Running Back Rating: An objective comparison of All-Time great NFL running backs

To occupy some time over my spring break (Spring 2011) while keeping my brain sharp (essentially doing some "productive procrastination") I came up with the idea of creating an "objective" measure of the overall quality of NFL running backs. My idea was based on the system of the NFL Quarterback rating, which takes into account accuracy, touchdowns, and interceptions.

I developed a formula very similar to the NFL QB rating, for running backs, which takes into account rushing yards, rushing touchdowns, receiving yards, receiving touchdowns, and fumbles. I used the data of the top 50 running backs from the 2001-2010 NFL seasons (found at SportsReference.com) to develop my formula. Since we're dealing with running backs, not wide receivers, I weighted rushing 87% and receiving 13% (based on rushing making up approximately 87% of the total touches for players in my data set.) The minimum score a player can receive is a zero, and the maximum is 100. My formula was designed to give an "average" (based averages from the data) player a score of 66.6 (So 2/3rds will be below and 1/3 will be above).

After a few failed attempts, oversights, and adjustments, I found some numbers that I was pleased with (the averages of the data earned a score of 66.25047...I'll go ahead and round). I've included my formula below.

\[
a = \left( \frac{\text{RushYds}}{\text{RushAttempts}} - 3.5 \right) \times 2.1
\]

\[
b = \left( \frac{\text{RecYds}}{\text{Catches}} - 7 \right) \times 1.7
\]

\[
c = \left( \frac{\text{RushTD}}{\text{RushAttempts}} \right) \times 50.3
\]

\[
d = \left( \frac{\text{RecTD}}{\text{Catches}} \right) \times 57.4
\]

\[
e = 3 - \left( \frac{\text{Fumbles}}{\text{Catches} + \text{RushAttempts}} \right) \times 129.9
\]

\[
A = .87a + .13b, 
B = .87c + .13d, 
C = e
\]

Then use the above calculations to compute the rating:

\[
\text{Rusher Rating} = \frac{\text{mm}(A) + \text{mm}(B) + \text{mm}(C)}{9} \times 100
\]

where \(\text{mm}(x) = \max(0, \min(x, 3))\)
Now, comes the fun part. There are a number of running backs who are in the discussion as the "Greatest of All-Time": Jim Brown, Emmitt Smith, Barry Sanders, Walter Payton, Gale Sayers, among others. I wanted to see who (according to the formula) is, in fact, the greatest of all-time. Now, I know that there are some factors which are not included in the formula (and can't actually be quantified); with that being said, I'm just interested in people's relative ratings.

So, here's how some of the all-time career numbers came out:

1. Jim Brown: 94.8
2. Gale Sayers: 92.5
3. Barry Sanders: 84.7
4. OJ Simpson: 84.6
5. Marcus Allen: 73.7
6. Walter Payton: 73.5
7. Eric Dickerson: 69.5
8. Emmitt Smith: 65.7
9. Earl Cambpell: 65.3

According to this formula, Jim Brown is the Greatest of All-Time, followed closely by Gale Sayers. An interesting illumination (as much as it pains me to say this as a Cowboys fan) is that Emmitt Smith, the NFL career rushing leader, has only a slightly above average rating for his career, indicating that he was good, not great, and just hung around a long time (which is a credit to his toughness...not measured here).

Here are rankings of some of the top current NFL RB's:

1. Adrian Peterson: 69.4
2. Maurice Jones-Drew: 68.4
3. Chris Johnson: 66.5
4. Ray Rice: 66.4
5. LaDanian Tomlinson: 64.5
6. Frank Gore: 53.7
7. Steven Jackson: 51.8
And, finally, a look at where some of the greatest single-seasons in NFL history stack up:

1. Marshal Faulk (2000): 100
2. Priest Holmes (2002): 96.2
3. LaDanian Tomlinson (2006): 92.9
4. Terrell Davis (1998): 92.4
6. Shaun Alexander (2005): 78.6
7. Chris Johnson (2009): 78.4
8. Gale Sayers (1966): 77.6
10. Eric Dickerson (1984)*: 51.2 (single-season rushing record)