

# Computer and Human Preference Divergences at Chess

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<sup>1</sup>Joint work with Tamal Biswas and Jason Zhou. Websites:  
<http://www.cse.buffalo.edu/~regan/>  
<http://www.cse.buffalo.edu/~regan/chess/fidelity/>

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- ❽ Discussion and applicability of model to the other papers.

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- ➏ Derived Outputs:
  - Aggregate statistics: *move-match* MM, *average error* AE, ...
  - Projected confidence intervals for those statistics.
  - “Intrinsic Performance Ratings” (IPR’s).

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2800 World champ: Carlsen peak 2881, now 2863

2700 “Super-GM”

2600 “Strong GM”

2500 Grandmaster (GM)

2400 International Master (IM) (KWR, D. Levy, H. Berliner)

2200 National Master, 30,000 worldwide

2000 Expert

⋮ ⋮

1000 Class E, “bright beginner”

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600? True beginner with “sight of the board”?

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- **Error of measurement**, not confidence test.

## Examples

### 2014 World Championship Match

- Anand, 2785  $\pm$  145
- Carlsen, 2920  $\pm$  135
- Combined, 2850  $\pm$  100,

### Screening test:

72	67.8%	0.055	202	Tal, Mihail	Marseille1989cat11
73	67.8%	0.078	121	Morphy, Paul	MorphyParisOffhand1858
74	67.7%	0.032	297	Shirov, A.	SofiaMTel2009cat21

Full test: Morphy at 2350 projected to match almost 60%, and full test actual is less (“regression to mean”), so not significant.

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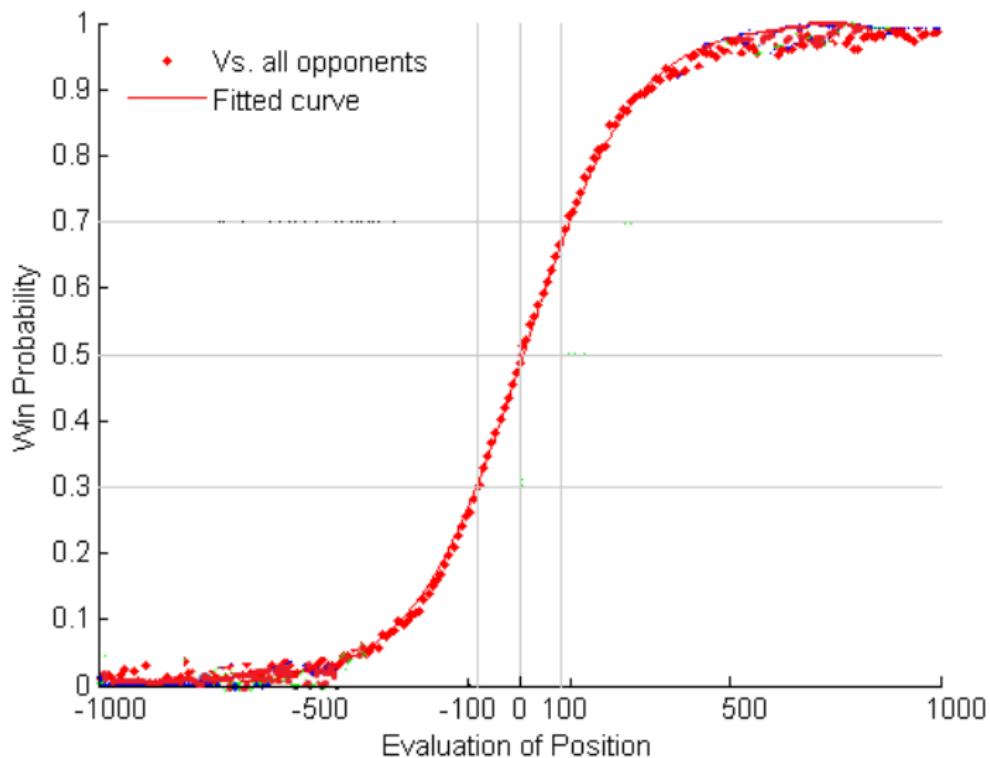
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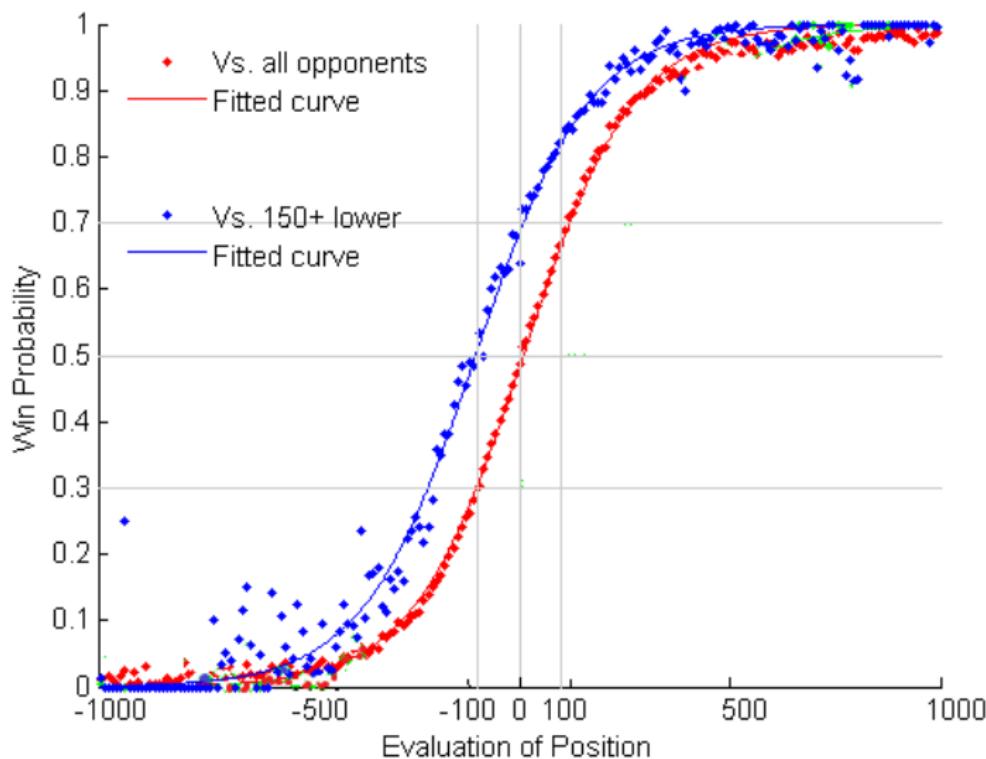
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*Use values at all depths to predict; use highest-depth values to assess.*

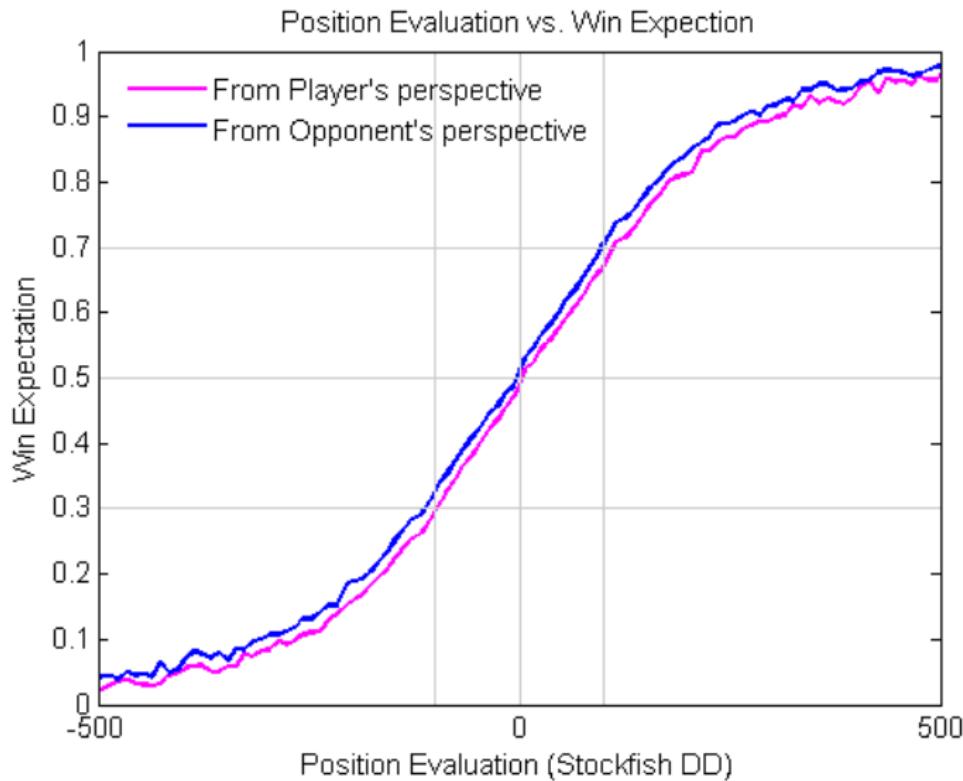
# Win % Expectation Curve



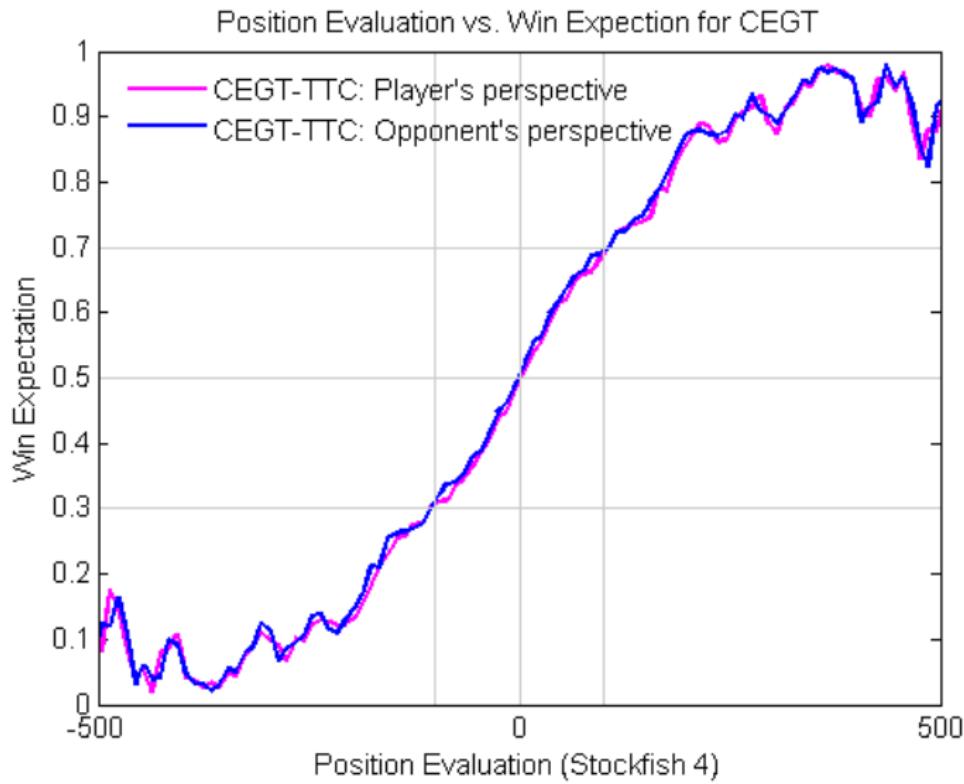
# And When You're Higher Rated



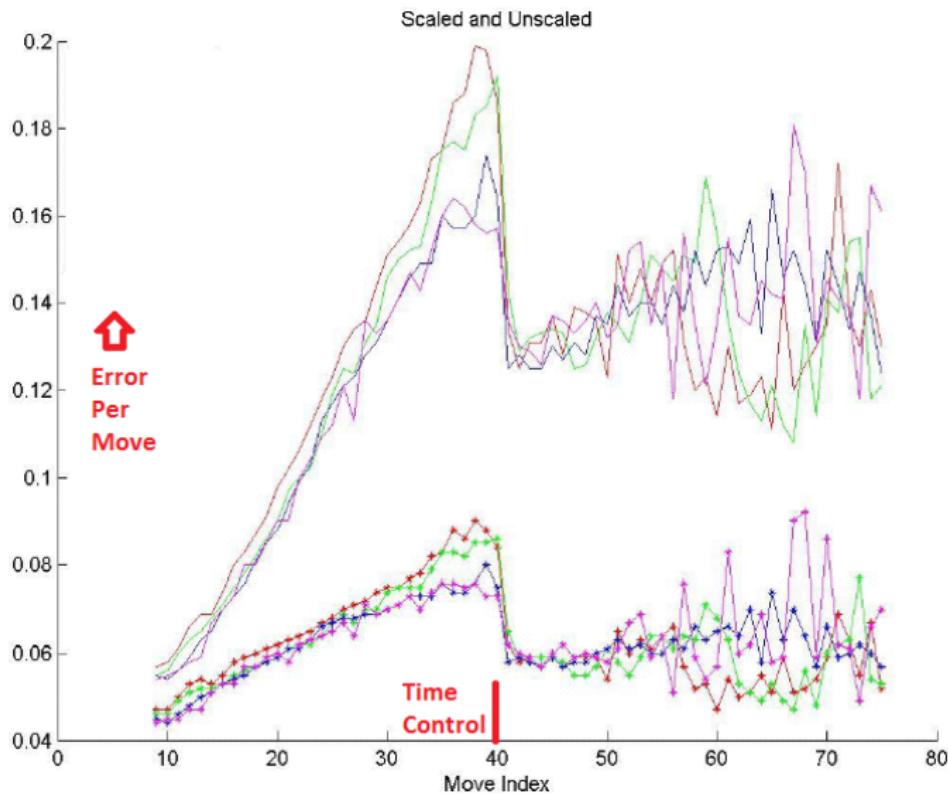
# Would You Like it to be Your Move?



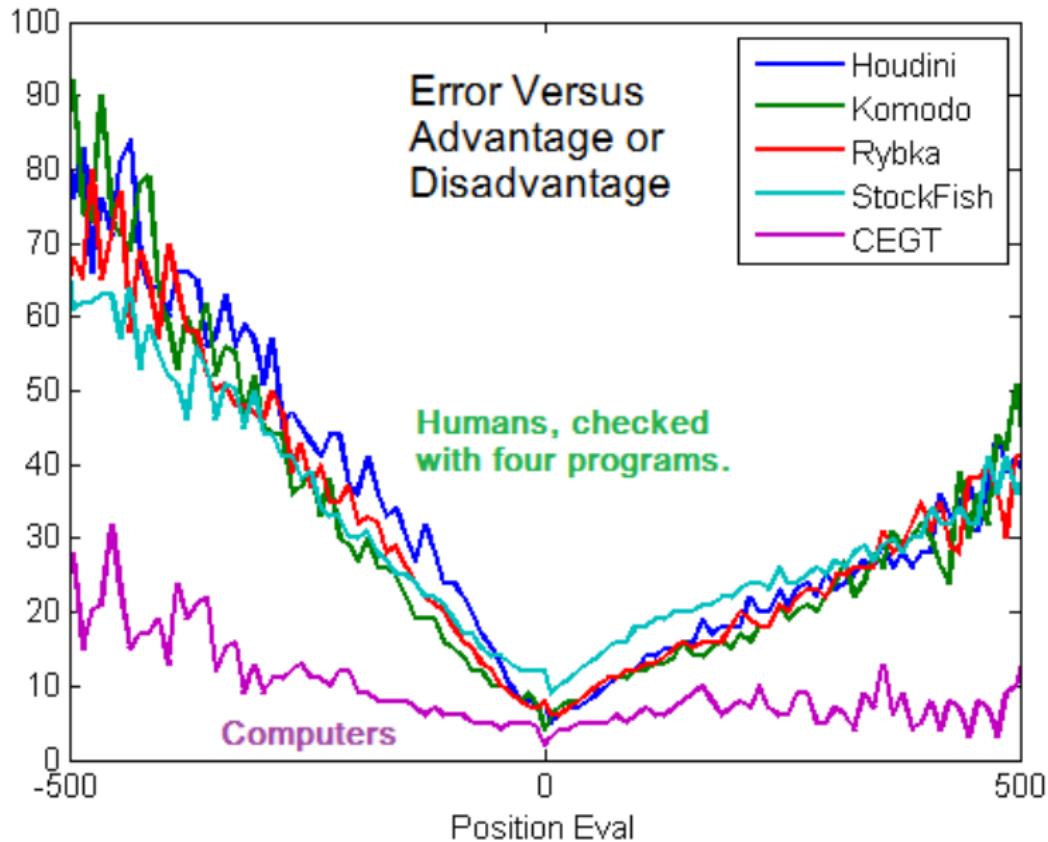
# Effect Absent in Computer Play



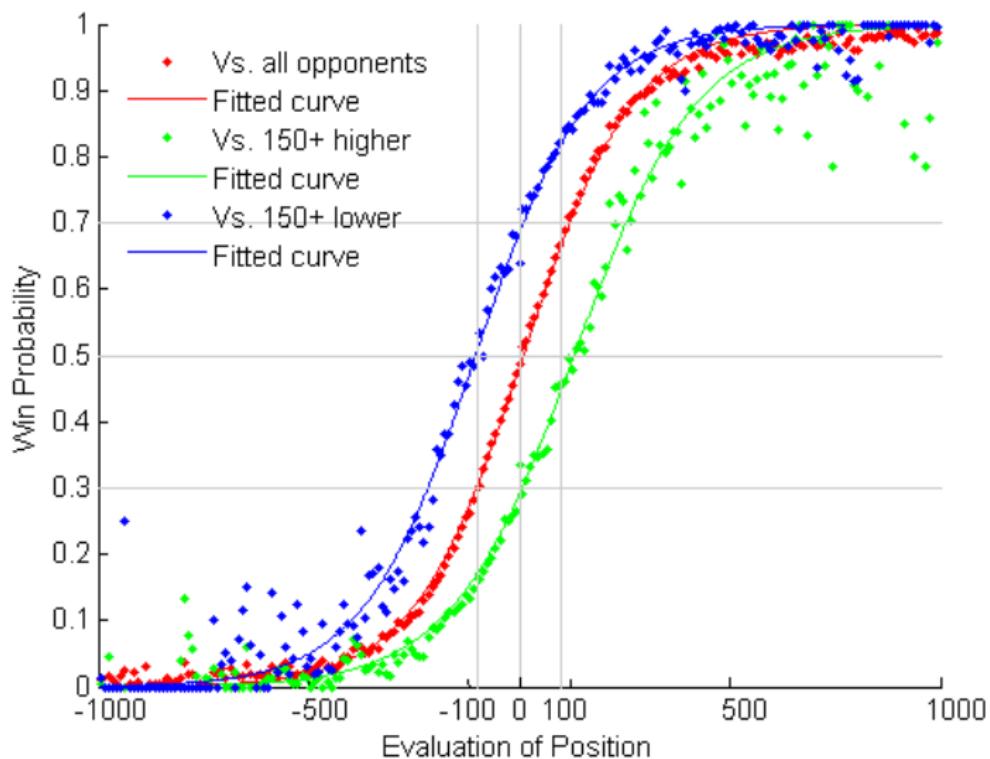
# Managing a Time Budget



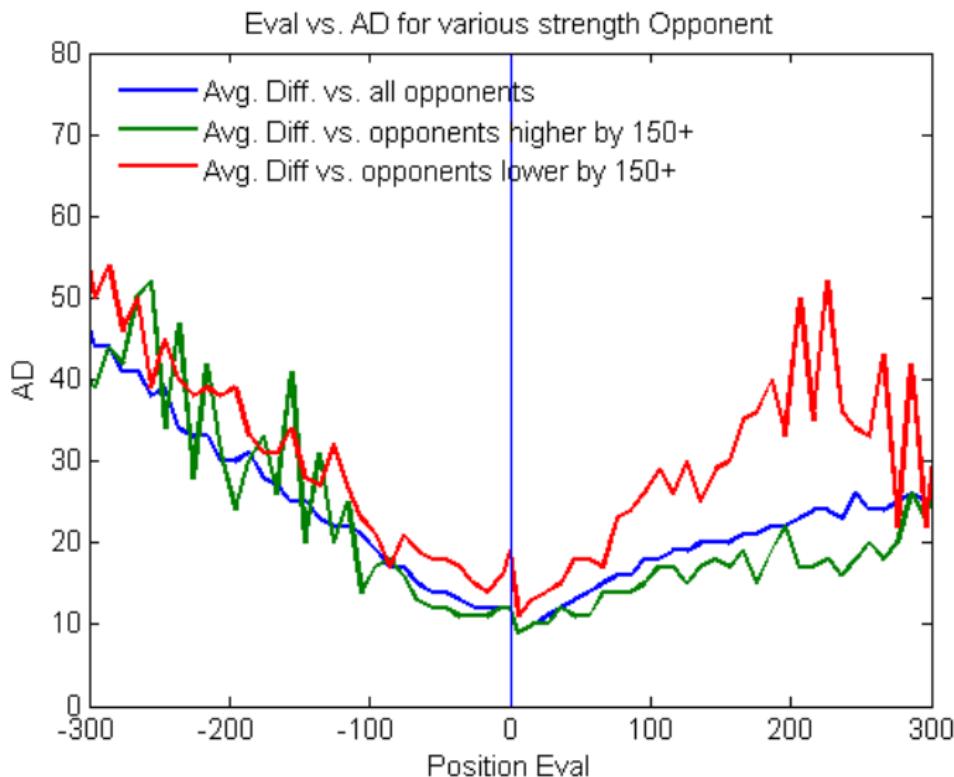
# Minding Nickels and Dimes



# Are We Psychological or Rational?



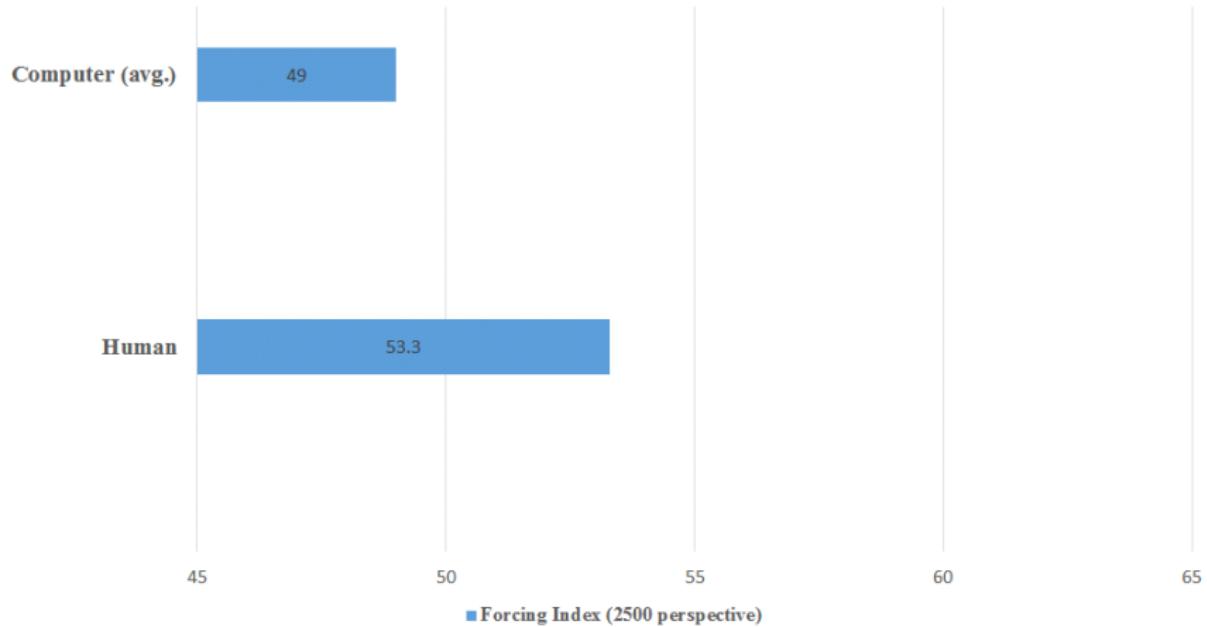
# Some Evidence for Psychological



Minima stay at 0.

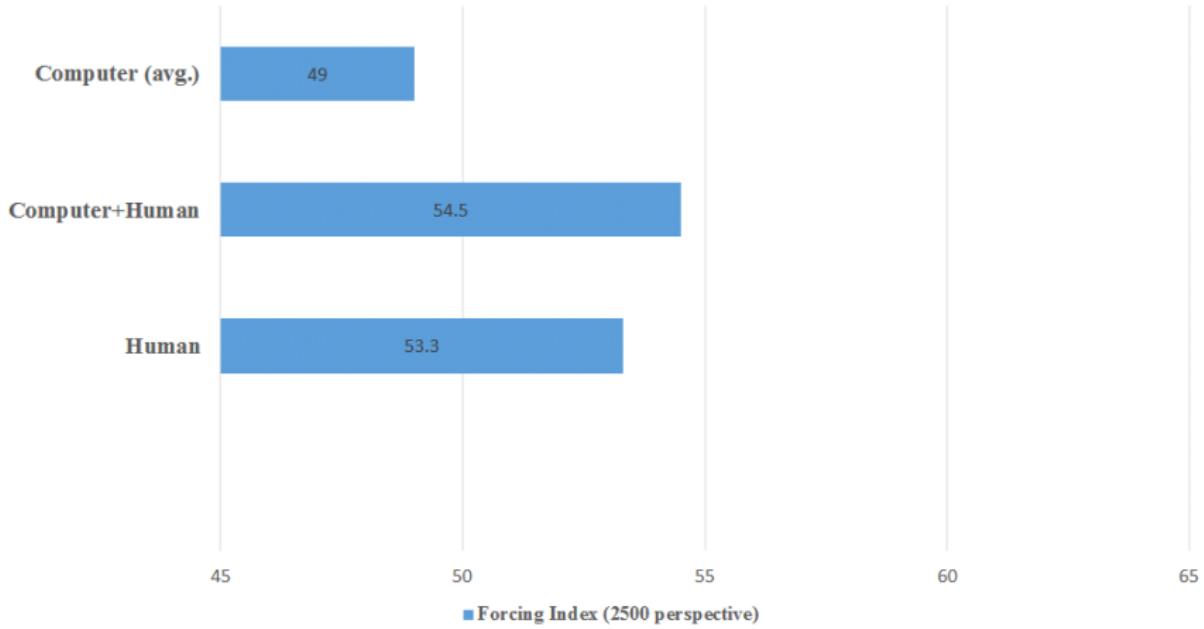
# Degrees of Forcing Play

## Forcing Index (2500 perspective)



# Add Human-Computer Tandems

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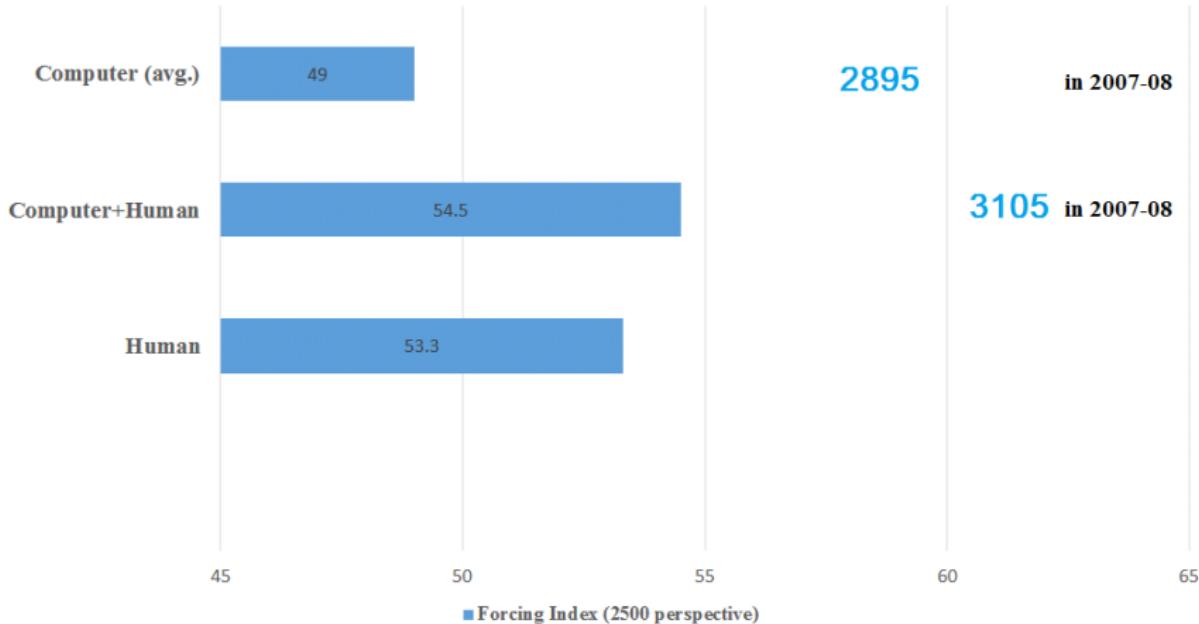
# Add Human-Computer Tandems



Evidently the humans called the shots. How was the quality?

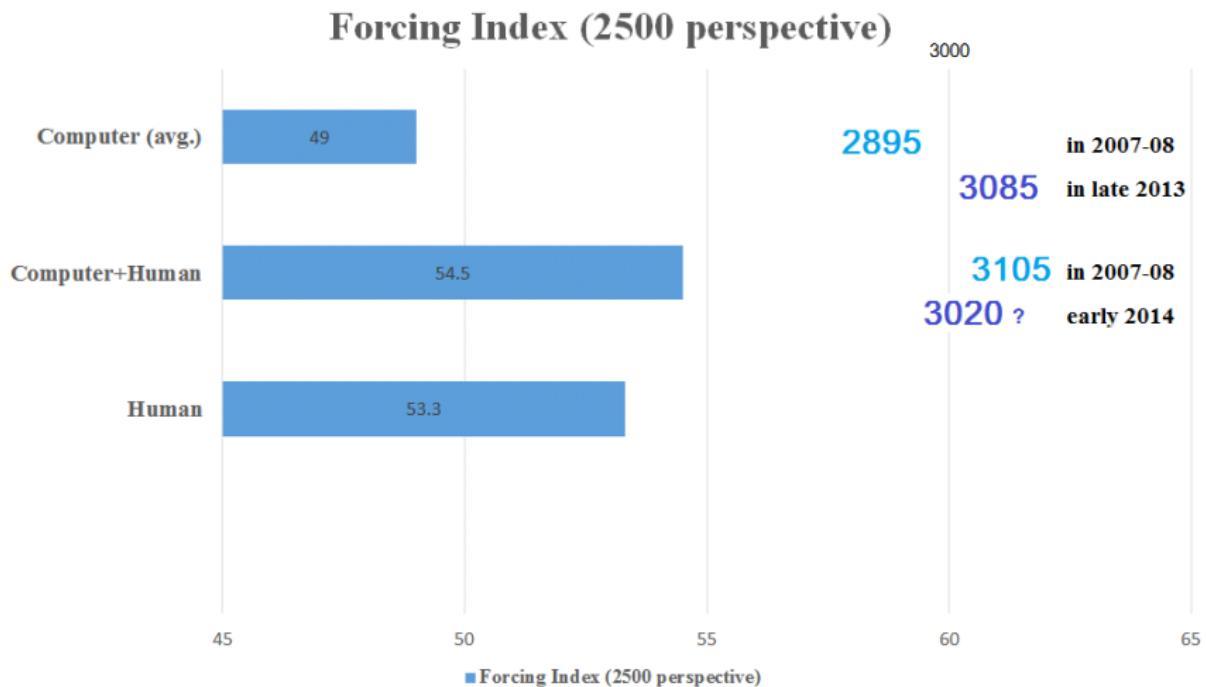
# 2007–08 Freestyle Performance

## Forcing Index (2500 perspective)



**Adding 210 Elo was significant. Forcing but good teamwork.**

# 2014 Freestyle Tournament Performance



2014: tandems marginally better W-L, but quality not clear...

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This could be the beginning of a beautiful relationship...