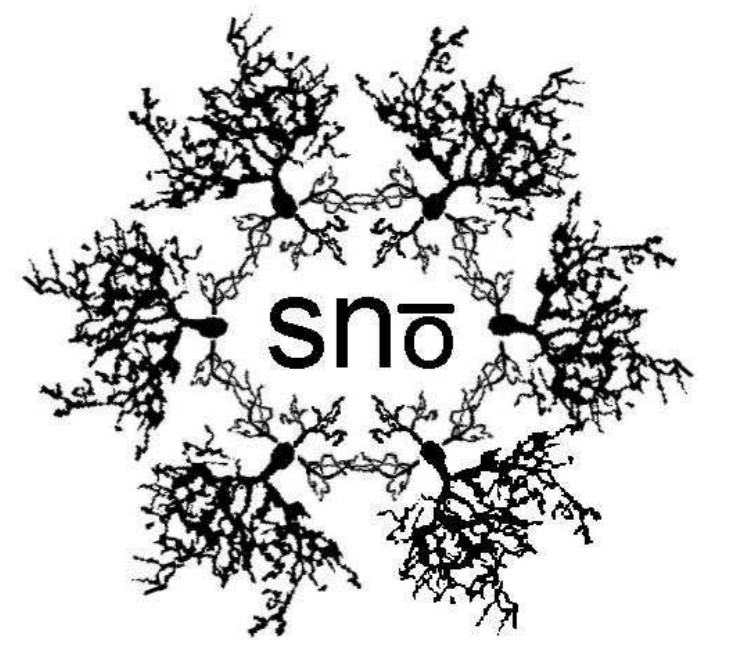




# Reconciling Single-process and Two-process Accounts of Item Recognition

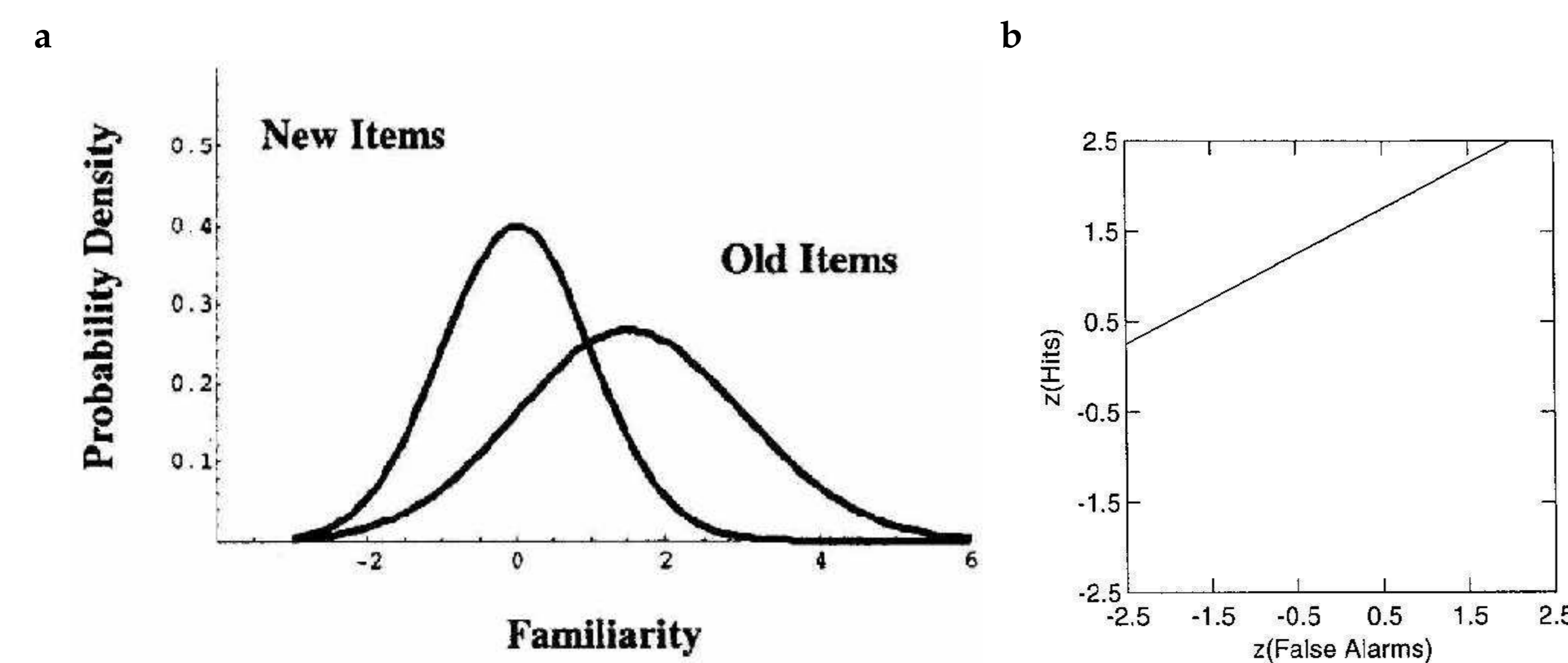
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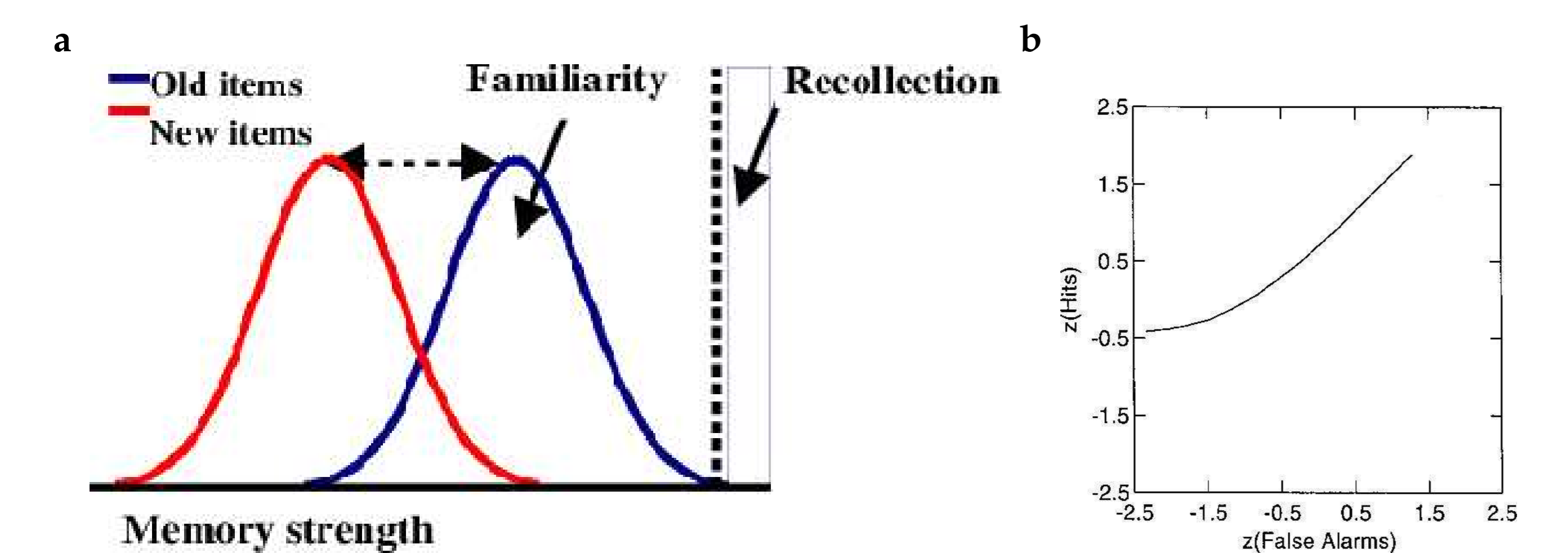
## Introduction

- Some theorists have proposed that two distinct processes support item recognition (Yonelinas, 2002). However, the single-process Normal Unequal Variance (NUV) model typically provides a better fit to ROC data (Heathcote, 2003; Wixted, In press).
- Recent studies (Sherman, Atri, Hasselmo, Stern, & Howard, 2003; Howard, Bessette-Symons, Zhang, & Hoyer, 2006) have consistently shown concave zROC curves and superior fits for the Yonelinas High Threshold (YHT) model using picture as stimuli in an item recognition task.
- Perhaps the discrepancy is due to the use of pictures as stimuli?

## NUV Model



## YHT Model



## Method

- Material: words & pictures as a between-subject variable
- 131 subjects in the word condition, 136 for pictures
- 8 keys to demonstrate confidence level: z d f v m k l /
- 6 lists of 64 items. 128 probes, half old, half new in random order.

## references

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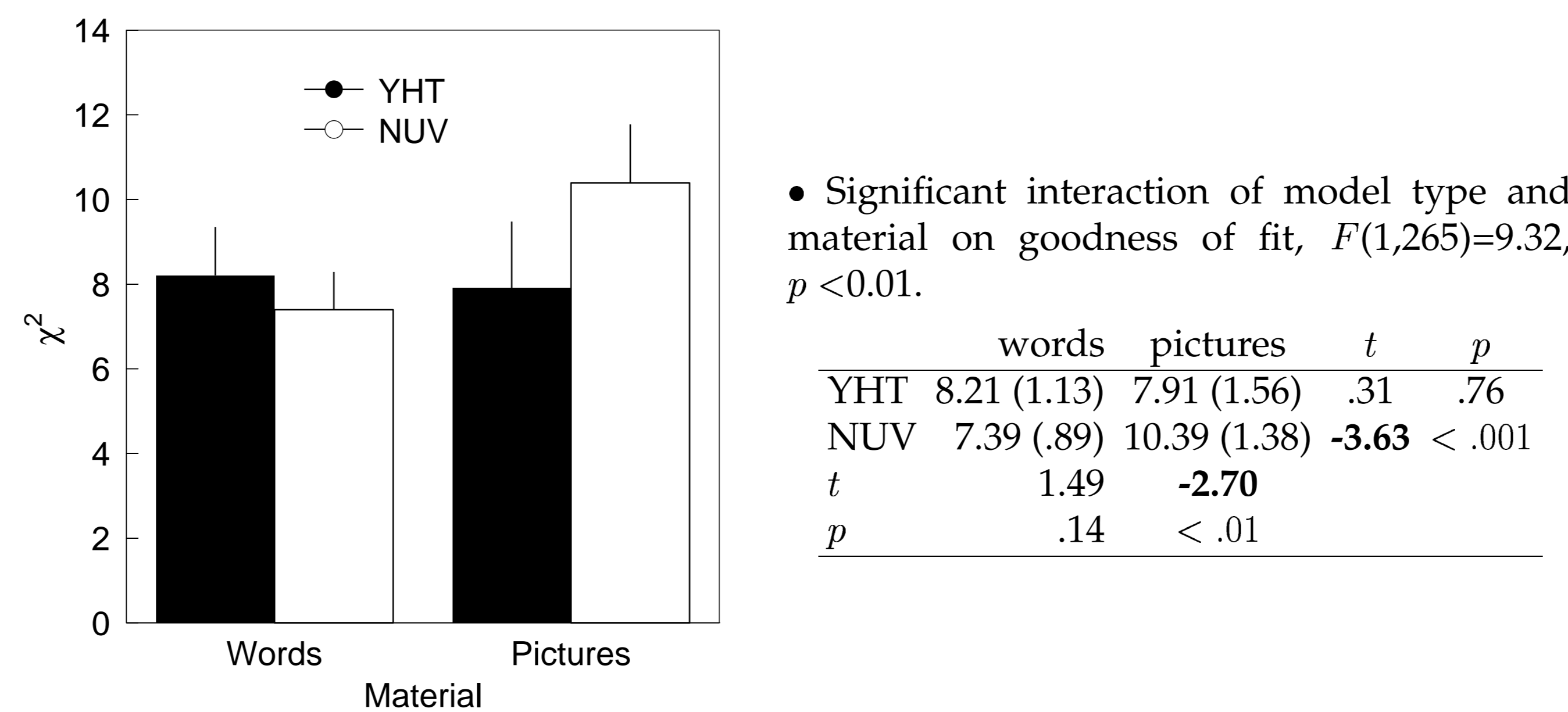
Howard, M. W., Bessette-Symons, B., Zhang, Y., & Hoyer, W. J. (2006). Aging selectively impairs recollection in recognition memory for pictures: evidence from modeling and receiver operating characteristic curves. *Psychology and Aging*, 21(1), 96-106.

Sherman, S. J., Atri, A., Hasselmo, M. E., Stern, C. E., & Howard, M. W. (2003). Scopolamine impairs human recognition memory: Data and modeling. *Behavioral Neuroscience*, 117, 526-539.

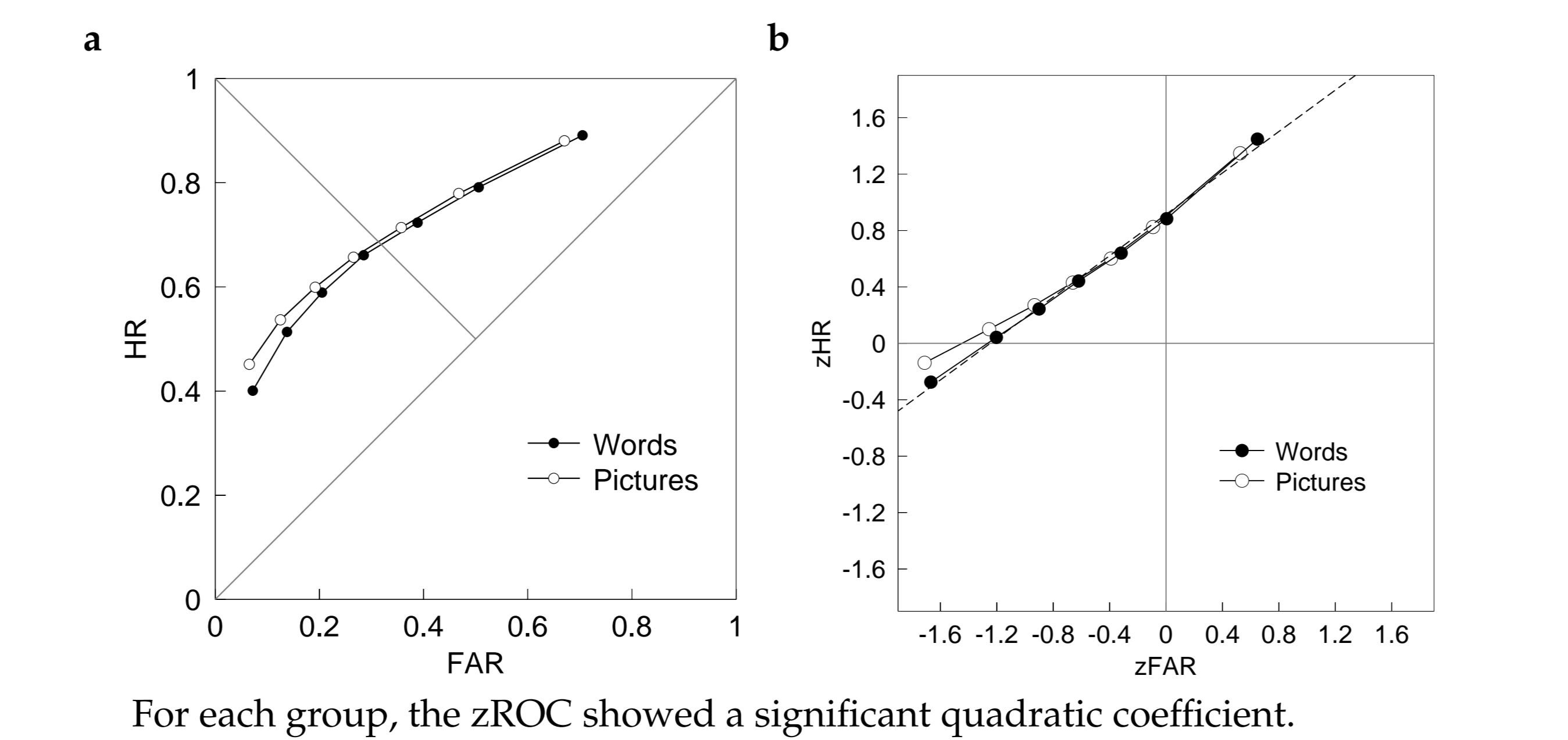
Wixted, J. T. (In press). Dual-process theory and signal-detection theory of recognition memory. *Psychological Review*.

Yonelinas, A. P. (2002). The nature of recollection and familiarity: A review of 30 years of research. *Journal of Memory and Language*, 46(3), 441-517.

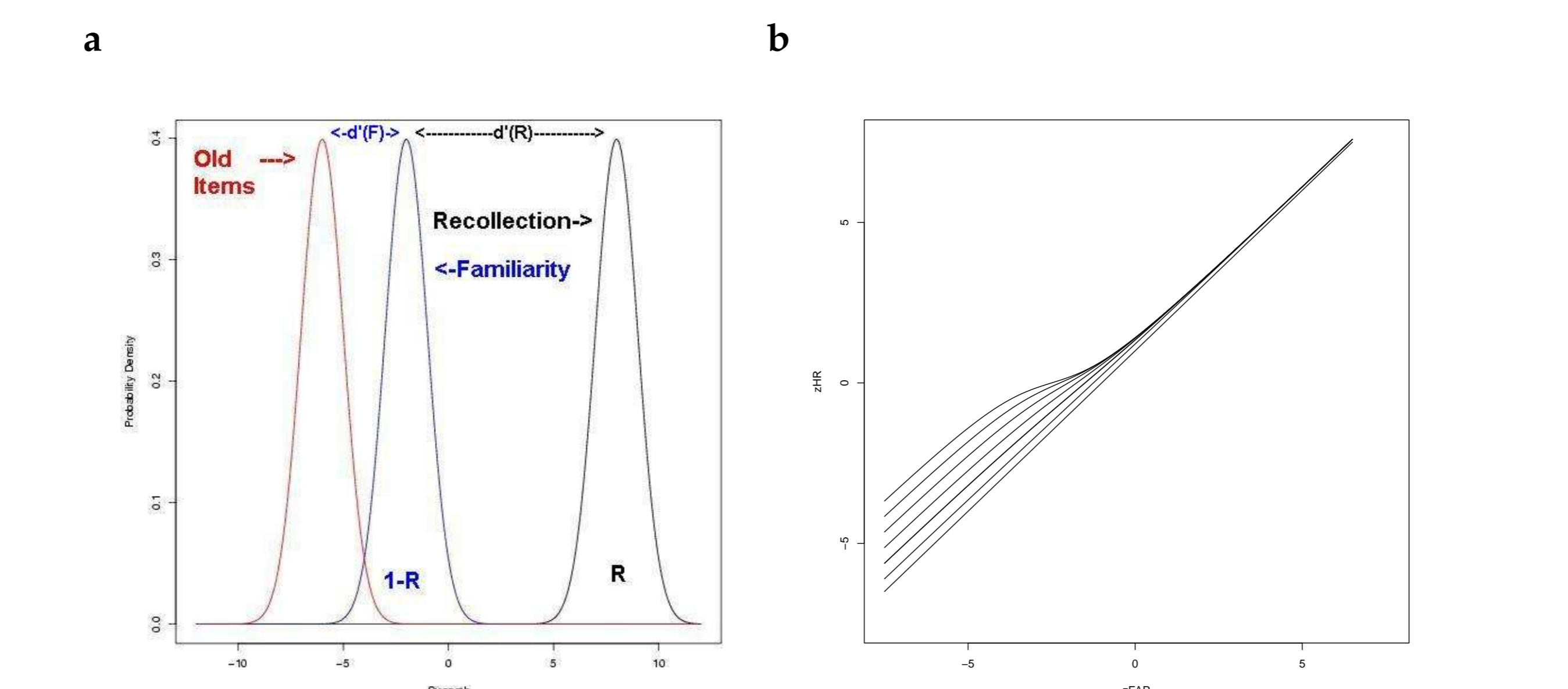
## Model Fits depend on materials



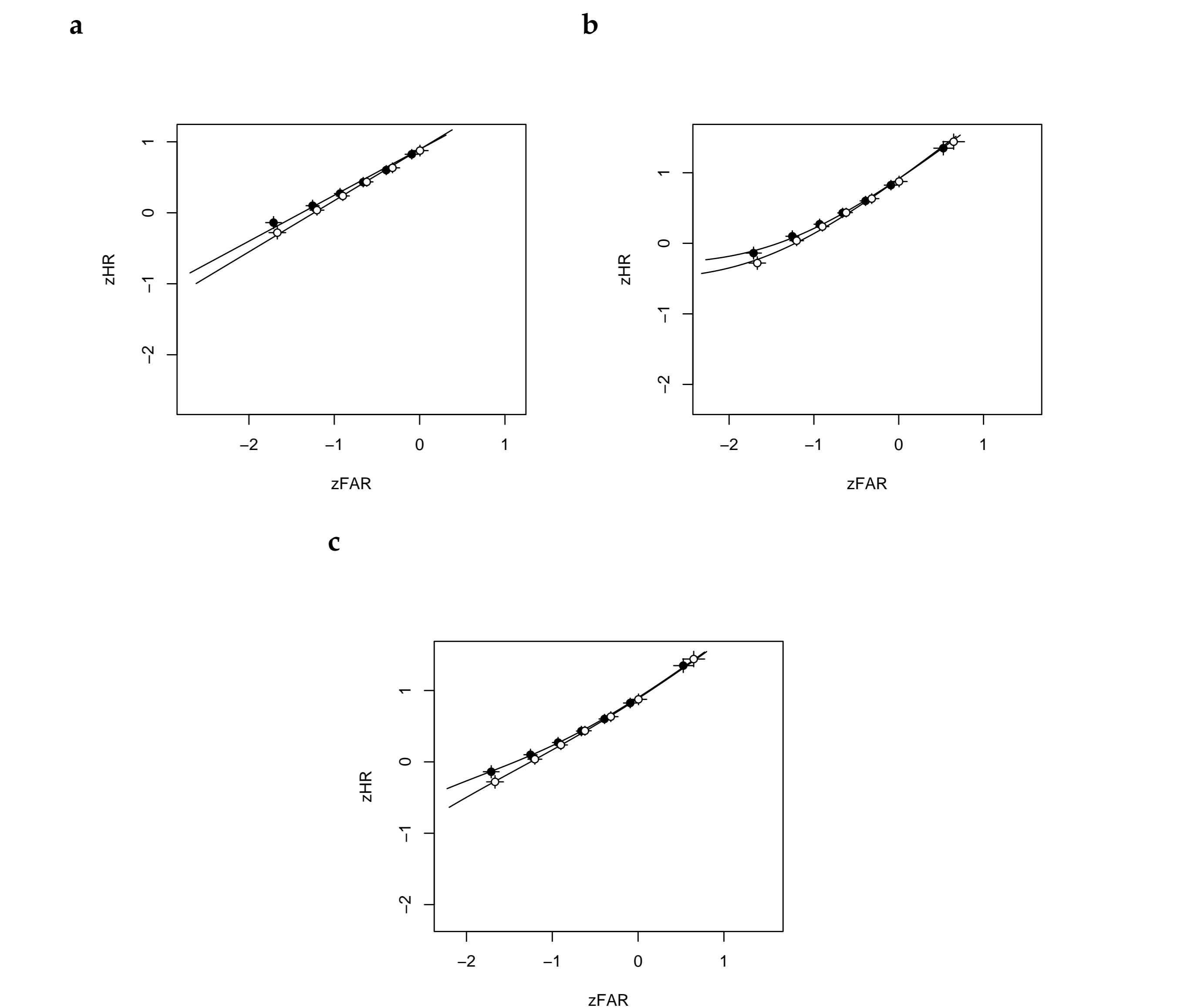
## Curvilinear zROCs for words and pictures



## VRM/Mixture (DeCarlo, 2002)



## Model Comparisons



Fits of models to average zROC curves. Data from the word condition are shown as open symbols. Data from the picture condition are shown as filled symbols. The error bars are 95% confidence intervals in each dimension treated independently. a. NUV model. b. YHT model. c. VR model.

## chi-squared for fits of models to individual response distribution

	Parameters	Words	Pictures
NUV	2	7.8 (.5)	11.2 (.8)
YHT	2	8.7 (.6)	7.9 (.6)
VR, $d'_F = 0$	2	6.7 (.4)	8.6 (.7)
NUV encoding failure	3	5.5 (.3)	6.9 (.5)
VR	3	5.1 (.3)	4.9 (.3)

VRM/Mixture fits better than either the NUV for words ( $\chi^2(120)=323.0$ ,  $p < .001$ ) or the YHT for Pictures ( $\chi^2(118)=356.6$ ,  $p < .001$ ).

## Conclusion

- The YHT fits better than the NUV for pictures.
- The NUV fits better than the YHT for words.
- The VRM/Mixture model fits better than either across materials.

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