

Are patients willing to let computers replace physicians? Effects of AI accuracy, wait time, and severity on willingness to use AI in healthcare

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INTRODUCTION

Artificial intelligence (AI) has the potential to reduce healthcare costs and increase quality of care by providing fast, accurate, and consistent screening, diagnosis and treatment (Racine et al., 2019). AI healthcare may be particularly beneficial where human doctors are in short supply. **Algorithm aversion** (Dietvorst et al., 2015), however, is feared to prevent patients from embracing health-related AI. Other research notes that AI is sometimes embraced, particularly when AI accuracy is high (Pezzo & Beckstead, 2020a).

We hypothesized that participants would be most willing to use an AI when wait time for the human provider is long, severity is low, and AI accuracy surpasses that of a human.

EXPERIMENT 1

Scenario. You go to see a doctor with varying (80% or 90%) **accuracy** about a skin condition of varying **severity** (suspicious mole or rash) and varying office **wait time** (30 min, 1hr, or 2hr+). To avoid a wait, you can use an AI device instead (see image 1).

Ss were informed how the AI works and about the diagnostic training of the doctor.

Measure. “What is the *minimum* accuracy you would require of the AI to use it instead of the doctor?” (Rating scale slider was anchored at either 50% or 100%)

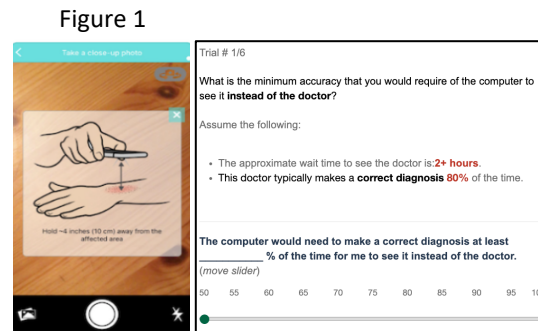


Figure 1

Design. 3 x 2 x 2 x 2 (mixed). Each S rated 6 scenarios (wait time x doctor accuracy). Severity (mole vs rash) and was manipulated between subjects. Anchor (50 or 100%) was manipulated between subjects. Total N = 408.

Results. As predicted, minimum required accuracy to use AI instead of doctor was lower when . . .

- doctor accuracy was low ($\eta^2_p = .51$)
- wait times were long ($\eta^2_p = .15$)
- condition severity was low ($\eta^2_p = .02$)
- No main effect of anchor
- *Subjects were willing to accept AI with accuracy lower (!) than the doctor when both wait time and doctor accuracy were high.*

EXPERIMENT 2

Method. We used the same scenario as in E1, but participants were asked to choose between the doctor and AI device.

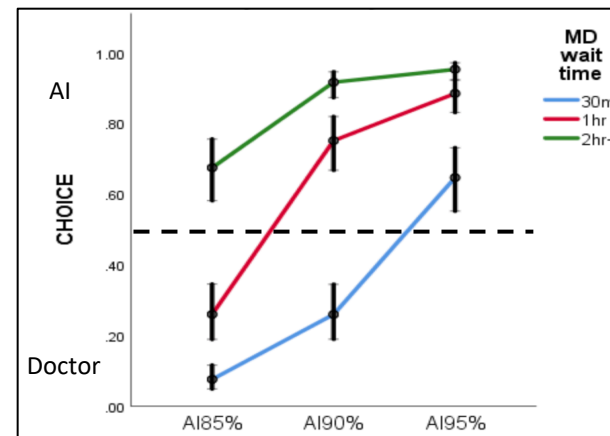
Doctor accuracy was fixed at 90%. AI accuracy was either below (85%), equal to (90%), or better than the doctor (95%). The skin condition was fixed (mole).

Design. 3 x 3 x 2 within subject design. Each S made 18 choices (wait time x AI accuracy x severity). Logistic regression was used. Total N = 196

Results. See Figure 2. All points on Y-axis above 50% choice indicate preference for AI over doctor. As predicted, Ss were more willing to choose AI when . . .

- AI accuracy increased ($\eta^2_p = .11$).
- Wait time increased ($\eta^2_p = .12$)
- Severity was lower ($\eta^2_p = .05$)
- *Subjects were willing to chose AI with inferior accuracy (85%) to offset a 2hr+ wait time.*

Figure 2



DISCUSSION

Many studies demonstrating algorithm aversion have either neglected to provide accuracy information or set AI and human accuracy to be equal. Further, a number of studies incorrectly state that even when AI outperforms doctors, people still prefer human doctors (Pezzo & Beckstead, 2020b)

The present research shows that participants consistently embrace AI over a human physician when AI accuracy was superior. Surprisingly, however, many participants (~65%) were willing to accept inferior AI accuracy when wait times were very long and severity of the condition is low.

Research to further replicate these findings and to examine the role of individual differences such as “uniqueness neglect” (Longoni et al., 2019) is ongoing.

References

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