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Using Contemporary Psychometrics to Enhance the CNB and GOASSESS

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UPenn Psychiatry
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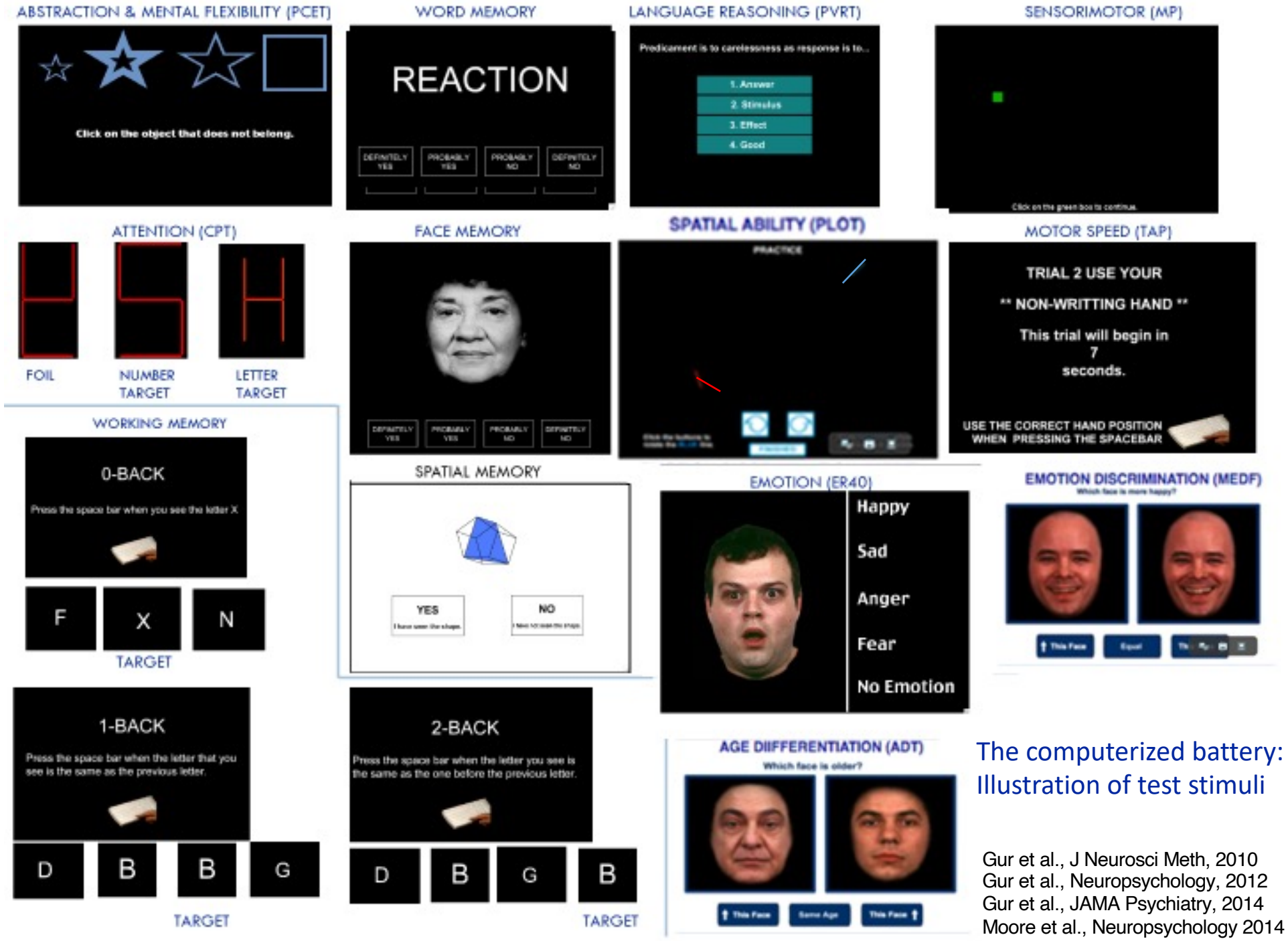
Perelman School of Medicine
Penn Psychiatry



The computerized battery:
Illustration of test stimuli

Gur et al., J Neurosci Meth, 2010
Gur et al., Neuropsychology, 2012
Gur et al., JAMA Psychiatry, 2014
Moore et al., Neuropsychology 2014

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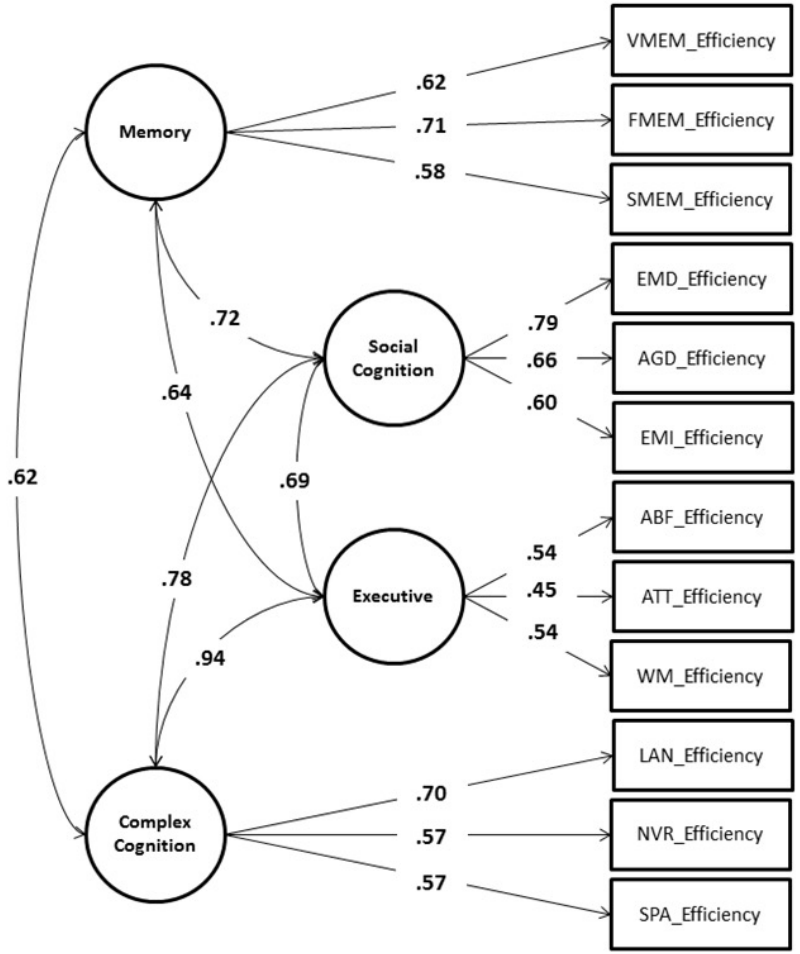
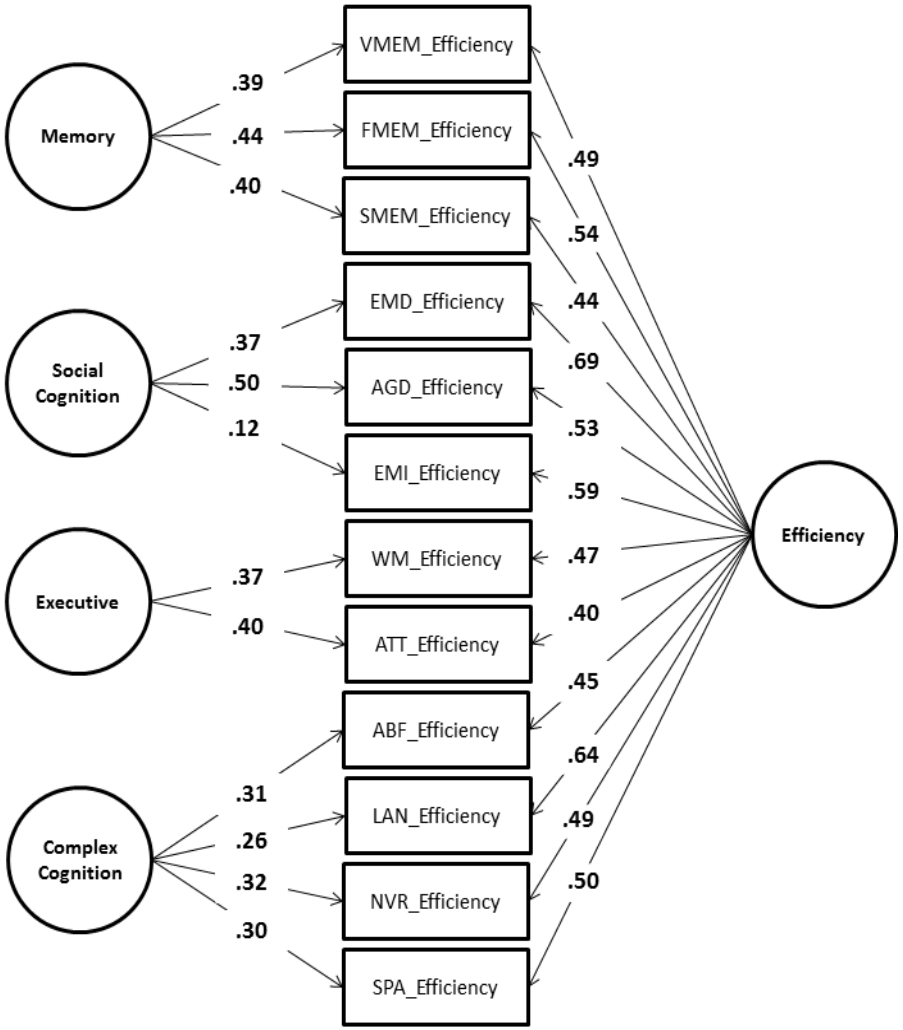
Penn Computerized Neurocognitive Battery



Note. Results are standardized such that the variance of the latent variables is 1.00. All coefficient estimates are significant with standard errors of 0.01.



Note. Results are standardized such that the variance of the latent variables is 1.00. All coefficient estimates are significant with all standard errors < 0.06.

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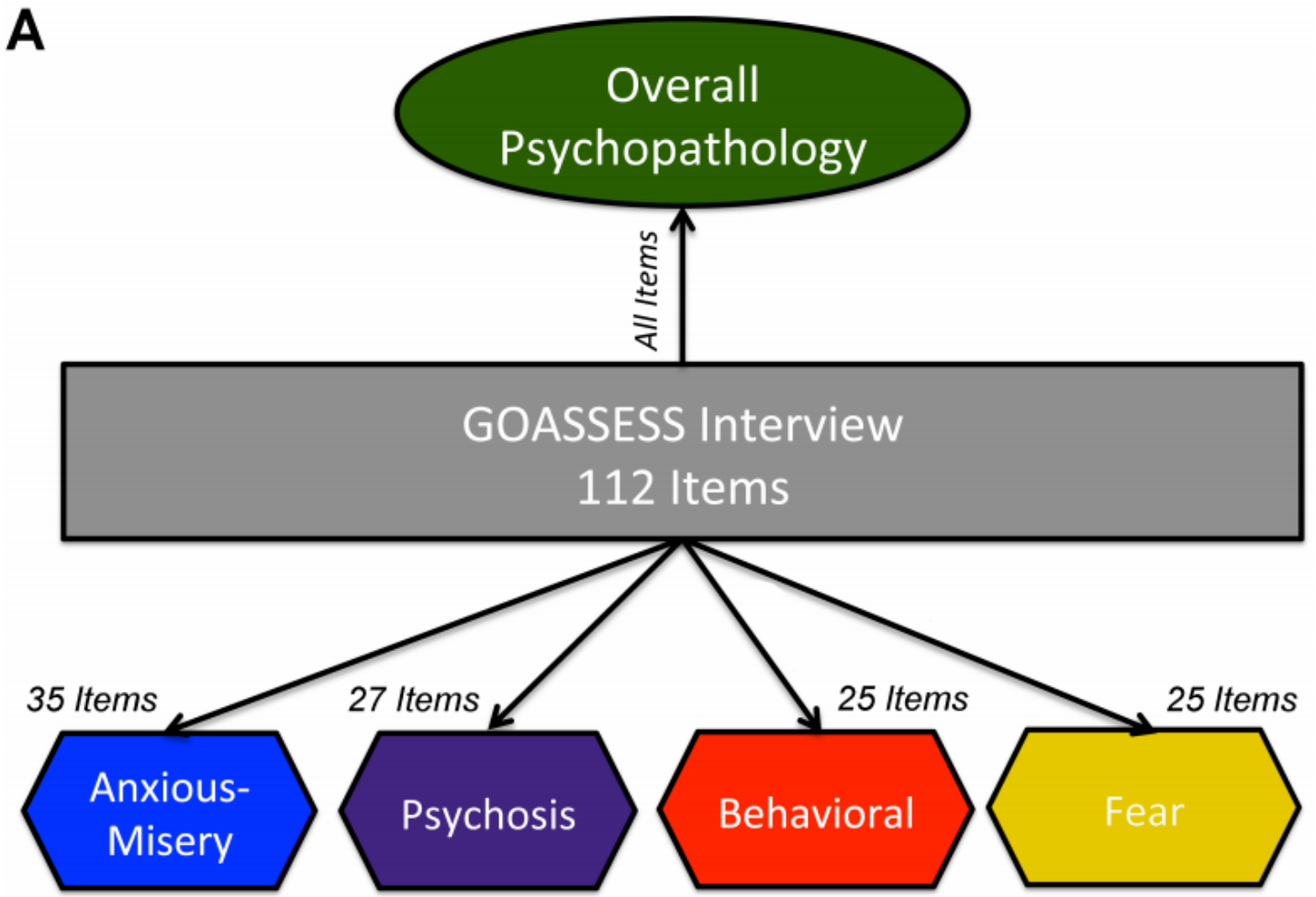
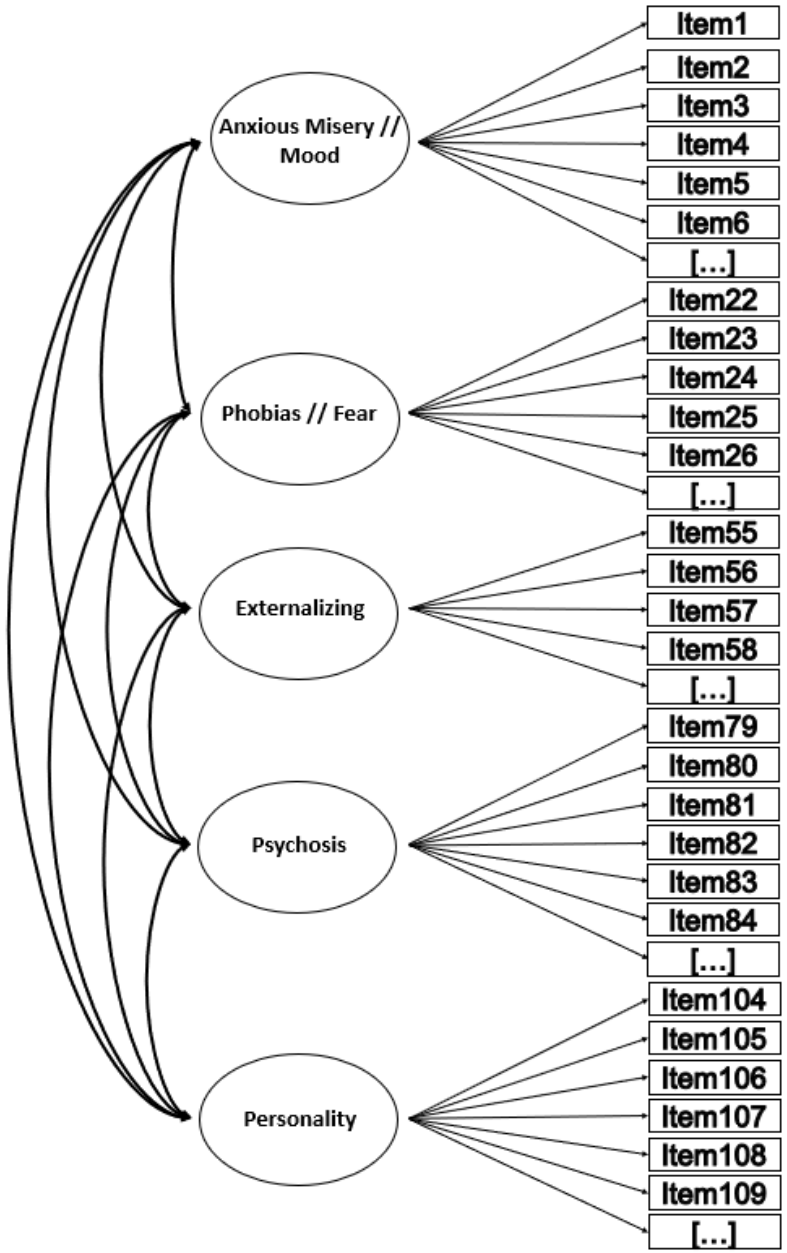
GOASSESS



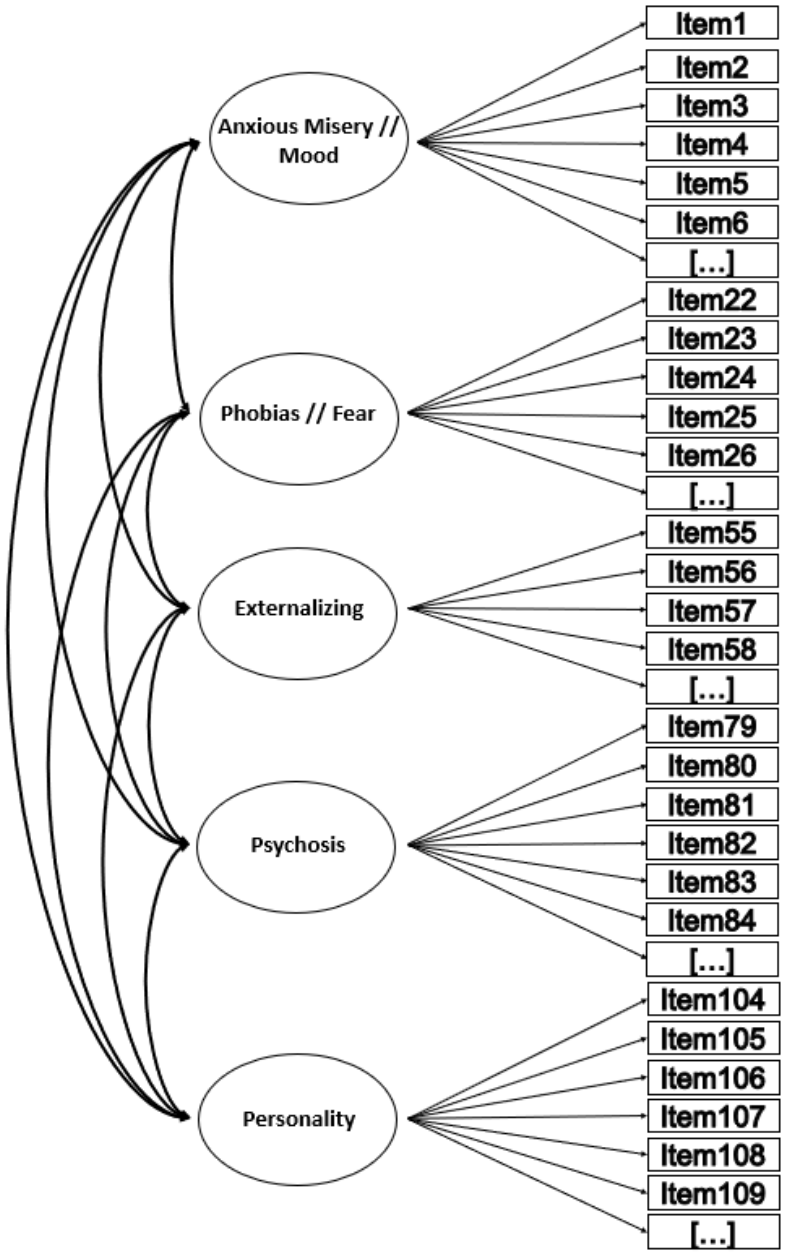
Section	Question
ADHD	Did you often have problems following instructions and often fail to finish school, work, or other things you meant to get done?
Agoraphobia	Have you ever been very nervous or afraid of being in an open field?
Conduct Disorder	Was there ever a time when you did things that got you into trouble with adults like lying or stealing or breaking rules?
Depression	Has there ever been a time when you cried a lot, or felt like crying?
Psychosis	I have had the experience of hearing faint or clear sounds of people or a person mumbling or talking when there is no one near me.

Now with personality disorders!

GOASSESS


Anxious Misery // Mood
Phobias // Fear
Externalizing
Psychosis
Personality
Item1
Item2
Item3
Item4
Item5
Item6
[...]
Item22
Item23
Item24
Item25
Item26
[...]
Item55
Item56
Item57
Item58
[...]
Item79
Item80
Item81
Item82
Item83
Item84
[...]
Item104
Item105
Item106
Item107
Item108
Item109
[...]

GOASSESS



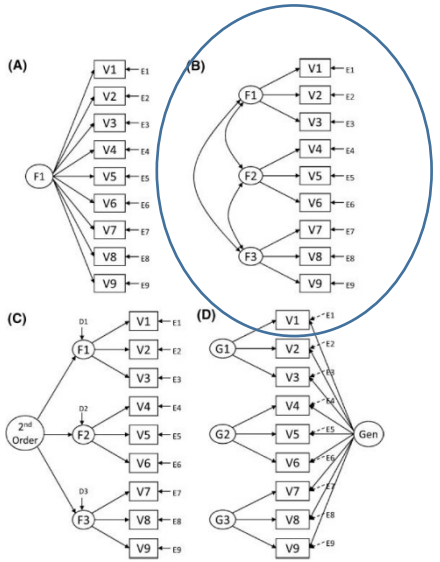


FIGURE 1.—Model A, a unidimensional model; Model B, a correlated traits model; Model C, a second-order model; and Model D, a bifactor model. F = factor; E = error; D = disturbance; V = measured variable.

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Table 1. Tests and scales used in the construction of the CAT-CCNB.

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Item Response Theory

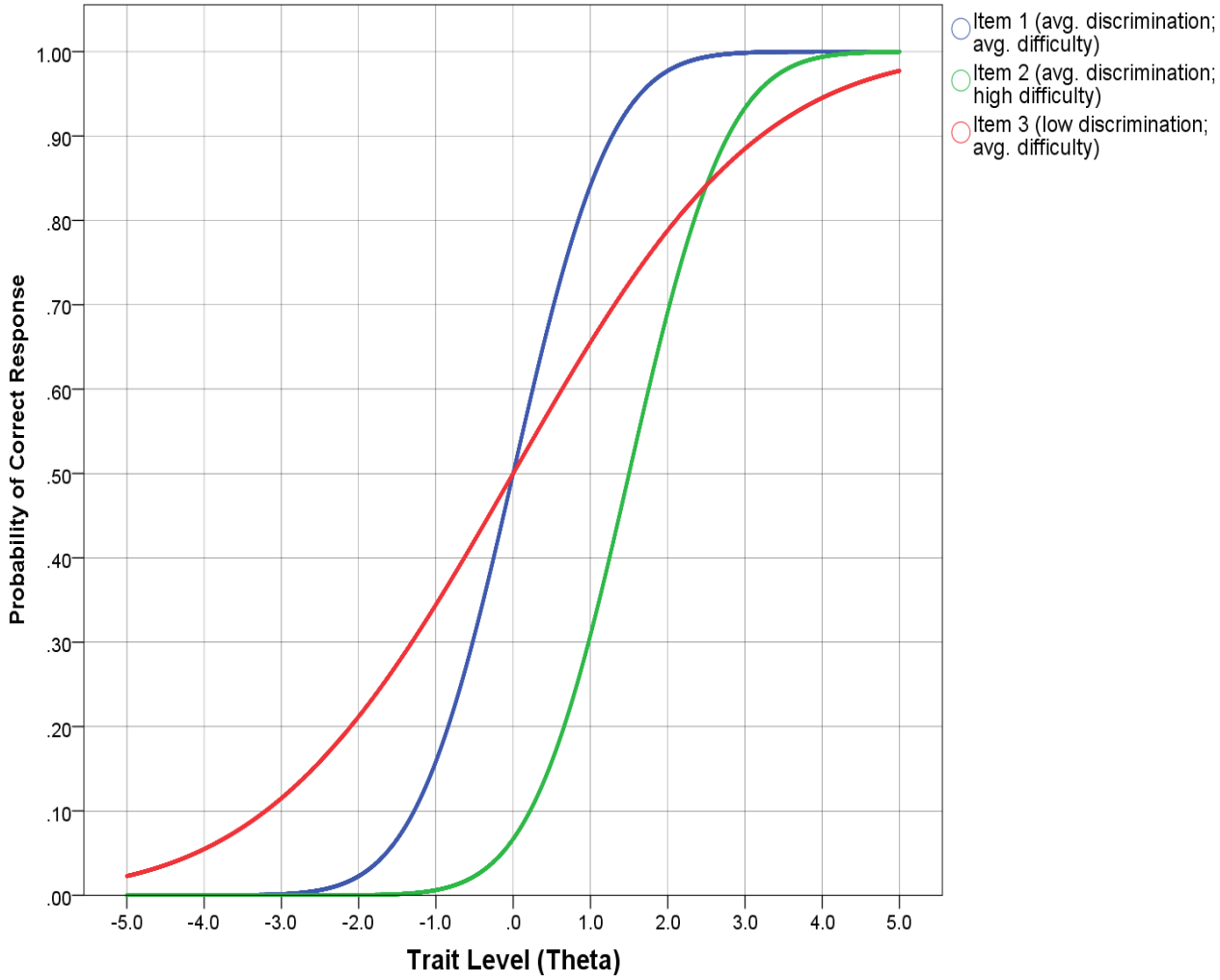
Ability (person)

Difficulty (item)

$$p(x_j = 1 | \theta, \beta_j, \alpha_j) = \frac{e^{\alpha_j(\theta - \beta_j)}}{1 + e^{\alpha_j(\theta - \beta_j)}}$$

Discrimination (item)

$$I(\theta) = a_i^2 p_i(\theta) q_i(\theta)$$



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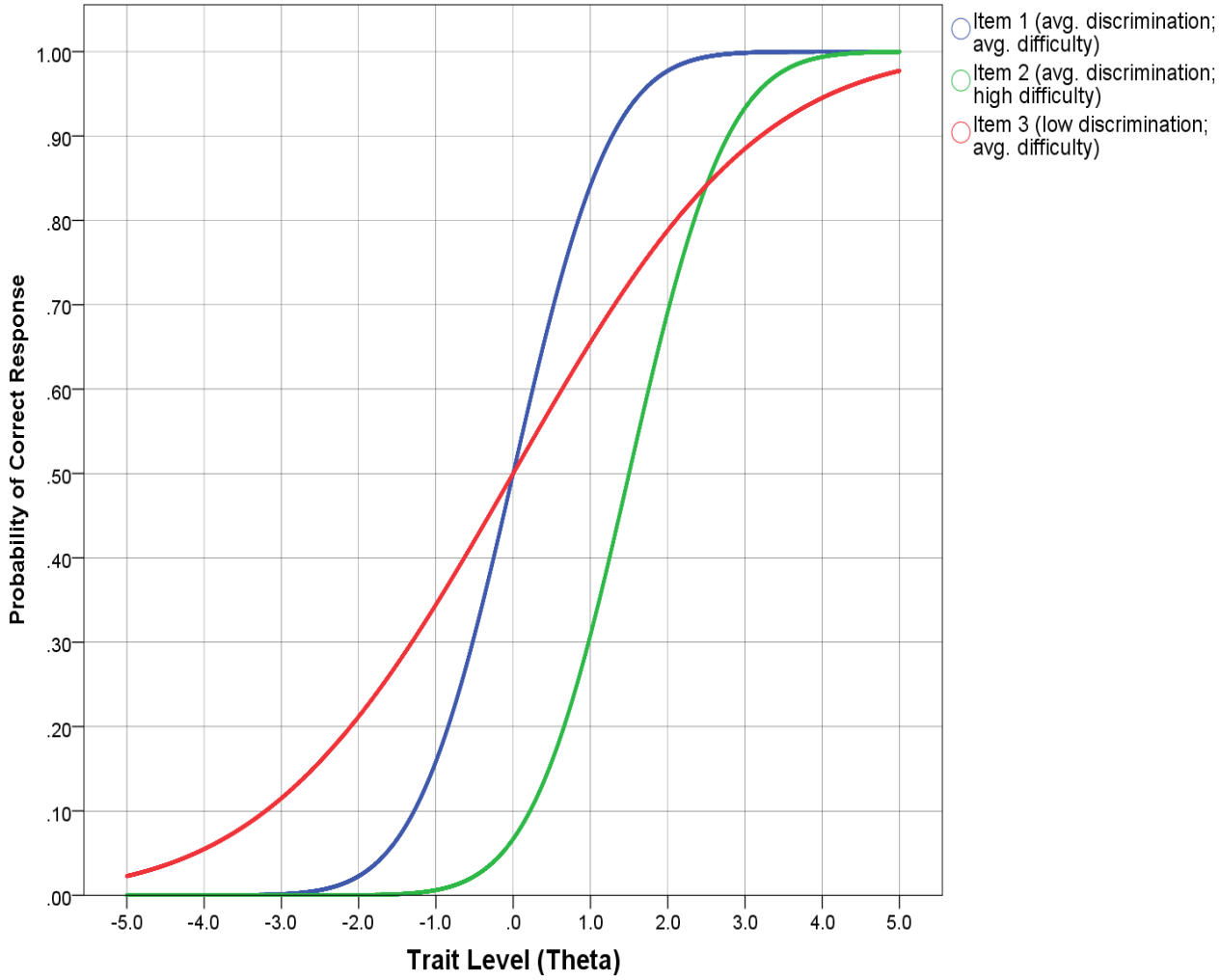

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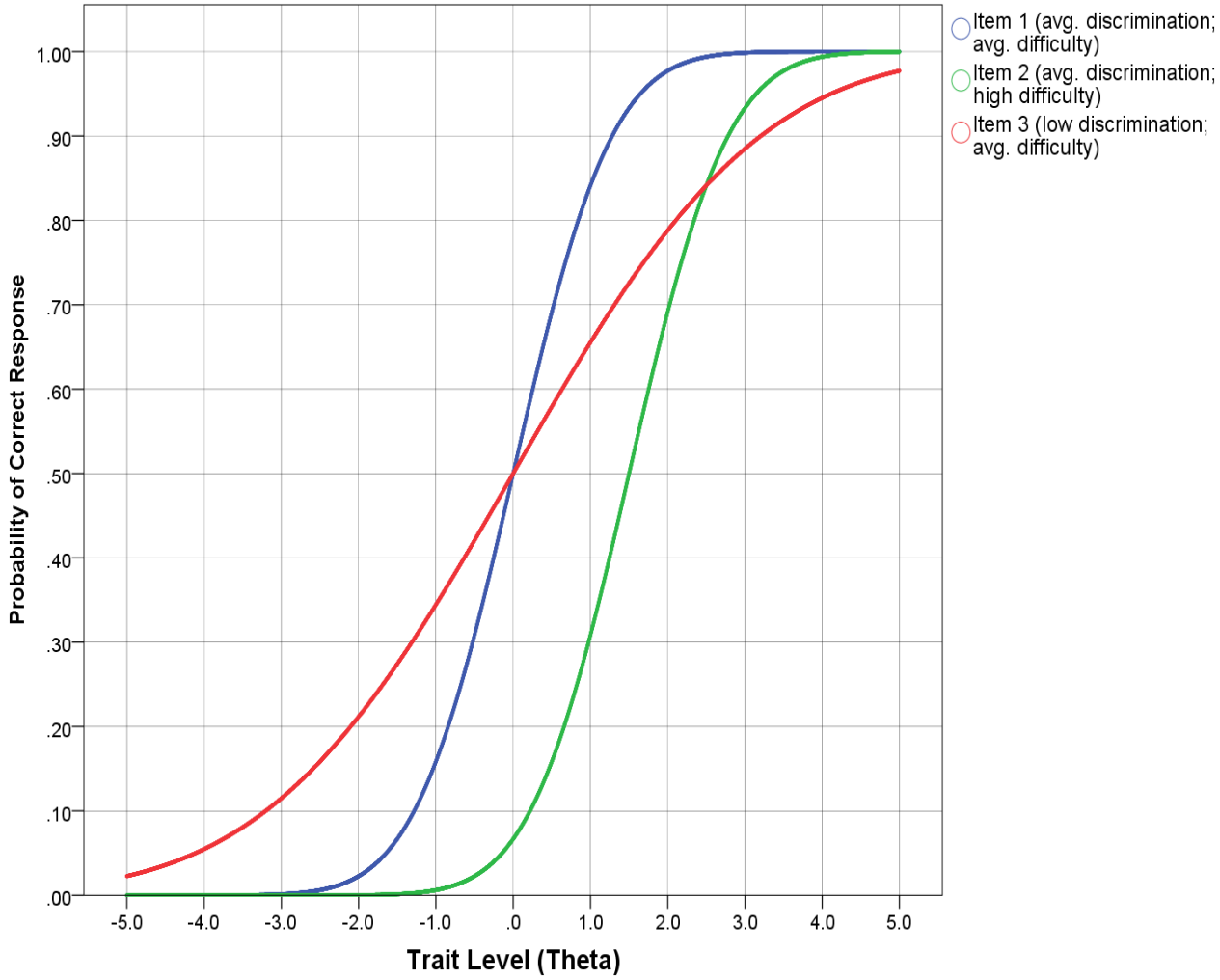

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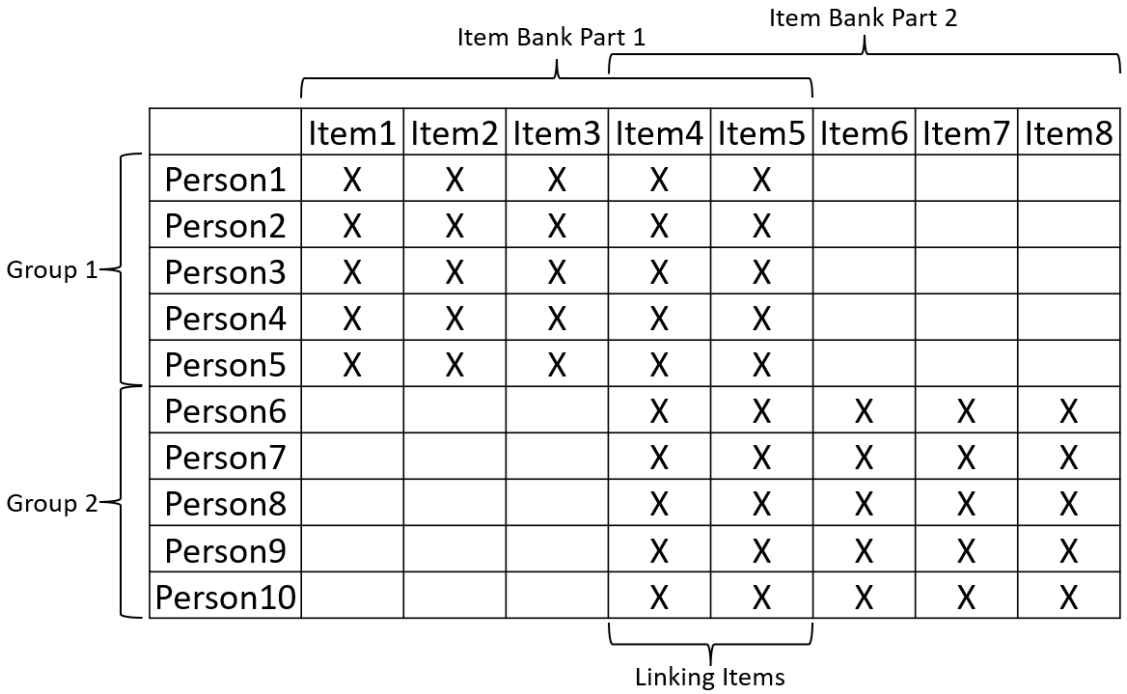
Computerized Adaptive Testing (CAT)

Calibration and Linking



CAT Algorithm

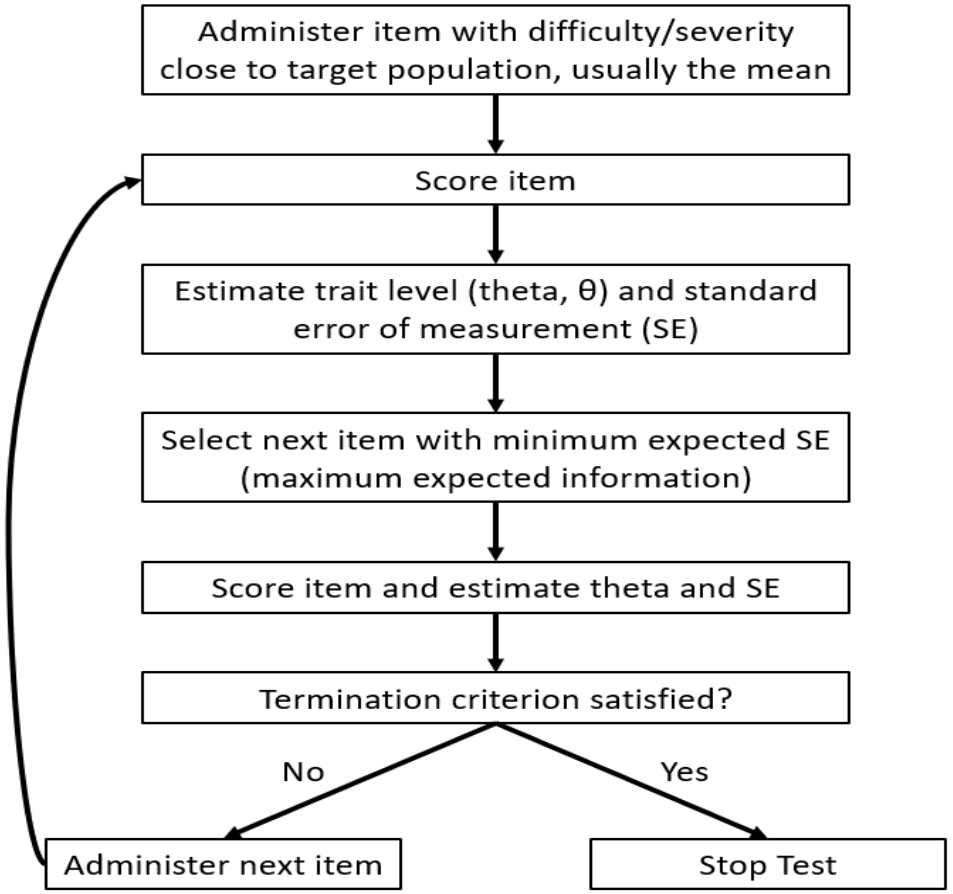


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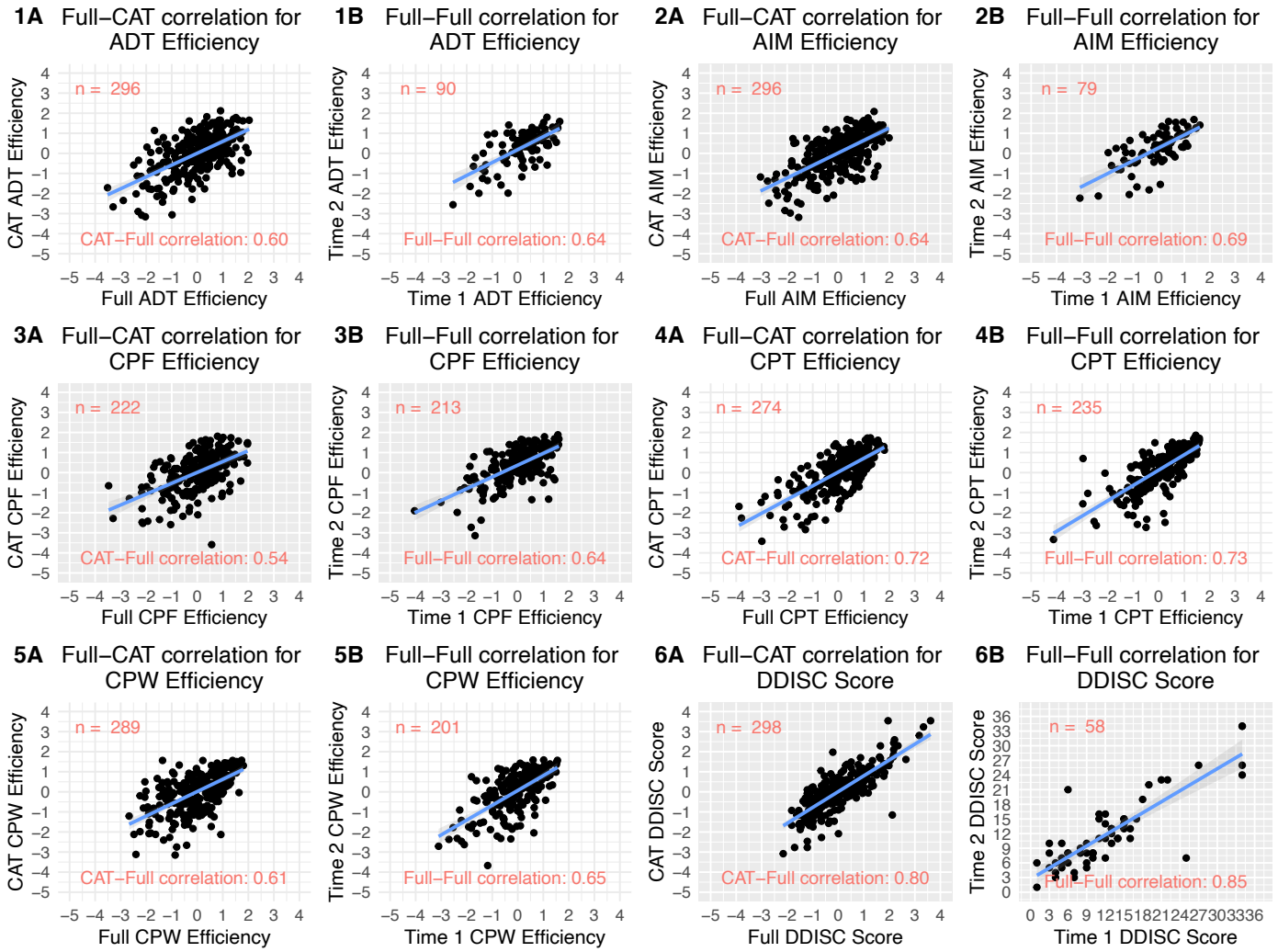
Figure 1. Test–Retest Reliability Scatters on All tests



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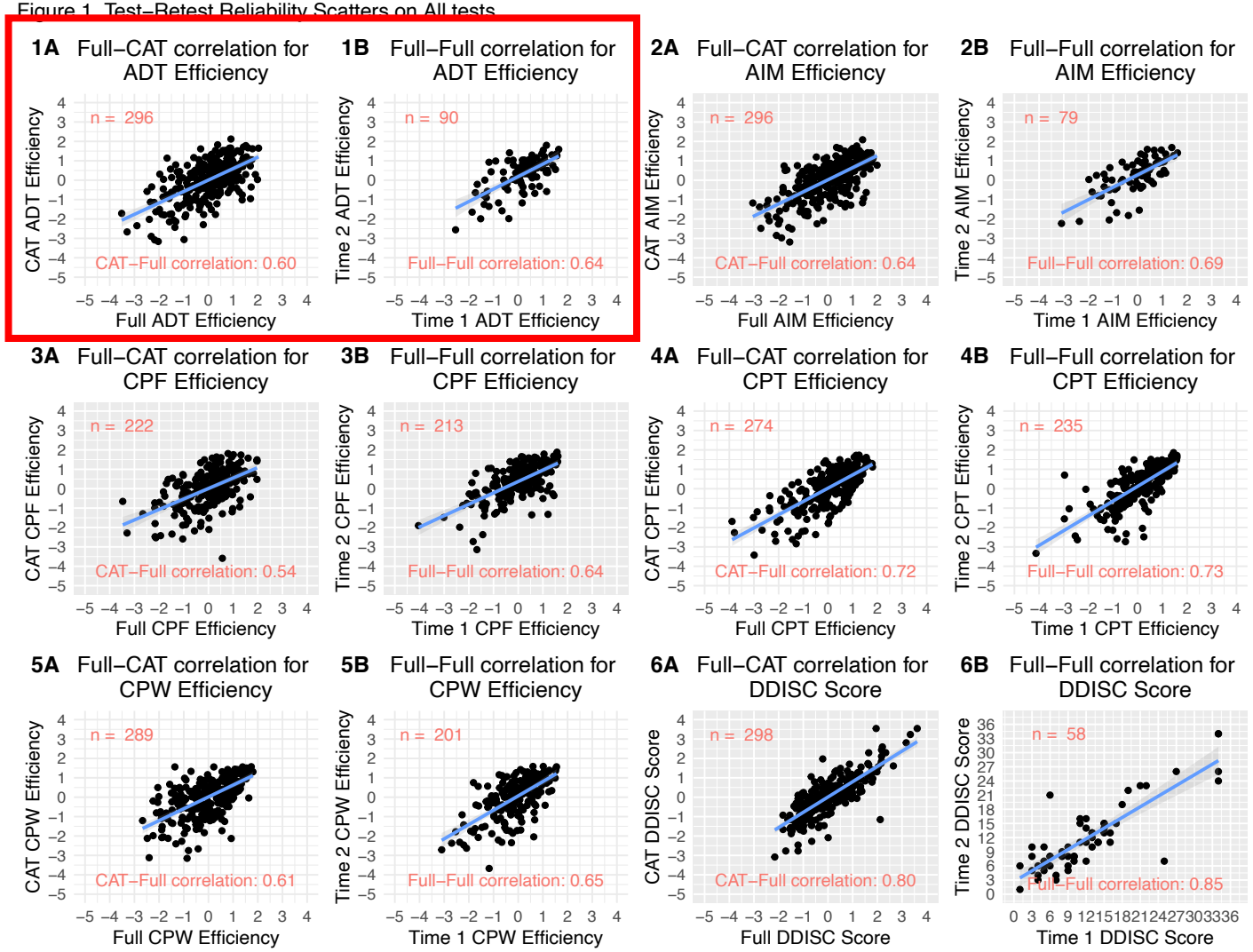

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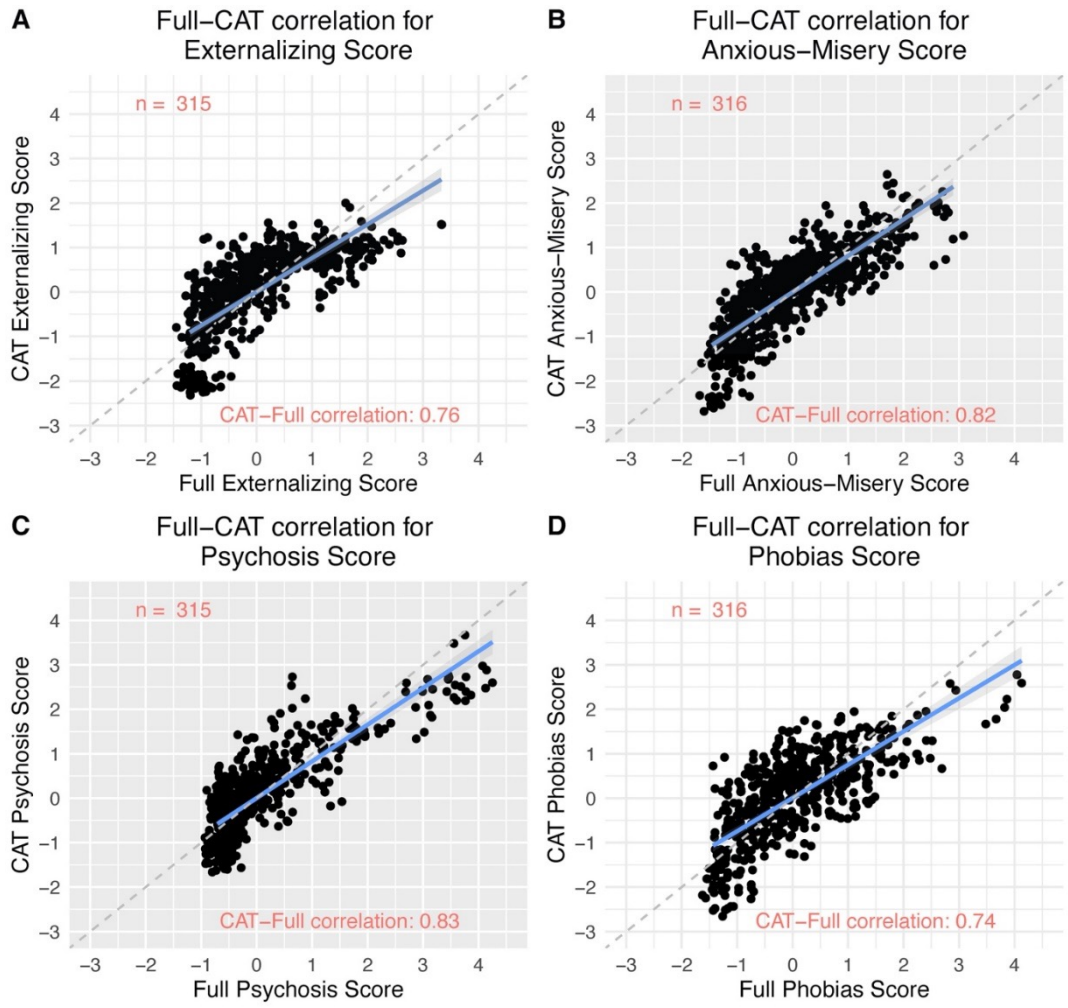

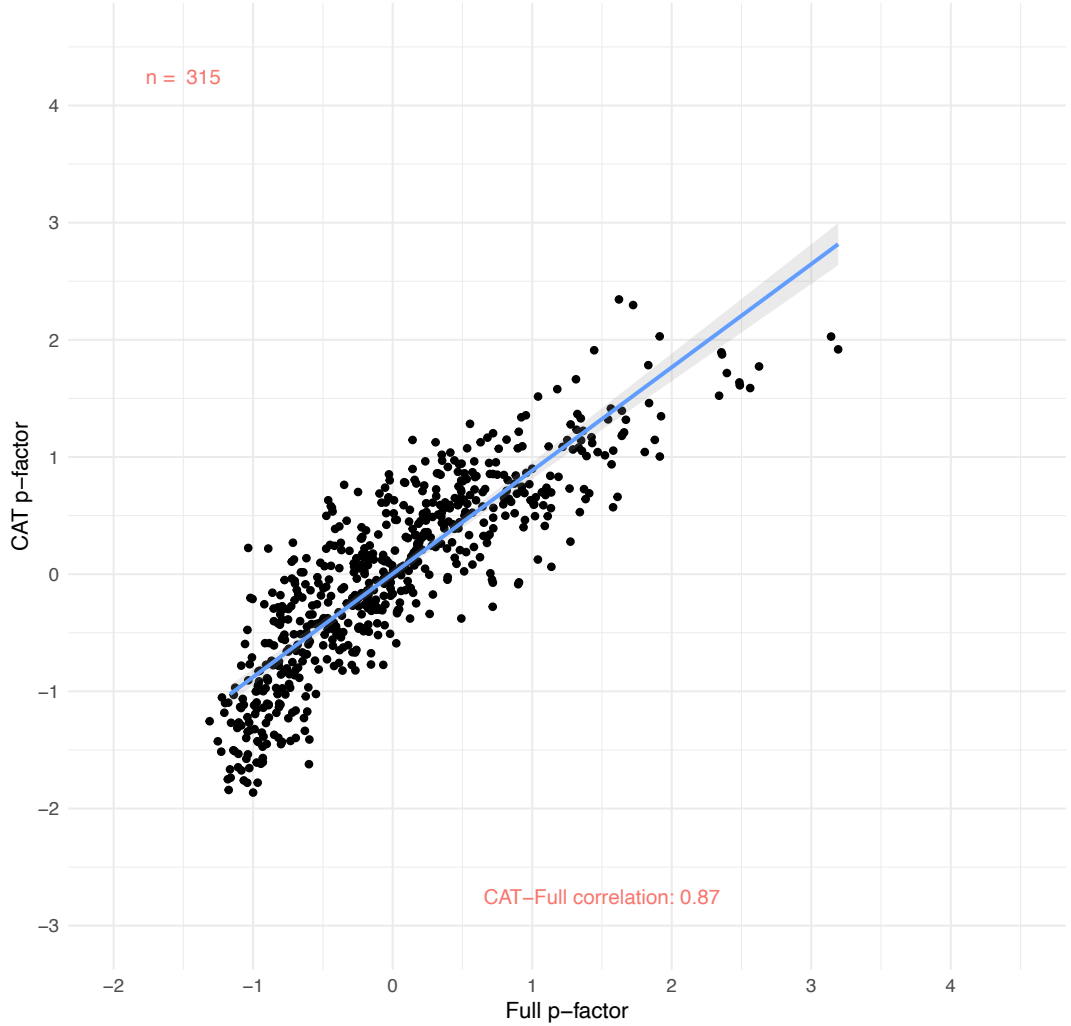

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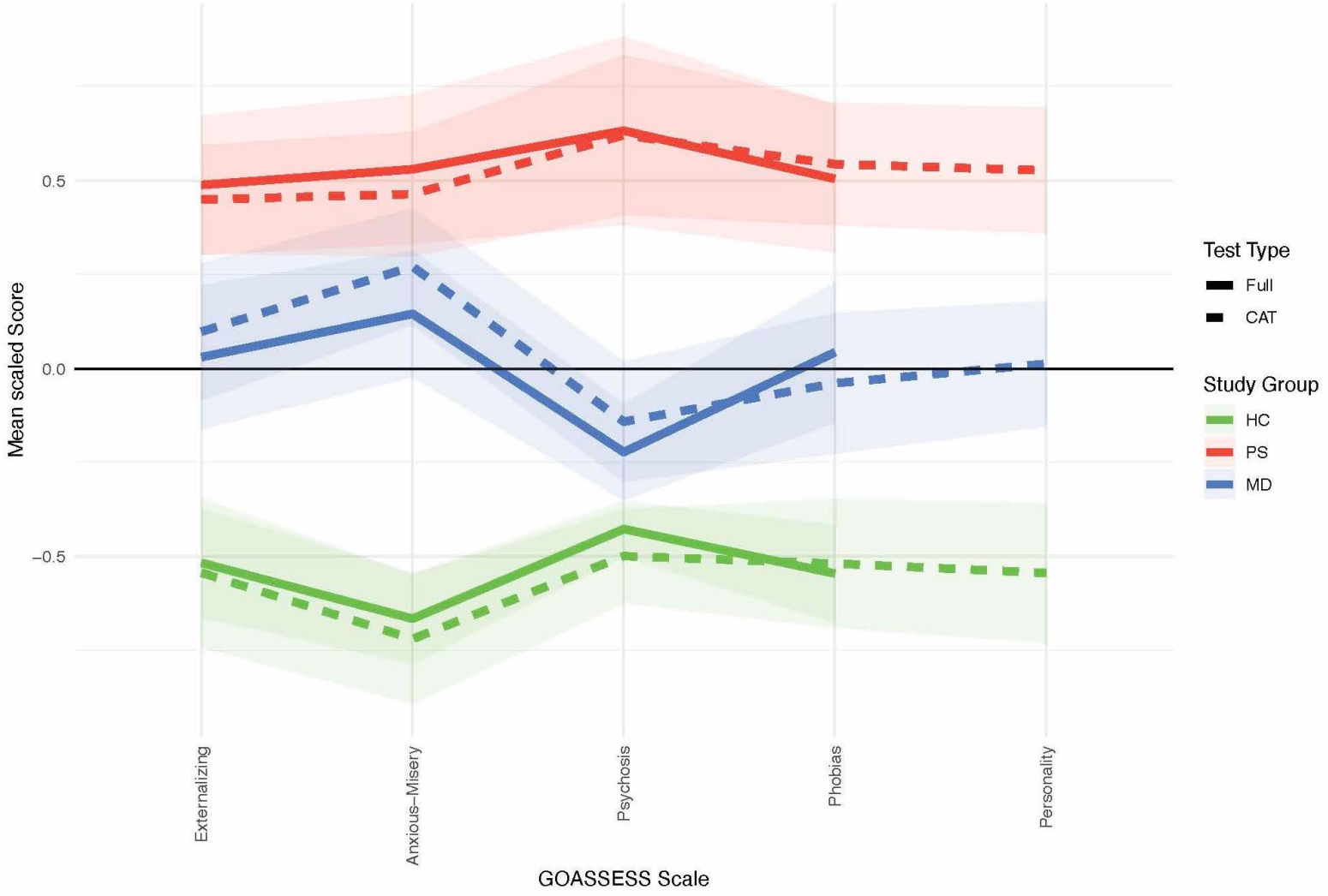

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