

Gaming Motivation: Developing a New Tool to Measure Psychological Motivations to Play Video Games

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Abstract

Video games are rapidly becoming a part of our daily life, both for entertainment and learning purposes and people of every age play them. The literature about gaming motivation has exponentially increased in recent years and researchers are thriving to understand what pushes people into playing video games by building scales that are able to do so. In this study, we have developed and validated a scale to investigate and assess the psychological gaming motivation that leads people to use video games to satisfy their basic needs without relying on a specific type of video game on the Italian gaming population. The proposed scale included 99 items that were administered to 543 players. Exploratory Factor Analysis partially confirmed the initial theoretical framework of 18 factors and led to a new 16 model factor: 12 were already quite established in the literature (autonomy/creativity; boredom; competition; completionism; coping; diversion; entertainment; escapism; habit; nostalgia; self - esteem and social), 2 resulted as the integration of two already existing motivations (immersion and fantasy; challenge and mastery), 2 were completely new (aggressivity and freedom). Younger and less educated people have stronger motivation than adult players; gender comparisons showed that males play mainly for competition and mental challenge reasons, while females for escapism and completionism reasons. Regarding the type of games, PvP players play mostly for competition, challenge, self - esteem and social reasons, while PvE players play usually for coping, immersion/fantasy, and competition reasons.

Keywords: Gaming Motivation, Video Games, Psychological Needs

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Introduction

In the last decade, with easy access to the internet (Duradoni et al., 2023; Guazzini et al., 2022), video games have also been on the rise in popularity. With more than 2.96 billion active players as of 2021 (Statista, 2021), the majority of them being in Asia (Statista, 2022), it is no wonder that the scientific community is getting more curious by the day about the psychological reasons that lay behind video games usage. From simple single-player games to online massive multiplayer ones, while also taking into consideration the new VR experiences, gamers of all kinds have a wide variety of choices to pick how to spend their time (Martucci et al., 2023). But why should people play video games? What stands behind the simple act of using a controller to interact with virtual reality? Self - Determination Theory (Deci & Ryan, 1985) is one of the most cited theories explaining why people play video games, ascribing people acts to fulfillment of basic needs and dividing motivation into internal and external motivation (Deci & Ryan, 2000). Bartle's (Bartle, 1996) famous taxonomy of four types of players of Multi-User Dungeons (achievers, explorers, socializers, and killers), was a first attempt to categorize what people seek in playing that kind of games, and thus profiling players motivation. Yee's (Yee, 2006a) first identified five main motivations (relationship, manipulation, immersion, escapism , and achievement, and later focused on the three main reasons) to play these games: achievement, immersion, and socialization, leading to the very first questionnaire created to assess gaming motivation: the Motivations to Play in Online Games Questionnaire (Yee, 2006b). The Player Experience of Need Satisfaction (PENS;(Ryan et al., 2006)) is another scale that assesses three main psychological motivations and one related more to technical aspects of the game per se: competence, autonomy, presence, and intuitive control.

There is no doubt that gaming motivation studies have received particular attention from researchers who determined an increasing number of published works about this topic in recent years. It is possible to find in the literature either interesting tools that tried to assess gaming motivation towards all types of games, but that lacked some psychological aspects, and tools that are more specific for certain types of games (e.g Massively Multiplayer Online Role Playing Games, or MMORPGs). Furthermore, every 2 or 3 years new types of games come out and this leads to specific scales that were created to become old quite fast.

Considering the existent gap in the literature about the lack of an instrument that properly attempts to assess gaming motivation without depending on the type/genre of game, the main scope of this study was to develop and validate an Italian questionnaire regarding psychological gaming motivation not dependent on a specific type or genre of video game (e.g online, offline, multiplayer, single-player, etc...) on an Italian sample. Specifically, the main aim was to explore its multidimensionality through exploratory factor analysis.

Methods and Procedures

Scale development

The psychological gaming motivation scale was created through extensive literature research on the existent instruments. By following the PRISMA guidelines, the first step was to gather all the validated instruments that attempted to measure non-pathological gaming motivation (thus including studies with an addicted sample as well) with their items and the Cronbach's α of each dimension individuated respectively. Initially, 57 questionnaires were examined and the subsequent information was collected: authors of the scale, year of the paper, name of

the scale, dimensions measured, items and their factor loadings, the Cronbach's alpha of each dimension, and, lastly, the number of citations of the paper. Consequently, those scales that: (i) mainly targeted pathological motivation for playing, (ii) were not validated properly or (iii) were qualitative surveys were removed. The final number of scales that were deemed eligible was 45.

The second step was to gather all the items and clusterize them into bigger common groups of motivation based on what that item wanted to measure. This operation was necessary due to the fact that authors from different fields gave different names to what could be considered the same, or at least similar, construct (e.g coping and diversion) (Demetrovics et al., 2011; López-Fernández et al., 2021; Sherry et al., 2006). Through some focus groups, the number of items was greatly reduced per each dimension identified and the remaining ones were deemed eligible for the Italian scale. The third step was to modify the items, if necessary, according to the main objectives of the scale and this step was also carried out through focus groups and an active discussion between the creators. The number of total items obtained was 99 and 18 dimensions were identified: (1) arousal, (2) autonomy, (3) boredom, (4) challenge, (5) competition, (6) completionism, (7) coping, (8) diversion, (9) entertainment, (10) escapism, (11) fantasy, (12) immersion, (13) habit, (14) mastery, (15) nostalgia, (16) relax, (17) self - esteem and (18) social. Finally, the items were translated into Italian and organized to be administered to the participants as part of the first initial data collection. This initial part was necessary to refine the instrument in terms of dimensions and items. Specifically, through the first data collection it was possible to: (i) verify which item could be kept, removed, or modified; (ii) which dimensions could be considered useful and informative; (iii) assess the overall distribution of the participants' answers.

Sample and sampling

The sample was recruited online through shared posts on specific Facebook, Whatsapp and Telegram groups dedicated to video games; word of mouth between players; on specific sections of Reddit; and video game forums. Data were collected by sharing the survey through the Google Forms platform. Account information was not collected to ensure anonymity. The survey was composed of 3 sections: in the first one participants had to certify that they could speak and understand Italian and that they were over 14 years old; in the second section they had to fill in some of their sociodemographic information such as age, gender, educational qualification, and marital status; lastly, the third one presented the survey composed of 99 questions on a 5-point Likert scale, two open questions about their favorite video game title and the title they played the most in the last month and one question about how much time they spend on playing. The final sample of this study consisted of 543 players (71.45% males; $M = 28.92$; $SD = 8.26$). Participation in this study was on a voluntary basis. Participants were informed about the data collection and their privacy rights according to the Italian law (Law Decree DL-101/2018), EU regulation (2016/699), and APA guidelines and were asked to fill out an informed consent. Participants could withdraw from the session at any moment, removing the corresponding data from collection and analysis. Anonymity was guaranteed by not collecting account information or other personal sensitive information.

Measures

Sociodemographic characteristics

Participants were asked to give information about their age, gender, educational qualification and marital status.

Gaming behaviors and preferences

Participants were asked to give information about the amount of time they spent on playing video games on a Likert scale (from 1 = never to 9 = plays more than 8 hours per day), their favorite video game and the game that they played the most during the last month. Each game written by the participants was then coded according to the following aspects: (1) their PEGI classification; (2) if they were a Player vs Player; (3) if they were a Player vs Environment; (4) if a co-operative mode between players was present; (5) if they had online multiplayer features; (6) if they were a graphic adventure game (i.e., a peculiar type of game where the player mainly reads the story and the interaction with the game is characterized by just a few choices) and, lastly, (7) if they were a game real life simulator.

Psychological gaming motivation questionnaire

Participants were asked to fill in the Italian version of the psychological gaming motivation questionnaire that was created for this study. The scale is made of 99 items on a 5 point Likert scale (from 1 = I totally disagree to 5 = I totally agree) and it is composed of 18 dimensions: (1) arousal (i.e playing for the perceived feeling of excitement) (4 items); (2) autonomy (i.e playing for the feeling of being able to be creative and free in terms of actions and choices) (8 items); (3) boredom (4 items); (4) challenge (i.e playing for the desire to find a cognitive stimulating activity through a series of obstacles) (6 items); (5) competition (i.e playing for the desire to compete and win against other players) (9 items); (6) completionism (i.e as playing for the desire to complete and obtain every single thing that the game has to offer) (3 items); (7) coping (i.e playing to feel relief from stress, reduce tension, get back in a good mood, not feeling alone and to deal with anger) (11 items); (8) diversion (i.e playing to procrastinate activities that should be done) (5 items); (9) entertainment (5 items); (10) escapism (i.e playing to avoid thinking about everyday problems and worries) (5 items); (11) fantasy (i.e playing to be able to try different roles and discover different worlds that cannot be found in real life) (5 items); (12) immersion (i.e playing for the feeling of being totally part of the gaming world) (4 item); (13) habit (i.e playing because it is a daily routine) (4 items); (14) mastery (i.e playing for the desire to master every single gameplay aspect) (6 items); (15) nostalgia (i.e playing to bring back good memories from the past) (3 items); (16) relax (3 items); (17) self-esteem (i.e playing because it contributes to the positive perception of oneself) (5 items); (18) social (i.e playing to interact and be with other players) (9 items).

Data analysis

An adequate sample size was recruited to make a first assessment of the scale's validity and its structure. Secondly, an exploratory factor analysis (EFA) was conducted to verify its dimensionality. A Promax with the principal axis factoring estimation method was used to obtain the structure matrix of the model. Factors were organized according to their dimensions and factor loadings under .35 were excluded. Furthermore, to explore the possible relationships between the individuated motivational factors and the sociodemographic ones

such as age, educational qualification and time spent playing, Pearson correlation tests were carried out.

Correlations were also done to assess possible relationships between age, educational qualification, and PEGI. This latter element was also correlated to time spent playing on average and motivational factors. To create gaming motivational profiles of the gamers connected to the type of game played, a t-test was carried out where the motivational factors were assessed with PvP games; PvE games; Co-Op games; games with online multiplayer aspects, graphic adventures, and game simulators. Differences between genders in relation to the motivational factors were done through a t-test for independent samples. A t-test was done to evaluate possible differences between gamers of a certain type of game (PvP/PvE, Co-Op, etc) in terms of motivational factors. Lastly, a Chi-square was carried out to see if there were possible gender differences in terms of preference about the type of game played.

Results

Descriptive statistics

The sample consisted of 543 players of age between 14 and 68 ($M = 28.92$; $SD = 8.26$). Among these 543 participants: 388 identified themselves as males (71.45%), 131 as females (24.12%), 4 as transgender males (0.73%), 1 as transgender female (0.18%), 9 as non-binary (1.66%) and 10 did not want to report their gender (1.84%). Participants were asked about their educational qualifications and marital status. As for what concerns their education in terms of years: 5 participants had an elementary school license (0.9%), 43 had a middle school license (7.9%), 286 had a high school diploma (52.7%), 111 had a bachelor's degree (20.4%), 76 had a master's degree (14%), 13 had a post lauream specialization (2.34%) and 9 (1.66%) had a Ph.D. Regarding marital status: 276 (50.8%) were bachelors, 131 were in a relationship (24.1%), 72 (13.3%) were living with their respective partners, 52 (9.6%) were married, 11 (2%) were divorced and 1 (0.2%) was a widow. Participants spent 4.9 hours per day ($SD = 1.68$) playing video games on average. Overall, more than 300 titles were suggested from the participants and they were representative of the video game panorama. Specific notes about this latter part can be found in the appendix.

Exploratory Factor Analysis

An exploratory factor analysis was carried out to assess the dimensionality of the scale through an oblique rotation of the factors (Promax) with a principal axis factoring estimation method. Through the Bartlett test ($p < .001$), the possibility of the correlation matrix is an identity matrix in the population was rejected. Thus, the 18 factors were computed and extracted to evaluate the factor loadings. Factor loadings below .35 were excluded, and items with salient cross-loadings on two factors were also excluded if both of these values were close to .50. By applying these criteria 79 items were left, thus 20 were removed. Specifically, all the items of the arousal factor and the relax factor had factor loadings below .35, thus these factors were removed entirely. Finally, of the 18 original factors: 12 were maintained and slightly modified in terms of items (autonomy (renamed creativity after the EFA), boredom, competition, completionism, coping, diversion, entertainment, escapism, habit, nostalgia, self-esteem and social), 2 were merged (immersion and fantasy; challenge and mastery) and 2 were completely new and were momentarily named freedom and rage/aggressivity. In more detail, the autonomy factor was split into two new factors: creativity, with items defining a desire to play to express themselves and to be imaginative,

and freedom, which defined the desire to play without having limits in terms of options. All the factors, despite exceeding the range, follow a normal distribution regarding skewness and kurtosis.

Correlations

Correlations between the 16 motivational factors and age, educational qualification, and average time spent on video games were done through a Pearson's r correlation test to assess possible relations between the variables. Age was negatively correlated with social motivations ($r = -.109$, $p < .01$), competition ($r = -.159$, $p < .001$), coping ($r = -.192$, $p < .001$), immersion/fantasy ($r = -.226$, $p < .001$), escapism ($r = -.243$, $p < .001$), entertainment ($r = -.136$, $p < .001$), self-esteem ($r = -.227$, $p < .001$), habit ($r = -.199$, $p < .001$), diversion ($r = -.216$, $p < .001$), challenge ($r = -.137$, $p < .001$), boredom ($r = -.241$, $p < .001$), freedom ($r = -.209$, $p < .001$), creativity ($r = -.269$, $p < .001$) and rage/aggressivity ($r = -.191$, $p < .001$).

Age did not correlate with completionism, motivation and nostalgia. The strongest correlation appears to be with creativity, following suit by escapism, boredom, self-esteem and immersion/fantasy. This suggests that younger players tend to have stronger gaming motivation and to play to be able to express themselves, relieve boredom, or escape from reality. Interestingly, nostalgia resulted in a non-significant correlation, this means that there is no difference between younger players and older players in playing for this reason. The educational qualification was negatively correlated with social motivation ($r = -.148$, $p < .001$), self-esteem ($r = -.127$, $p < .01$), habit ($r = -.220$, $p < .001$) and freedom ($r = -.193$, $p < .001$). Non-significant correlations were found between educational qualification and competition, coping, immersion/fantasy, escapism, entertainment, diversion, challenge, completionism, boredom, nostalgia, creativity, and rage/aggressivity. This result is coherent with the results obtained regarding age. Younger and less educated people have stronger gaming motivation than older players.

In general, it seems that the level of education does not have a particular impact in playing video games for a certain reason. Average time spent playing was positively correlated with habit ($r = .535$, $p < .001$), creativity ($r = .288$, $p < .001$), self-esteem ($r = .286$, $p < .001$), social motivation ($r = .282$, $p < .001$), diversion ($r = .261$, $p < .001$), entertainment ($r = .257$, $p < .001$), challenge ($r = .254$, $p < .001$), escapism ($r = .222$, $p < .001$), coping ($r = .212$, $p < .001$), boredom ($r = .209$, $p < .001$), competition ($r = .203$, $p < .001$), immersion/fantasy ($r = .203$, $p < .001$), freedom ($r = .180$, $p < .001$), and rage/aggressivity ($r = .116$, $p < .001$). It did not significantly correlate with completionism and nostalgia. Players seem to play mainly because of habit, creativity, self-esteem, social, diversion, entertainment, challenge, escapism, and coping. It seems that nostalgia is not affected by time spent on video games, age, and education received.

Correlations between PEGI, hours spent playing, educational qualifications and age showed that age had small negative correlations with time spent playing on average ($r = -.158$, $p < .001$) and PEGI ($r = -.115$, $p < .01$). This suggests that younger players prefer titles with higher PEGI and that older people seem to spend less time playing video games and tend to play titles that are less high in terms of violent content. Education had a negative correlation with time spent playing ($r = -.244$, $p < .001$) which is coherent with the results regarding age as well: younger people are also less educated and they are the ones more likely to spend many hours playing on average. Lastly, correlations between the motivational factors and the PEGI showed only small positive correlations with immersion/fantasy ($r = .171$, $p < .001$),

diversion ($r = .118, p < .01$) and freedom ($r = .126, p < .01$). It is interesting that there was no positive significant correlation between PEGI and aggression, considering that the higher the PEGI, the more aggressive the content of the game is.

Gender comparisons

To evaluate any difference in gender, a series of t-tests for independent samples was performed to compare males and females. Males are more competitive than females ($t = 3.964, p < .001$), they play more for habit reasons ($t = 4.536, p < .001$), to seek challenges in games ($t = 3.815, p < .001$) and because of nostalgia ($t = 2.564, p < .01$). Females tend to play more because of completionism motivation ($t = - 3.496, p < .011$), diversion ($t = - 2.364, p < .05$) and escapism ($t = - 2.082, p < .05$).

Gender comparisons related to game type

A chi-square was run to assess gender differences in terms of preference for a certain type of game (i.e PvE, PvP, etc). Males seem to prefer PvP games (60%) more than females. This is also true for PvE (87.5% males, 79.8% females), Co-Op games (54.6% males, 36.4% females), and Online multiplayer games (73.4% males, 62.8%). Females tend to prefer games more oriented to stories, like interactive graphic adventures (4.5% females, 0.5% males) and simulator games (20.2% females, 1% males).

Comparisons in terms of gaming motivation between gamers who play different types of video game

Two t-tests for the independent sample were carried on to compare the motivational factors to the type of the game and the participants' answers to deepen what gaming motivation might be behind players that play a specific type of game and those who do not play such games. Gamers that play PvP tend to play for competition ($t = - 5.053, p < .001$), freedom ($t = - 3.362, p < .001$), social reasons ($t = - 3.195, p < .001$), habit ($t = - 2.727, p < .01$), self-esteem ($t = - 2.331, p < .05$) and challenge ($t = - 2.176, p < .05$). People who play for completionism ($t = 2.023, p < .05$) and coping reasons ($t = 1.918, p = .056$) tend to avoid PvP games since they are highly competitive and may cause high levels of stress. In fact, people who play PvE are mainly interested to play for coping reasons ($t = - 3.974, p < .001$), immersion/fantasy motives ($t = - 3.934, p < .001$) and entertainment ($t = - 2.519, p < .05$).

Those who are not interested in playing PvE games tend to avoid them because they cannot satisfy their need for social aspects ($t = 4.848, p < .001$), competition ($t = 4.570, p < .001$), habit ($t = 2.519, p < .05$) and self-esteem ($t = 1.970, p = .052$). PvE games are usually stand-alone games that follow a story and they do not need to be played online so interaction with other people is not needed.

Co-Op gamers play for social ($t = - 4.293, p < .001$), competition ($t = - 4.252, p < .001$), freedom ($t = - 2.013, p < .05$) and self-esteem reasons ($t = - 1.970, p < .05$) since these games require two players to collaborate in either local or remote settings (through the Internet) and they may have PvP aspects or not. Since they require highly coordinated actions between the gamers, they are considered challenging games that can satisfy the need to stay with other people and, at the same time, to think out of the box to play the game itself. More like people who play Co-Op, people who generally play multiplayer games with online aspects tend to play for the same reasons: competition ($t = - 3.602, p < .001$), social ($t = -$

3.519, $p < .001$), freedom reasons ($t = - 2.214$, $p < .05$), with the only difference being creativity ($t = - 2.025$, $p < .05$). People who prefer interactive graphic games just for a nostalgia feeling ($t = - 3.293$, $p < .01$). This result is interesting if we consider that interactive graphic games are mainly played by adult people on smartphones or by female gamers.

Gamers that play simulators are motivated to play to express their creativity ($t = -2.426$, $p < .05$) and they are games generally avoided by people who seek to play for challenge ($t = 3.914$, $p < .001$), habit ($t = 2.743$, $p < .01$), self-esteem ($t = 2.591$, $p < .05$) and competition ($t = 2.219$, $p < .05$). Even though the sample of this group was relatively small (just 31 people chose simulators games as their favorites), the fact that the creativity factor is the only actual need that seems to be satisfied through these games appears coherent with the fact that simulator games tend to represent reality in a very detailed manner, thus letting the players to be free in customizing them the way they want (e.g The sims).

Discussion

The current study had the main objective to assess a new tool to measure gaming motivation independently from the type of game or genre and gather data about Italian players. The exploratory factor analysis partially confirmed the structure hypothesized while exploring the literature, while also highlighting unexpected results. The theoretical framework of 18 psychological gaming motivations eventually led to a final framework of 16 motivations: 12 were confirmed (autonomy/creativity; boredom, competition, completionism, coping, diversion, entertainment, escapism, habit, nostalgia, self-esteem and social); one new factor was removed due to lack of items loading on it (i.e anger), some items about freedom of actions and options in videogames originally belonging to the autonomy factor were found to load on a new factor (i.e freedom); immersion and fantasy were merged together, as well as challenge and mastery.

Anger might be a motivation on its own, needing further study considering the current lack of items to actually assess this dimension. The difference between freedom and creativity should also be explored and deepened. The most important result regarding this scale is that nostalgia seems a totally novel motivation that was never assessed on gamers in general, but only in relation to a specific videogame (i.e Pokémon Go) (Yang & Liu, 2017; Zsila et al., 2018). Interestingly, the strongest correlation obtained was between habit and hours spent playing on average, consequently by creativity, self-esteem, and social reasons.

The fact that social factors are a strong gaming motivation has already been confirmed numerous times (Dauriat et al., 2011; Frederik & Jan, 2015; Hilgard et al., 2013; López-Fernández et al., 2021; Myrseth et al., 2017; Sherry et al., 2006; Williams et al., 2008; Yang & Liu, 2017; Yee, 2006a, 2006b), but the same cannot be said for habit, creativity, and self-esteem. It appears that gamers play video games mostly because it is part of their daily routine and a pattern that they do not like to skip. Also, players that spend more time gaming feel that they can be as creative as they want and have self-esteem related to the performance in the games they play. Gaming motivation appears to be stronger in younger and less educated players and this is coherent with literature (Carlisle et al., 2019; Dauriat et al., 2011; Demetrovics et al., 2011; Fuster et al., 2013; Hilgard et al., 2013; López-Fernández et al., 2021; Scharkow et al., 2015; Tekofsky et al., 2017; Wu et al., 2010). Additionally, education had very few significant correlations with all gaming motivation.

It appears that playing different types of games actually satisfies different human and psychological needs. Players who play PvP games play to satisfy the need to compete (i.e. competition), to feel that their free to transform their mental plans into actual actions (i.e. freedom), of interacting with others (i.e. social), simply for routine (i.e. habit), and, lastly and interestingly, for self - esteem reasons (i.e. self - esteem). As already pointed out, several studies demonstrated that self-esteem is connected to gaming activity (Beard & Wickham, 2016), leading people to develop in some cases a gaming disorder (Cudo et al., 2019).

While PvP games are characterized by their competitive setting as well as the real-time interactions between the players, in which players are free to act in whatever strategies come to their mind to win against an opponent, PvE games are more focused on the story and on the interaction between the game's environments and the players itself. Indeed, results showed that PvE players tend to play for coping reasons, for the immersion/fantasy aspects, and because they want to enjoy themselves (i.e. entertainment). The social aspect is often limited and not much relevant and, more than competitiveness and mental challenge, the feeling of immersion in the story is most important. Similarly to PvP games, but more focused on a story, Co-Op games are mainly played to satisfy not only the need of being in a social environment (since it is necessary to cooperate with another player) and of competition (since it is possible to go against in other teams in some games), but also for freedom and self-esteem reasons.

Conclusions

The structure of the scale was partially confirmed and it can be considered one of the first attempts to put together all psychological gaming motivations that could lead people to play video games. It was also one of the first attempts to assess gaming motivation in an Italian sample without restricting the research to a specific type of game.

Gaming motivation seems to be stronger in younger and less educated players and boys and girls differ in terms of what gaming motivation pushes them to play and which need they satisfy through the gaming activity: boys mainly play to compete and to beat difficult challenges while girls play to momentarily forget about their daily life and to achieve trophies. PvP players play because of competition, freedom, social, self - esteem and challenge reasons. Players who play for coping and completionism reasons tend to avoid PvP games while preferring other types. In fact, PvE players are mainly interested in the immersion and entertainment aspect of the games and they play majorly for coping reasons. Co-Op and multiplayer gamers play for competition, freedom, and social reasons. In a few words, video games seem to contribute to satisfying very basic human needs (e.g. the social aspect, the need to improve and to seek challenges, to feel free) and the satisfied needs are different based on the type of game.

The present study was not exempted from some limits: firstly, the sample was recruited online and it might not be representative of the actual gaming population; the sample presented an unbalanced ratio in terms of gender and in terms of age; the scale was a self-report one, thus social desirability could have affected some of the answers; the study was a cross-sectional study thus no inference can be made on a long term basis; some dimensions have only three items which is the minimum number to create one and the scale needs further validation; certain groups of players were quite small and data may not be considered representative of the whole population who actually play this genre; lastly the scale needs further assessment with a bigger sample size to confirm the seen results.

Authors Contribution

Conceptualization: MCG, AM, MD, ADAM, AG; Methodology: MCG, MD, AG; Investigation: MCG, AM; Data curation: AM, MD, AG; Formal analysis: MCG, MD, AG; Software: MCG, AG Validation: AM, MD, ADAM; Visualization: MCG, AM, AG; Project administration: AG Supervision: ADAM, AG; Writing – original draft: MCG, AM; Writing – review & editing: All authors.

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