Validation of a Short Version of the Game User Experience Satisfaction Scale (GUESS)

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What is the GUESS?

The GUESS is a validated measure that breaks down game user satisfaction into 9 dimensions with 55 items

An analysis of over 460 different video games with 1,300 participants resulted in the determination of the nine factors that contribute to video game satisfaction

Current Study

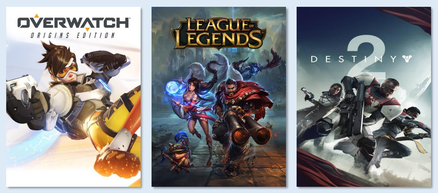
The current study validated a shorter version of the GUESS as responding to 55 items can be cumbersome in some situations. The validated short scale consists of 18 items that captures the 9 dimension of the original GUESS.

Methods

Participants rated a video game that they played for at least 10 hours in the last 3 months with the GUESS-18

197 participants were recruited from MTurk and the ERAU SONA system:

- 97 Males, 100 Females
- 164 from Mturk, 33 from SONA
- Ages: 18 - 68 (*M* = 33.21, *SD* = 10.90)



Figures 1, 2, 3. Examples of some of the games participants evaluated

Takeaways

A short version of the GUESS was validated using CFA. The GUESS-18 provides ratings of 9 different dimensions related to game user satisfaction. GUESS-18 is a comprehensive tool that can be used for iterative game design, testing, and research.

Results

A CFA was conducted on a separate data set to see if it fits with the current theoretical model for the GUESS. The CFA appears to have acceptable levels of fit (Byrne, 2016; Hu & Bentler, 1999). Given that the fit was satisfactory for the configural model, we moved forward with truncation to reduce the number of items.

A priori to analysis, researchers evaluated the original 55 items of the GUESS that best fit with the constructs of interest and removed items that may not be generalizable across all games. We assessed the fit of this shortened 18-item scale using Chi-squared, TLI, CFI, RMSEA, and Hoelter's fit indices.

Table 1. Fit indices for original GUESS, new configural model, and final short scale model

Model	X^2 p-value	Degrees of Freedom	TLI (>.95)	CFI (>.95)	RMSEA (<.08/<.05)	Hoelter's (>200)
Original GUESS	4428.63† p<.001	1394	NA	.82	.053*	258*
Configural Model	171.966† p<.001	99	.961*	.975*	.042*	328*
GUESS-18	137.015† p<.001	100	.961*	.974*	.043*	196*

*Indicates the value for the model is in the acceptable range of fit indices.
† A significant Chi-square test is usually an indicator of poor fit. All chi-square tests reported n this row were significant. Although it is standard to report Chi-square tests for CFA/SEM analyses, they are almost always significant due to large sample sizes. Therefore, other fit indices are provided which account for the large sample constraints of these techniques.

Results

We utilized maximum likelihood estimates to conduct the following confirmatory factor analyses (CFA). To best determine a short scale factor structure required three steps:

1) creation of a configural model to determine if the current data set fits the previously assumed theoretical structure
2) a truncation based on a priori independent review of items by the authors that best fit with the constructs of interest (DeVellis, 2016)
3) a final truncated model that allowed us to determine the fit of the shortened scale, including tests for construct validity

Table 2. Assessment of Discriminant and Convergent Validity

Subscale	CR	AVE	MSV	MaxR(H)
Usability/Playability	0.769	0.625	0.338	0.972
Narratives	0.809	0.680	0.372	0.975
Play Engrossment	0.722	0.572	0.055	0.977
Enjoyment	0.800	0.669	0.475	0.987
Creative Freedom	0.819	0.694	0.372	0.980
Audio Aesthetics	0.890	0.802	0.256	0.984
Personal Gratification	0.771	0.629	0.475	0.985
Social Connectivity	0.794	0.671	0.054	0.969
Visual Aesthetics	0.818	0.692	0.359	0.986

Discussion

The GUESS-18 provides a strong measurement model for the analyzed data and indicates a well-fitting model of game user satisfaction that assesses 9 constructs with an 18-item survey.

The GUESS-18 is less than half the length of the original. This will allow for it to be more readily implemented, used in repeated measures designs, iterative design, and prevent survey fatigue.

Future work should investigate if the GUESS-18 holds constant across variations in games, and potentially into other non-game environments such as training simulations.

Table 3. GUESS-18 subscales and items

Subscale	Statements
Usability/ Playability	I find the controls of the game to be straightforward.
	I find the game's interface to be easy to navigate.
Narratives	I am captivated by the game's story from the beginning.
	I enjoy the fantasy or story provided by the game.
Play Engrossment	I feel detached from the outside world while playing the game.
	I do not care to check events that are happening in the real world during the game.
Enjoyment	I think the game is fun.
	I feel bored while playing the game. (REVERSE CODE)
Creative Freedom	I feel the game allows me to be imaginative.
	I feel creative while playing the game.
Audio Aesthetics	I enjoy the sound effects in the game.
	I feel the game's audio (e.g., sound effects, music) enhances my gaming experience.
Personal Gratification	I am very focused on my own performance while playing the game.
	I want to do as well as possible during the game.
Social Connectivity	I find the game supports social interaction (e.g., chat) between players.
	I like to play this game with other players.
Visual Aesthetics	I enjoy the game's graphics.
	I think the game is visually appealing.

References

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, New Jersey.

DeVellis, R. F. (2016). *Scale development: Theory and applications* (Vol. 26). Sage publications.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118.

Phan, M. H., Keebler, J. R., & Chaparro, B. S. (2016). The development and validation of the game user experience satisfaction scale (GUESS). *Human factors, 58*(8), 1217-1247.

Try the GUESS-18!