



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

Stephen Hamilton, PhD

Experience Lab, Worldwide Studios, Sony Computer Entertainment America

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 ^{1, 2, 3}

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 3rd person action-adventure title
- Rated for enjoyment and difficulty (1 – 7 Likert scale)

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 ($r = .35, ns$)

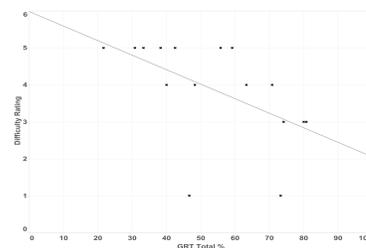


Figure 2. GRT x Difficulty Ratings

Study 2

- 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 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 ($r = .91, p < .001$)

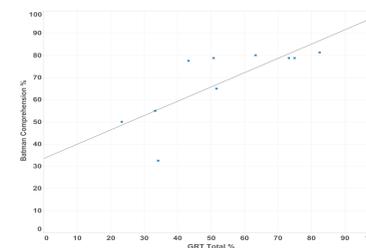


Figure 3. GRT x Comprehension

Study 3

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

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
Batman	.56	Nascar Unleashed	.61	Blazing Angels	.63
Super Smash Bros.	.52	Nascar '14	.62	Provenge	.60
Dying Light	.50	Blazing Clack	.67	Driver: Parallel Lines	.64
Deus Ex	.50	Test Drive Unlimited	.66	Virtus Fighter	.64
Dragon's Dogma	.45	Unltd Legends: Dark Kingdom	.63		
Alice: Madness Returns	.45				
Red Dead Redemption	.45	Factor 3	Loadings		
LA Noire	.45	Fortress LHM	.60		
Warner Bros. Animation Un	.44	Assault 3D	.61		
Street	.43	Steel Dawn	.60		
		Combat of Giants: Dinosaurs 3D	.60		
		Nascar Unleashed	.60		
		Breath of Fire	.64		
		Core Wars	.61		

$\chi^2(428, p < .000)$, $\text{RMSEA} = .029$ (very good)

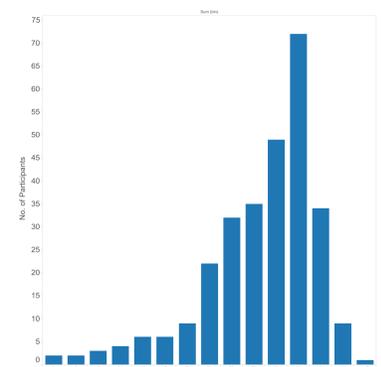


Figure 4. GRT Frequency Distribution

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')