



# Gaming Experience in Relation to Difficulty, Enjoyment, and Comprehension: The Game Recognition Test

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## Introduction

Gaming is a multifaceted skill relying on motoric abilities (e.g., gamepad dexterity), general cognitive processes (e.g., working memory, attention), and background knowledge (e.g., camera control, wayfinding, leveling).

The amount of time a user has spent playing video games, and the variety of games they have played, will almost certainly impact on their ability to deal with the mechanics and systems that are employed by different types of games.

One difficulty in asking users report the frequency and variety of the games they play is that they tend to over- or under-estimate their exposure.

This problem is mirrored in reading research, as participants tend to exaggerate the amount of time the spend reading novels.

## The Author and Magazine Recognition Tests <sup>1, 2, 3</sup>

Real authors (NYT best sellers) or magazines (Amazon) are embedded alongside fake names and titles. Check-mark next to those recognize as real.

Performance correlates with standardized measures of vocabulary (Pearson's  $r_s = .56$  to  $.60$ ); reading comprehension ( $r_s = .48$  to  $.54$ ), and cultural knowledge ( $r_s = .54$  to  $.59$ )

## The Game Recognition Test

Game titles are used in place of authors and magazine titles. 120 titles embedded amongst 120 foils (movies, TV shows, etc.) 20 Action titles, 20 RPGs, 20 Fighting, 20 Narrative, 20 Racing, 20 Shooters (EEDAR)

### References

1. Stanovich, K.E. & West, R.F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly*, 24, 402-433.
2. Stanovich, K.E. & Cunningham, A.E. (1992). Studying the consequences of literacy within a literate society: The cognitive correlates of print exposure. *Memory & Cognition*, 20, 50-68.
3. Stanovich, K.E., West, R.F., & Harrison, M.R. (1995). Knowledge growth and maintenance across the life span: The role of print exposure. *Developmental Psychology*, 31, 811-826.

**GAMES YOU RECOGNIZE**

- Check the box next to the titles that you know to be video game titles.  
- Do not guess, but only check those that you know to be real game titles and franchises.  
- Remember, some of the titles are not game titles, so guessing will be easily detected!

Cradle 2 the Grave     IP Man     Steel Diver  
 Bloodsport     Red Dawn     Dragon's Dogma  
 Deus Ex     L.A. Noire     Hero  
 Rise of Nightmares     Three Kings     The Legend of Drunken Master  
 Serenity     Watch Dogs     Dying Light  
 Streets of Rage     Terraria     WWE All-Stars  
 Heat     UFC Undisputed     Alaric  
 Taken     The Right Stuff     Dead Rising  
 Ong-Bak     Ryse: Son of Rome     Assassin's Creed  
 Darksiders     Hunted: The Demon's Forge     Soul Calibur  
 The One     All is Lost     Super Smash Brothers  
 Apocalypse Now     Red Dead Redemption     Skyfall  
 Marvel Vs. Capcom     Blood and Bone     Run All Night  
 Injustice: Gods Among Us     Knack     Point Break  
 Dissidia Final Fantasy     BEYOND: Two Souls     Alice: Madness Returns  
 In the Name of the King: A Dungeon Siege Tale     Tekken     Never Back Down  
 Insidious     Gravity Rush     Journey  
 Catherine     Jupiter Ascending     The Searchers  
 It Follows     Equilibrium     The Equalizer  
 Christine     Combat of Giants: Dinosaurs 3D     True Grit

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Figure 1. GRT Sample

## Methods

### Study 1

- 20 young adults (15 male, 5 female)
- Demo of remastered 3<sup>rd</sup> person action-adventure title
- Rated for enjoyment and difficulty (1 – 7 Likert scale)

### Study 2

- 10 young adults (8 male, 2 female)
- First 3 hours of Batman: Arkham Knight
- Comprehension questions tapping details and inferences
- Rated for enjoyment (1 – 5 Likert scale)

### Study 3

- 286 users from the PlayStation MVP panel (sexes unknown)
- Completed GRT alongside genre ranking
- Reliability estimates derived
- Factor Analyzed to identify game recognition 'components'

## Results

### Study 1

- The GRT was strongly related to difficulty ratings: Those who scored higher on the GRT rated the game as less challenging than those who scored low ( $r = -.61$ ,  $p = .004$ ). See Figure 2.
- Moderate positive relationships found between GRT scores and ratings of the cover system ( $r = .37$ ,  $ns$ ); climbing mechanic ( $r = .32$ ,  $ns$ ); and framerate ( $r = .35$ ,  $ns$ )

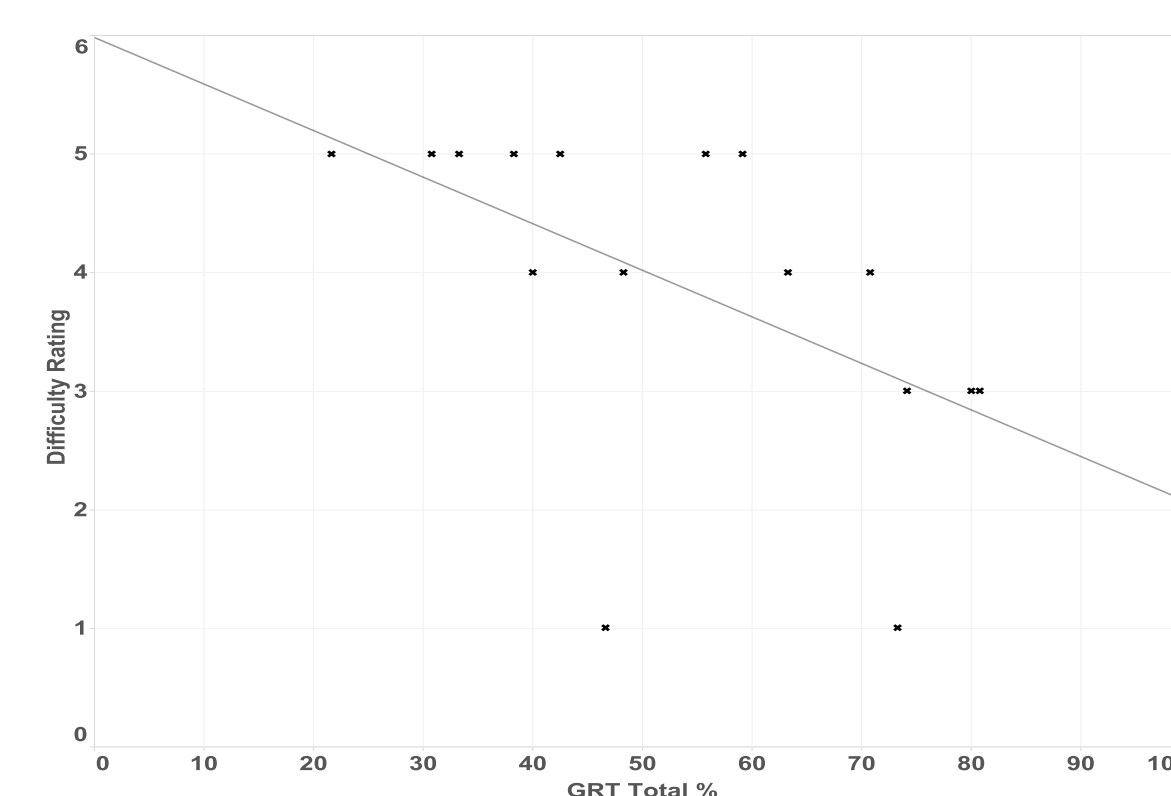


Figure 2. GRT x Difficulty Ratings

### Study 2

- Comprehension was positively correlated with game enjoyment ratings ( $r = .63$ ,  $p < .05$ ).
- Comprehension was positively correlated with GRT scores ( $r = .77$ ,  $p < .001$ ). See Figure 3.
- This correlation was strongest when the Action subscale was used ( $r = .91$ ,  $p < .001$ )

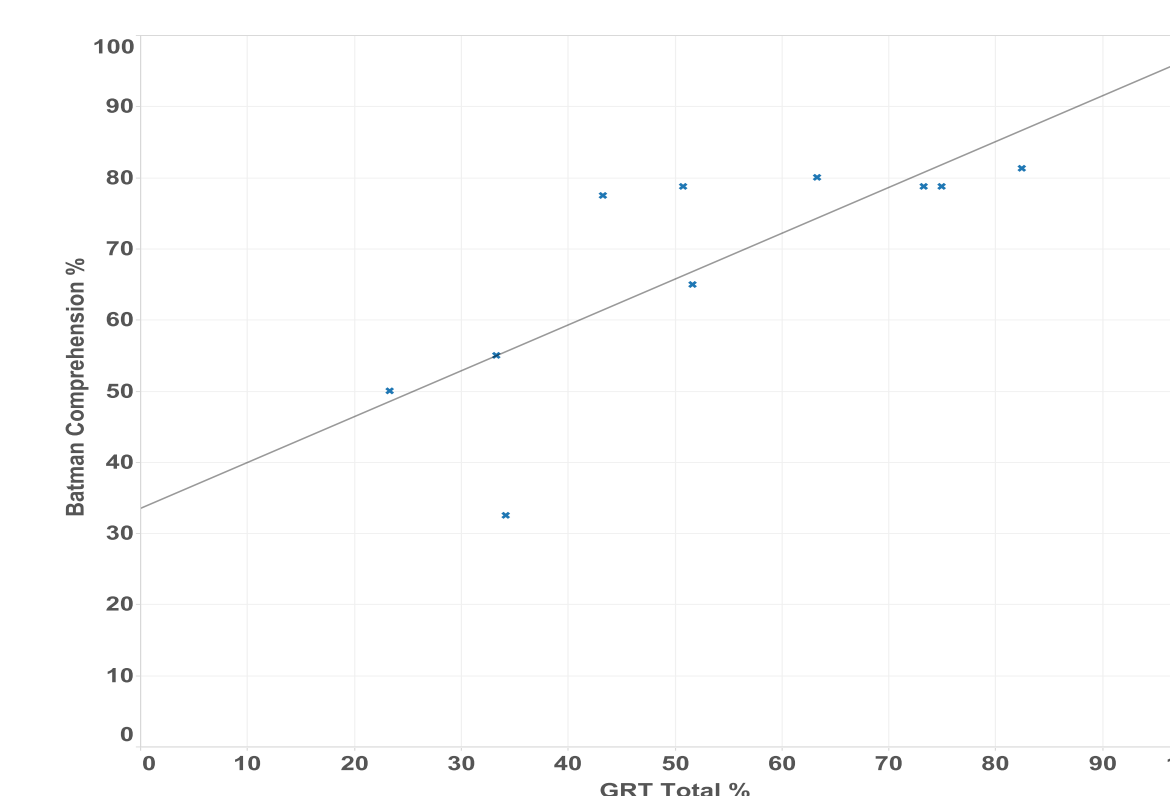


Figure 3. GRT x Comprehension

### Study 3

- Test has excellent internal consistency (overall  $\alpha = .97$ ; subscale  $\alpha_s = .82$  to  $.88$ )
- Slight negative skew (see Figure 4)
- Fit indices for FA are good, but top 4 factors are difficult to interpret

Factor 1	Loadings	Factor 2	Loadings	Factor 3	Loadings
Beyond: Two Souls	.63	F1 2000	.57	Fight Night	.61
Itinerary	.56	Nascar Unleashed	.61	Blazing Angels	.63
Super Smash Bros.	.52	Nascar '14	.62	Provenge	.60
Overylight	.50	Blazing Clack	.67	Driver's Edge	.64
Deus Ex	.50	Test Drive Unlimited	.66	Virus Fighter	.64
Dragon's Dogma	.45	Unltd Legends: Dark Kingdom	.63		
Alan: Madmax Returns	.45				
Red Dead Redemption	.45	Factor 3	Loadings		
LA Noire	.45	Fortress LHM	.60		
Warner Bros. Animating Us	.44	Assault 3D	.61		
Archi	.43	Steel Dawn	.62		
		Combat of Giants (Dinosaurs 3D)	.60		
		Nascar Unleashed	.64		
		Breaks Down	.64		
		Car Wash	.61		

$\chi^2(426) = 11.1$  (good - none is deviant)  
 Tucker Lewis = 1.1 (good)  
 RMSEA = .029 (very good)

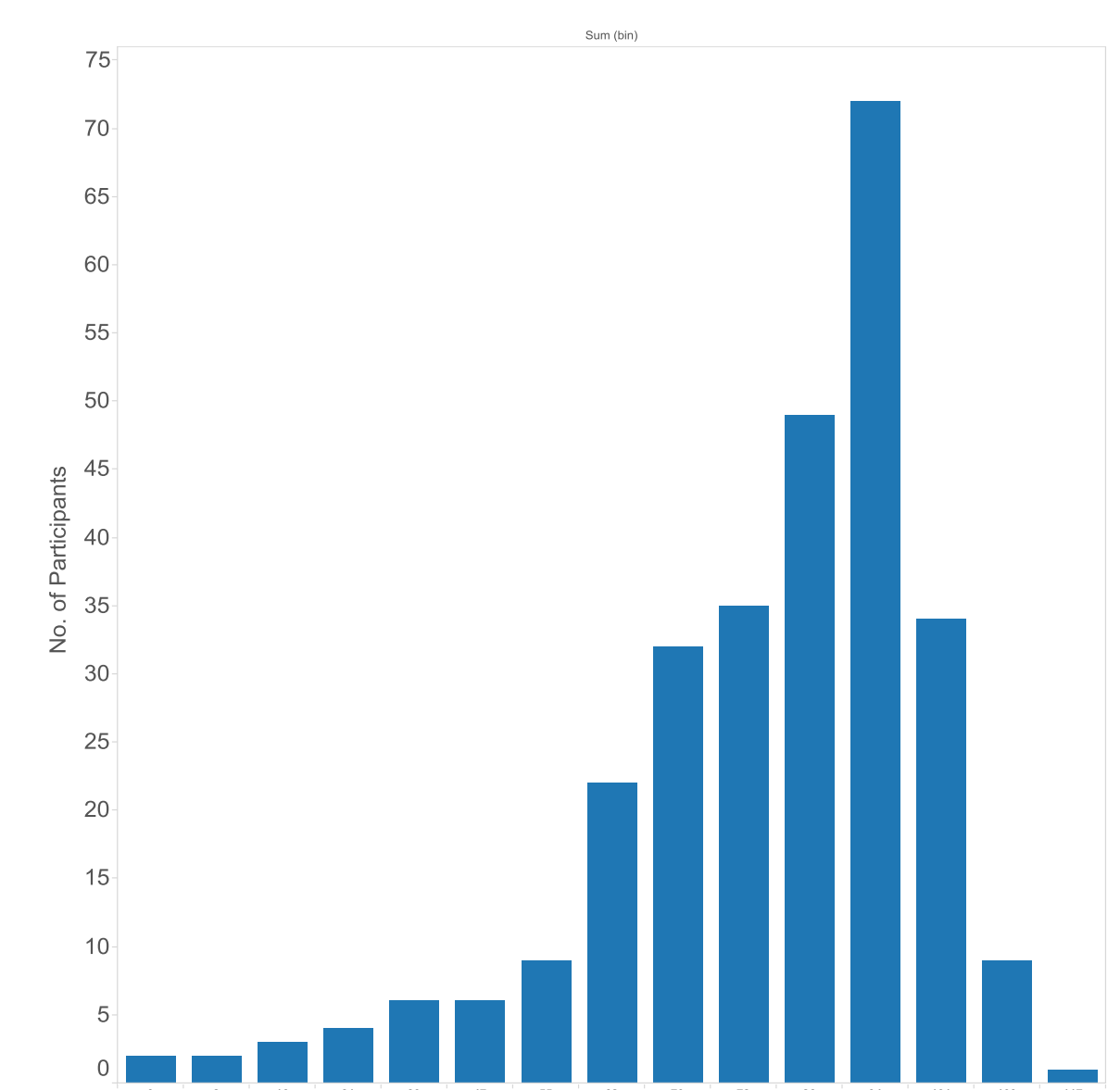


Figure 4. GRT Frequency Distribution

## Discussion

### Study 1

- More experienced players were impressed by certain aspects of the game
- Difficulty x Experience relationship supported dev's decision to include difficulty settings beyond 'easy', 'normal', and 'hard'

### Study 2

- Players who comprehended the narrative enjoyed the game more than those who did not
- More experienced players were better able to comprehend the narrative than were less-experienced players
- **Sample size is small**

### Study 3

- The test appears to be reliable, and subscale items appear to be consistent
- High-spend gamers skew distribution toward higher scores
- Factors loosely tied to genres (e.g., Factor 2 = 'Racing'; Factor 4 = 'Fighting')