Psychometric Assessment and Gender Invariance of the Polish Adaptation of the Game Transfer Phenomena Scale

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ABSTRACT

Studies show that gamers experience altered sensory perceptions, automatic thoughts and behaviors with video game content when not playing. These experiences are referred to as Game Transfer Phenomena (GTP). The first aim of the current study was the psychometric assessment of the Polish version of the GTP Scale (GTPS). The second aim was to analyze gender invariance, which is important due to the gender differences in game playing habits, motivations and game preferences. The study comprised 675 gamers (340 female gamers) aged 15 to 45 years. The participants' mean age was 31.74 years (SD = 7.75). Confirmatory factor analysis showed that the Polish version of the GTPS is reliable, valid, and adequate for assessing GTP. Findings also indicated that strict gender invariance exists. Consequently, the GTPS is an instrument by which GTP can be compared and assessed in female and male gamers. Additionally, findings showed that GTP was associated with hours played per week across all game genres and devices, except for smartphones.

KEYWORDS

Game Transfer Phenomena
altered perceptions
gamers
video games experience

INTRODUCTION

Video games are becoming one of the most popular forms of entertainment (Statista, 2021). People play a variety of video game genres on computers, consoles, smartphones, and tablets. Consequently, understanding the effects of playing video games has become more important, and there is an increasing number of studies on this topic (see Dale & Green, 2017; Griffiths & Pontes, 2020). Researchers in this area tend to dichotomize the effects of playing video games by highlighting the positive and negative ones.

On the one hand, the positive effects of playing video games have been associated with the enhancement of cognitive functions (Bavelier & Green, 2019; Bediou et al., 2018; Green et al., 2017). On the other hand, the negative effects of gaming have been associated with excessive playing that can become problematic and evolve into gaming disorder (GD, Cudo et al., 2020; Griffiths et al., 2012; Griffiths et al., 2016). To avoid dichotomizing the effects of video game playing into positives and negatives, Ortiz de Gortari (2010) proposed examining the transfer of experiences from the virtual world to the real world, manifesting as changes in perception, cognition, and behavior, without implying a subsequent positive or negative effect.

Qualitative studies (Ortiz de Gortari 2010; Ortiz de Gortari et al., 2011; Ortiz de Gortari & Griffiths, 2014a, 2014b) have shown that playing video games can lead to spontaneous transfers of video game experiences to real-life such as (a) distortions in the perception of physical objects, environments, one's own body, and sounds, (b) confusion between objects and sounds similar to those in the video game, (c) interpretation of real life situations in light of video game logic, (d) re-experiencing images, sounds, or tactile sensations related to video games, and (e) behaviors and involuntary actions based on experiences from the video game. In this context, these experiences are referred to as Game Transfer Phenomena (GTP) (Ortiz de Gortari, 2010; Ortiz de Gortari, 2019).

Game Transfer Phenomena experiences are directly related to the content and the mechanics of video games. The multimodal and holistic conceptualization of GTP aims to understand "the effects of playing video games on cognition, sensory perceptions and behaviors, considering

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the interplay of video game contents, in-game phenomena (e.g., immersion, trance state, embodiment), in-game activities, and the manipulation of hardware and peripherals." (Ortiz de Gortari, 2019, p. 536).

Game Transfer Phenomena have been assessed using a five-factor scale validated by Ortiz de Gortari et al. (2015), the Game Transfer Phenomena Scale (GTPS). Three factors of the GTPS assess altered perceptions (altered visual perceptions, altered body perceptions, and altered auditory perceptions), and two factors assess automatic mental processes, actions, and behaviors. More specifically, the altered perceptions modality comprises experiences in various sensory channels associated with (a) distorted perceptions, (b) misperceptions, (c) perceptions of video game elements without stimuli present, and (d) visual, motor, or auditory imagery. The automatic mental processes modality comprises thoughts, urges, and automatic mental actions. It includes experiences associated with (a) rumination about the game, (b) spontaneous thoughts about the game, (c) cognitive biases, (d) jumping to conclusions, (e) source monitoring errors, and (f) slips errors when trying to use game elements in the real world (Ortiz de Gortari et al., 2015; Ortiz de Gortari, 2019). The actions and behaviors modality includes (a) involuntary mental actions, (b) carrying out automatic actions, and (c) behaviors influenced by video games (Ortiz de Gortari, 2019). The scale consists of 20 items and includes a 5-point response scale: 1 = *never*, 2 = *once*, 3 = *a few times*, 4 = *many times*, and 5 = *almost all the time*. The Cronbach's α scores were between .71 and .85 across the subscales, and .94 for the entire scale. The scale items' factor loadings ranged from 0.57 to 0.87 (Ortiz de Gortari et al., 2015).

The Turkish adaptation of the GTPS (Dindar & Ortiz de Gortari, 2017) was analogous to the results in the five-factor original GTPS (Ortiz de Gortari et al., 2015). The Cronbach's α scores were between .741 and .825 across the subscales. Additionally, the factor loadings of the scale items were between 0.56 to 0.84 across the subscales. The composite reliability (CR) scores were between 0.741 and 0.831, and the average variance explained (AVE) scores were between 0.419 and 0.555. The convergent validity of the Turkish GTPS can be considered adequate. Additionally, Dindar and Ortiz de Gortari (2017) showed that all GTPS subscale scores were positively correlated with daily gaming time and gameplay session length.

Ortiz de Gortari et al. (2016), using multinomial regression analyses of predictors for GTP levels (low, moderate, and severe), reported that severe level of GTP (i.e., experiences of GTP very frequently and in several forms) was positively associated with length of time spent playing, frequency of playing, distress, pleasantness of GTP experience, and the tendency to recall dreams. Additionally, gamers who experienced GTP were more likely to indicate a motivation to play related to exploration, immersion, mechanics, customization, and escapism than gamers who did not experience GTP (Ortiz de Gortari & Griffiths, 2015).

Overall, research on GTP has established the basis for investigating and understanding involuntary phenomena associated with video game content which appear to be very common among gamers. Studies have shown that at least 95% of gamers have experienced GTP when playing video games on various devices (Ortiz de Gortari & Griffiths, 2015; Dindar & Ortiz de Gortari, 2017) and 82% when playing on a mobile phone (Ortiz de Gortari, 2018).

The relevance of investigating GTP in the context of GD has also emerged. Gaming disorder has been found to be a predictor of GTP (Jones-Rincon et al., 2021; Llamas-Alonso et al., 2021). Studies comparing players who experienced GTP and those classified as suffering from GD have found shared psychopathological predictors such as depression, anxiety, and perceived stress (Jones-Rincon et al., 2021). Still, those with GD are the ones that tend to invest more hours playing per day (Ortiz de Gortari & Gackenbach, 2021; Jones-Rincon et al., 2021). The GTPS has been used in the clinical context as a psychopedagogic tool and for establishing differential diagnoses involving psychosis (Basche & Ortiz de Gortari, 2021; Ortiz de Gortari & Basche, 2021). Various studies have found no differences between female and male gamers in GTP (Dindar & Ortiz de Gortari, 2017; Ortiz de Gortari, 2018; Ortiz de Gortari & Griffiths, 2015; Ortiz de Gortari et al., 2016). However, no study has investigated whether the GTPS structure is equivalent in female and male gamers. The gender invariance question is important because previous research has indicated gender differences in playing platforms, motivations for playing, and types of games played. According to a report from the Entertainment Software Association (ESA, 2020), female gamers (18–34 years old) usually played casual games, whereas male gamers (18–34 years old) mainly play action games. Additionally, female gamers most often play on smartphones, whereas male gamers most often play on a game console (ESA, 2020) or computer (Polish Gamers Observatory, 2020). McLean and Griffiths (2019) showed that female gamers played alone, played anonymously, and changed groups in which they play regularly. Considering the gender differences mentioned before, it can be assumed that playing habits and motivations may account for how much and what type of GTP gamers experience.

Therefore, it is crucial to examine whether the GTPS has an equivalent structure in female and male gamers. It is also important to examine whether gamers from different cultures experience GTP in different ways. Therefore, the current study aimed to test the GTPS in a Polish cultural context. Considering the difference between female and male gamers in gaming (ESA, 2020; Lopez-Fernandez, Williams et al., 2019; Polish Gamers Observatory, 2020), this study aimed to verify gender invariance of the GTPS.

The validation of the GTPS in the present study has the purpose to ensure that the assessment of GTP in the Polish context has the same construct validity and is conceptually equivalent to the original GTPS. This is important for supporting a rigorous examination of GTP in the Polish context and potentially contributing to future invariance analyses considering cross-cultural differences. Moreover, making the GTPS available in the Polish language will facilitate its use in research with Polish samples and its application in Polish clinical contexts (cf. Basche & Ortiz de Gortari, 2021).

METHOD

Participants

The study included 699 participants. To ensure the quality of the data, a total of 24 outliers were removed. Consequently, the final sample consisted of 675 (340 females; M = 31.74 years; SD = 7.75; age range: 15–45) participants. The participants were recruited online from the Polish research panel Ariadna, and all were active gamers. They came from the following places of residences: 21.8% = rural area, 13.0% = small city (up to 20,000 residents), 27.1% = medium city (20,000–100,000 residents), and 38.1% = big city (over 500,000 residents). Additionally, 22.8% of participants were single, 30.5% were in a non-marriage relationship, 43.6% were married, 0.4% were widowed, and 2.7% were divorced. The participants most often played on the following devices: 20.6% = desktop computer, 31.7% = laptop, 1.7% = tablet, 12.4% = stationary console, 31.6% = smartphone, and 1.8% = mobile console. Additionally, 75.3% of the participants experienced GTP in the last twelve months. The study was conducted in accordance with the Declaration of Helsinki. According to the Ariadna research panel rules, both adults and minors can take part in the panel. However, in the case of minors, their parents have given written consent for them to participate in this panel. No personal information about the participants was collected during the study. All participants answered the attention check questions correctly. It should be noted that individuals participating in the Ariadna panel receive points for completing the surveys, which they could collect to receive material prizes.

Measures

The GTPS was used to assess the spontaneous transfer of video game experiences to real life. The translation of the original GTPS (Ortiz de Gortari et al., 2015) into Polish was guided by the back-translation method (Cha et al., 2007). The first step consisted of translating the scale from English into Polish by three independent translators. Next, the consolidated Polish version was created based on these three translations. Then the consolidated Polish version was retranslated from Polish into English by three other independent translators. Additionally, the compatibility of the items and instruction was discussed with the main author of the scale. A reference to a twelve months' timeframe was included in the instructions (the content of individual items in the Polish version of the GTPS is presented in the Supplementary Materials). The GTPS consists of 20 items that are divided into five subscales: (a) altered perceptions modality-altered visual perceptions submodality (IA, e.g., "I have visualised video game images in my mind or seen them with closed eyes when I was not playing [e.g., seeing images from the game in the back of the eyelids]"), (b)altered perceptions modality-altered body perceptions submodality (IB, e.g., "I have experienced bodily sensations of movement as if I was in a video game [e.g., lying in bed but feeling like your body or some part of your body is moving]"), (c) altered perceptions modality-altered auditory perceptions submodality (IC, e.g., "I have heard the music from a game when I was not playing"), (d) automatic mental processes modality (II, e.g., "I have found myself thinking about using something from a video game in real life [e.g., wanting to use the scope zoom to see faraway objects"]) and (e) actions and behaviors modality (III, e.g., "I have sang, shouted, or said something from a video game in real life without intending to do so"). Participants responded to the items using a 5-point Likert scale (1 = *never*, 5 = *almost all the time*).

The video game questionnaire by Green et al. (2017) was used to assess the frequency of different game genres played during the past 12 months. Participants answered questions about the number of hours per week they spend playing specific game genres (first/third-person shooters, action-RPG/adventure, sports/driving, real-time strategy/MOBA, turn-based/nonaction role-playing/fantasy, turn-based strategy/life simulation/puzzle, music games, and other) using a 6-point scale: 1 = *never*, 2 = *less than 1 hour*, 3 = *between 1 and 3 hours*, 4 = *between 3 and 5 hours*, 5 = *between 5 and 10 hours*, and 6 = *more than 10 hours*. Additionally, a question about the most frequently used gaming device was included. Participants could select one response: desktop computer, laptop, tablet, stationary console, mobile console, or smartphone.

The questionnaire also included questions on demographic information (i.e., age, gender, place of residence, marital status). Additionally, taking into account the possibility of careless responding (Brühlmann et al., 2020), attention check questions (e.g., "Please choose the answer: Never.") were included in the questionnaire.

Statistical Analysis

Descriptive statistics are presented in the form of arithmetic means and standard deviations. Pearson's r correlation coefficient was applied to determine the relationships between the items, items and subscale scores and items and total score.

Confirmatory factor analysis (CFA) was used to verify whether the structure of the Polish version of the GTPS was identical to the original version (Ortiz de Gortari et al., 2015) separately for the female and male gamer groups. The CFA was calculated using the maximum likelihood method. However, considering the violation of the multivariate normality assumption (female gamers: Doornik-Hansen test: χ^2[df = 40] = 1532.24; p < .001; male gamers: Doornik-Hansen test; χ^2[df = 40] = 1116.72; p < .001), the Sattora-Bentler adjustments (Satorra & Bentler, 1994) were used. The following statistics were applied as measures of models fit in CFA: χ^2, root mean square error of approximation (RMSEA), standardized root means squared residual (SRMR), comparative fit index (CFI), and Tucker-Lewis index (TLI; Kline, 2011). An RMSEA lower than 0.08 indicates an acceptable fit of the model, and CFI values and TLI higher than 0.90 allow a conclusion that the model fits the data well. Also, an SRMR lower than 0.08 suggests a good fit to the dataset (Hu & Bentler, 1999; Kline, 2011). Additionally, discriminant validity analysis was carried out using the Fornell-Larcker criterion (Fornell & Larcker, 1981) and the heterotrait-monotrait ratio of correlations (HTMT; Henseler et al., 2015). The Fornell-Larcker criterion (Fornell & Larcker, 1981) implies that discriminant validity is present if each of the latent construct's AVE is higher than its squared correlations between this latent construct and other latent constructs in the model.

The invariance analysis was conducted to inspect differences between female and male gamers using multiple-group CFA (Brown, 2006). Brown (2006) recommends that the sequence of multiple-group CFA invariance evaluation be as follows: (a) test the CFA model separately in each group; (b) conduct a simultaneous test of the equal form (identical factor structure); (c) test the equality of factor loadings; (d) test the equality of indicator intercepts; (e) test the equality of indicator residual variances (optional) and, if substantively meaningful; (f) test the equality of factor variances; (g) test the equality of factor covariances (if applicable, i.e., > 1 latent factor); and (h) test the equality of latent means. Steps (a) though (e) are tests of measurement invariance; Steps (f) through (h) are population heterogeneity tests (Brown, 2006; p. 269-270). Consequently, the invariance analysis was conducted according to these steps. The criteria for identifying a lack of equal factor loadings (metric invariance) compared with the equal form model (configural invariance) was a CFI change larger than 0.005, supplemented by a RMSEA change larger than 0.010 or a SRMR change larger than 0.025. The criteria for identifying a lack of equal indicator intercepts (scalar invariance) compared with the equal factor loadings model (metric invariance) were a CFI change larger than 0.005, supplemented by a RMSEA change larger than 0.010 or a SRMR change larger than 0.005 (Chen, 2007; Putnick & Bornstein, 2016). The last criterion of a lack of invariance was used for subsequent comparisons. Additionally, the Satorra-Bentler scaled chi-square difference test (Satorra & Bentler, 2010) was used to examine the difference between the models.

The GTPS internal consistency was verified using different reliability coefficients, such as Cronbach's α, Raykov's composite reliability (Raykov, 1997), and omega higher order (see Flora, 2020). The analyses were carried out separately for the female and male gamers groups. However, considering the strict measurement invariance, the analyses were also carried out for the whole sample.

Moreover, based on previous research (Ortiz de Gortari et al., 2016), criterion-related validity was investigated by testing the relationship between the GTPS subscales and time spent playing different video game genres (Green et al., 2017) in the last twelve months. Considering that the frequency of playing different game genres was assessed on an ordinal scale, this relationship was tested by the Spearman's ρ correlation coefficient. Criterion-related validity was also investigated by comparing gamers who most often played on the smartphone ($N = 213$) to gamers who most often played on other devices ($N = 462$). In this context, it should be noted that GTP may be related to the intensity of content and the mechanics of video games. More precisely, gamers hear the sounds, see images from the game, and experience thoughts associated with the game in off-game situations (Ortiz de Gortari et al., 2011; Ortiz de Gortari & Griffiths, 2014a; 2014b). However, the gamer must experience this content while playing on a device that enables the delivery of this content. Consequently, gamers who most often play on the smartphone might experience less game-related content than gamers who most often play on other devices such as PCs, laptops, and so forth. In this context, Kang et al. (2020) showed that gamers who played action video games on desktop devices presented a stronger relationship between flow experience and game engagement than gamers who played action video games on the smartphone. Additionally, Ortiz de Gortari (2018) showed that Pokémon Go gamers who played the game with sound were significantly more likely to report auditory GTP experiences than those who played it without sound. Hence, gamers who use a smartphone for gaming may experience GTP less often than gamers who use other gaming devices. This difference was verified using independent samples t tests. The Cochran–Cox adjustment was applied when variances between the groups were heterogeneous. The magnitude of differences was measured with Cohen's d effect size and interpreted in accordance with Cohen's (1988) guidelines: small $d = 0.2$, moderate $d = 0.5$, and large $d = 0.8$.

The SPSS 23 software was used to compute descriptive statistics, correlation confections and internal consistency analysis. The *R* Studio software with Lavaan package (Rosseel, 2012) and semTools package (Jorgensen et al., 2018) was used for the CFA analysis, reliability analysis, and invariance analysis.

RESULTS

The descriptive statistics and correlation coefficients per gender are presented in Table 1.

The CFA showed that the Polish version of the GTPS structure was analogous to the original version (Ortiz de Gortari et al., 2015) among the female and male gamers group. More precisely, for the female gamers group, the results showed that model was acceptably fit to the data: $\chi^2(df = 160) = 289.12$, $p < .001$, RMSEA = 0.073, SRMR = 0.035, CFI = 0.960, TLI = 0.952. Additionally, all standardized factor loadings were statistically significant ($p < .001$), and their values ranged from 0.723 to 0.918. Detailed findings are presented in Figure 1.

In the male gamers group, the five-factor structure of the GTPS was also acceptably fit to the data: $\chi^2(df = 160) = 243.30$, $p < .001$, RMSEA = 0.060, SRMR = 0.030, CFI = 0.976, TLI = 0.972. Additionally, all standardized factor loadings were statistically significant ($p < .001$), and their values ranged from 0.754 to 0.942. Detailed findings are presented in Figure 2.

However, it should be noted that the AVE for almost every latent factor was lower than the squared correlations between this latent construct and other latent constructs in the original five-factor model (see Table 2, Figure 1, and Figure 2) among the female and male gamer groups. Additionally, the heterotrait-monotrait ratio was higher than the 0.90 threshold (see Henseler et al., 2015) for almost every latent factor in the female and male groups. Consequently, discriminant validity was not achieved. More precisely, the latent GTPS subscale was probably not able to account for more variance in the measurement items associated with it than other latent GTPS subscales within the model (see Farrell, 2010; Fornell & Larcker, 1981). Considering these results and the GTP model framework (Ortiz de Gortari, 2010, 2015, 2019), it can be assumed that there was a higher-order factor including a general tendency to transfer experiences from the game into real-life contexts. Consequently, the CFA was conducted again with the higher-order factor separately for female and male gamers.

TABLE 1.
The Descriptive Statistic and the Correlations Between Items and Subscale Scores Among Female ($N = 340$) and Male ($N = 335$) Gamers

			Female gamers (N = 340)																							
	M	*SD*	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
[1] Item 1	2.09	1.14																								
[2] Item 2	1.65	1.03	0.68																							
[3] Item 3	1.58	0.99	0.61	0.79																						
[4] Item 4	1.57	0.99	0.60	0.72	0.75																					
[5] Item 5	1.71	1.08	0.57	0.71	0.73	0.73																				
[6] Item 6	1.61	1.02	0.58	0.69	0.71	0.75	0.72																			
[7] Item 7	1.77	1.11	0.53	0.60	0.64	0.66	0.67	0.64																		
[8] Item 8	1.66	1.05	0.58	0.70	0.74	0.73	0.74	0.73	0.68																	
[9] Item 9	2.02	1.16	0.66	0.56	0.51	0.55	0.64	0.58	0.57	0.59																
[10] Item 10	1.90	1.21	0.63	0.65	0.62	0.63	0.68	0.67	0.58	0.69	0.79															
[11] Item 11	1.64	0.99	0.64	0.69	0.77	0.75	0.72	0.72	0.65	0.73	0.69	0.76														
[12] Item 12	1.66	1.04	0.64	0.67	0.74	0.76	0.72	0.80	0.59	0.74	0.63	0.71	0.76													
[13] Item 13	1.67	1.09	0.58	0.61	0.69	0.71	0.73	0.66	0.63	0.67	0.55	0.62	0.76	0.73												
[14] Item 14	1.69	1.04	0.64	0.68	0.74	0.77	0.73	0.71	0.63	0.69	0.59	0.66	0.75	0.79	0.76											
[15] Item 15	1.65	1.02	0.62	0.70	0.73	0.74	0.70	0.72	0.57	0.72	0.57	0.65	0.71	0.77	0.72	0.77										
[16] Item 16	1.56	1.04	0.56	0.69	0.72	0.75	0.67	0.70	0.60	0.76	0.55	0.67	0.73	0.76	0.68	0.74	0.74									
[17] Item 17	1.58	0.98	0.53	0.65	0.70	0.68	0.66	0.67	0.70	0.68	0.57	0.60	0.70	0.67	0.66	0.65	0.66	0.69								
[18] Item 18	1.54	0.96	0.55	0.67	0.73	0.70	0.70	0.74	0.62	0.70	0.58	0.65	0.74	0.76	0.70	0.76	0.71	0.80	0.73							
[19] Item 19	1.48	0.90	0.56	0.69	0.75	0.74	0.69	0.68	0.62	0.73	0.55	0.61	0.76	0.74	0.71	0.74	0.76	0.83	0.75	0.84						
[20] Item 20	1.51	0.98	0.55	0.68	0.74	0.75	0.68	0.70	0.62	0.73	0.52	0.62	0.71	0.74	0.71	0.75	0.78	0.80	0.73	0.80	0.83					
[21] Subscale IA	1.73	0.91	0.84	0.91	0.89	0.87	0.78	0.77	0.69	0.78	0.65	0.72	0.81	0.80	0.74	0.80	0.79	0.77	0.73	0.75	0.78	0.77				
[22] Subscale IB	1.69	0.93	0.64	0.77	0.80	0.81	0.89	0.87	0.86	0.89	0.68	0.74	0.80	0.81	0.77	0.78	0.77	0.78	0.77	0.78	0.77	0.78	0.86			
[23] Subscale IC	1.80	0.98	0.72	0.72	0.74	0.74	0.78	0.77	0.67	0.77	0.88	0.92	0.89	0.86	0.74	0.78	0.75	0.76	0.71	0.76	0.74	0.72	0.83	0.85		
[24] Subscale II	1.64	0.93	0.67	0.75	0.80	0.83	0.79	0.78	0.68	0.79	0.63	0.72	0.82	0.85	0.89	0.91	0.90	0.88	0.75	0.83	0.85	0.85	0.87	0.86	0.84	
[25] Subscale III	1.53	0.87	0.60	0.74	0.80	0.79	0.75	0.76	0.70	0.78	0.61	0.68	0.79	0.79	0.76	0.79	0.80	0.85	0.88	0.92	0.93	0.92	0.83	0.85	0.80	0.89

Note. For all correlation coefficients $p \leq 0.001$; IA = Altered perceptions modality - Altered visual perceptions submodality; IB = Altered perceptions modality - Altered body perceptions submodality; IC = Altered perceptions modality - Altered auditory perceptions submodality; II = Automatic mental processes modality; III: actions and behaviors modality.

TABLE 1.
The Descriptive Statistic and the Correlations Between Items and Subscale Scores Among Female ($N = 340$) and Male ($N = 335$) Gamers (Cont.)

	Male gamers (N = 335)																									
	M	*SD*	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
[1] Item 1	2.20	1.15																								
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[4] Item 4	1.79	1.07	0.66	0.81	0.81																					
[5] Item 5	1.81	1.07	0.63	0.77	0.76	0.80																				
[6] Item 6	1.76	1.06	0.64	0.79	0.77	0.78	0.80																			
[7] Item 7	1.93	1.14	0.60	0.66	0.66	0.71	0.68	0.69																		
[8] Item 8	1.82	1.10	0.60	0.70	0.76	0.78	0.74	0.74	0.70																	
[9] Item 9	2.07	1.15	0.62	0.62	0.63	0.63	0.60	0.61	0.69	0.62																
[10] Item 10	1.92	1.11	0.65	0.73	0.72	0.70	0.68	0.72	0.67	0.66	0.81															
[11] Item 11	1.84	1.11	0.66	0.73	0.70	0.69	0.72	0.70	0.65	0.70	0.72	0.81														
[12] Item 12	1.81	1.09	0.65	0.74	0.74	0.77	0.75	0.77	0.68	0.75	0.64	0.73	0.79													
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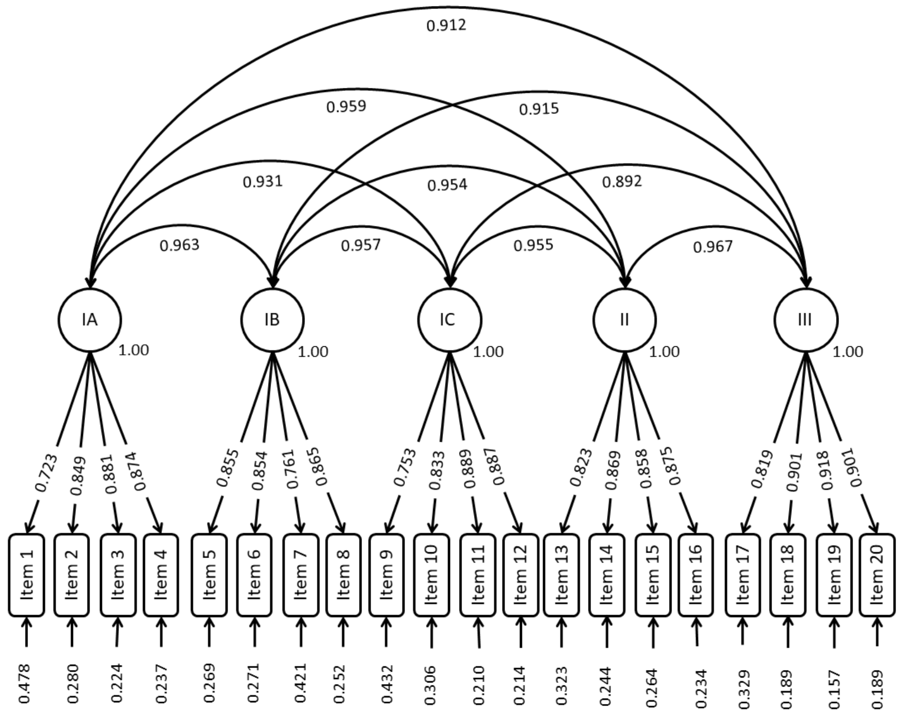
[14] Item 14	1.82	1.09	0.61	0.74	0.69	0.74	0.76	0.73	0.65	0.74	0.61	0.68	0.75	0.81	0.79											
[15] Item 15	1.84	1.10	0.61	0.68	0.67	0.72	0.74	0.70	0.68	0.70	0.64	0.67	0.72	0.77	0.75	0.76										
[16] Item 16	1.70	1.06	0.58	0.74	0.69	0.76	0.75	0.74	0.68	0.71	0.61	0.69	0.74	0.81	0.78	0.79	0.80									
[17] Item 17	1.84	1.12	0.62	0.69	0.70	0.73	0.71	0.72	0.68	0.68	0.66	0.68	0.71	0.76	0.74	0.75	0.78	0.78								
[18] Item 18	1.77	1.06	0.63	0.71	0.73	0.74	0.76	0.77	0.68	0.75	0.63	0.68	0.72	0.78	0.76	0.75	0.71	0.74	0.76							
[19] Item 19	1.69	1.04	0.60	0.73	0.73	0.73	0.73	0.75	0.67	0.74	0.61	0.71	0.78	0.85	0.79	0.82	0.78	0.85	0.79	0.81						
[20] Item 20	1.69	1.04	0.59	0.74	0.71	0.75	0.76	0.76	0.68	0.73	0.62	0.71	0.76	0.85	0.79	0.81	0.79	0.87	0.82	0.78	0.90					
[21] Subscale IA	1.89	0.98	0.85	0.93	0.91	0.91	0.82	0.83	0.73	0.79	0.70	0.78	0.77	0.80	0.77	0.77	0.74	0.77	0.76	0.78	0.77	0.78				
[22] Subscale IB	1.83	0.97	0.69	0.82	0.83	0.86	0.90	0.90	0.87	0.89	0.71	0.77	0.78	0.83	0.79	0.81	0.79	0.81	0.78	0.83	0.81	0.82	0.89			
[23] Subscale IC	1.91	1.01	0.72	0.78	0.77	0.77	0.76	0.78	0.75	0.76	0.88	0.93	0.92	0.87	0.78	0.79	0.77	0.79	0.78	0.78	0.82	0.81	0.85	0.85		
[24] Subscale II	1.78	0.98	0.66	0.79	0.75	0.82	0.81	0.78	0.74	0.78	0.68	0.75	0.81	0.86	0.91	0.92	0.91	0.92	0.83	0.81	0.89	0.89	0.84	0.87	0.86	
[25] Subscale III	1.75	0.99	0.66	0.77	0.77	0.80	0.80	0.81	0.73	0.78	0.68	0.75	0.80	0.87	0.83	0.84	0.82	0.87	0.91	0.90	0.95	0.94	0.83	0.88	0.86	0.92

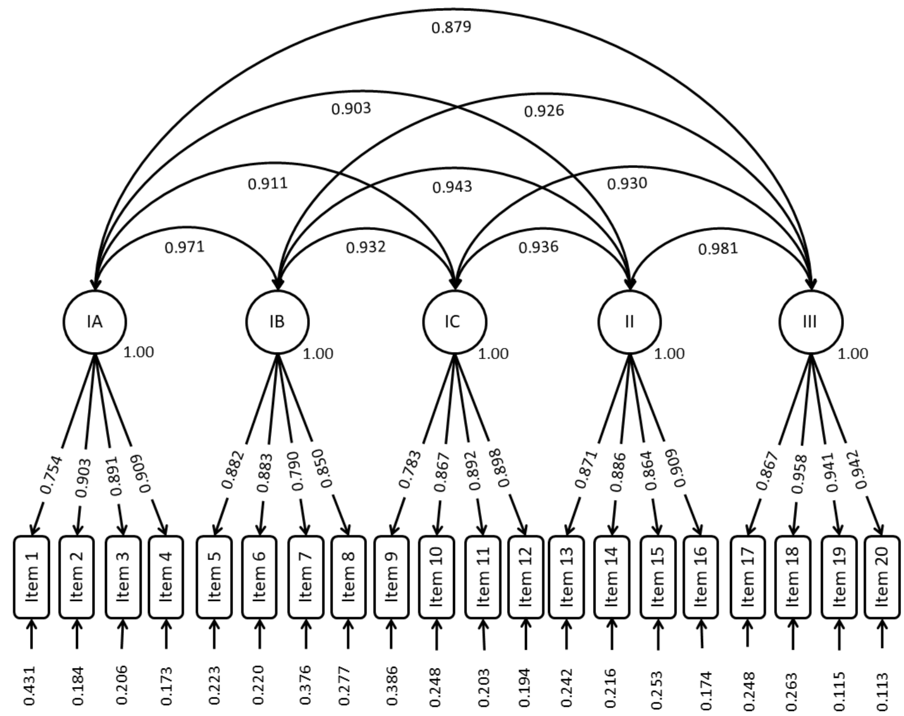
Note. For all correlation coefficients $p \le 0.001$; IA = Altered perceptions modality - Altered visual perceptions submodality; IB = Altered perceptions modality - Altered body perceptions submodality; IC = Altered perceptions modality - Altered auditory perceptions submodality; II = Automatic mental processes modality; III: actions and behaviors modality.



Note: All paths are statistically significant ($p < 0.05$)

FIGURE 1.

Five-factor Game Transfer Phenomena model for the female group.



Note: All paths are statistically significant ($p < 0.05$)

FIGURE 2.

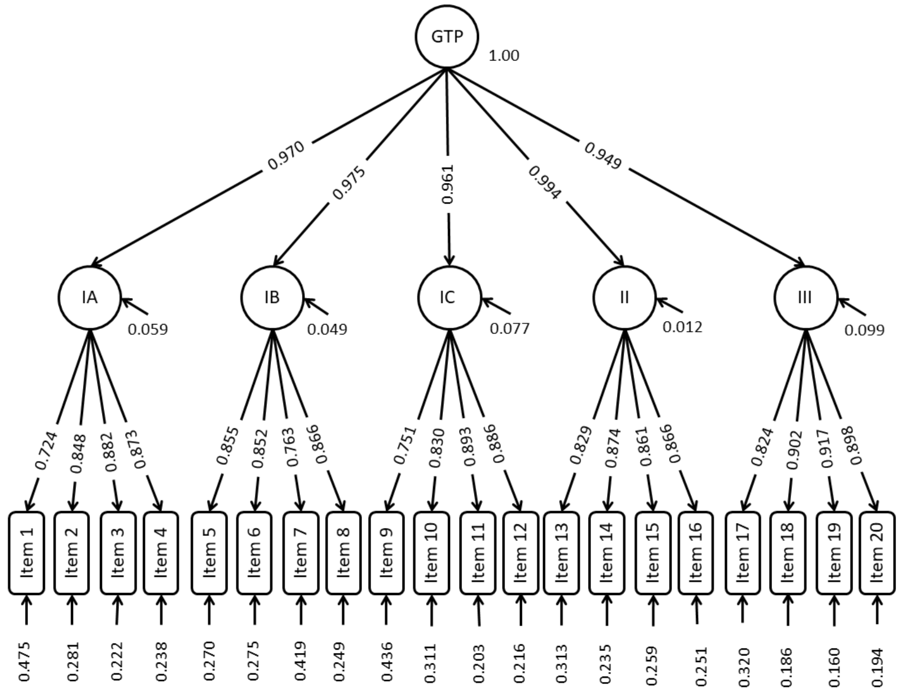
Five-factor Game Transfer Phenomena model for the male group.

TABLE 2.
Results of Average Variance Extracted (AVE) and Heterotrait-Monotrait Ratio (HTMT) for Game Transfer Phenomena Original Five-Factor Model

Average variance extracted (AVE)					
	Game Transfer Phenomena (GTP) subscale				
	Altered perceptions modality				
Gamer groups	Altered visual perceptions submodality	Altered body perceptions submodality	Altered auditory perceptions submodality	Automatic mental processes modality	Actions and behaviors modality
Female	0.696	0.697	0.710	0.734	0.784
Male	0.752	0.726	0.742	0.779	0.815

Heterotrait-monotrait ratio (HTMT)						
Female						
GTP subscale		Altered perceptions modality			Automatic mental processes modality	Actions and behaviors modality
		Altered visual perceptions submodality	Altered body perceptions submodality	Altered auditory perceptions submodality		
Altered perceptions modality	Altered visual perceptions submodality	1.00				
	Altered body perceptions submodality	0.956	1.00			
	Altered auditory perceptions submodality	0.924	0.940	1.00		
Automatic mental processes Modality		0.956	0.951	0.930	1.00	
Actions and Behaviors Modality		0.906	0.925	0.874	0.966	1.00

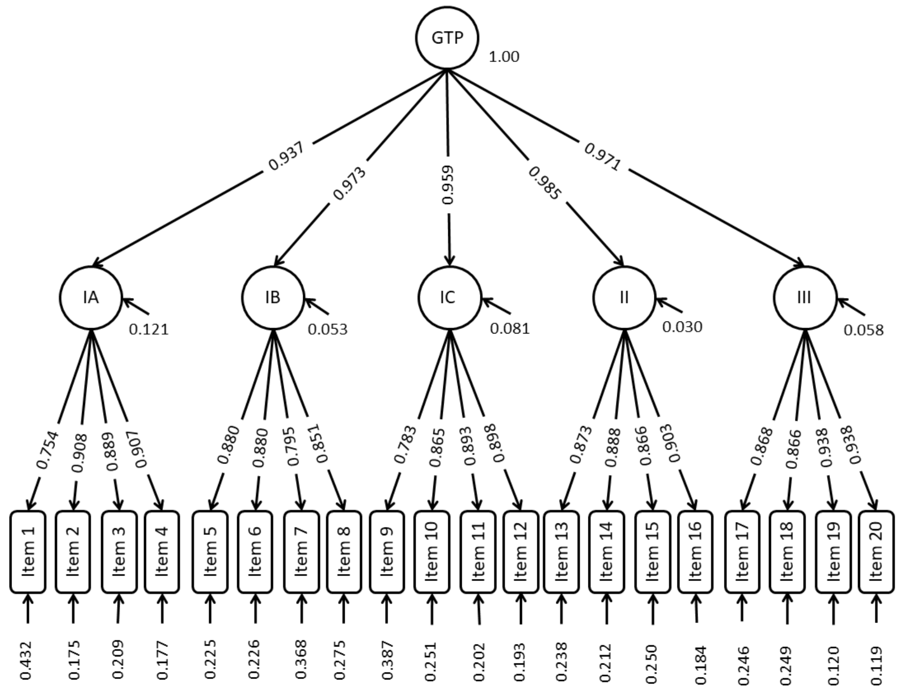
Heterotrait-monotrait ratio (HTMT)						
Male						
GTP subscale		Altered perceptions modality			Automatic mental processes modality	Actions and behaviors modality
		Altered visual perceptions submodality	Altered body perceptions submodality	Altered auditory perceptions submodality		
Altered perceptions modality	Altered visual perceptions submodality	1.00				
	Altered body perceptions submodality	0.970	1.00			
	Altered auditory perceptions submodality	0.919	0.931	1.00		
Automatic mental processes modality		0.903	0.947	0.923	1.00	
Actions and behaviors modality		0.895	0.944	0.921	0.982	1.00



Note: All paths are statistically significant ($p < 0.05$)

FIGURE 3.

Five-factor GTP model with higher order factor for the female group.



Note: All paths are statistically significant ($p < 0.05$)

FIGURE 4.

Five-factor GTP model with higher order factor for the male group.

The results of the CFA reanalysis demonstrated that the GTPS structure with the higher-order factor including a general tendency to transfer experiences from the game into the real life context was acceptably fit to the data among the female and male gamer groups (female gamers: $\chi^2[df = 165] = 303.20$, $p < .001$, RMSEA = 0.075, SRMR = 0.033, CFI = 0.957, TLI = 0.950; male gamers: $\chi^2[df = 165] = 268.88$, $p < .001$, RMSEA = 0.067, SRMR = 0.035, CFI = 0.969, TLI = 0.964). For both groups, all standardized factor loadings were statistically significant ($p < .001$). Additionally, factor loadings ranged from 0.724 to 0.917 in the female group, and from 0.754 to 0.938 in the male group. Details of the findings are presented in Figure 3 and Figure 4.

The invariance analysis per gender was carried out as per the recommendation by Brown (2006). The first step in the invariance analysis was to test the CFA model with the higher order factor separately in the female and male groups. The results showed that the CFA model was fit to the data in the female and male group. The next step consisted of conducting the simultaneous test of the equal form (configural invariance). The results confirmed the identical factor structure among female and male gamers group: $\chi^2(df = 330) = 571.06$, $p < .001$, RMSEA = 0.071, CFI = 0.963, TLI = 0.957, SRMR = 0.033. Specifically, the number of factors and the pattern of indicators such as factor loadings were identical across both groups. Equal factor loadings model (metric invariance) also showed an adequate fit according to the goodness-of-fit indices: $\chi^2(df = 349) = 593.19$, $p < .001$, CFI = 0.963, RMSEA = 0.069, SRMR = 0.041, TLI = 0.960. There was no difference between equal form (configural invariance) and equal factor loadings (metric invariance) models: $\Delta\chi^2(\Delta df = 19) = 22.13$; $p = .518$. Additionally, the difference in the CFI values was lower than or equal to 0.005 (ΔCFI = 0.000), lower than 0.010 in the RMSEA (ΔRMSEA = 0.002) and lower than 0.025 in the SRMR (ΔSRMR = 0.008). Consequently, it can be assumed that the factors loadings were equal between the male and female gamers groups.

The equal indicator intercepts model (scalar invariance) showed an adequate fit: $\chi^2(df = 363) = 617.65$, $p < .001$, CFI = 0.963, RMSEA = 0.068, SRMR = 0.041, TLI = 0.961. There was no significant difference between the equal factor loadings model and the equal indicator intercepts model ($\Delta\chi^2(\Delta df = 14) = 24.46$; $p = .106$). The change in the CFI value was lower than 0.005 (ΔCFI = 0.000) when comparing both models. Additionally, the RMSEA change was lower than 0.010 (ΔRMSEA = 0.001) and the SRMR change was lower than 0.005 (ΔSRMR = 0.000). Consequently, the results demonstrated that the factors loadings and intercepts were equal between the male and female gamers groups.

The equal indicator error variances model was adequately fit to the data: $\chi^2(df = 383) = 663.32$, $p < .001$, CFI = 0.963, RMSEA = 0.066, SRMR = 0.043, TLI = 0.963. There was no difference between the equal indicator intercepts model and the equal indicator error variances model: ($\Delta\chi^2[\Delta df = 20] = 15.67$; $p = .392$). Additionally, the CFI change was lower than or equal to 0.005 (ΔCFI = 0.000), RMSEA change was lower than 0.010 (ΔRMSEA = 0.002), and SRMR change was lower than 0.005 (SRMR = 0.002). Consequently, the results showed that there was a strict measurement invariance between the male and female gamers groups. More details on the results are presented in Table 2. Additionally, tests of population heterogeneity showed that equal factor variance model was fit to data, $\chi^2(df = 389) = 634.08$; $p < .001$; CFI = 0.963; RMSEA = 0.065; SRMR = 0.065; TLI = 0.964. The $\Delta\chi^2$ test was nonsignificant, $\Delta\chi^2(\Delta df = 6) = 0.76$; $p = .642$. The CFI change was lower than or equal to 0.005 (ΔCFI = 0.000) and RMSEA change was lower than 0.010 (ΔRMSEA = 0.001). However, SRMR change was greater than or equal to 0.005 (SRMR = 0.022). Consequently, it should be noted that equal factor variance was most likely not assumed. In this context, the higher order GTP factor variance was relaxed. Consequently, the partial equal factor variance model showed an acceptable fit: $\chi^2(df = 388) = 632.14$, $p < .001$, CFI = 0.963, RMSEA = 0.066, SRMR = 0.042, TLI = 0.964. Additionally, the CFI change was lower than or equal to 0.005 (ΔCFI = 0.000), RMSEA change was lower than 0.010 (ΔRMSEA = 0.000), and SRMR change was lower than 0.005 (SRMR = 0.001). The higher order GTP factor variance was 0.598 for the female gamers group and 0.693 for the male gamers group. Moreover, the equal latent mean model was fit to data: $\chi^2(df = 394) = 645.46$; $p < .001$; CFI = 0.962; RMSEA = 0.066; SRMR = 0.049; TLI = 0.964. However, there was difference between the partial equal factor variance model and the equal latent mean model, $\Delta\chi^2(\Delta df = 6) = 13.23$; $p = .013$. Additionally, SRMR change was ≥ 0.005 (SRMR = 0.007) (see Table 3). However, it should be noticed that there were differences in the female and male gamer groups in latent means. Taking the female gamers group as the reference group, the latent factor means in the male group were as follows: 0.651 (*SE* = 0.102) for the IA subscale, 0.731 (*SE* = 0.123) for the IB, 0.470 (*SE* = 0.108) for the IC subscale, 0.978 (*SE* = 0.113) for the II subscale, 0.846 (*SE* = 0.098) for the III subscale, and 0.163 (0.078) for the higher order factor including a general tendency to transfer experiences from the game into real life context.

Considering the reliability analyses, the Cronbach's α ranged from .898 to .934 for the GTPS subscales in the female gamers group, from .912 to .944 in the male gamers group, and from .908 to .940 among all gamers (see Table 4). All Cronbach's α scores were above the recommended threshold of .70 (Nunnally & Bernstein, 1994). The reliability measured by Raykov's composite reliability (Raykov, 1997) ranged from 0.896 to 0.935 among the female gamers group, from 0.912 to 0.945 among the male gamers group, and from 0.907 to 0.941 among all gamers, which was above the desired threshold of 0.70 (see Table 4). Additionally, for the GTPS total score, the Cronbach's α was .977 for the female gamers group, .981 for the male gamers group, and .979 for all gamers, which were above the recommended threshold of .70 (Nunnally & Bernstein, 1994). The higher-order omega was 0.968 for the female gamers group, 0.967 for the male gamers group, and 0967 for all gamers. Consequently, these results suggest that the Polish version of the GTPS presents good internal consistency levels.

The criterion-related validity analysis showed that the GTPS subscales and total GTPS score were positively correlated with hours per week spent playing video games in the last twelve months (see Table 5). More precisely, there was a positive relationship between all GTPS subscales, GTPS total score and playing time for all game genres. Gamers who mainly played on smartphones experienced less GTP than gamers who mainly played on other gaming devices (see Table 5). More precisely, all GTPS subscales and total GTPS score were higher among gamers who used other gaming devices than gamers who used

TABLE 3.
Tests of Measurement Invariance and Population Heterogeneity of Game Transfer Phenomena Scale Among Female and Male Gamers Group

Model	χ^2	*df*	*p*<	CFI	RMSEA	SRMR	TLI	Model comparison	$\Delta\chi^2$	Δdf	*p*	ΔCFI	ΔRMSEA	ΔSRMR	Decision
Measurement invariance															
M1: Equal form (configural invariance)	571.06	330	.001	0.963	0.071	0.033	0.957	-	-			-	-	-	-
M2: Equal factor loadings (metric invariance)	593.19	349	.001	0.963	0.069	0.041	0.960	M1	22.13	19	0.518	.000	0.002	0.008	Accept
M3: Equal indicator intercepts (scalar invariance)	617.65	363	.001	0.963	0.068	0.041	0.961	M2	24.46	14	0.106	.000	0.001	0.000	Accept
M4: Equal indicator error variances (strict invariance)	633.32	383	.001	0.963	0.066	0.043	0.963	M3	15.67	20	0.392	.000	0.002	0.002	Accept
Population heterogeneity															
M5: Equal factor variance	634.08	389	.001	0.963	0.065	0.065	0.964	M4	0.76	6	0.642	.000	0.001	0.022	Reject
M5a: Partial equal factor variance	632.14	388	.001	0.963	0.066	0.042	0.964	M4	1.18	5	0.655	.000	0.000	0.001	Accept
M6: Equal latent mean	645.37	394	.001	0.962	0.066	0.049	0.964	M5a	13.23	6	0.013	.000	0.000	0.007	Reject

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root means squared residual; TLI = Tucker-Lewis index.

TABLE 4.
Results of Internal Consistency for the Game Transfer Phenomena Scale

Internal consistency tests	Gamer groups	Game Transfer Phenomena Scale				
		Altered perceptions modality			Automatic mental processes modality	Actions and behaviors modality
		Altered visual perceptions submodality	Altered body perceptions submodality	Altered auditory perceptions submodality		
Cronbach's alpha	Female	0898	0.901	0.911	0.917	0.934
	Male	0.920	0.912	0.923	0.934	0.944
	All	0.910	0.908	0.917	0.926	0.940
Raykov's composite reliability	Female	0.896	0.900	0.903	0.916	0.935
	Male	0.921	0.912	0.919	0.934	0.945
	All	0.910	0.907	0.910	0.925	0.941

TABLE 5.
Relationship Between Game Transfer Phenomena Subscales and the Time Played Different Video Game Genres in the Last Twelve Months ($N = 675$)

Game genre	Game Transfer Phenomena subscale					
	Altered perceptions modality			Automatic mental processes modality	Actions and behaviors modality	GTP total
	Altered visual perceptions submodality	Altered body perceptions submodality	Altered auditory perceptions submodality			
First/Third person shooters	0.40	0.37	0.38	0.35	0.36	0.40
Action-RPG/adventure	0.34	0.29	0.31	0.33	0.28	0.35
Sports/driving	0.30	0.32	0.31	0.29	0.30	0.32
Real-time strategy/MOBA	0.38	0.37	0.38	0.36	0.38	0.39
Turn-based/Non-action role-playing/Fantasy	0.41	0.37	0.39	0.41	0.41	0.41
Turn-based strategy/Life simulation/Puzzle	0.15	0.17	0.20	0.21	0.15	0.19
Music games	0.44	0.44	0.42	0.44	0.48	0.43
Other	0.22	0.27	0.27	0.29	0.26	0.27

Note. GTP = Game Transfer Phenomena. $p \leq .001$ for all correlation coefficients.

TABLE 6.
Difference Between Gamers who Most Often Played on the Smartphone ($N = 213$) and Gamers who Most Often Played on the Other Devices ($N = 462$) on the Game Transfer Phenomena subscales and total score

GTP subscales		Most often played				t	p	Cohen's d
		On other devices		On smartphones				
		M	SD	M	SD			
Altered perceptions modality	Altered visual perceptions submodality	1.92	1.00	1.57	0.78	4.87	.001	.39
	Altered body perceptions submodality	1.84	1.02	1.57	0.77	3.83	.001	.30
	Altered auditory perceptions submodality	1.94	1.04	1.67	0.85	3.61	.001	.28
Automatic mental processes Modality		1.80	1.02	1.52	0.78	3.91	.001	.31
Actions and Behaviors Modality		1.73	1.01	1.43	0.73	4.32	.001	.34
Total GTP		1.85	0.97	1.55	0.71	4.43	.001	.33

a smartphone for playing. However, it should be noted that effect sizes assessed by Cohen's *d* were small.

DISCUSSION

The main aim of this study was to assess the reliability and validity of the GTPS in a Polish sample. Additionally, this study aimed to test the gender invariance of the GTPS. The CFA showed that the Polish version of the GTPS had a structure analogous to the original one (Ortiz de Gortari et al., 2015) and the Turkish adaptation of the GTPS (Dindar & Ortiz de Gortari, 2017). These findings suggest that the GTPS structure holds across the various cultural contexts in which it has been adapted.

The gender invariance analysis showed that the Polish version of the GTPS presented strict measurement invariance (see Table 3). This result indicates the same one-factor structure and the same patterns of factor loadings between females and males. Also, there was an equivalent strength of the relationships between the items and factors. Additionally, these results showed that indicator intercepts and indicator residual variances were equal between the analyzed models for the female and male gamer groups (see Brown, 2006; Putnick & Bornstein, 2016). Consequently, it can be concluded that the GTPS has a strict identical structure for these groups.

Additionally, these findings indicate that the GTPS score can be directly compared between female and male gamers. This finding is important when studying differences among gender regarding video game consumption (see Lopez-Fernandez, Williams et al., 2019; Lopez-Fernandez, Williams, & Kuss, 2019). The measurement invariance results suggest that the structure of the GTPS for female and male gamers are similar, and the same GTP construct is being measured across both groups. However, there were differences between the female and male gamer groups in latent means. More precisely, the male gamers group presented higher GTP scores than the female gamers group. Previous studies have not found gender differences in GTP (e.g., Dindar & Ortiz de Gortari, 2017; Ortiz de Gortari, 2018). However, in the current study, differences between gender groups were investigated at the latent mean level of the GTP subscales for the first time.

The internal consistency of the Polish version of the GTPS was assessed with Cronbach's α, Raykov's composite reliability (Raykov, 1997). Average variance extracted was good. Moreover, criterion-related validity results showed a positive relationship between GTPS subscales and time spent playing video games (i.e., hours playing per week) in the last twelve months. This relationship was significant for every analyzed game genre (including first/third-person shooters, action-RPG/adventure, sports/driving, real-time strategy/MOBA, turn-based/non-action role-playing/fantasy, turn-based strategy/life simulation/puzzle, and music games). These results are consistent with previous research on the relationship between time spent playing and GTP (Dindar & Ortiz de Gortari, 2017; Ortiz de Gortari et al., 2016; Ortiz de Gortari & Griffiths, 2015).

Additionally, the difference between gamers who most often played on the smartphone and those who most often played on the other devices was analyzed as an additional source of criterion-related validity. In this context, it should be noted that the content and the mechanics of video games can influence GTP intensity. This means that gamers hear the sounds, see the game images, and experience thoughts in off-game situations that correspond to what they have experienced while playing (Ortiz de Gortari et al.2011; Ortiz de Gortari & Griffiths, 2014a; 2014b). The game features, the intensity of the game (e.g., the sense of immersion), and the device appear to play a role in the susceptibility to GTP (Ortiz de Gortari, 2018, 2019). Consequently, gamers who most often play on the smartphone may experience less GTP than gamers who most often play on devices that increase immersion, such as computers, consoles, or VR-headset. For instance, according to Kang et al. (2020), playing action games on a desktop showed a stronger relationship between the flow experience and game engagement than playing action games on a smartphone.

Consistent with the GTP framework (Ortiz de Gortari, 2019) the current study demonstrated that gamers who played on smartphones were less likely to experience GTP in each dimension than gamers who played on other devices. This finding is aligned with a study conducted on an augmented reality mobile game (Pokémon Go, Ortiz de Gortari, 2018) which found that gamers who played the game with sound were significantly more likely to report auditory GTP experiences than those who played without sound.

In conclusion, this study demonstrated that the Polish version of the GTPS is a reliable and valid method to assess GTP in the Polish context and that GTP experienced by female and male gamers can be reliably assessed and compared.

This study results should be interpreted in light of several limitations. The current study was self-report and cross-sectional in nature. Consequently, causal relationships between the variables cannot be assumed. Additionally, it should be considered that survey studies may be limited by method biases when participants answer such questions (e.g., social desirability, biased recalls, lack of insight). It is also important to note the careless responding problem (see Brühlmann et al., 2020). More precisely, despite the use of attention-checking questions, participants may have responded in a biased manner. Moreover, participants were recruited online from the Polish research panel Ariadna. Consequently, it is necessary to be cautious in generalizing the results of this study to other Polish gamers. Additionally, the participants' age range was 15 to 45 years old. Therefore, it is important to be careful in generalizing the results to children or seniors. Further research needs to establish whether similar results can be identified in these gamer groups.

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The authors declare no conflict of interest.

The study was conducted in accordance with the Declaration of Helsinki. According to the Ariadna research panel rules, both adults and minors can take part in the panel. However, in the case of minors, their parents have given written consent for them to participate in this panel. No personal information about the

participants was collected during the study.

Authors' contributions. AC: substantial contributions to the conception and design of the work; AC and EZM: preparation of the study methodology; AC: the data analysis; AC: interpretation of data for the work. AC, EZM and ABOG: drafting the work. EZM and ABOG: revising the work critically for important intellectual content.

DATA AVAILABILITY

The raw data will be made available by the authors to any qualified researcher without undue reservation.

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SUPPLEMENTARY MATERIAL

Contents of the Polish version of the Game Transfer Phenomena Scale

Skala do pomiaru zjawiska przenoszenia się wrażeń z gry

Instrukcja: Poniższe pytania dotyczą doświadczeń w różnych kanałach sensorycznych (np. wzrokowym, słuchowym, dotykowym), które mogą mieć związek z Twoją aktywnością w grze. Prosimy o podanie, jak często w ciągu ostatnich 12 MIESIĘCY zdarzały się Tobie następujące doznania, gdy NIE grałeś/aś. Proszę podać tylko te doświadczenia, które miałeś/aś, kiedy nie byłeś/aś pod wpływem jakiejś substancji psychoaktywnej (np. alkoholu, marihuany, ecstasy, itp.) Odpowiedz na pytania przy pomocy skali częstości Likerta (*prawie cały czas*, *wiele razy*, *kilka razy*, *raz*, *nigdy*)

I. Modalność zniekształconego sposobu postrzegania

Submodalność: Postrzeganie wzrokowe

Wyobrażałem/am sobie obrazy z gier video lub widziałem/am je, gdy zamknąłem/am oczy w czasie kiedy nie grałem/am (np. widząc niejako obrazy pod powiekami).

Widziałem/am obrazy z gier z otwartymi oczami, kiedy nie grałem/am (np. widziałem/am pasek z życiem nad głowami innych ludzi, lub mapy kątem oka).

Widziałem/am zniekształcenia rzeczywistego otoczenia i/lub przedmiotów z życia realnego w wyniku grania w gry video (np. widzenie rzeczywistego otoczenia w zwolnionym tempie lub zabarwionego kolorem z gry).

Widząc coś rzeczywistego, błędnie postrzegłem/am to jako coś z gry video (np. widząc samolot pomyślałem, że to obiekt z Modern Warfare 2).

Submodalność: Zmienione odczuwanie ciała

Doświadczyłem/am fizycznego wrażenia ruchu, jakbym znajdował/a się w grze video (np. leżąc na łóżku, ale odczuwając, jakby ciało lub jakaś jego część się poruszała).

Odczuwałem/am wrażenie dotykowe związane z grą w czasie gdy nie grałem/am (np. miałem/am uczucie w palcach, jakbym naciskał/a przyciski na gamepadzie).

Inaczej odbieram czas i/lub moje ciało po zagraniu w grę (np. odczuwam jak czas biegnie wolniej lub czuję się większy/-a lub mniejszy/-a niż naprawdę jestem).

Po graniu w grę czułem/am, jakby mój umysł odłączył się od mojego ciała (np. doświadczenie bycia poza swoim ciałem).

Submodalność: Zniekształcone postrzeganie słuchowe

Słyszałem/am muzykę z gry w czasie gdy w nią nie grałem/am.

Słyszałem/am efekty dźwiękowe z gry kiedy nie grałem/am.

Słyszałem/am głos postaci z gry kiedy nie grałem/am.

Błędnie zinterpretowałem/am dźwięk w prawdziwym życiu, myśląc, że to dźwięk z gry.

II. Modalność automatycznych procesów umysłowych

Odczuwałem/am chęć lub potrzebę zrobienia czegoś w prawdziwym życiu po zobaczeniu czegoś, co przypominało element z gry video (np. widząc czerwone drzwi miałem/am ochotę je sforsować, grając wcześniej w Mirror's Edge lub odczuwając potrzebę wspinania się na budynki po grze w Assassin's Creed).

Doświadczyłem/am sytuacji, w której pomimo, że zakończyłem/am grę, wciąż towarzyszył mi sposób myślenia z gry (np. próbując ustawiać lub łączyć elementy z prawdziwego życia lub nieustannie myśląc gdzie jest najlepsze miejsce, by ustawić portale po grze w 'Portal').

Złapałem/am się na rozważaniu użycia przedmiotu z gry w prawdziwym życiu (np. myślałem/am o użyciu lunety, żeby zobaczyć odległe obiekty).

Mieszały mi się wydarzenia z gry video z wydarzeniami z prawdziwego życia (np. zastanawiałem/am się czy drzwi są zamknięte, aby potwory nie mogły wejść).

III. Modalność dotycząca działania i zachowania

Śpiewałem/am, krzyczałem/am lub mówiłem/am w prawdziwym życiu coś z gry video, nie zamierzając tego robić.

Doświadczyłem/am odruchowej reakcji ciała, związanej z graniem w gry video (np. poruszałem/am dłońmi lub palcami w celu znalezienia podkładek do gier – odruchowo, bez zastanowienia).

Odgrywałem/am zachowanie z gry video lub wykonywałem/am jakąś czynność z nią związaną (np. wspinanie się na szczyt dachu po grze w Mirror's Edge).

W prawdziwych sytuacjach życiowych zachowywałem/am się inaczej z powodu czegoś, czego doświadczyłem w grze, mimo iż nie zamierzałem/am tego robić (np. unikanie fontann po zagraniu w Fallout, czy wymykanie się/ chowanie się, przed kamerą bezpieczeństwa).