

Detection of AI-Generated Images: A Mixed Methods Study on Age-Related Differences



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Background

- AI generated content is projected to occupy 10% of the internet by 2025 primarily in customer experience [4].
- AI growth brings challenges: AI may be used for creating and spreading misinformation.
- Age and analytical thinking have been identified as potential predictors of accuracy in misinformation detection in traditional media (i.e., news, [3,5]).

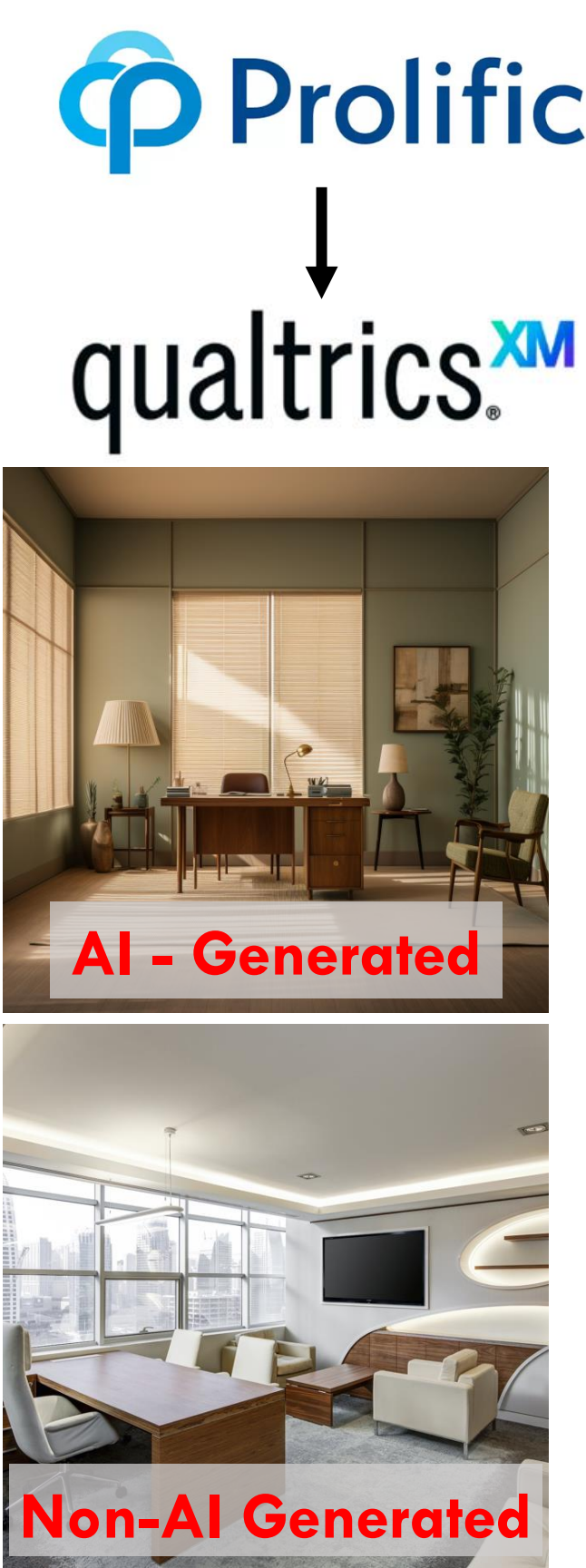
Research Question

Are there age-related differences in the ability to discern AI images from non-AI images?

Hypothesis

Older and Middle Adult age groups will experience lower accuracy (increased misses and false alarms) than the Young Adult age group.

Methods



Experimental Task

90 total trials.
45 trials per condition.
Shown until response (Median_{RT} = 3.69s).

CRT questionnaire [6]:
measures analytical thinking.

- 3 (Age Group) x 4 (Signal Detection) Within-Subjects ANCOVA with CRT as covariate.
- N = 190 (Male = 84, Female = 103, Other = 2)

Age Group	N	Real	Fake
Young Adult (18-39)	104	Hit	False Alarm
Middle Adult (40-59)	64		
Older Adult (60-89)	21		
Missing	1	Miss	Correct Rejection

Signal detection accuracy metrics.

Key Findings

- Older adults (M = 0.426, SD = 0.150) exhibited significantly higher false alarms than younger adults (M = 0.306, SD = 0.180, p = 0.007, n_{2p} = 0.053).
- Significant difference in correct rejections across age groups (p < .05, η²p = 0.035), but no significant post hoc comparisons.
- No significant effect of age on hits or misses.

Results of one-way ANCOVAs: Effects of Age on Signal Detection, Controlling for CRT Score.

ANCOVA	Dependent Variable	df	F	p	η ² _p
Effect of Age on False Alarms, Controlling CRT Score	False Alarm Rate	2, 183	5.10	0.007*	0.053
Effect of Age on Hits, Controlling CRT Score	Hit Rate	2, 183	0.858	0.426	0.009
Effect of Age on Misses, Controlling CRT Score	Miss Rate	2, 183	1.682	0.189	0.018
Effect of Age on Correct Rejections, Controlling CRT Score	Correct Rejection Rate	2, 183	3.321	0.038*	0.035

Note. Type III Sum of Squares. *p<.05. **p<.001.

Post Hoc Comparisons - Effect of age on rate of false alarms.

	Mean Difference	SE	t	Cohen's d	P _{bonf}
Young Adult Middle Adult	-0.055	0.028	-1.98	-0.317	0.148
Older Adult	-0.121	0.041	-2.927	-0.701	0.012*
Middle Adult Older Adult	-0.066	0.044	-1.524	-0.384	0.388

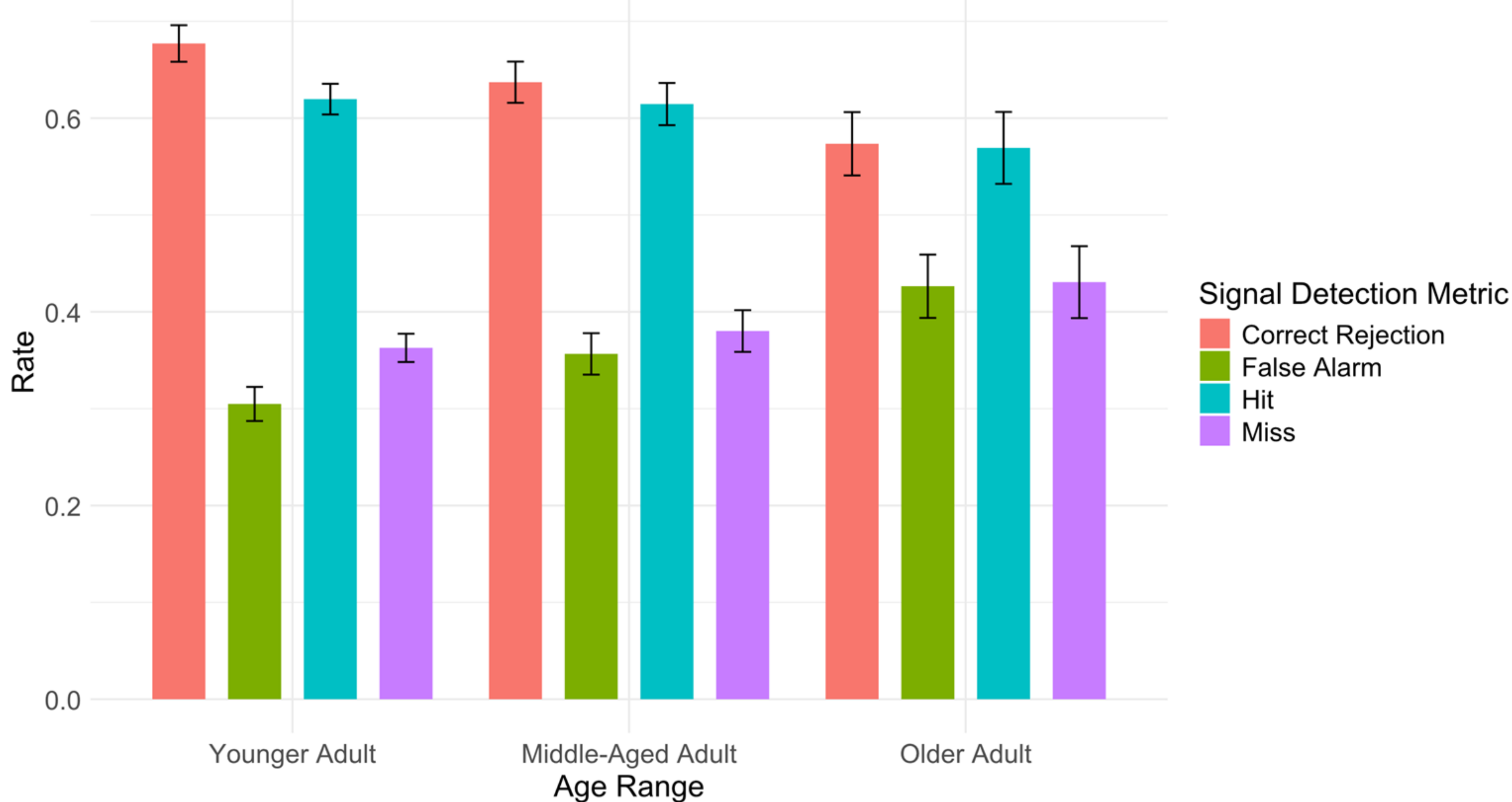
Note. P-value adjusted for comparing a family of 3. * p < .05

Post Hoc Comparisons - Effect of age on rate of correct rejections.

	Mean Difference	SE	t	Cohen's d	P _{bonf}
Young Adult Middle Adult	0.043	0.029	1.509	0.242	0.399
Older Adult	0.103	0.043	2.404	0.576	0.052
Middle Adult Older Adult	0.06	0.045	1.326	0.334	0.559

Note. P-value adjusted for comparing a family of 3

Signal Detection Rates by Age Group with Std. Error Bars



Key Takeaways

- Older adults were more sensitive to AI-generated images**, challenging assumptions of age-related vulnerability to misinformation.
- Higher false alarm rates** in older adults suggest increased **AI image sensitivity** as a potential protective factor.
- Older adults had a **higher**, though non-significant, **rate of correctly rejecting** fake AI images.
- Taken together, these suggest **older adults may have more conservative sensitivity bias (B)** in judging image authenticity.
- Findings **align with previous research** suggesting older adults' conservative response biases in decision-making [1,2].
- Future models should **account for older adults' sensitivity** to misinformation.
- Main limitations:** limited image set size, small number of older adults in sample.

Conclusion

Our findings suggest that older adults may exhibit heightened sensitivity to AI-generated images, compared to other age groups. This aligns with some established patterns of cautious decision-making in older adult age groups and could serve as a protective factor in AI interactions.

References

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