	0.903092
403	J. Pendergraph	2.08125	0.433594	0.902417
404	R. Hollins	3.66875	0.242964	0.891373
405	A. Goudelock	2.907955	0.299789	0.871773
406	Y. Jianlian	2.401613	0.35845	0.860857
407	M. Daniels	3.11087	0.27051	0.841523
408	K. Dooling	3.337931	0.250972	0.837728
409	A. Carter	2.695833	0.309866	0.835347
410	D. Sloan	3.366667	0.245742	0.827332
411	S. Williams	4.082	0.198155	0.80887
412	D. Wilkins	3.51	0.227922	0.800006
413	T. Battie	2.914815	0.267414	0.779463
414	D. Diop	3.042593	0.253549	0.771447
415	E. Ubiles	3.1625	0.243269	0.769339
416	S. Pavlovic	2.935	0.262054	0.769127
417	K. Bogans	3.74	0.2	0.748
418	C. Johnson	2.3875	0.310065	0.74028
419	W. Russell	3.075	0.240234	0.738721
420	T. Johnson	2.027273	0.362013	0.733899
421	J. Butler	2.41	0.297531	0.717049
422	E. Moore	2.421429	0.295296	0.715039
423	A. Emmett	2.308333	0.307778	0.710454
424	J. Smith	2.52	0.273913	0.690261
425	C. Johnson	1.785	0.379787	0.67792
426	T. Honeycutt	1.986667	0.336723	0.668957
427	T. Thompkins	1.804167	0.360833	0.651003
428	S. Young	2.375	0.272989	0.648348

429	B. Simmons	3.023438	0.214428	0.64831
430	L. Stephenson	2.505435	0.253074	0.634061
431	L. Walton	2.133333	0.296296	0.632099
432	D. Stevenson	3.439216	0.182937	0.62916
433	L. Owens	2.585714	0.241656	0.624852
434	R. Butler	2.909091	0.212342	0.617723
435	B. Scalabrine	1.644444	0.365432	0.600933
436	C. Joseph	2.32931	0.253186	0.589749
437	T. Leslie	1.62	0.36	0.5832
438	R. Reid	1.37	0.415152	0.568758
439	M. Carroll	2.45283	0.217065	0.532423
440	E. Dampier	1.955263	0.267844	0.523706
441	D. Morris	1.967391	0.255505	0.502679
442	J. Magloire	2.336765	0.212433	0.496406
443	E. Barron	1.475	0.335227	0.49446
444	J. Moon	2.69375	0.174919	0.471188
445	R. Gomes	2.498438	0.187852	0.469338
446	C. Higgins	2.211842	0.199265	0.440743
447	J. Brockman	1.662857	0.244538	0.406631
448	J. Pargo	1.957955	0.203954	0.399332
449	M. Thompson	2.74	0.144974	0.397228
450	X. Silas	1.9875	0.1875	0.372656
451	D. Liggins	1.579412	0.232266	0.366844
452	R. Ivey	1.802703	0.182091	0.328256
453	E. Curry	1.346429	0.228208	0.307266
454	M. Gladness	1.03125	0.294643	0.30385
455	J. Kapono	1.740385	0.168969	0.294072
456	J. Selby	1.448276	0.176619	0.255793
457	M. Morris	1.317647	0.17806	0.234621
458	J. Howard	1.208065	0.185856	0.224526
459	J. Collins	1.568571	0.140051	0.21968
460	A. Nocioni	1.054545	0.206774	0.218052
461	M. Thomas	1.033333	0.206667	0.213556
462	C. Brackins	1.125	0.178571	0.200893
463	B. Cardinal	1.097826	0.177069	0.194391
464	B. Ahearn	0.892857	0.165344	0.147628
465	D. Gadzuric	0.875	0.132576	0.116004
466	D. Horner	0.5375	0.191964	0.103181
467	F. Elson	0.57	0.172727	0.098455
468	J. Foote	0.925	0.094388	0.087309
469	J. Harper	0.71	0.120339	0.085441
470	K. Azubuike	0.675	0.118421	0.079934
471	L. Hayward	0.636207	0.122347	0.077838
472	K. Benson	0.433333	0.144444	0.062593
473	L. Hudson	0.533333	0.082051	0.043761
474	D. Hobson	0.36	0.046154	0.016615
475	I. Diogu	0.075	0.010563	0.000792
476	L. Hughes	-0.1	-0.00794	-0.00079

477	H. Ndiaye	-0.21667	-0.21667	-0.04694
478	B. Skinner	-0.65	-0.14773	-0.09602