Score-dependent save percentage: quantifying the ability to make a ‘timely’ save

I’m going to start this post by saying something controversial: a goaltender can’t win you hockey games. Since goaltenders don’t score goals (no disrespect to [Pekka Rinne](https://www.espn.com/nhl/story/_/id/28456122/predators-pekka-rinne-becomes-12th-nhl-goalie-score-goal)), in the very literal sense, a goaltender can’t win you a hockey game. Even if your goaltender records a shutout, you still have to rely on at least one your other skaters to score a goal in order to win the game. Thus, rather than winning the game, the primary responsibility of a goalie is it to give your team a *chance* at winning. To keep the game, and the score, within reach for as long as possible.

With this thought in mind, I was curious to see how goalies performed when their teams were either ahead or behind by ≤1 goal. I am not trying to suggest that save percentage doesn’t matter when the goal differential is ≥2. We all know that NHL teams give up multiple goal leads all too often, just ask the [2012-13 Toronto Maple Leafs](https://www.sportsnet.ca/hockey/nhl/leafs-blow-late-lead-fall-to-bruins-overtime-bergeron/). All I’m suggesting is that one of the factors which separates an elite goalie from an average one is the ability to make a ‘timely’ save. The ability to keep your team in the game even if momentum is moving against you.

I scraped through the NHL’s [play-by-play html reports](http://www.nhl.com/scores/htmlreports/20192020/PL020001.HTM) for every game of the 2019-2020 season and calculated each goaltenders cumulative save percentage when the game’s goal differential was ≤1. I then compared each goaltender’s score-dependant save percentage with their overall save percentage (minimum of 500 shots faced). This analysis yielded 46 goalies as shown in Table 1.

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| **Table 1.** Comparing NHL goalie’s score-dependent and overall save percentage | | | |
| Goalie | Score-Dependent  Save Percentage | Overall Save Percentage | Difference |
| J. Halak | 93.3 | 91.9 | 1.4 |
| A. Khudobin | 93.3 | 93 | 0.3 |
| E. Merzlikins | 93.2 | 92.3 | 0.9 |
| T. Jarry | 92.9 | 92.1 | 0.8 |
| T. Rask | 92.8 | 92.9 | -0.1 |
| A. Raanta | 92.7 | 92.1 | 0.6 |
| S. Varlamov | 92.5 | 91.4 | 1.1 |
| D. Kuemper | 92.4 | 92.8 | -0.4 |
| J. Saros | 92.3 | 91.4 | 0.9 |
| A. Vasilevsky | 92.2 | 91.7 | 0.5 |
| C. Crawford | 92.2 | 91.7 | 0.5 |
| R. Lehner | 92.2 | 92 | 0.2 |
| P. Francouz | 92.2 | 92.3 | -0.1 |
| M. Koskinen | 92.1 | 91.7 | 0.4 |
| B. Bishop | 92.1 | 92 | 0.1 |
| C. Hellebuyck | 92.1 | 92.2 | -0.1 |
| C. Hart | 91.9 | 91.4 | 0.5 |
| P. Grubauer | 91.8 | 91.6 | 0.2 |
| T. Greiss | 91.7 | 91.3 | 0.4 |
| A. Georgiev | 91.6 | 91 | 0.6 |
| L. Ullmark | 91.6 | 91.5 | 0.1 |
| J. Markstrom | 91.5 | 91.8 | -0.3 |
| M. Blackwood | 91.4 | 91.5 | -0.1 |
| F. Andersen | 91.3 | 90.9 | 0.4 |
| J. Korpisalo | 91.3 | 91.1 | 0.2 |
| A. Dell | 91.1 | 90.7 | 0.4 |
| M. Murray | 91 | 89.9 | 1.1 |
| J. Binnington | 91 | 91.2 | -0.2 |
| J. Quick | 90.9 | 90.4 | 0.5 |
| S. Bobrovsky | 90.8 | 90 | 0.8 |
| C. Anderson | 90.8 | 90.2 | 0.6 |
| A. Stalock | 90.8 | 91 | -0.2 |
| M. Smith | 90.7 | 90.2 | 0.5 |
| C. Price | 90.6 | 90.9 | -0.3 |
| B. Holtby | 90.4 | 89.7 | 0.7 |
| M. Fleury | 90.4 | 90.5 | -0.1 |
| P. Mrazek | 90.4 | 90.5 | -0.1 |
| D. Rittich | 90.4 | 90.7 | -0.3 |
| J. Bernier | 90.4 | 90.7 | -0.3 |
| H. Lundqvist | 90.2 | 90.5 | -0.3 |
| J. Gibson | 89.8 | 90.4 | -0.6 |
| P. Rinne | 89.7 | 89.5 | 0.2 |
| M. Jones | 89.6 | 89.6 | 0 |
| C. Hutton | 89.4 | 89.8 | -0.4 |
| D. Dubnyk | 88.8 | 89 | -0.2 |
| J. Howard | 88.6 | 88.2 | 0.4 |

The first thing that stands out is how closely score-dependent save percentage reflects the goalies overall save percentage. We can quantify this relationship using a Pearson’s correlation coefficient, which measures the strength and direction of the association between two continuous variables. With a ‘strong’ positive association (*r* = 0.91) we can see that, generally speaking, the higher a goalie’s overall save percentage the higher their score-dependant save percentage (Figure 1). In fact, for 67% of the goalie’s included in this analysis their score-dependent save percentage was within ±0.5% of their overall save percentage. So what does this mean? Is score-dependent save percentage giving us the same information we can get from overall save percentage? Well, for the most part, yes. But there are some notable exceptions.

Figure 1. Plot showing the score-dependent (minimum of 500 shots) and overall save percentage for goalies from the 2019-20 season. Dashed line represents the line of best fit.

Jaroslav Halak saved 1.4% more shots when the goal differential was ≤1 compared to his overall save percentage. This may not seem significant, but this increase skyrockets Halak from outside the top-10 in overall save percentage, to now topping the list for score-dependent save percentage last season. This just adds further evidence for the strength of [Boston's goaltending tandem](https://causewaycrowd.com/2020/10/31/boston-bruins-best-goalie-tandem-nhl/) last season. The other notable exception was Matt Murray who saved 1.1% more shots when the goal differential was ≤1. This jumped him from a rank of 40th in overall save percentage, to a much more respectable 27th in score-dependent save percentage. While I have no idea what the future holds for Matt Murray, this does reflect positively on the Ottawa Senators decision to sign him to a [four year contract](https://www.nhl.com/news/goalie-matt-murray-signs-four-year-25-million-contract-with-senators-after-trade-from-penguins/c-319390310).

The final thing worth highlighting is that most goalies improved their save percentage when the score of the goal differential was ≤1. In total, 85% of goalies had a higher score-dependent save percentage with an average increase of 0.24%. The reason for this increase is not clear, however it is likely a combination of both the goalie and the team around him playing better when the score is close. While score-dependent save percentage may leave much to be desired, I believe this is an important step towards quantifying a goalie’s ability to make a timely save.