Pilot Study Optimizing Dump-In Strategy

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Introduction

Through previous research done in the field of hockey analytics, it has been found that the optimal way to enter the offensive zone in terms of shot production is by carrying it in with possession. This can be seen in a study done by Tulsky, Detweiler, Spencer, and Sznajder[1]. They also noted that carrying the puck is not always the best option as when the carry percentage increases, the turnover percentage also increases. This finding has inspired the creation of this study to find if there exists a strategy of dumping the puck in that's better than the others.

Methods

The data for this study was taken from 36 random periods from the 2018-2019 NHL season using the NHL source API *nhlsrcapi* to randomly pick the games and periods. Each dump-in was collected by hand and was broken up into three types; Strong-Side, Rim, and Cross. In addition, other variables include: if there was a change after the dump-in and if the puck was recovered in the offensive zone.

Findings

Through analysis, the variable that made the biggest impact on the recovery rate was if a change occurred or not. Shown below is a table and graph showing the difference in retrieval rate when a change occurred and when no change occurred. One of the reasons for this large difference is that when a change occurs, there is less pressure on the opposing defenceman and when you give more a player more time and space, they make better plays.

As a result of the difference in recovery rates, the data was then separated into two sets as player positioning is drastically different in both situations. In the case of a change occurring, when analyzed further, no conclusive insights could be found and requires further research. On the other hand, when further

Recovery Rate Factoring in Line Changes
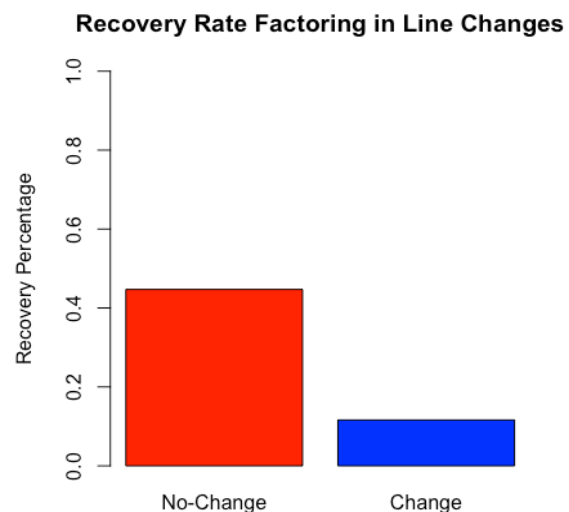
analyzing the data when no change occurred, the data set was much larger and more conclusive insights could be found.

One of the interesting findings found from the set where no change occurred was how close the recovery rate was when comparing the different types of dump-ins. However, it

**Recovery Rate When No Change Occured, Separated by Type**
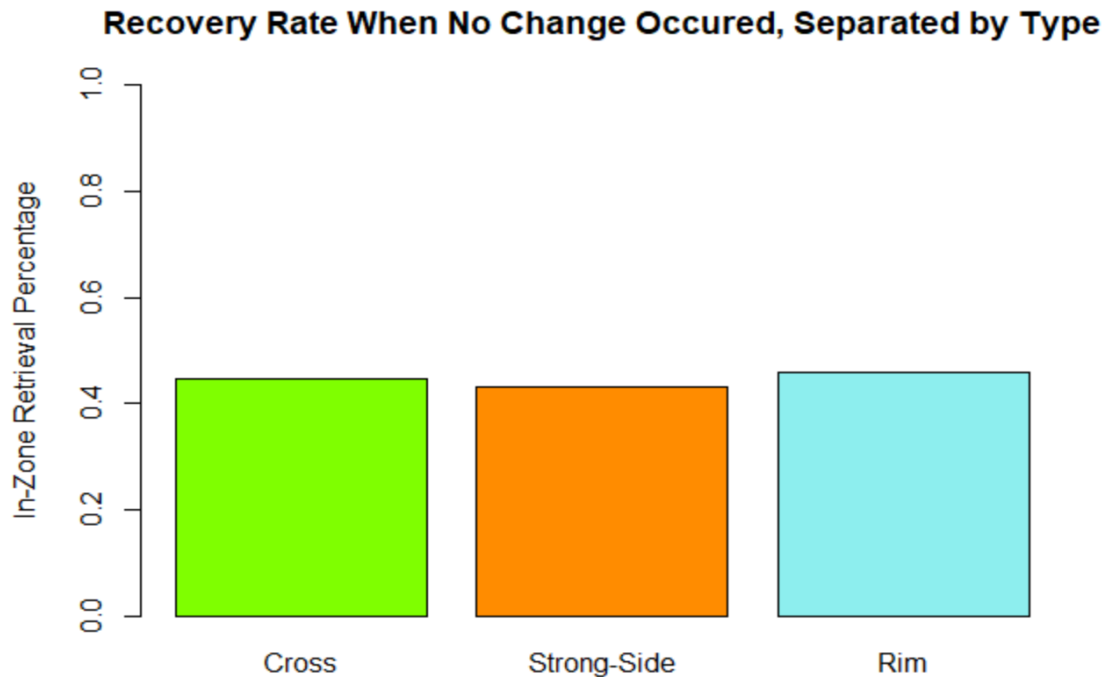
cannot be concluded that the rates are the same as the data set used is still relatively small, which leaves a lot of uncertainty. Conversely, an insight that can be concluded with a high amount of certainty is that dump-ins where the goalie either stops the puck behind the net or where a player picks up the puck behind the net gives a lower

Recovery Rate When No Change Occured, Separated by Placement
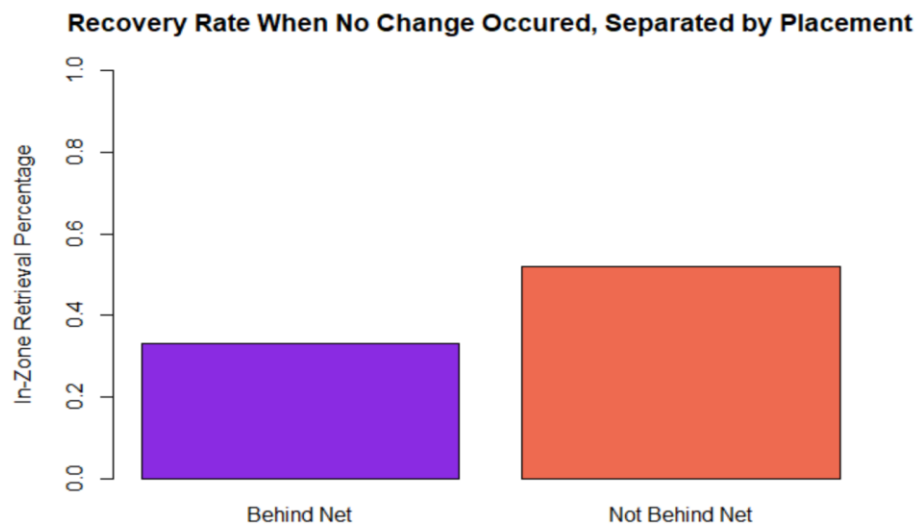
recovery percentage.

A possible reason for this difference in recovery rate could be that when a goalie stops the puck behind the net, they have control and can make a play to one of their players. In addition, if a defenceman picks the puck up behind the net, they can use the net to shield themselves from the forechecker. Going further, when the different dump-in types are also separated by if the puck is stopped or picked up behind the net, we can see the difference still holds.
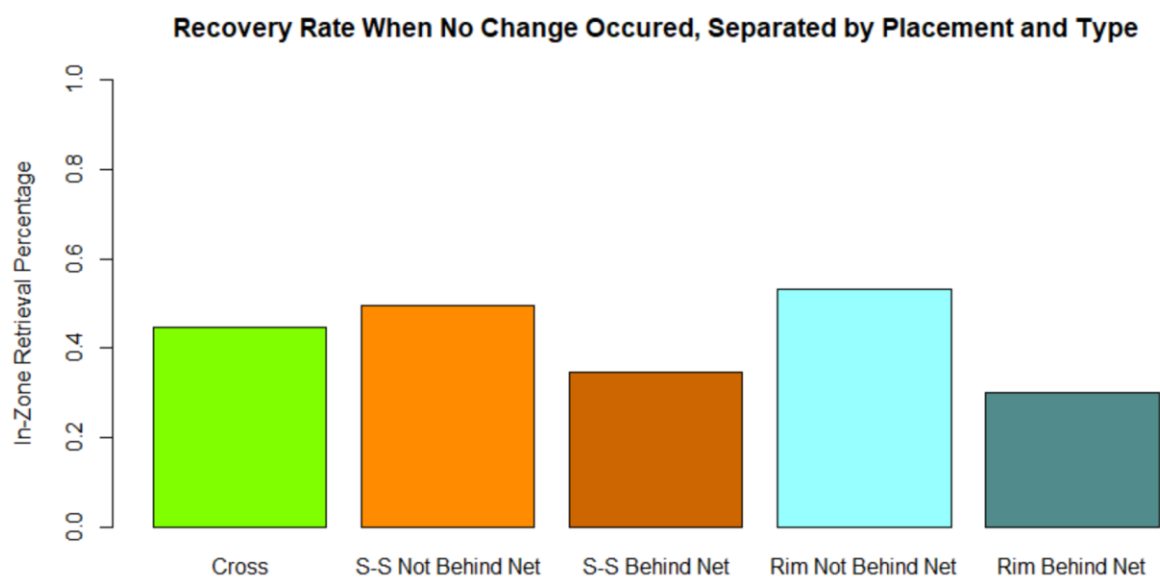
The reason why the cross dump could not be split up was that a cross dump that goes behind the net is a very rare event and could not give an accurate value.

Conclusion

Through the findings of this pilot study, it can be concluded with a high amount of certainty that one of the best dump-in strategies is to keep the puck from stopping behind the net. One of the reasons why this strategy is tangible is

that most situations where the puck ends up behind the net, it can be pre-vented by good puck placement by the player who dumped the puck into the offensive zone. This strategy is not new to the game though and is the reason why goalies play the puck behind the net. The drop-in recovery rates when the puck stops behind the net is consistent with the logic that when a goalie gets to the puck first, they have control and can make a play to their own players and when the puck naturally stops behind the net, the defencemen have an advantage as they can use the net as a pick. Conversely, when the puck does not go behind the net, the in-zone recovery rates of around 50% follow the logic that it is a 50/50 puck battle when the puck is in the corner or along the half-wall in the case of a rim.

   In addition, another factor that was found to have a big effect on in-zone recovery rates on whether the players changed or not after the puck was dumped in. This finding is not as helpful though in the way of strategy as line changes on the fly is a necessity and dumping the puck is in logically the best way to go about it.

   Last but not least, the final finding of this case study, which was also the main purpose of the study, was to find if there was a dump-in type (Cross, Strong-Side, Rim) that yielded a higher recovery rate than the others, and from the data collected it is still inconclusive. From inspection of the data, all three types have very similar recovery rates, but since the sample is relatively small, there is a lot of uncertainty and there is still the possibility that a superior type can still exist.

   If this study is to be further conducted, one of the things that would improve the results would be to use the expected goals model for each dump-in as opposed to using recovery rates. In addition, differentiating between dump-ins where the goalie explicitly played the puck and dump-ins where the puck was just picked up behind the net would yield more accurate results. Also, this leaves the ability to measure the value of goalies who play the puck.

Bibliography

[1] R. S. C. S. Eric Tulsky, Geoffrey Detweiler, *Using Zone Entry Data To Separate Offensive, Neutral, And Defensive Zone Performance*. MIT Sloan, 2013.