



Predicting A Successful Plastic Surgery Residency Applicant - The Linear Rank Model

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BACKGROUND

- Residency applicant selection is highly competitive and complex
- Prior efforts include personality assessments and standardized letters of recommendation¹⁻³
 - Individual metrics and standardized letters may perpetuate the underrepresentation of disadvantaged groups^{4,5}
- Linear Rank Model (LRM)** uses aggregate data to model human judgment⁶

PROBLEM

- While the AAMC advocates for holistic evaluation, due to the growing number of applicants, programs resort to convenient screening methods

AIMS

Primary: Assess if the LRM is predictive of applicant match success for applicants

Secondary: Examine if there are differences in LRM scores between the diversity, equity, and inclusion (DEI) categories of gender and self-identified race

METHODS

- Collected data to screen and rank applicants
 - Screened = 617 applicants (2021 – 2022)
 - Ranked = 231 applicants (2019 – 2022)
 - Standardized rubric applied to screen all applicants and assign a numerical rating (**Table 1**)

Statistics:

- T-test to evaluate differences between LRM score of race and gender groups
- Logistic regression and Area Under the Curve (AUC) to evaluate predictiveness of the LRM

Table 1. Weighting of Linear Rank Model Variables

Application Metric	Scale	Weight
Letter of recommendation strength	1 – 5	12.5%
Personality score	1 – 5	12.5%
Extracurricular activity score	0 – 100	25%
USMLE Score	-	25%
No. First Author Publications	-	12.5%
No. Research Items	-	12.5%

*Calculated to develop an aggregate score (0-100)

Figure 1.

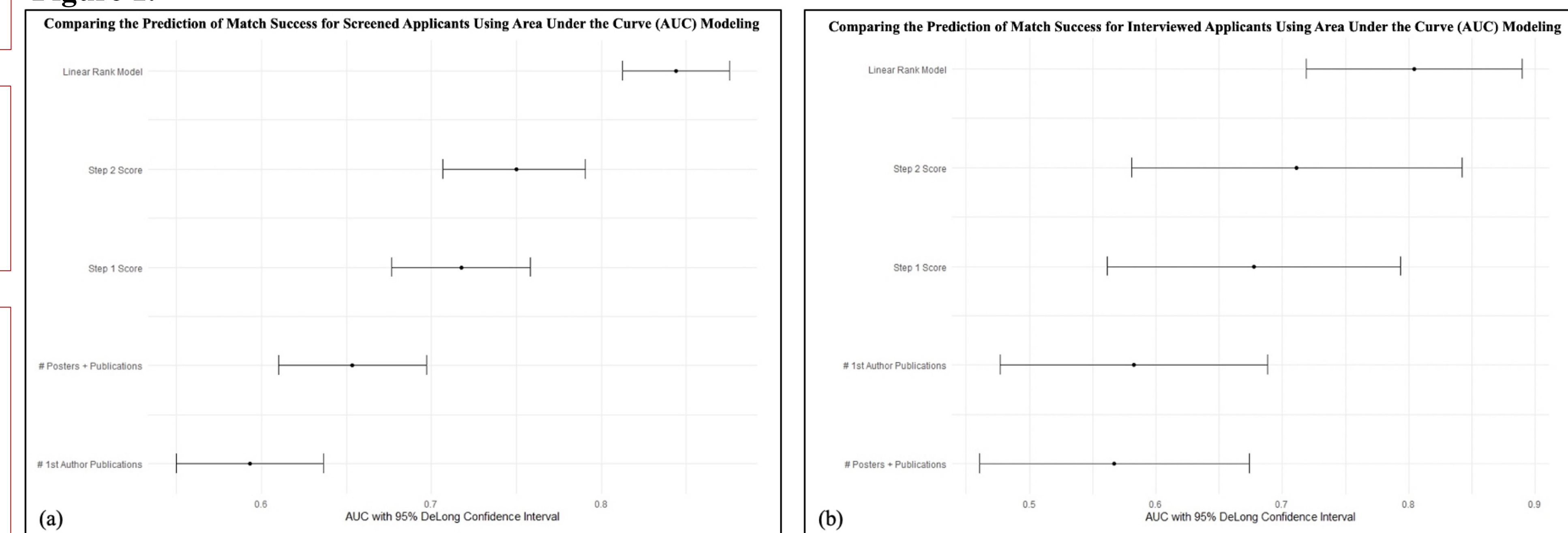
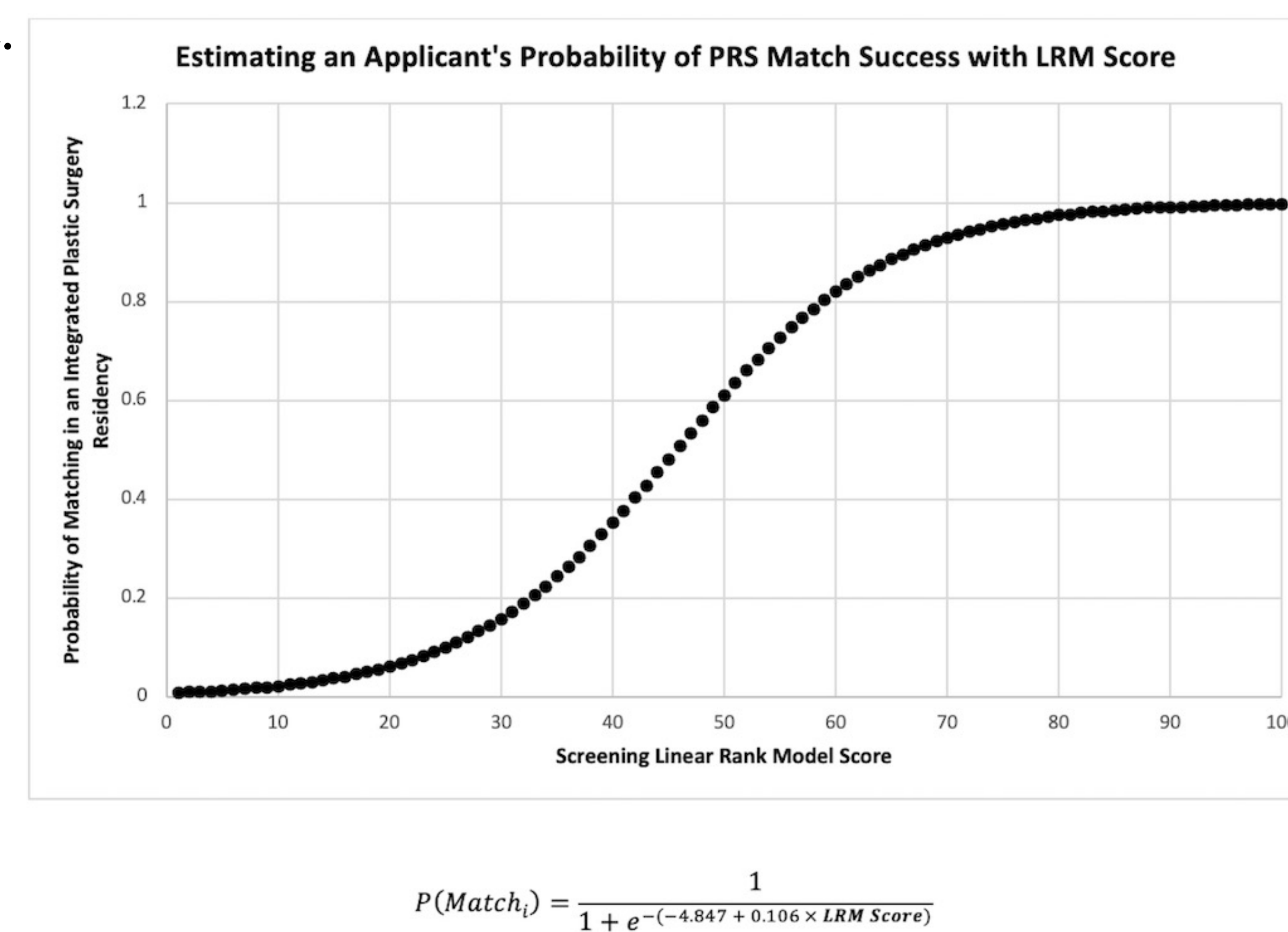


Figure 2.



$$P(\text{Match}_i) = \frac{1}{1 + e^{-(-4.847 + 0.106 \times \text{LRM Score})}}$$

RESULTS

- No significant difference in LRM score between gender or race for all groups except screened race group (**p= 0.047**)
- LRM score was significantly associated with match success for both screened (**OR 1.11, p< 0.001**) and interviewed (**OR 1.08, p< 0.001**) applicants
- AUC modeling demonstrated that LRM score is significantly more predictive than other traditional application metrics for screened applicants (**Figure 1**)
- An equation was derived to estimate the probability of an applicant's match success into plastic surgery based on LRM score (**Figure 2**)

CONCLUSIONS

- The Linear Rank Model is a standardized tool to efficiently perform a **holistic screening** of a residency applicant pool
- The Linear Rank Model is a **more predictive** screening tool for match success than USMLE Scores or research productivity
- How the LRM accounts for race merits further investigation.

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