

An Application of Mixed Effects Modeling to eSports Data

ABSTRACT

Overwatch League is one of several burgeoning professional, competitive eSports leagues with 12 franchises, or teams, across the U.S. and South Korea. Overwatch is classified as a team-based multiplayer online first-person shooter video game. In 2016, the franchise winning the Overwatch League regular season championship earned a total prize pool of \$3.5 million, while the industry at-large generated \$493 million.

As other professional sports leagues (e.g., MLB, NBA, NFL) continually apply data analytics to the forecasting of player and team performance, eSports leagues are in a similar position. In the context of Overwatch League, all game play statistics are generated and made available for public review. Examples include, players' skill rankings, results of in-game competitions, character role, and duration of game play, to name a few.

QUESTION

1. To what degree does fight win rate predict an individual players skill rating?

METHOD

Data for the current analysis were collected from the ESports Lab, Inc.-owned Winston's Lab—a gameplay and statistics database for Overwatch League. The current data are comprised of complete gameplay statistics from Overwatch League season 1, which is a a five-week long stage, with three matches played four days a week among 12 teams.

The current study applied mixed effects linear regression models to player-level and in-game data from the eSports Overwatch League to estimate the degree to which fight win rate predicts individual players' overall skill ranking.

Players' skill ranking was modeled against each in-game character's fight win rate, across all players. In addition to a completely fixed-effects model, three mixed effects models were estimated:

1. a random intercepts model
2. a random slopes model
3. a random intercepts, random slopes model

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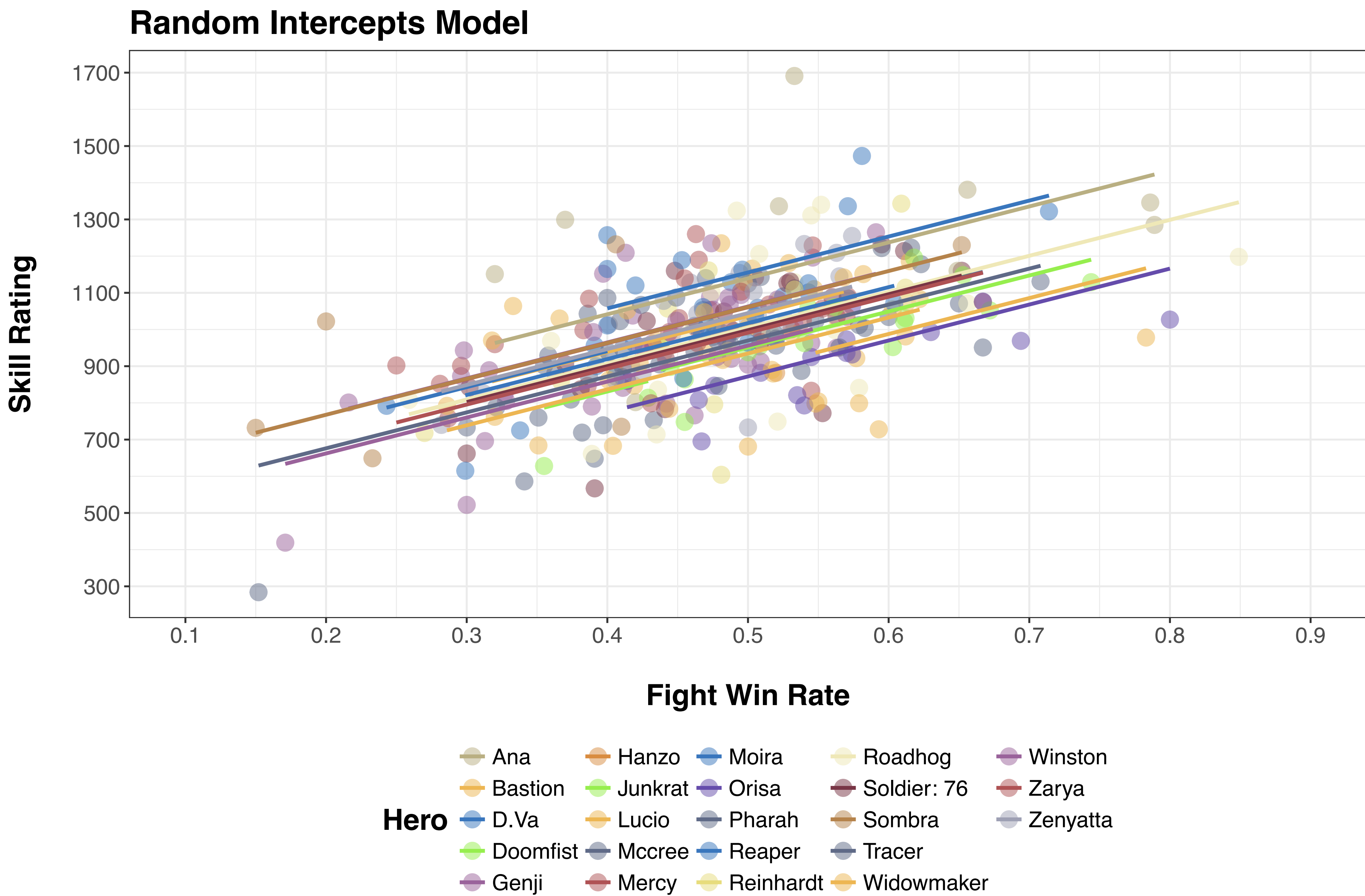


Figure 1. Random intercepts of skill rating versus fight win rate by Overwatch League hero character.

Table 1.

Fixed Effects of Random Intercepts Model

Parameter	B	SE	df	t	p	95% CI	
						Lower	Upper
Intercept	563.11	36.93	317	15.25	< .001	490.44	635.77
Fight Win Rate	879.97	75.31	317	11.69	< .001	731.81	1028.14

Table 2.

Random Effects of Random Intercepts Model

Parameter	B	SE	Wald Z	p	95% CI	
					Lower	Upper
Residual	21,616.07	17,16.97	15.25	< .001	18,499.75	25,257.35

RESULTS

Across Overwatch League season 1, a total of 101 individual players from 12 U.S. and international franchises compiled over 700 hours of competitive game play ($M = 2.38$, $SD = 2.75$).

A conditional R-squared estimate was used to examine model fit, with fight win rate in the random intercepts model explaining approximately 51% of the variance in individual players' skill ranking.

Conditional R^2 measures were used to estimate model fit among each of the four models, with fight win rate in the random intercepts model explaining approximately 51% of the variance in individual players' skill ranking (see Tables 1-2). Fig. 1 displays the relationship, with random intercepts, between fight win rate and skill rating. Fig. 2 displays the predicted probability, with 95% confidence intervals, of skill ranking by hero character.

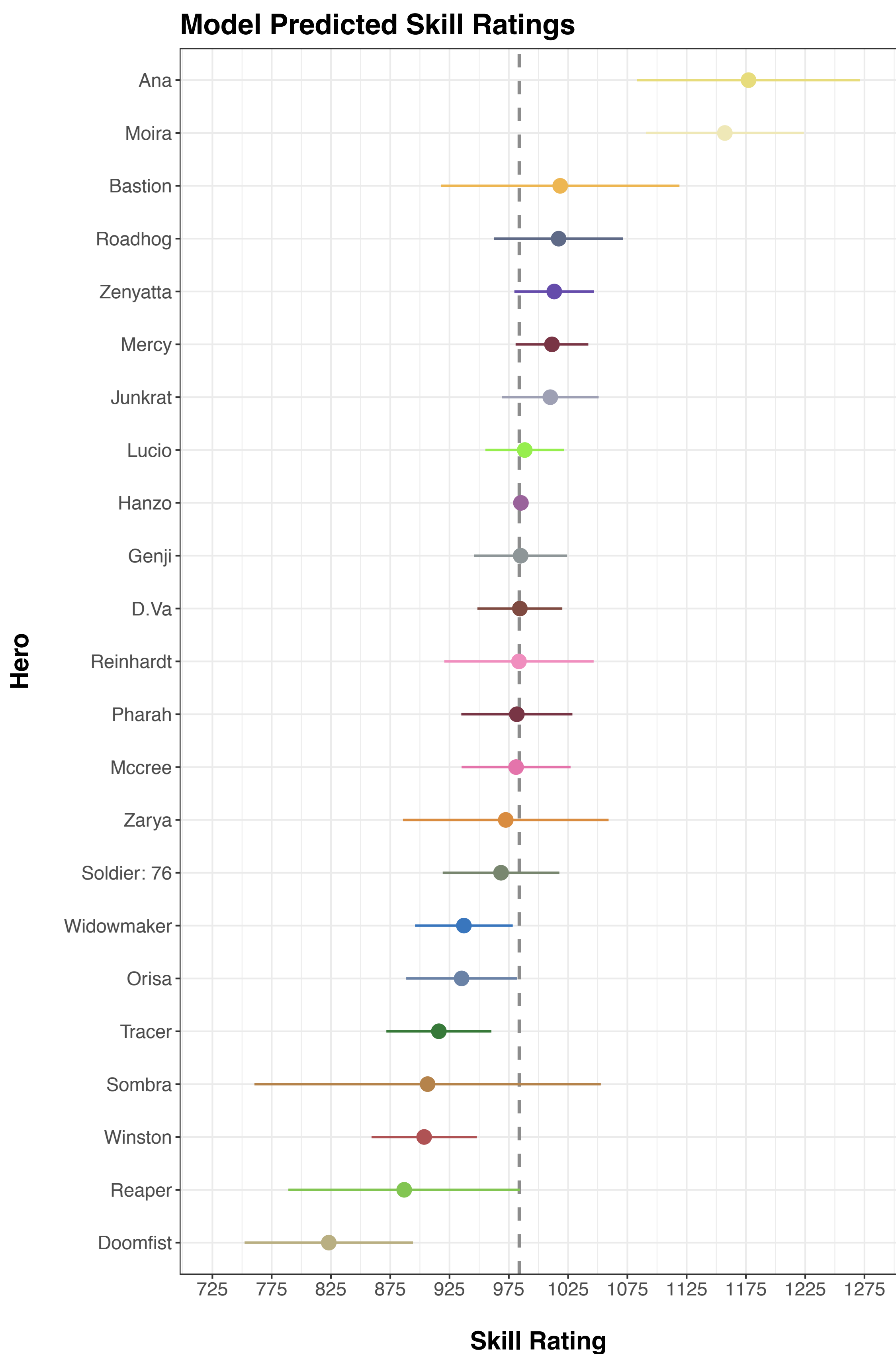


Figure 2. Predicted probabilities of skill rating by Overwatch League hero character.