Revista Psicologia: Teoria e Prática, *19*(3), 209-225. São Paulo, SP, set.-dez. 2017. ISSN 1516-3687 (impresso), ISSN 1980-6906 (*on-line*). http://dx.doi.org/10.5935/1980-6906/psicologia.v19n3p209-225. **Sistema de avaliação**: às cegas por pares (*double blind review*). Universidade Presbiteriana Mackenzie.

Psychological assessment of videogame, board and live players: Personality, reasoning, and emotional perception

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Abstract: This research aimed at investigating the relationship between gaming preferences and psychological characteristics: abstract and verbal reasoning, emotional perception, and pathological personality traits. To this end, 164 people participated in the study, predominantly women (75%) with a mean age of 18.93 (SD = 6.36) and that have finished high school or college, in its majority. They answered a gaming preferences questionnaire, the Computerized Test of Primary Emotions Perception (PEP), the Dimensional Clinical Personality Inventory (IDCP), and two subtests from the Battery of Reasoning Tests (BPR-5). The results indicated correlations that were consistent with most of the measures, with a significant majority of magnitudes that varied from .16 (Anger Distortion vs. Interest in violent games) to .41 (Emotional perception vs. Monthly frequency of playing with other people). Also, we determined the importance attributed to being a gamer by three personality traits: Grandiosity, Criticism avoidance, and Impulsiveness. We found association tendencies between psychological characteristics and game preference, in a way that attributing higher importance to gaming was associated with higher frequency of eccentric behaviors, suspicion towards others' intentions, and avoiding criticism. We have discussed the relations we found, and we concluded that there seems to be a typical profile for people who demonstrate a high tendency for gaming.

Keywords: games; recreation; personality traits; emotional intelligence; intelligence measures.

AVALIAÇÃO PSICOLÓGICA DE JOGADORES DE *VIDEOGAME*, TABULEIRO E *LIVE*: PERSONALIDADE, RACIOCÍNIO E PERCEPÇÃO EMOCIONAL

Resumo: Esta pesquisa teve por objetivo investigar a relação entre preferência por jogos e características psicológicas: raciocínio abstrato e verbal, percepção de emoções e traços patológicos de personalidade. Para tanto, 164 pessoas participaram do estudo, predominantemente mulheres (75%) com idade média de 18,93 (DP = 6,36), e a maioria possuía ensino médio completo ou graduação. Os indivíduos responderam a um questionário de preferências de jogos, ao Teste Informatizado de Percepção de Emoções Primárias (PEP), ao Inventário Dimensional Clínico da Personalidade (IDCP) e a dois subtestes da Bateria de Provas de Raciocínio (BPR-5). Os resultados indicaram correlações coerentes com a maioria das medidas, de modo que a maior parte das magnitudes foi significativa, variando entre 0,16 (Distorção de Raiva *vs.* Interesse em

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jogos violentos) e 0,41 (Percepção emocional *vs*. Quantas vezes por mês se reúne com outras pessoas para jogar). Além disso, a importância atribuída a ser um usuário de jogos foi predita principalmente por três traços da personalidade: Grandiosidade, Evitação a críticas e Impulsividade. Foi possível encontrar tendências de associação entre características psicológicas e a preferência por jogos, de modo que atribuir maior importância ao ato de jogar mostrou-se associado à maior frequência de comportamentos excêntricos, desconfiança quanto às intenções dos outros e evitação a críticas. As relações encontradas foram discutidas, o que possibilitou concluir que parece existir um perfil típico para pessoas que demonstram alta tendência para o ato de jogar.

Palavras-chave: jogos; recreação; traços de personalidade; inteligência emocional; medidas de inteligência.

EVALUACIÓN PSICOLÓGICA DE LOS JOGADORES DE VIDEOJUEGOS, TABLEROS Y LIVE: PERSONALIDAD, RACIOCINIO Y PERCEPCIÓN EMOCIONAL

Resumen: Esta investigación tuvo como objetivo investigar la relación entre la preferencia por los juegos y las características psicológicas: el razonamiento abstracto y verbal, la percepción de las emociones y rasgos de personalidad patológicos. Para ello, 164 personas participaron en el estudio, en su mayoría mujeres (75%) con una edad media de 18,93 (SD = 6,36), con nivel de educación secundaria y graduación, en su mayoría. Respondieron a un cuestionario de preferencias de juego, la Prueba Computarizada de Percepión de las Emociones Primarias (PEP), el Inventario Dimensional Clínico de la Personalidad (IDCP) y dúas pruebas de la Batería de Pruebas de Razonamiento (BPR-5). Los resultados mostraron correlaciones coherentes con la mayoría de las mediciones, siendo la mayoría de magnitudes significativas, variando de .16 (Distorsión de ira x Interés en juegos violentos) a .41 (Percepción emocional x Frecuencia mensual de jugar con otras personas). Además, la importancia atribuida a ser un jugador fue predicha por tres rasgos de personalidad: Grandiosidad, Evitación de la crítica e Impulsividad. Encontramos tendencias de asociación entre las características psicológicas y la preferencia del juego, de tal forma que atribuir mayor importancia al juego se asoció con una mayor frecuencia de conductas excéntricas, sospechas hacia las intenciones de los demás y evitar críticas. Las relaciones que encontramos son discutidas, y llegamos a la conclusión de que parece que hay un perfil típico para las personas que demuestren tendencia alta para los juegos.

Palabras clave: juegos; recreación; rasgos de personalidad; inteligencia emocional; medidas de inteligencia.

Introduction

Games and video games are often leisure activities and, like all human activity, involve psychological aspects. Research shows that certain types of video games are related to better spatial reasoning (Feng, Spence & Pratt, 2007), faster processing speed, and higher short-term visual memory (McDermott, Bavelier & Green, 2014), higher abstract reasoning, and problem-solving (Suziedelyte, 2015), among others. Literature suggests that video games can train neurological development, as in the research conducted by Kühn, Gleich, Lorenz, Lindenberger, & Gallinat (2014). The authors compared two groups: a control group with one that trained for two months in a platform game, and the results indicate a significant increase of brain matter in areas responsible for spatial location, planning, working memory, and motor performance.

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However, games associate not only affective and personality traits but also with cognitive skills. For example, comparing people who played aggressive video games during three days with people who played non-aggressive video games, Hasan, Bègue, Scharkow, & Bushman (2013) found that the first group showed a significant increase in the frequency of aggressive behavior, while the second group showed a decrease in aggressive behaviors; the difference nonetheless was not significant. Other studies that found similar results suggest that violent video game exposure can lead to reduced awareness and aggressive thoughts and behavior (Anderson et al., 2010; Engelhardt, Bartholow, Kerr, & Bushman, 2011). In contrast, other studies suggest that the use of pro-social games may increase the frequency of socially valued behaviors (Greitemeyer & Osswald, 2011).

Concerning personality traits, Peever, Johnson & Gardner (2012), based on the model of the five great factors, found that extraversion associates with the preference for more casual and festive games; introversion associates with RPG games and strategy; conscientiousness associates with sports games; fighting and simulation, and openness to experience associate with action and platform games. In a study conducted by Chory & Goodboy (2011), the preference for violent games associates with greater openness and lesser agreeableness.

The research conducted by Herodotou, Kambouri, and Winters (2011) investigated characteristics of emotional intelligence according to trait theory, that is, more associated with personality and evaluated by self-report tests. The participants were young people who played multiplayer online video games. The results indicate that the emotional intelligence trait correlated significantly with social preferences in the game, such as helping other users and chatting, as opposed to success preferences such as acquiring power and competing. The emotional intelligence trait also correlates with fewer hours dedicated to the game. All correlations were of magnitude 0.16 or lower.

As for frequency, a two-year longitudinal study (Gentile et al., 2011) found that there is an association between the pathological use of video game with lower levels of social skills and school performance. Also, there is an association of high frequency of playing with higher levels of impulsivity, depression, and anxiety.

Given the shortage of Brazilian research in this area, and looking to contribute to mapping the impact of games on psychological variables, the present study intended at studying the relationship between the preference for different types of game and psychological characteristics. More specifically, the study verified how much the importance given to games, the time spent playing, and the preference for specific types of games can relate to abstract and verbal reasoning, the perception of emotions in others, and pathological personality traits.

Taking into account the presented analysis, we understand that there is an association between several psychological characteristics with the preference for certain types of games, so this study sought to expand the role of psychological

characteristics. For this, we selected instruments to evaluate several aspects: an ability to perceive emotions, intelligence, and personality traits. The test for assessing emotional perception provided the following results: a general level of perception, specific levels of identification of each of the eight primary emotions (joy, love, fear, surprise, sadness, disgust, anger, and curiosity), and general level of distortion, which indicates errors in the attribution of emotions (Miguel & Primi, 2014). The intelligence test assessed abstract reasoning ability (understanding relationships between concepts without previous learning) and verbal reasoning (understanding relationships between words) (Primi & Almeida, 2000). We evaluated these personality traits: dependency (feelings of inferiority and the need for others to make decisions), aggressiveness (interest in violence and aggressive behaviors), mood instability (sudden mood swings), eccentricity (perception of self as being different), (suspicion of others' intentions), grandiosity (sense of superiority and view of oneself as better than others), isolation (avoidance of social experience), avoidance of criticism (embarrassment with social situations), self-sacrifice (making oneself more available to others than to himself), conscientiousness (worry with detail and perfection), and impulsiveness (adventurous and reckless behavior) (Carvalho & Primi, 2015).

Based on the constructs evaluated by the aforementioned tests and their typically manifest behaviors, we elaborated the following hypotheses: h_1 – Attributing greater importance to games would be related to greater eccentricity, attention seeking, distrust, isolation and criticism avoidance; h_2 – Greater time dedicated to games would be related to higher levels of reasoning, less ability to perceive others' emotions and lesser perception of joy; h_3 – Interest in reasoning games (which require strategy and planning) would be related to higher levels of reasoning; h_4 – Interest in action games (involving movement and energy) would be related to higher levels of impulsiveness; h_5 – Interest in violent games (involving fighting, destruction, and morbidity) would be related to higher levels of anger perception, with traits of aggression, distrust, and impulsiveness; h_6 – Interest in live Role Playing Games – RPG (an uncommon modality in which the game happens through representation and experience) would be related to higher levels of eccentricity and grandiosity; h_7 – Interest only in online games would be related to higher levels of isolation; h_8 – The monthly frequency of meetings with others to play would be related to higher levels of emotional perception and perception of joy, and lower levels of general emotional distortion and isolation.

Method

Participants

Participants included a total of 164 people, with a mean age of 18.93 (SD = 6.36; minimum 14 and maximum 59), of which 123 (75%) were female. Regarding educational level, 57.0% had completed secondary education, 27.6% higher education, 11.7% primary education, and 3.7%, post-graduate education.

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Instruments

Game Preferences Questionnaire: We developed the questionnaire specifically for this research, and it presented several questions related to game preferences. The first question was "How important is playing games in your life?" with the possibility of responding on a Likert scale from 0 to 10. The second question was "How long have you been playing regularly?" with a response in years. The third question was "Check how many hours a week you play" with options of every five hours up to the final choice of over 35 hours. The fourth question was "Check the type(s) of game(s) you normally play," with three options (online, table/live, console) with examples of current and classic games, with the option to check more than one option. The fifth question was "What genre(s)/style(s) of game do you prefer or play more often?" with a list of various styles of games also accompanied by current and classic examples, with the option to check more than one option. As we did not find any references that identified the specific amount of game styles, we listed the following styles based on internet search results (e.g., Costa, 2014). The options were: platform, first-person shooter (FPS), third-person shooter (TPS), RPG Live action (theatrical), Electronic RPG, action, adventure, fighting, terror, arcade, open world, simulation, strategy, multiplayer, indie games (independent electronic games), old school. The sixth question was "Do you have a set group of people who play the same game with you?" with four response options: no; yes, we play offline (in person); yes, we play online, with people that I know in person; yes, we play online, with people that I don't know personally. The participant could check more than one option with "yes." The seventh question was "Do you usually meet with other people to play?" with the option to answer yes or no, and, if yes, we asked information on how many times they met each month. There was also an open question "Would you like to leave a comment about your playing experience?" but few participants responded, so we could not categorize the answers.

Computerized Test of Primary Emotions Perception (PEP): PEP is a computerized test that is designed to assess the ability to perceive emotions as well as distortions in perception, i.e., inappropriate attribution of emotional states (e.g., to attribute disgust to an expression of joy). For this, it presents 38 soundless videos of people expressing emotions, and the first three videos are examples of the task. The participant should watch the videos and report which emotion or emotions from a list of eight emotions (joy, love, fear, surprise, sadness, disgust, anger, and curiosity) are present in each video. In this study, we employed the general emotional perception score, the general distortion score, and the scores of each of the eight emotions, i.e., frequency of each emotion. Psychometric studies with PEP demonstrated adequate accuracy and validity, and there is a relation between the ability to perceive emotions and other measures of intelligence and emotional perception, whereas there is a relation between distortions and individual frequency of emotions and personality characteristics (Miguel & Pessotto, 2016; Miguel & Primi, 2014).

Dimensional Clinical Personality Inventory (IDCP): It is a self-report instrument for the evaluation of pathological personality traits designed by Carvalho and Primi (2015). It consists of 163 items distributed in 12 dimensions: dependency, aggressiveness, mood instability, eccentricity, attention seeking, distrust, grandiosity, isolation, criticism avoidance, self-sacrifice, conscientiousness, and impulsiveness. We verified the psychometric properties of the instrument in several studies (Carvalho & Primi, 2015, 2016), in which we found favorable evidence of validity and adequate reliability indexes.

Abstract Reasoning (RA) e Verbal Reasoning (RV): We extracted both tests from the Battery of Reasoning Test (BPR-5; Primi & Almeida, 2000). They consist of tasks in which the participant must identify the relationship between the presented stimuli to find the correct solution, the AR test uses abstract geometric figures, and the VR test uses words.

Procedures

The research was approved by the Research Ethics Committee of the State University of Londrina (Universidade Estadual de Londrina – CAAE 20786713.8.000.5231). We included all the instruments used in an online system developed for research with the tests. We then invited the participants to respond to the survey through personal invitation or social networks and disclosed the link to the online system. We invited only people aged 18 or older, with no other types of restriction (e.g., gender, socioeconomic level, among others). The invitations explained that the purpose of the research was to understand possible psychological characteristics of game users, without specifying the types of games. Following international recommendations regarding the application of online tests (ITC, 2005), the participants initially saw only the free and informed consent term and, if they agreed to it, they had to create a user in the system via email. After that, the research tests were made available.

As the system allowed choosing the tests to be answered, not all participants responded to all the instruments. In addition to the game preferences questionnaire, 152 participants also responded to the PEP, 118 responded to the IDCP, 141 responded to the AR, and 120 responded to the VR.

Data Analysis

We based the two reasoning tests scores on the tests' raw score (Primi & Almeida, 2000). On the other hand, we calculated the IDCP factors scores based on the T-scale, i.e., mean 50 and standard deviation of 10, using as a reference the non-patients sample of Carvalho and Primi (2015).

In the case of PEP, in addition to the general emotional perception score, distortions were also studied, which are incoherent attributions of emotional states (e.g., attributing disgust to a video of a cheerful and smiling person). Previous studies (Miguel & Pessotto,

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2016) have shown that there is an association between these distortions and personality traits rather than cognitive aspects. Also, there is an association between the general distortion in the test and being less able to correctly perceive reality. There is a relation between distortions of joy and greater sociability, just like there is between anger distortions and aggressive thinking and behavior. The general perception and general distortion scores were calculated on a z-scale (mean 0, standard deviation 1). The specific distortions of the emotions were calculated according to the frequency in which they appeared, subtracted from the actual frequency in the test. Thus, for example, a score of 0 for anger distortion indicates that the participant identified the correct number of anger expressions in the PEP. A score of -3 indicates that the participant did not identify three expressions of anger, and a score of +5 indicates that the participant identified five expressions of rage that was not present in the test.

We calculated the scores on games styles by the frequency of games that the participant checked. Thus, reasoning represented the sum of electronic RPG, simulation, and strategy games. The action represented the sum of platform, FPS, TPS, action, adventure, fighting, terror, arcade, and open world games. Violent represented the sum of FPS, fighting, and terror games. For the scalar scores, we used Pearson correlations to study the association with psychological tests. For the dichotomous categorical scores, we used Student's t and Cohen's d tests, considering an effect size from .20 as not negligible (Cohen, 1992). Also, we employed logistic regression analysis to predict to which extent playing is essential in a person's life, based on the dimensions of the IDCP. The importance variable was dichotomized using the lower and upper quartile. We also used ANOVA by repeated measures for the two groups formed, based on the extreme quartiles regarding the level of importance, seeking to understand the interaction of the IDCP dimensions about the profile of players who consider playing little important and those who consider playing extremely important.

Results

The descriptive statistics of the participants are present in Table 1. There was a significant variability of results regarding the questionnaire on game preferences, indicating several levels of importance attributed to the games, time spent playing, among others. Regarding the IDCP results, the scores were around the normative mean of the test (50.0), suggesting that the participants were distributed adequately along the personality traits. Similarly, the AR and VR scores showed that the participants of this research tended to present average performance close to normative expectation (Primi & Almeida, 2000). Regarding the general PEP scores (perception and distortion), the proximity of zero and standard deviations close to one indicate distribution close to the norm. The emotion of joy was perceived with a lower frequency than the test presents, while the frequency of anger approached the expected in the test.

Table 1. Descriptive statistics of the psychological measures and variables regarding gaming preferences.

	Mean	Standard deviation	Minimum	Maximum	Standard error
1. Importance	4.42	2.93	0	10	0.23
2. Time	6.02	6.61	0	40	0.52
3. Week hours	5.33	8.14	1	36	0.64
4. Reason.	1.19	0.93	0	3	0.07
5. Action	2.49	1.78	0	7	0.14
6. Viol.	0.50	0.69	0	2	0.05
7. Gather	1.33	3.33	0	20	0.26
8. Aggressiveness	53.71	9.44	13.6	76.3	0.87
9. Eccentricity	57.71	7.18	24.5	75.5	0.66
10. Attention seek.	47.60	11.53	0.0	74.7	1.06
11. Distrust	50.93	15.22	13.0	80.7	1.40
12. Isolation	51.77	19.77	10.0	97.2	1.82
13. Criticism Av.	55.34	10.26	34.8	91.2	0.94
14. Impulsiveness	56.73	8.34	32.0	80.4	1.31
15. AR	18.99	3.59	6	24	0.30
16. VR	18.28	2.76	11	25	0.25
17. PEP Perception	0.19	0.96	-2.45	6.36	0.08
18. PEP Distortion	-0.26	1.03	-2.87	2.46	0.08
19. Freq. Joy	-1.67	2.38	-10	3	0.19
20. Freq. Anger	0.42	1.73	-3	5	0.14

Note. 1. Importance = How important is playing games in your life?; 2. Time = How long have you been playing regularly?; 3. Week hours = how many hours a week you play; 4. Reason. = Total of reasoning games that participant is interested in; 5. Action = Total of action games that participant is interested in; 6. Viol. = Total of violence games that participant is interested in; 7. Gather = How many times participant meets with other people to play, if he/she does that.

Source: The authors.

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We observed that, among 23 analyzes, 15 were significant (65%), with magnitudes varying between 0.16 (Anger *vs.* Total of violent games that one is interested in) and 0.41 (General PEP *vs.* How often per month the person gathers with other people to play). Complementing these data, we used logistic regression analysis to predict how significant is playing in a person's life, based on the 12 dimensions of personality. Table 3 presents the results.

Table 2. Correlations between psychological measures and variables regarding gaming preferences.

	1. Importance	2. Time	3. Week hours	4. Reason.	5. Action	6. Viol.	7. Gather
8. Aggressiveness						.21*	
9. Eccentricity	.27**						
10. Attention Seek.	-.21*						
11. Distrust	.19*					.18*	
12. Isolation	.13						.04
13. Criticism Av.	.26**						
14. Impulsiveness					.28**	.35***	
15. AR		.11	.13	.21*			
16. VR		.24**	.11	.21*			
17. PEP Perception		.17*	.07				.41**
18. PEP Distortion							.09
19. Freq. Joy			-.37***				.17
20. Freq. Anger						.16*	

Note. 1. Importance = How important is playing games in your life?; 2. Time = How long have you been playing regularly?; 3. Week hours = how many hours a week you play; 4. Reason. = Total of reasoning games that participant is interested in; 5. Action = Total of action games that participant is interested in; 6. Viol. = Total of violence games that participant is interested in; 7. Gather = How many times participant meets with other people to play, if he/she does that. *p ≤ 0,05; **p ≤ 0,01; ***p ≤ 0,001.

Source: The authors.

We observed that, among 23 analyzes, 15 were significant (65%), with magnitudes varying between 0.16 (Anger *vs.* Total of violent games that one is interested in) and 0.41 (General PEP *vs.* How often per month the person gathers with other people to play). Complementing these data, we used logistic regression analysis to predict how significant is playing in a person's life, based on the 12 dimensions of personality. Table 3 presents the results:

Table 3. Logistic regression for predicting how playing is important the people's lives based on personality traits.

	B	Standard error	Wald	df	p
Grandiosity	-.124	.051	5.921	1	.015
Criticism Av.	.154	.048	10.372	1	.001
Impulsiveness	.094	.046	4.250	1	.039
Constant	-8.013	3.505	5.226	1	.022

Source: The authors.

We maintained three of the total of 12 IDCP dimensions that were significant: Grandiosity, Avoidance of Criticism, and Impulsiveness. Together, these variables can predict 47% ($r^2_{Nagelkerke}$ = 0.47) of the importance of playing in participant's lives. Likewise, the dimensions of the IDCP predicted approximately 78% of the cases in the groups (more and less importance). Also on the variable concerning the importance of playing, ANOVA with repeated measures was performed for the two groups based on the extreme quartiles, whose results are in Table 4:

Table 4. Repeated measures ANOVA for groups with inferior percentile (n = 35) and superior percentile (n = 25) in IDCP dimensions.

	Importance	M	SD	d
Dependence	P ≤ 25	54.03	9.79	.50
	P ≥ 75	58.93	9.74	
Aggressiveness	P ≤ 25	51.21	10.70	.60
	P ≥ 75	56.67	6.30	

(to be continued)

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Table 4. Repeated measures ANOVA for groups with inferior percentile (n = 35) and superior percentile (n = 25) in IDCP dimensions.

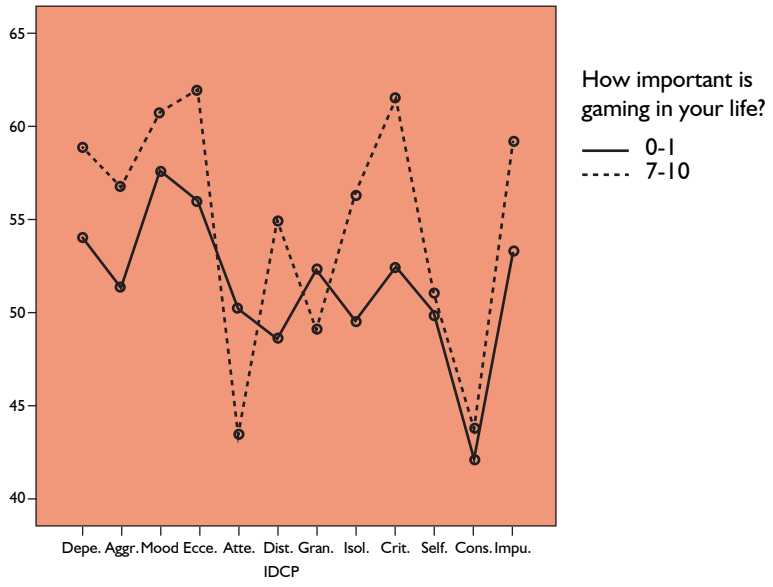
	Importance	M	SD	d
Mood Instability	P ≤ 25	57.66	9.79	.33
	P ≥ 75	60.76	8.89	
Eccentricity	P ≤ 25	56.00	8.77	.79
	P ≥ 75	61.93	5.25	
Attention Seeking	P ≤ 25	50.20	7.99	.69
	P ≥ 75	43.33	12.22	
Distrust	P ≤ 25	48.63	17.77	.40
	P ≥ 75	54.94	12.51	
Grandiosity	P ≤ 25	52.37	8.36	.37
	P ≥ 75	49.03	9.92	
Isolation	P ≤ 25	49.52	18.94	.37
	P ≥ 75	56.35	17.82	
Criticism Avoidance	P ≤ 25	52.46	9.16	1.03
	P ≥ 75	61.48	8.20	
Self-sacrifice	P ≤ 25	49.94	9.95	.12
	P ≥ 75	51.03	6.63	
Conscientiousness	P ≤ 25	42.07	14.66	.13
	P ≥ 75	43.74	8.27	
Impulsiveness	P ≤ 25	53.23	9.52	.70
	P ≥ 75	59.20	6.85	

Source: The authors.

Except for the Self-Sacrifice and Conscientiousness dimensions, the groups presented expressive differences (d ≥ 0.20) in the dimensions of the IDCP; also, we found low (Mood Instability, Mistrust, Grandiosity, and Isolation), moderate (Dependency, Aggressiveness, and Attention Seeking), and high differences (Eccentricity, Avoidance

of Criticism, and Impulsivity). Figure 1 illustrates the groups' profiles, showing the differences in the IDCP factors according to the importance given to the games.

Figure 1. Superior and inferior profiles regarding gaming importance in IDCP dimensions.



Source: The authors.

Finally, we verified differences between groups in dichotomous measures used in the questionnaire, using the t test. The data are in Table 5. As we can observe, two of the three comparisons presented significant differences, except for the Eccentricity dimension regarding the live RPG groups, although the differences are low.

Table 5. IDCP and PEP's mean scores comparison for people that report playing and not playing the modality.

	Groups	M (SD)	t (df)	p	Mean differences	Confidence interval	d
Play live RPG?							
Eccentricity	Yes	60.14 (7.65)	1.63 (116)	.106	2.90	-0.63/6.44	.06
	No	57.24 (7.02)					

(to be continued)

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Table 5. IDCP and PEP's mean scores comparison for people that report playing and not playing the modality.

	Groups	M (SD)	t (df)	p	Mean differences	Confidence interval	d
Grandiosity	Yes	55.78 (7.82)	2.73 (116)	.007	6.76	1.85/11.67	.49
	No	49.01 (10.23)					
Play online and not in person?							
Isolation	Yes	54.82 (19.91)	1.98 (116)	.050	7.21	0.00/14.41	.37
	No	47.61 (18.99)					

Source: The authors.

Discussion

This research aimed at investigating relations between psychological measures (personality, emotional perception, and reasoning) and playing preferences. Based on the literature available, we established some hypotheses. Taking into account the results obtained, we confirmed hypotheses h_3 (intellectual reasoning games), h_4 (action games with impulsiveness), h_5 (violent games with a perception of anger, aggression, distrust, and impulsiveness), and h_7 (isolated online games). The following hypotheses were partially confirmed: h_1 (importance of the game with eccentricity, attention seeking, distrust, isolation and criticism avoidance), h_2 (longer playing time with intellectual level), h_6 (live RPG with eccentricity and grandiosity), and h_8 (frequency of meetings with people to play with emotional awareness, joy, less distortion, and lower isolation). When analyzing the correlations, we found associations between the mentioned psychological characteristics and the preference for specific games, such as already observed in previous studies (Anderson et al., 2010; Chory & Goodboy, 2011; Engelhardt et al., 2011; Feng et al., 2007; Hasan et al., 2013; Herodotou et al., 2011; Peever et al., 2012; Suziedelyte, 2015). Thus, as predicted in the hypotheses, to assign more importance to the act of playing, we found an association between eccentric behaviors higher frequency, mistrust regarding others' intentions, and avoidance of criticism. Although the correlation with Isolation was not significant, there was a tendency towards not seeking attention from others, of being more independent, for the people who gave more importance to the act of playing.

The time (in years) that the participant engages in games correlated significantly with verbal reasoning and the general perception of emotions, but not with abstract reasoning. Although this result may suggest a possible development of these abilities because of the

duration of time played, it is also possible that verbal reasoning and the perception of emotions are merely correlated with age, as they are crystallized intelligence (Schneider & McGrew, 2012). In fact, an exploratory correlation between age and time devoted to games resulted in r = .61 (p <.001), indicating a strong association between the two.

What brought another look at this relation is the variable hours per week devoted to playing. There were no significant correlations between the two measures of reasoning nor with the perception of emotions, which at first seemed to contradict previous studies on cognitive development related to playing frequency (Feng et al., 2007; Kühn et al., 2014; McDermott et al., 2014; Suziedelyte, 2015). However, by examining the correlations with the preference for reasoning games, these have proved to be significant. These results suggest that only dedicating weekly hours to playing does not necessarily mean higher cognitive ability, but rather the preference for games stimulates reasoning.

Besides, there was a correlation between more hours playing and lower attribution of joy to emotional expressions, which may be related to less interest in contact with others, according to other studies with emotional perception (Miguel & Pessotto, 2016). This result indicates a propensity for social isolation and the little experience of joy given a large number of hours in-game activity. On the other hand, there is a significant association between emotional perception and more frequent meetings with other people to play, which is an indicator that personal experience is associated with the development of the ability to perceive emotions. Taking these results into account, it is likely that there is a compensation of the trend towards isolation by games that require social gatherings.

Also, there is an association of preference for particular styles of games and psychological characteristics, such as hypothesized. The greater the preference for action games, the greater is the level of impulsiveness and emotional unrest. The greater the preference for violent games, the greater is the frequency of aggressive thoughts, corroborating previous data (Chory & Goodboy, 2011; Hasan et al., 2013), besides a higher mistrust of other people's intentions, impulsivity, and emotion attribution of anger towards other people. Additionally, the most impulsive people were those who reported a preference for action games and violence, which makes sense considering the relationship of the Impulsivity dimension with sadistic and antisocial functioning (Carvalho & Primi, 2015, 2016). People who prefer live RPG had higher scores in Grandiosity that is individuals who tend to want to stand out among others, to be admired, according to the traits assessed by the dimension (Carvalho & Primi, 2015). This result demonstrates an association between the practice of an unusual activity (live RPG) and the self-view of being more relevant and outstanding. There is a higher level of isolation and social withdrawal in participants who prefer to play only online. We also suggest that future research deepens this aspect, considering results such as those by Greitemeyer and Osswald (2011) since online games can be more or less pro-social, depending on the tasks involved.

Revista Psicologia: Teoria e Prática, *19*(3), 209-225. São Paulo, SP, set.-dez. 2017.
ISSN 1980-6906 (*on-line*). http://dx.doi.org/10.5935/1980-6906/psicologia.v19n3p209-225

Also, regarding the profile of personality traits of the participants who give greater importance to the games in comparison with those who give less importance, we observed that the first group tends to demonstrate a higher frequency of dependency, aggressive behaviors and thoughts, eccentric ways of acting and thinking, seeking to avoid situations in which they are exposed to criticism, and greater impulsivity, together with less need for attention from others. These characteristics, present in the same profile, suggest people with evident introverted tendencies, besides few social skills and more difficulty in handling emotions (compared to the other group).

When taking the data set found in this research, although some associations may indicate health (as the frequency of social gatherings to play with a higher level of emotional perception), other relations suggest difficulties (such as the preference for violent games and traits of aggression). Although experimental studies are using violent games, the results of this research do not allow establishing a causal relation between game preference and psychological characteristics. Studies in this field could benefit from experimental or longitudinal research to have a better understanding of the psychological aspects involved in this activity, which is so usual today. On the other hand, the results point to possible emotional and social problems that players may suffer. In this sense, people who dedicate themselves to games, especially playing alone, may present difficulties in social interaction and tendency to isolation.

As a limitation of the study, we can point out the number of participants, which may not be representative of the population. Further research could broaden the sample and check the stability of the results found here. Future studies could also verify whether the predominance of women in this research (75%) was a peculiar characteristic of the sample or if it reflects the Brazilian distribution of players. Also, other categories of games could be studied, such as cards, board games, among others. This research focused predominantly on video games and live RPG games.

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Submission: 11.9.2015

Acceptance: 18.8.2017