

## Heuristic Analysis

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For my heuristic analysis, I decided to try out differing levels of defensiveness and aggressiveness.

I implemented 4 heuristic functions of varying degrees:

- Defensive
  - $\text{score} = \text{float}(2 * \text{own\_moves} - \text{opp\_moves})$
- Aggressive
  - $\text{score} = \text{float}(\text{own\_moves} - 1.5 * \text{opp\_moves})$
- Super aggressive
  - $\text{score} = \text{float}(\text{own\_moves} - 2.2 * \text{opp\_moves})$
- Super duper aggressive
  - $\text{score} = \text{float}(\text{own\_moves} - 3 * \text{opp\_moves})$

My hypothesis is that there is an optimum balance between defensiveness and aggressiveness. By trying out differing amounts, I should be able to find the optimum weights to balance the two. In isolation, the goal is to “isolate” the opponent by getting them into a position where they can no longer make any more moves. Therefore, it makes sense that an aggressive strategy could potentially be very effective. On the other hand, an overly aggressive strategy might backfire, as the agent is not optimizing for his own available moves as well.

### Results:

Match #	Opponent	AB_Improved		defensive		aggressive		super aggressive		super duper aggressive	
		Won	Lost	Won	Lost	Won	Lost	Won	Lost	Won	Lost
1	Random	9	1	9	1	8	2	7	3	8	2
2	MM_Open	5	5	5	5	3	7	6	4	4	6
3	MM_Center	8	2	5	5	6	4	9	1	5	5
4	MM_Improved	5	5	4	6	6	4	5	5	5	5
5	AB_Open	5	5	4	6	1	9	4	6	3	7
6	AB_Center	6	4	6	4	4	6	3	7	3	7
7	AB_Improved	6	4	2	8	3	7	3	7	3	7
Win Rate:		62.9%		50.0%		44.3%		52.9%		44.3%	

It seems like the “super aggressive” heuristic perform the best.