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The Effects of Autonomy in Mechanical Prediction on Perceived Stakeholder Perceptions

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1. Introduction

- In personnel selection, applicant information can be combined in two ways [1]:
 - **Holistic prediction** (HP); information is subjectively combined in the mind
 - **Mechanical prediction** (MP); information is combined with an algorithm
- MP is more valid than HP [2], but rarely used due to the "threat of technological unemployment" (TOTU) [3]; decision makers fear negative stakeholder evaluations.
- We expected autonomy-enhancing prediction procedures (holistically adjusting predictions from a prescribed algorithm and self-designing the algorithm) to result in:
 - Improved decision-makers' perceived stakeholder perceptions, compared to using a prescribed algorithm.
 - Higher predictive validity, compared to pure holistic prediction.

2. Method

- **Participants:** $N = 269$ MTurk participants with experience in making hiring decisions.
- **Procedure:** Participants made 40 performance predictions based on applicants' GMA and conscientiousness test scores, and an unstructured interview rating.
- **Between-subjects design:** The approach to making performance predictions was varied in four conditions.
 - *Holistic*: Predict performance holistically.
 - *Holistic adjustment*: Holistically adjust the prediction from a prescribed algorithm.
 - *Self-designed algorithm*: Determine predictor importance by assigning percentage weights to predictor scores.
 - *Prescribed algorithm*: Strictly use predictions from a prescribed algorithm.

3.1 Results - Perceived stakeholder perceptions

- Retaining autonomy (vs. using a prescribed algorithm) generally improved decision-makers' perceived stakeholder perceptions:

Variable	Cohen's d	95% HDI
Personal control	0.96	[0.67, 1.25]
Locus of causality	0.38	[0.10, 0.66]
Perceived competence	0.77	[0.49, 1.06]
TOTU	0.14	[-0.14, 0.42]
Use intentions	0.28	[0.00, 0.56]

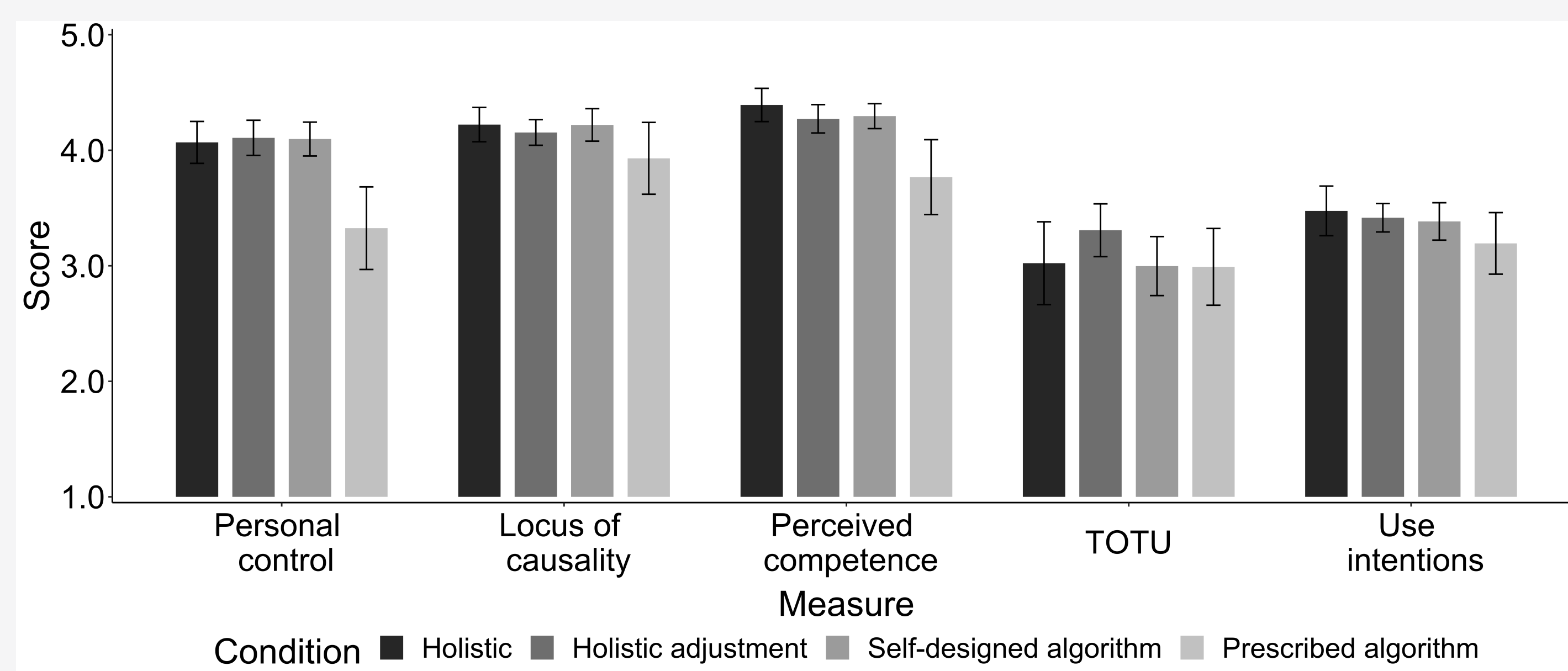


Figure 1: Mean scores per outcome measure and condition. Error bars are 95% CIs.

3.2 Results - Predictive validity

- Autonomy-enhancing prediction procedures resulted in more valid predictions than holistic predictions ($d = 1.10$, 95% HDI [0.82, 1.37]).

Condition	\bar{r}	95% CI
Holistic	.16	[.11, .21]
Holistic adjustment	.28	[.25, .30]
Self-designed algorithm	.31	[.30, .32]
Prescribed algorithm	.36	-

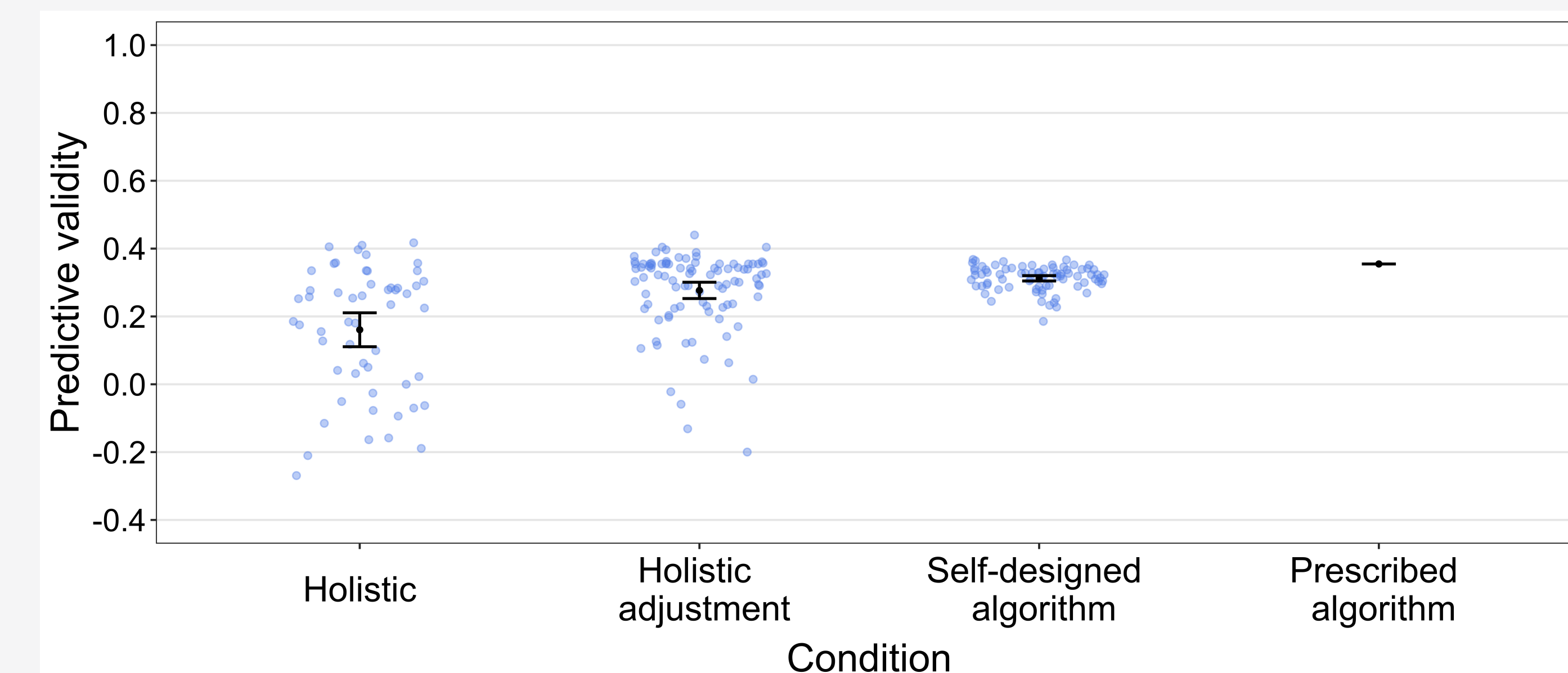
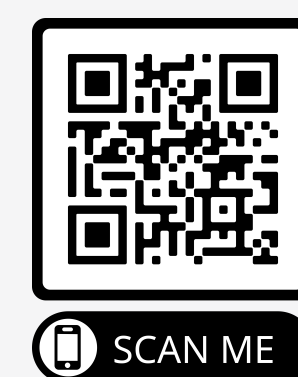


Figure 2: Mean predictive validity per condition with jittered individual correlations. Error bars are 95% CIs.

4. Discussion and Conclusion

- Holistically adjusting predictions from a prescribed algorithm or self-designing an algorithm can improve algorithm use and validity in practice

- Wondering how to design your own algorithm? Check out this app!



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5. References

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