

# Personality and Motivation to Play Board Games

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## ABSTRACT

Our goal is to understand what drives players to play board games and verify if there is a correlation between their personality and their motivations to play board games. As a result of our research, we created a model named CISSI that grouped into components the dimensions of motivations to play board games: Intellectual Challenge; Imaginative Experience; Sensory Experience; Competitive Interaction; Social Challenge. In our sample of 229 participants we found a small correlation between personality and motivations to play dimensions. We observed that Extraversion and Neuroticism are the most related to the dimensions of Motivations. We also included a demographic characterization of our players and the context they play in. Overall, it is possible to define a model that allows characterizing a board game player based on their motivations to play.

## Author Keywords

Board game; Analog gaming; Player Motivation Model; Personality.

## INTRODUCTION

Despite rapid technological advancements, several families consider connecting and bonding over a board game[1]. Board games are considered as one of the best ways to leave aside electronic gadgets and devices, which are otherwise keeping modern-day families busy, and get them together over an interesting game. A group of friends who meet in a social environment can choose to play a board game instead of the usual electronic console games[5]. People who like to be at home alone can find in board games some fun, or a way to work their mind to solve certain challenges. Board games can also be played with strangers. A person with little confidence to play can explore different strategies without the feeling of being observed or surrounded by the expectations of those who know them.

The number of people engaged in analog gaming (modern board games) has never been so high, according to Arizton's market study for 2019-2024[1] which foresees a growth of

10% between this period. Technavio's[23] market study expects that there will be a 15% grow for the referred forecast period. Analog games are an emerging phenomenon also due to their explicit relation to the digital[5]. However, the research on tabletop gaming has not kept up with the rising popularity of tabletop games. This area recently started to attract more researchers, who wish to understand how players conceptualize the hobby and what is their engagement with these games. What motivates people to engage with tabletop games is not well studied and is yet to be fully explored in research. For that, it is important to understand what they do, and not only what they think that motivates them to this activity, which can go beyond playing and expand into the immersive in-game experience [5].

One aspect that may be important to consider when analysing motivation is personality. The individual characteristics of a person can influence any activity they perform, so the same can apply to board game players. In this way, personality analysis can be a good way to assess a player's motivations. Will two people with the same personality enjoy playing exactly the same game, and all the same types of games? And if they play the same game, do they feel exactly the same motivation to do so? Based on a set of personality and player models, which include analysis of questionnaires, some research work was carried out, in order to be able to answer this and other questions relating motivations with personality.

Although research on tabletop gaming became more diverse in the last two decades, there are insufficient studies that address the measuring of tabletop gaming motivations/experiences. The experience of a game is inherently personal and different for each player, therefore we want to understand the factors that motivate a player to play a board game. Current approaches to understand the motivations to play board games do not consider individual characteristics of each player. We will research how individual personality traits affect and correlate with tabletop gaming motivations. Will players with the same personality traits have the same gaming motivations?

The focus of this project is to understand the relationship between a player's personality and his motivations to play a board game. We researched the current state of art, developed a questionnaire, collected data on user personality and gaming motivations and then analysed the results. This work has three major contributions: characterization of analog gaming in Portugal, definition of a model that studies motivations to play board games and exploration of the correlation between personality and motivations to play a board game.

## BACKGROUND AND RELATED WORK

This study builds on research in three distinct areas: Personality, Board Games and Player Types and Motivation Models. A player type model is an attempt to categorise players into different player types, by identifying characteristics that players exhibit within games[6]. A motivation model allows us to understand players' reasons to play a game.

### Personality

Each person has a different taste for everything in the world, therefore we know different people have different personalities and each one has their particular needs[12]. Personality can be defined as a set of traits and characteristics that describe a person's behaviour[17]. Some of the most prominent trait models of the nineteenth century are Allport's trait theory[8], Cattell's 16 Factor Model[2], Eysenck's Giant Three[9], and the MBTI[15]. However, we focused on the psychological theory of The Five Factor Model (FFM) which is the most widely accepted trait model of our time and the one we consider most relevant to our work.

#### *Five Factor Model*

The FFM represents the existing differences in interpersonal personality, through five dimensions. It is considered a useful tool to describe the personality of an adult and it works like a conceptual guide that can be used whenever personality is assessed. With this model, all the behavioral, emotional and cognitive human trends can be grouped into five categories (known as OCEAN).

**Openness** to Experience (O): discloses the preference an individual must allow him/herself to face unknown situations; **Conscientiousness** (C): is related to the way people control, regulate, and direct their impulses; **Extraversion** (E): indicates how social a person is and how much he/she likes to interact with other people; **Agreeableness** (A): is about how much people value getting along with others and have an optimistic view of human nature; and **Neuroticism** (N): is the tendency to experience negative emotions like anxiety, depression, or anger. These five basic dimensions from this personality model structure the most important differences between people's personality traits [11].

#### *Personality Traits and NEO Inventories*

The FFM is not a complete theory of personality and may have some limitations and criticism named by McCrae and Oliver [16]. Numerous alternatives to the FFM have been proposed[18], but the availability of this comprehensive model of personality and validated instruments to assess it, made it the most accepted or universal model. Although there are several instruments to assess the FFM, the first measuring questionnaire was the Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI). However, the NEO-PI is quite extensive, with 240 items, which makes the tool time consuming and not very versatile[11]. Later, the data provided by the application of the NEO-PI to college students demonstrated evidence to introduce a 60-item brief version that assesses only the five factors Five Factor Inventory (NEO-FFI) and many other scales have emerged: the NEO inventories.

This study will focus on Portuguese board game players population, thus we will use the Portuguese version of the NEO-FFI[13].

### Board games and Motivation Models

We define a board game as a game being played with a known number of players usually on a game board or on a table. The game proceeds through actions (moves) of each player in turn. This differentiates board games from video or RTS games where usually each player can take an action at any point in time. The game usually has a fixed set of rules that limit the number of pieces on a board, positions for those pieces and the number of possible moves. These concepts and definitions are defined based on related literature. The way a board game player defines board game concepts may often be different from one to another. The overlap between "style" and "mechanic" can be either the same or a different thing for them[5]. Our work was based on three main studies which also present their definition of board game: Towards a Tabletop Gaming Motivations Inventory (TGMI) [10]; Gamer Motivation Profile (GMP) [3] and Board Game Motivation Profile (BGMP) by Yee [25].

#### *Tabletop Gaming Motivation Inventory*

Kosa and Spronck[10] developed a tabletop gaming motivation questionnaire based on the literature of video gaming motivations. Their questionnaire has 14 dimensions: Customization, Escapism, Relationships, Completion, Story, Socializing, Loss Aversion, Fantasy, Competition, Arousal, Autonomy-Exploration, Mastery, Teamwork and Aesthetics[10]. To better capture the motivations to play different kinds of board games, we decided that we needed to incorporate the next two models, beside TGMI, to serve as a basis for our study

#### *Nick Yee's Gaming Motivational Model*

In 2015 Nick Yee's [25] and Nicolas Ducheneaut developed a motivation model based on Bartle's [3] work, known as Gamer Motivation Model (GMP). In this model there are three high-level motivations, namely Extraversion, Conscientiousness, and Openness to Experience, but these can be divided into six middle-level motivations which are Action and Social, Mastery and Achievement, Immersion and Creativity. Each of these are divided again into 2 low-level motivations each.

#### *Board Game Motivation Profile*

GMP was more relevant to video games but Yee also developed a model related to board games known as Board Game Motivation Profile (BGMP). It has 4 high-level motivations, each composed by a central component and one or more secondary component.

The central component is the more dominant motivation, and the secondary is often (but not always) aligned with it:

**1) Conflict** measures the competitiveness of the player and their pleasure (or not) in hostile actions against other players. **Social Manipulation** (secondary component) assesses if the player enjoys (or not) playing mind games where outcomes are not determined by dice or rule books. **2) Strategy** measures if the player appreciates (or not) strategy games where a lot of thinking, planning and decision making is required.

**Discovery** (secondary component) is where the will to explore and discover is assessed. It can be from discovering new game mechanics, new rule sets or keeping up with new game releases and current meta. **Need to Win** (secondary component) as its name implies measures if the player cares a lot (or not) about winning and beating their opponent. **3) Immersion** measures if the player enjoys (or not) taking on a role in a believable alternate world with its own lore, culture and cast of interesting characters. **Aesthetics** (secondary component) assesses if the player cares about the quality and design of the components and the board itself. **4) Social Fun** measures if the player plays the game mostly to have a good time with other people with a lot of social interaction. **Cooperation** (secondary component) assesses if the player likes (or not) to work together with others towards a common goal. **Chance** (Secondary component) determines if the player enjoys (or not) luck elements in their board games (ex.: dice, card drawing). **Accessibility** (secondary component) evaluates if the player prefers games that a broad range of people can easily pick up and enjoy.

## APPROACH

For our approach we considered three points: one to assess the personality of the players, another to measure human context of the game, and a third one to measure gamers' motivations. For the personality analysis, we used the FFM, with the NEO-FFI. For human context beyond the game, which was not covered in any of the models, we created questions from scratch. For motivations, we took three models as our starting point: the GMP, the BGMP and the TGMI from which items of all motivation dimensions were considered, removing overlaps that arose and performing some adjustments, including all different dimensions considered in the literature. We also created some items from scratch every time that we feel the need to ask aspects not addressed in either model. Therefore, we based our study on two questionnaires: one that assessed the player's personality and a second that assessed the human context and the motivations for playing board games.

One of the challenges that we also wanted to achieve with the questionnaires was to get to know the human context around the game, outside the events resulting from the game itself. We analysed a set of studies [24, 19, 7, 20, 26] that made us recognise new perspectives of possible events around the game which are completely external to it, but that can influence the player's moves and posture. We created a set of new questions with the collaboration of board game experts that allowed us to answer different issues that arose within this theme, in order to confirm whether our participants saw themselves in some of these facts presented. The value of materiality reflected in the physical objects of a board game [24, 20] generated a new dimension (Object) to include in our questionnaire. This area of study allowed us to introduce a new perspective to be included in the characterization of the Portuguese population of board game players and their motivations to play.

Following our approach, we gathered and analysed data from board game players personality and their motivations to play. Data gathering was mainly aimed at national participants through convenience sampling.

The questionnaires were shared on platforms used by hobby players like Open the Game portal, Facebook and WhatsApp groups, and sent by email to association managers and player groups in order to share directly with their members. Posts were made on the personal blog YouTube channel and Instagram dedicated to modern board games from the Board game expert working with us on this study. The methodology we followed to achieve the objectives of this work was based on two user questionnaires, presented to the players through a simple web page with a brief description of our study and the links for them to access the questionnaires. All personal data provided by participants will only be used within the context of this research. To design the questionnaires we followed two basic goals ([14] as cited in [22]): (1) obtain relevant information for the survey goals, and (2) collect this information with maximum reliability and validity[22].

## Evaluation Process

Evaluation of our working approach was divided into three main stages: **Verification**, **Testing with Users** and **Results Analysis**. For the Motivations for Playing Board Games, the first evaluation stage was really important as we needed to guarantee a good Motivations assessment tool. This Verification stage was compounded of three distinct steps:

- (1) Researching and looking at related literature to identify what dimensions were being explored in this area of board games, and also some of the digital games literature that could help us define our set of dimensions;
- (2) Establishing our set of items clustered by dimensions;
- (3) Using a measure of internal consistency to validate the consistency of all the items according to the dimensions of play and its alignment, so that the responses could be summarized as a value representing the importance of that dimension to the participant, and remove items, or even dimensions, from the analysis if necessary. This step needed us to do some pilot testing of the initially designed questionnaires;

For personality, the questionnaire used was already validated and accepted for universal use, so no item verification step was necessary, only the following two.

The next stages were the final testing, both Personality and Motivations for Playing Board Games tests were conducted through questionnaires, and lastly the analysis of the respective obtained results. This analysis was held at different levels: Demographic Characterization, Personality Characterization, Motivations for Playing Board Games, and Correlation values between dimensions of Personality and Motivations. We grouped the aligned dimensions into components, by using a measure of dimensionality reduction (Principal Components Analysis) which reduced the set of principal dimensions onto only the principal components composed by groups of dimensions. The last analysis mentioned is the focus of our study and was performed by using a correlation statistical test (Pearson's Correlation) to analyze and conclude if the dimensions of the Personality Five Factor model were correlated with the dimensions of Motivations to Play Board Games.

## ASSESSING PERSONALITY AND HUMAN CONTEXT OF THE GAME

The first part of the experiment measured the participant's personality, through the 60-item Portuguese translation of the NEO-FFI questionnaire by Lima and Simões (2000)[11]. For the second part of the experiment, we designed questionnaires that gathered data for the characterization of our participants: one to Player Decisions (Game Context) and another to Game Designer Decisions (Game Artefact). In addition to general demographic characteristics, we included questions to capture and describe the environment our participants have and feel when playing board games. The questionnaires begin with a small set of demographics questions about the participant: gender, age, level of education, marital status and professional occupation. By asking these questions we intended to trace the demographic profile of our participants, in order to more easily identify the group of players we included in our study, and to control responses in regard to demographic subsets.

### *Human context of the game (Player decisions)*

The first section includes all questions related to the participants' profile and playing habits, and also questions related to the environment and context in which they play. Everything that happens or exists around the players is part of the whole Human context and environment. This include particular aspects not related to the game itself or how to play it like decoration, noises, the comfort of the space, among others. Our goal in focusing on this issue is to be able to investigate what this connection is, what importance players give to aspects outside the game, and how these can interfere and influence game experience.

We divided all these questions into eight groups/categories.

- 1- Characterization of playing time habits and preferences
- 2- Characterization of impacts, motivations and objectives when playing board games
- 3- Dedicated Board Games Room
- 4- Board Games vs Digital Games
- 5- Factors that impact the activity (including covid-19)
- 6- Venue and environment of the game
- 7- Collection of games - Valuing, Caring and Acquiring
- 8- Contact/Relationship with the game, customisation and information search

## ASSESSING MOTIVATIONS TO PLAY BOARD GAMES

Continuing onto the second questionnaire, and addressing one of the most central parts of our study, the last section measured motivations for playing board games. This includes a list of items associated with Motivations dimensions that ask the participants to state their agreement with a set of 35 statements. They are organized on multiple dimensions of the play experience, using a 7-point Likert scale and were inspired by the three models previously presented: the GMP, the BGMP and the TGMI. After we got a first draft of the items, we worked with board game experts to refine and improve them. Besides

adjustments to existing items, some items were also created from scratch in response to the experts' identification of dimensions that they thought were relevant and that had not been included in the previous work that served as the basis for the elaboration of the motivation questionnaire. As the focus of our study was the Portuguese population, our questionnaires were written in Portuguese and we carried out a verification on the items it contained to ensure that it is reliable and valid. This methodology can be replicated in other contexts.

### Verification procedures

All our translations in this context were made by using back-translation [4]: a back-translation takes the translated version of a text and through an independent translator, which has no knowledge in advance about the original text, translates it back into the original language. At the same time, we performed a comparison with some literature references. In this process, we also needed to guarantee that questions from the Motivations Questionnaire were consistent between themselves. For this, we used Cronbach's alpha, a measure of internal consistency, which evaluates how closely related a set of items is as a group [22], helping us to determine the internal consistency of the scale used. This analysis was useful essentially in the pilot testing phase to ascertain whether the various items we created were aligned, within each dimension.

### Pilot tests

Firstly, we applied the initial questionnaires to a sample of 10 players. When carrying out a statistical analysis of the responses obtained, there were some inconsistencies and results that did not go according as expected, which was observed through the low Cronbach's alphas within some dimensions. Therefore, it became necessary to adjust some of the initial items and then re-test them to make sure about internal consistency in the respective dimension. For this, we followed an Iterations process.

The improvements or problems identified in the first pilot test focused on six dimensions of motivation: **Conflict, Competition, Challenge, Strategy, Completion** and **Power**. We went through a process of reformulating the initial items based on rewriting, creating or deleting the ones which are causing some inconsistencies in these dimensions. After all the changes to existing questions and the creation of new ones the issues were solved in all dimensions and we proceeded with another phase of pilot testing, which served to fine-tune small details that still needed to be improved for the final tests. In the Second Pilot Tests, Cronbach's Alphas values obtained for the dimensions of Motivations to Play Board Games showed good values for the majority of the dimensions - **Table 1**. However, Power and Fantasy dimensions had a low Cronbach's Alpha, the questions from this dimension were tuned with the help of our expert in order to improve Cronbach's Alpha value. Apart from the consistency values, the feedback we got indicated that there were no further significant changes to make, which allowed us to move on to the final tests. In the Final Tests, all the dimensions of Motivations for Playing Board Games obtained good Cronbach's alpha values many of them rather high which allowed us to confer greater validity to our items - **Table 1**.

<i>Dimension</i>	<i>Second Pilot Test</i>	<i>Final Test</i>
Conflict	.771	.871
Social Manipulation	.868	.814
Social	.763	.706
Competition	.781	.762
Challenge	.641	.760
Strategy	.670	.799
Completion	-	-
Power	<b>.317</b>	.699
Fantasy	<b>.275</b>	.861
Story	.957	.889
Design	-	-
Design + Object	.873	.896
Discovery	.854	.741

**Table 1. Values of Cronbach's alpha obtained in the Second Pilot Tests and in Final Tests. Bold values represent the low Cronbach's Alphas.**

### MOTIVATIONS ASSOCIATED WITH THE ARTEFACT (DECISIONS OF THE GAME DESIGNER)

The second section of the questionnaire contains the items of all motivation dimensions already tested in the initial pilot tests, with the appropriate corrections. These items allowed us to understand what characteristics identify a participant regarding player profiles.

These dimensions are: **1-** Conflict; **2-** Social Manipulation; **3-** Social; **4-** Competition; **5-** Challenge; **6-** Strategy; **7-** Power; **8-** Fantasy; **9-** Story; **10-** Design; **11-** Object; **12-** Discovery

High score in **Conflict** identifies players who enjoy games where players can take hostile actions directly against each other; High score in **Social Manipulation** identifies players who enjoy mind games, where outcomes are determined by their ability to bluff, deceive, and persuade other players; High score in **Social** identifies players who enjoy social interaction with other players; High scores in **Competition** identifies players who enjoy building strategies that directly oppose other players in the game and pursue goals that are directly conflicting with the others' goals; High scores in **Challenge** identifies players who like to overcome obstacles during the game playing as they learn and need to think; High scores in **Strategy** identifies players who enjoy games where strategic mastery and skill are the primary determinants of the game's outcome; High scores in **Power** identifies players who are motivated by accumulating or building resources over time; High scores in **Fantasy** identifies players who enjoy fantasy-themed games or real-themed games to experience realities different from their own; High scores in **Story** identifies players who value game elements that help building up a story during play, and this story motivates them to play; High scores in **Design** identifies players who value all the aesthetic part of what is included in the game; High scores in **Object** identifies players who find some special feature or affection in physical elements of the game; High scores in **Discovery** identifies players who likes to explore and have a broad interest in rule sets and game mechanics.

## RESULTS

In total 245 answers were submitted to both questionnaires, however it was not possible to consider all of them for evaluation: we identified players who answered more than once and players who only answered one of the questionnaires, therefore we were forced to discard those situations. After a detailed analysis to identify all these cases, the number of valid participants that we used for our study was 229.

### Characterization of Portuguese Board Games Players

Participants are aged between 18 and 59 (Mean = 36 e Std. Deviation = 8.049) years. Regarding gender, 78% are male and 21% are female. Participants' marital status is divided between 45% single and 42% married. Most players have Higher education as their level of education (78%) and the most frequent occupations are in the area of Consultancy, Marketing and Information Technology. However, in addition to these we obtained a huge variety of occupation areas that ranged from students, various technicians, management, administrative and financial areas, engineering, design, architecture and games, teaching and research, business, sales and entrepreneurship, doctors, among several others. All these demographic aspects distribution show a fairly wide range of groups, making it possible to pick up different preferences and habits that may be directly related to age and different life phases.

### Personality

Personality scores were obtained along the whole spectrum between the minimum and the maximum (0 to 48) in all the dimensions. For the lower limit, the closest proximity was Neuroticism which had a minimum specifically of 0. We concluded this by performing a descriptive statistical analysis for each dimension - **Table 2**. For a better interpretation of the values, we compared them with Pedroso-Lima et al. study's values which used the same version of NEO-FFI - **Table 3**. We concluded that in most dimensions the mean scores were lower than those obtained by Lima et al. Only in the **Openness to Experience** dimension the mean scores of our participants were higher. The most significant difference was found in the **Neuroticism** dimension, with a difference of more than ten points between both studies. **Agreeableness** dimension was the one that gathered the most similarity.

An important point of analysis to complement the demographic characterization of the Portuguese Board Game Players is the distribution of scores across the different groups. When analysing this distribution, we found a few statistically significant differences. Neuroticism showed statistically significantly different scores between genders ( $t(226) = -2.766$ ,  $p = .006$ ). Extraversion ( $t(226) = -2.935$ ,  $p = .004$ ), Agreeableness ( $t(226) = -2.068$ ,  $p = .040$ ) and Neuroticism ( $t(226) = 3.554$ ,  $p = .000$ ) showed statistically significantly different scores between marital status. Openness to Experience showed statistically significantly different scores between academic degrees ( $t(226) = -2.359$ ,  $p = .019$ ). Female board game players and Single board game players have higher Neuroticism scores. Married board game players have higher Extraversion and Agreeableness scores. Players whose academic degree is Higher education have higher Openness to Experience scores.

<i>Dimension</i>	<i>Mean</i>	<i>Median</i>	<i>Std. Deviation</i>	<i>Min</i>	<i>Max</i>
Openness to Experience	32.10	32	5.625	17	44
Conscientiousness	31.35	32	7.399	12	48
Extraversion	27.88	27	6.668	10	46
Agreeableness	32.19	33	5.143	13	47
Neuroticism	22.64	22	8.879	0	46

**Table 2. Descriptive Statistics obtained for each of the OCEAN personality dimensions.**

<i>Dimension</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Min</i>	<i>Max</i>
Openness to Experience	27.54	6.30	5	46
Conscientiousness	34.26	6.31	4	48
Extraversion	29.55	6.01	7	44
Agreeableness	32.49	5.61	8	48
Neuroticism	34.26	6.31	0	48

**Table 3. Descriptive Statistics obtained for each of the OCEAN personality dimensions by Pedroso-Lima et al. in 2014 with N=1178 participants [11].**

### Preferences and Gaming Habits of Board Game Players

52% of our players dedicated and 46% casual and 75% have been playing board games for less than 10 years. On average, they do about 9 board game sessions per month. 41% stated that they prefer games with a duration of 1-2 hours. 93% revealed that their motivations for playing have increased over different stages of their lives, and 12% acknowledged that board games have already hindered some responsibilities in their life. We concluded that most players regularly play with the same people they prefer to play with. On the other side 38% of the participants have the habit of playing alone and only 26% actually prefer to play on their own.

Strategy games is the favorite game type (74%) and the least favorite (38%) are party games. Mechanisms stood out with 55% of the players valuing it more than game theme. Concerning the theme, 14 % say they prefer the game to create a real scenario and 23 % say they prefer the game to create a fantasy, fictional scenario, but most thereby focused on assuming they had no preference for either. 64% of the participants enjoy hosting game sessions. On average, players own 99 board games, 81% owns up to 100 games, and 16% like to have different versions of the same game. Around half the population (58%) had already used digital platforms to play board games, 60% of the players have moved from playing digital games to playing board games, and 7% have moved from playing board games to playing digital games. In a collection of games, participants value first the number of games (71%), second their quality (39%) and lastly 9% attaches importance to collecting.

Most states that their will to play board games overcomes possible discomforts of the game space and that an environment with distractions can contribute to creating a bad gaming experience. Regarding the context and environment outside the game, 23% of the participants have a reserved and exclusive space to play board games and 28% say that the room decoration is a factor than can influence their willingness to play. Room lighting of the space can also influence their behaviour or concentration throughout the game. 70% have a reserved and exclusive space to store board games. 30% take board games into the workplace or study.

In the process of opening a board box, 66% prefer to take everything out calmly, considering that an important process. 80% stated they like to keep the original rules of the game, rather than considering making small changes to them (16%). Only 16% considered it important to have the opportunity to customise/modify the material elements of a board game. The social dimension factor is the most predominant (92%), followed by the learning process with 76% enhancing it as an enjoyable environment to play. Also, 57% say they like to play for escapism/fantasy dimension and 41% are attracted by the simulation component.

Our participants mainly look for information about board games on BGG<sup>1</sup> (80%) and on direct personal relationships with friends or family (52%). The most frequently purchasing method is online shops (76%). When it comes to acquiring games, 45% already purchase a second hand game. 14% see the purchase of a game as a financial investment, and 59% mentioned that they buy games because of the meaning it has for them, which is the most mentioned reason to justify the care they take with the game. Regarding crowdfunding, 36% have never invested and 20% consider to be their preferred way of acquiring board games. The reason most indicated to justify the importance they attached to crowdfunding was financial support for an initiative that might otherwise have no future (45%). Lastly, 80% of our participants recognized that covid-19 pandemic impacted on their activity of playing board games. For the majority (62%) it caused a decrease and/or change in the group of players they usually played with. Other factors most commonly mentioned as impacting on playing activity mentioned is the social life and influences (41%).

### Motivations for Playing Board Games

As for the personality, firstly we performed a descriptive statistical analysis at dimension level. Most of the dimensions obtained an average rating of around 5. There is a slightly higher tendency for players to like to explore and practice strategic thinking throughout their moves, and they do not identify particularly well with competition and manipulation. However, we noticed that the whole spectrum of answers was used, in practically all dimensions, with the minimum identified almost always being 1 and the maximum always 7. We also analysed the distribution of our participants' scores at the level of the five components that constitute our model of Motivations to play board games.

For gender there are statistically significant differences in Conflict ( $t(226) = 3.295, p = .001$ ), Social Manipulation ( $t(226) = 2.803, p = .006$ ), Social ( $t(226) = -3.013, p = .003$ ) and Discovery ( $t(226) = 2.697, p = .008$ ). Male obtained higher scores in Conflict, Social Manipulation and Discovery. Female obtained higher scores in Social dimension. For academic degree, Conflict ( $t(226) = 2.063, p = .040$ ) and Social Manipulation ( $t(226) = 2.362, p = .019$ ) are the dimensions that differed more between board game players with Secondary and Higher Education. Secondary Education players obtained higher scores in these two dimensions. Marital status does not present any statistically significant differences to point out.

<sup>1</sup><https://boardgamegeek.com/>

After this analyse, we obtained the correlations between each dimension. Most of the dimensions have some significant degree of correlation with the others.

**Social** dimension is the dimension which presented the fewest correlations with the other dimensions. The remaining ones have some sort of correlation with almost all dimensions, despite sometimes being a small correlation. **Challenge, Strategy, Power, Fantasy, Story, Design, Object** and **Discovery** have exhibited strong significant correlation values with at least one of the other dimensions. The **Challenge** and **Strategy** dimensions showed a significantly strong correlation with two of the other dimensions: **Challenge** with **Strategy**, **Challenge** with **Discovery** with **Power**. These relationships make sense as the challenges are closely linked to discovery and the need to create strategies and have some power.

### Personality and Motivations Correlations

Focusing on our goal of finding if personality of a board game player and his motivations to play are correlated, we performed a Pearson's Correlation test between dimensions of personality and motivations for playing board games - **Table 4**. All of the significant correlations found were small correlations. Nevertheless, although they are not very sharp correlations, they were visible and exist between specific dimensions.

**Extraversion** and **Neuroticism** are those most related to motivations to play board games, and there are four Motivation dimensions which are only affected by one personality dimension: **Extraversion**. They are **Conflict, Social Manipulation, Competition** and **Story**. The first two and also Story represent people oriented dimensions as they require interaction with other players which meets the definition of extroverts. **Social** also has a small positive correlation with **Agreeableness** and **Neuroticism**. This is no surprise as an agreeable person likes to get along with everyone. Although it is not such an obvious relationship, it can be common that a person who relates to everyone also likes to have control over everything in order to have some stability, as they relate to many different people. That is, have a high **Neuroticism** score.

**Challenge** and **Discovery** have a small significant correlation with every personality. This due to the fact that regarding leadership or some assertive circumstances of competition, which are needed in **Challenge** and **Discovery** dimensions, agreeableness personality is characterized by having some difficulties and being uncomfortable to manage those kind of situations. **Strategy** has a small correlation with **Openness to Experience, Conscientiousness** and **Neuroticism**. However, with the third one it is a negative relationship. The first two make sense in a way that to have high scores in **Openness to Experience** and **Conscientiousness** it is needed to planning and prepare everything, that is, creating a strategy, without being afraid of be opened to experience new things. **Power** has a small positive correlation with **Conscientiousness**. This may make sense if we analyse the power dimension from the perspective that it is needed some tendency to be a responsible, hard-working and an organized person. Someone that is goal-directed is someone that can be characterized with **Power** and **Conscientiousness** at the same time.

Dimension	Openness to Experience	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Conflict			.163* (small)		
Social Manipulation			.221** (small)		
Social			.141* (small)	.171** (small)	.182** (small)
Competition			-.181** (small)		
Challenge	.223* (small)	.195** (small)	.171** (small)		-.237** (small)
Strategy	.140* (small)	.158* (small)			-.158* (small)
Power		.147* (small)			
Fantasy					.209** (small)
Story			.207** (small)		
Design					.177** (small)
Object					
Discovery	.161* (small)	.131* (small)	.170** (small)		-.130* (small)

**Table 4. Values of Pearson's Correlation obtained between Personality dimensions and Motivations dimensions. \*\* Correlation is significant at the 0.01 (2-tailed) level. \* Correlation is significant at the 0.05 level (2-tailed).**

Lastly, **Fantasy** and **Design** have a small positive correlation with **Neuroticism**. Since high **Fantasy** scores mean that people like to experienced different situations from their daily routine, it does make a little sense that it is positive correlated with **Neuroticism** which may represent feelings of self-doubt and so they need to live new situations. Regarding **Design**, since people with high scores on this dimension value aesthetics of the game, it also can be related with neurotic side of preferring to have everything under their control, even the design related aspects of a game.

When applying the Pearson's Correlation between the five components of CISSI none of them obtained a significant correlation with dimensions of Personality, so we will assume the reported results for dimensions individually. Hence, our conclusion is that there is a correlation but it is a weak correlation, and therefore the link between Personality and Motivations to play board games needs to be handled with caution.

### BOARD GAME PLAYER MOTIVATION MODEL

Following the correlation values found, we performed a Principal Components Analysis (PCA) to Motivations dimensions which aims to reduce a larger set of variables into a smaller set, and thus understand whether some of the dimensions should be grouped together. In our case, given the twelve dimensions of our model, we looked to the variance it explained and explored the best viable solution. In the rotated component matrix - **Table 5** - two of the dimensions cross loaded on more than one component: items with a loading less than 0.4 were removed as recommended and standard process [21]. From this analysis was born the concept of a model which we called CISSI:

**Competitive Interaction** - Competition + Power + Conflict

**Intellectual Challenge** - Challenge + Strategy + Discovery

**Sensory Experience** - Design + Object

**Social Challenge** - Social + Social Manipulation + Conflict

**Imaginative Experience** - Fantasy + Story + Social

The **Competitive Interaction** component reveals interest for hostile confrontations and the need to win and players who love to compete against other and strive for victory. Power is a dimension easily related with the other two as it is all about gathering resources and becoming more powerful allowing the player to succeed in the game.

<i>Dimension</i>	<i>Intellectual Challenge</i>	<i>Imaginative Experience</i>	<i>Sensory Experience</i>	<i>Competitive Interaction</i>	<i>Social Challenge</i>
Challenge	.885				
Strategy	.819				
Discovery	.738				
Fantasy		.869			
Story		.818			
Social		.653			.413
Design			.875		
Object			.860		
Competition				.794	
Power				.708	
Social Manipulation					.895
Conflict				.575	.618

**Table 5. Rotated Component Matrix for 5 components with absolute value below 0.4.**

The **Intellectual Challenge** component embraces the interest in game mechanics and its progression, how their exploitation can lead to victories, in a way that depends more on individual skill and strategy than on interaction with others. It is also another type of player that makes sense to distinguish, identifying players who prefer to think before acting, planning their strategies and exercising their mind while playing.

The **Sensory Experience** component represents players who like the games due to its aesthetics, the design of the board itself, texture, color, size and shape of the game components.

The **Social Challenge** component is related to the human and the social dimension of the experience, which represents players considering that more important than being good individually, it is to know how to interact with other players to ensure the best possible game experience. Social Manipulation and Conflict are two dimensions that relate to each other seamlessly, because who enjoy conflicts needs to use some Social Manipulation and interaction is implicitly in both types of interactions, being needed in both.

The **Imaginative Experience** group leads to a component related to the fictional experience of the game, such as its setting and the lore behind the characters. All the dimensions Story, Fantasy are linked by common characteristics. Players who enjoy fantasy and story will also feel attracted by the lore of the games.

#### **Board Game Player Motivation Model with 3 components**

Principal Components Analysis suggested a more compact approach with three components with a different rotated component matrix - **Table 6**. We called this model MIS and its components are the following:

**Mechanism Exploration** - Strategy + Challenge + Discovery + Power + Object + Competition

**Imaginative Experience** - Story + Fantasy + Design + Social + Object

**Social Challenge** - Social Manipulation + Conflict + Competition

**Mechanism Exploration** adds to itself the object dimension, as game pieces can contribute to the feeling of control and strategy. The size or shape of these pieces is something that these players value a lot also due to its functional design part

<i>Dimension</i>	<i>Mechanism Exploration</i>	<i>Imaginative Experience</i>	<i>Social Challenge</i>
Strategy	.840		
Challenge	.815		
Discovery	.726		
Power	.668		
Story		.802	
Fantasy		.769	
Design		.741	
Social		.656	
Object	.488	.647	
Social Manipulation			.776
Conflict			.765
Competition	.436		.541

**Table 6. Rotated Component Matrix for 3 components with absolute value below 0.4.**

which makes it easy the mechanisms exploration. **Imaginative Experience** is a merge of Sensory Experience and Imaginative Experience from the previous approach. **Social Challenge** is also a combination of dimensions from two components of the 5-model, Competitive Interaction and Social Challenge.

This model can justify 64% of our data variance therefore it was the first reason not to go with it, yet it is still worth to mention as there are also other models similar to this one like the Engagement Design model[27].

While comparing our results with literature, we found a related work that identifies three types of player profiles composed by similar dimensions as our three components suggested by PCA: The Engagement Design model with three streams that helps adjusting and choosing games to engage users: (1) The Abstracts like to simplify and generalize everything, they are feeling comfortable by dealing with doubts and do problem-solving by themselves; (2) The Thinkers like new experiences and are led by imagination, curiosity, and creativity; (3) The Dramatics are human people, they show understanding with other players worries, empathy and trust [27]. The Abstracts are the Mechanism Exploration, although our component includes an interaction part that Abstracts does not. The Thinkers are the Component 2 Imaginative Experience and lastly, the Dramatics are represented by Social Challenge.

#### **Discussion**

In our study we managed to gather people of different demographic profiles. Regarding preferences and habits, we found out that players of board games focus more on the social factor than in a particular game mechanic, as the major part of our sample usually play in a social context, a fact already noticed by Booth when studying Board Games as Media [5]. The most striking differences between habits and the preferences were in playing with people with whom they only interact in the context of the game, as 55% play regularly with these players compared to 66% who actually prefer to do it. Due to these numbers, game players seem to take advantage of game time to socialise not only with those they already know, but also with those they only meet during the game [5].



The most favourite game type is the strategy (74%) as for Booth participants [5] which can be a tendency among board gamers, and the type of game they less like (38%) was the "party games" type, which probably was due to the fact that it is a type of game more targeted at people who do not take this activity as a real hobby but a free time activity. In a collection of games, 71% of participants value first the number of games they have and second their quality. Physical environment of the activity may have an impact in building the ideal experience [5] which can be represented by participants that have a reserved and exclusive space to play board games and to store them. The furniture and the space comfort may also be an important part of an ideal experience of board gaming [5].

Both for Personality and Motivations a few statistically significant differences were found within the groups concerning demographic aspects. For personality: Neuroticism between Male and Female; Extraversion, Agreeableness and Neuroticism between single and married; Openness to Experience between Secondary Education and Higher Education degree. For motivations: Conflict, Social Manipulation, Social and Discovery between Male and Female; Conflict and Social Manipulation between Secondary and Higher Education.

Analysing the CISSI Model, the dimensions corresponding to the Yee's Immersion are now independent from the Social dimension. However, it separated our "Immersion" dimensions in two different components because Design and Object dimensions are in a different component than Story and Fantasy are, and so looking at this perspective they are still linked with Social dimension. We have Competition in only one component, related with Power and Conflict, which made sense for us but is not represented in Yee's model. Power and Competition dimensions correspond to "Need to Win" dimension in the Yee's model, which belongs to Strategy component, a different one from Conflict component. Apart from these disparities there are some matching points between the two models, although it is not a completely direct match. Intellectual Challenge dimensions may be equivalent to Strategy from Yee's. This dimension includes a secondary component Discovery and also a Need To Win component which can be associated with Challenges and Strategies needed for winning. Imaginative Experience includes dimensions of Fantasy, Story and Social, which in Yee's model may correspond to a mix of Immersion and Social Fun. This is due to the fact that Immersion is about Aesthetics which is linked with Fantasy and Story. Regarding the Social dimension, it is similar to Social Fun from Yee. Sensory Experience is also related with Aesthetics, since it includes Design and Object, so the matching Yee's dimension is the Immersion. Regarding the Social Challenge, we associated it with Conflict from Yee since we have the dimensions of Social, Social Manipulation and Conflict that fit well on his dimension. Lastly, in our perspective we did not find an analogous dimension for Competitive Interaction in Yee's approach.

Going back to the relationship between a board player's personality and his/her motivation to play, among the conclusions found we highlighted some important points: We concluded that Extraversion and Neuroticism are the Personality dimen-

sions that most are correlated to motivations to play board games. In a global perspective, there are four Motivation dimensions which are only affected by one personality dimension: Extraversion. As a main conclusion, there is in fact a correlation between Personality and Motivations but it is a small correlation.

As limitations, there is not yet in place a universal vocabulary that can be applied to every board games study which make it difficult for players to interpret equally the spelling and meaning of questions and item scales, and consequently for us to compare answers. Also, many hobby board game players do not attend online communities or organized groups, so it was not possible for them to answer our questionnaires. Regarding the demographic sample, the nationality might have been more varied to approach distinct cultures and habits that may influence the results which aimed to be applied to any country.

## CONCLUSIONS

Through 12 dimensions, we identified motivations to play board games and whether the participants fit into the characteristics of the player profiles that each dimension represents. In the end, we defined a model that grouped the 12 dimensions into five distinct components: Intellectual Challenge; Imaginative Experience; Sensory Experience; Competitive Interaction; Social Challenge. For personality, we assessed the dimensions by using the NEO-FFI [11] questionnaire. We observed that our participants has a well-balanced demographic distribution and by crossing this characteristics with Personality dimensions we learned that Female and Single players have statistically significantly higher Neuroticism scores than Male and Married players, and also that players with Higher Education degree have higher Openness to Experience scores. Regarding the Motivations dimensions, we observed that Male have higher Conflict, Social Manipulation and Discovery scores than Female, which have higher Social scores than Male. Players with Secondary Education degree scored higher on Conflict and Social Manipulation dimensions than the ones with Higher Education degree.

Towards our main goal, we studied the correlations between personality and motivations. All the statistically significantly are small. Extraversion and Neuroticism are the personality dimensions that most are correlated to the dimensions of Motivations, and Agreeableness is the one that correlates least with motivations dimensions. As a major conclusion, the presented hypothesis about the existence of correlation is verified by the results obtained. However, since it is a weak correlation, care must be taken when analyzing it and in making associations, as this may lead to wrong conclusions.

As future work, we propose to establish the association between experiences, preferences and gaming habits and the respective demographic niches. We suggest an exploration at the level of the Motivation dimension components by analyzing the Personality-Motivation correlations across players from different demographic niches, preferences and playing habits. Lastly, we suggest the application of CISSI model in other study contexts related with Board Game Motivations, as it gathers important aspects from literature existing models.

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