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Personality and Motivation to Play Board Games

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Abstract

The analog and digital world of board games is constantly evolving, making it important to collect information about the players. It is fundamental to understand the differences that exist between different players as it allows us to comprehend the motivations to play a board game. We have characterized our players from more general demographic traits to aspects related to the human context and the environment around the game. We managed to gather a wide spectrum of participants. One of the questions we were looking to an answer was: Can different players play the same game in different ways or for different reasons? To verify if this relationship exists we used a personality questionnaire and created a board game motivations questionnaire. We defined a model Competitive Interaction, Intellectual Challenge, Sensory Experience, Social Challenge, Imaginative Experience (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 board games. We observed that Extraversion and Neuroticism are the most related to the dimensions of Motivations. Overall, it is possible to define a model that allows characterizing a board game player based on their motivations to play. However, its correlation with Personality is a process that needs caution, due to the weak correlation.

Keywords

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

Resumo

O mundo analógico e digital dos jogos de tabuleiro está em constante evolução, o que torna importante a recolha de informações sobre os jogadores. É fundamental compreender as diferenças que existem entre os jogadores, pois permite-nos compreender as suas motivações para jogar um jogo de tabuleiro. Caracterizámos os nossos jogadores desde traços demográficos mais gerais a aspectos relacionados com o contexto humano e o ambiente em torno do jogo. Conseguimos reunir um vasto espetro de participantes. Uma das questões para as quais procurávamos uma resposta era: Jogadores diferentes podem jogar o mesmo jogo de formas diferentes ou por razões diferentes? Para verificar se esta relação existe, utilizámos um questionário de personalidade e criámos um questionário de motivação de jogos de tabuleiro. Definimos um modelo CISSI que agrupa em componentes as dimensões das motivações para jogar jogos de tabuleiro: Desafio Intelectual; Experiência Imaginativa; Experiência Sensorial; Interação Competitiva; Desafio Social. Na nossa amostra de 229 participantes encontrámos uma pequena correlação entre a personalidade e as motivações para jogar jogos de tabuleiro. Observámos que a Extroversão e o Neuroticismo são as mais relacionadas com as dimensões das Motivações. Globalmente, é possível definir um modelo que permite caracterizar um jogador de jogo de tabuleiro com base nas suas motivações para jogar. No entanto, a sua correlação com Personalidade é um processo que necessita de cuidado, devido à fraca correlação.

Palavras Chave

Jogos de tabuleiro; Jogos analógicos; Modelo de Motivações do Jogador; Personalidade.

Contents

x

List of Figures

List of Tables

Acronyms

NEO	Neuroticism-Extraversion-Openness
MBTI	Myers–Briggs Type Indicator
OCEAN	Openness, Conscientiousness, Extroversion, Agreeableness, and Neuroticism
FFM	Five Factor Model
FFT	Five Factor Theory
NEO-FFI	Five Factor Inventory
NEO-PI	Neuroticism-Extraversion-Openness Personality Inventory
NEO-PI-R	Revised Neuroticism-Extraversion-Openness Personality Inventory
PCA	Principal Component Analysis
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
RTS	Real-Time Strategy
RPG	Role-Playing Game
CCG	Collectible Card Games
GEQ	Game Experience Questionnaire
TGMI	Tabletop Gaming Motivation Inventory
QF	Quantic Foundry
GMM	Gamer Motivation Model
GMP	Gamer Motivation Profile
BGMP	Board Game Motivation Profile
BGG	Board Game Geek
CISSI	Competitive Interaction, Intellectual Challenge, Sensory Experience, Social Challenge, Imaginative Experience

SIM   Social Challenge, Imaginative Experience, Mechanism Exploration

1

Introduction

Contents

1.1 Motivation

Despite rapid technological advancements, several families consider connecting and bonding over a board game [3]. 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 [4]. 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. Those who play alone may also do so due to the fact that they like to take their time playing or learning how to play [4]. In addition there are solo modes in several games. 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 her. This exploration can also be done in solo mode.

The number of people engaged in analog gaming (also known as board games) has never been so high, according to the Arizton's market study for 2019-2024 [3] which foresees a growth of 10% in this period. A Technavio 's [5] market study expects that there will be a 15% growth for the referred forecasted period. 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 the engagement of players with these games. What motivates people to engage with tabletop games is not well studied and is yet to be fully explored by research. For that, it is important to understand what they do, and not only what they think that motivates them to this activity [4].

One aspect that may be important to consider when analysing motivation is the player's personality. The individual characteristics of a person may influence any activity he/she performs, so the same can apply to board game players. Within this context, personality analysis may constitute a good starting point to assess a player's motivation. Will two people with similar personalities enjoy playing the same game, and/or the same types of games? And if they enjoy playing the same game, do they feel the same motivation to do so?

Another aspect that we found interesting to consider is the whole context and environment outside the game. That is, everything that happens or exists around the players. This can include decoration, noises, the comfort of the space, particular aspects of the game that have nothing to do with the way the game is played, among other aspects.

Being a player himself, the author of this study often reflects on the situation in context, and how to find answers to the questions it raises; then, based on a set of personality and player models, which includes the use of questionnaires and analysis of their answers, some research work was carried out, in order to be able to answer those questions, namely those relating to a possible correlation between motivation and personality.

1.2 Problem

More recent research [6] related to modern board games started to gain some traction, including the understanding of prototyping, game design, collaborative game design, game development methodology, or educational goals of a board game. However, although research on tabletop gaming slightly increased in the last two decades, there are still 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 and if those factors are related to the player's personality.

1.3 Research Questions

Current approaches to understand the motivations to play board games do not take into account the individual characteristics of each player. We researched how individual personality traits affect and correlate with tabletop gaming motivations. Our research questions are as follows:

1) How is the population of Portuguese board players characterized?

2) Is it possible to define a model that allows characterizing a board game player based on their motivation to play?

3) Is there any relationship between a board player's personality and his motivation to play?

1.4 Objectives

The focus of this project is to understand the relationship between a player's personality and his motivations to play a board game. The steps we took in order to do so were the following: research on current state of the art, development and verification of questionnaire, collection of data on user personality and gaming motivations and an analysis of the results.

1.5 Contributions

Having studied the relationship between a board game player's personality and his/her motivation to play a specific board game, with the help of personality and game motivation models, we expect to leave a useful contribution in the field of board games.

This dissertation contributes by adding to the state of the art of these areas a study that directly works to relate the player's personality with his motivations to play a board game, through two questionnaires.

Due to our research and the creation of a new questionnaire, this work may contribute in different ways such as:

1 - Characterization of Portuguese Board Games Players: We have board game specific data (including demographic) from a reasonable size sample from portuguese players. This can lead to more in depth studies about our population in this world which we currently lack.

2- Player's Motivation to Play Board Games: We can now understand better our analog gaming population's preferences and we found some interesting data and correlations. With the obtained data we may reach a suitable model for the Portuguese Board Game Players and compare it with existing models in literature.

3- Correlations between Personality and Motivations for Playing Board Games: There is no research that studies this correlation in board games so this thesis is a pioneer in that matter.

1.6   Document Outline

This dissertation is organized as follows: Chapter 1 introduces the whole topic that was studied and worked on, including the author's motivation, definition of the problem to be solved, research questions, the objectives to achieve and the contributions that will emerge from this work. In Chapter 2, previous work on this area of study is addressed, from which we have drawn some conclusions about the current state of the art in a set of sub-areas underlying the main theme. Chapter 3 details the approach followed in this project, from methodology to evaluation process in all assessments performed to users. In Chapter 4 we report the obtained results from our user studies through user questionnaires, and the respective analyses carried out on them, according to those that were our work objectives. Chapter 5 sums up our main conclusions and achievements taken from our work. Finally, we also discuss potential directions for the future of this work.

2

Related Work

Contents

This chapter presents the state of the art in the area of board game genres, personality, gaming motivations and player types, since those are the most relevant topics to develop this project. For this purpose, different studies and contributions were surveyed, accompanied by a set of definitions, which will be presented below as they are needed to understand our approach to the problem.

2.1 Personality

Each person has a different taste for everything in the world, therefore we assume different people have different personalities and each one has their particular needs [7]. Personality can be defined as a set of traits and characteristics that describe a person's behaviour [8]. Some of the most prominent trait models are Allport's trait theory [9], Cattell's 16 Factor Model [10], Eysenck's Giant Three [11], and the Myers–Briggs Type Indicator (MBTI) [12]. However, we focused on the psychological theory of The Five Factor Model (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.

2.1.1 Five Factor Model

The FFM, also known as Big Five Personality Traits, is a theory that divides a person's personality into five different dimensions [13]. 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 Openness, Conscientiousness, Extroversion, Agreeableness, and Neuroticism (OCEAN), see Fig.2.1): These five basic dimensions from this personality model structure the most important differences between people's personalities [14].

Openness to Experience: discloses the preference an individual must allow him/herself to face unknown situations. People with Openness to Experience are intellectually curious and sensitive to beauty and have in mind to experience new fantasies or feelings. Players who are not so open, do not feel the importance of trying new things, preferring to stay in their comfort zone or usual routine. They are practical and have fixed values and ideas.

Conscientiousness: is related to the way people control, regulate, and direct their impulses. Conscientious people are reliable and responsible, have good impulse control and care to make decisions with self-awareness. Less conscientious individuals prefer to plan as things happen rather than having everything planned. Therefore, they like short-term goals because they tend to follow their impulses instead of deliberating in advance.

Extraversion: indicates how social a person is. Extroverts like interacting with people, and they often have lots of energy. They seek excitement and positive emotions in their relationships and in their activities with other individuals. Introverts tend to spend their time alone because they recover more energy by being with themselves than by being with other people. Everything that extroverts experience from interacting with other people, they can achieve from their own company.

Agreeableness: is about how much people value getting along with others and have an optimistic view of human nature. People with a high Agreeableness are more empathetic and prefer avoiding conflict to establish positive relationships, instead of taking stronger stances for their beliefs. Those who score low in Agreeableness tend to be more competitive and hostile. They prefer to avoid comparing themselves to others and their judgements and attitudes are not influenced by emotions. Their confidence comes from themselves.

Neuroticism: is the tendency to experience negative emotions like anxiety, depression, or anger. Neurotic individuals are more sensible, have stronger reactions to negative emotions. Therefore, they can also be more alert to dangerous situations. On the other side, individuals with very low Neuroticism scores may be more emotionally stable and less reactive to stress. They are calmer, less impulsive and less vulnerable.
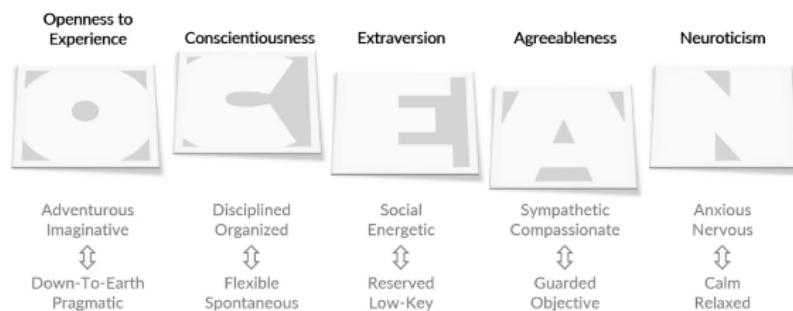
Figure 2.1: Big Five personality factors [1].

Compiled tables were created to show standard personality scales or some factors assigned to these five, which demonstrates its nature and constitutes a guide for others researchers to be able to identify measures. The opposite scenario is also possible: other models own factors that are interpreted based on these five. Some interpretation discrepancies can be found and compromise the model, for example, the Openness to Experience scale was classified as a measure of conscientiousness by Hogan [15].

Summing up, the FFM is a hierarchical organization of personality traits in terms of five basic dimensions [15]. Although it is possible that there are other basic dimensions besides these five, at least some of these are always necessary for a good description of personalities. Are any of the five traits of the FFM more relevant than others to understand the motivations to play board games?

2.1.2 Personality Traits Research

In the history of personality research, most personality assessment has been based on questionnaires ([16] as cited in [15]). Questionnaires have scales designed for specific practical applications or to measure constructs derived from personality theory. In 1969, Norman provided early evidence that self-report questionnaires could actually measure the five factors ([17] as cited in [15]). Numerous questionnaires have emerged and most of the scales reflected one or more of the five factors, which empirically justified the correspondences between similarly named factors ([18] [19] [20] as cited in [15]). McCrae and Oliver did some research [15] to find evidence that supports the model in terms of its comprehensiveness and its applicability across observers and cultures.

Beyond the above evidence for the model, the factors make explicit that the personality theory is encoded in the language used by everyone [15]. However, even when all five dimensions are represented in a factor analysis, selecting different variables can lead to different dimensions within the same factor space, which can be a problem of rotation [15]. Therefore, the FFM is not a complete theory of personality and may have some limitations named by McCrae and Oliver such as: a) Too few factors, b) Too many factors, c) Ratings versus self-reports and d) Cognitive artifacts versus realistic description [15]. If on the one hand there are many writers arguing that five factors are insufficient to summarize all that is known about individual differences in personality, on the other hand there are some researchers who do not feel the need for the five factors to exist [15].

Numerous alternatives to the FFM have been proposed, including the Eysenck Personality Questionnaire [21], but the availability of this comprehensive model of personality and validated instruments to assess it, provide many advances in personality psychology. All of the authors that tried to apply the FFM in their work and research, found advantages and disadvantages. However it became clear for them that, although the model will not explain everything, it provides a good starting point and a big challenge to the next decades.

2.1.3 Personality Traits and Neuroticism-Extraversion-Openness (NEO) Inventories

Another problem with the FFM is the fact that personality theories tend to be focused on abnormal variants of personality traits, and thus other important variables may be omitted. In an attempt to solve these problems, many observations led personality psychologists to find clusters of traits. These clusters were called "personality structure" and have the advantage of extending and irradiating the nature of each of the five factors. For decades factor analysts offered competing models of trait structure. Since the FFM is universal and the most accepted personality trait structure model, Costa & McCrae developed the NEO Inventories [22] to assess it.

These inventories are operationalizations of the FFM and offer computer administration and interpretation [22]. However, trait measures are also target of criticism and stigmas by a large number of psychologists, presenting objections like: (a) traits are mere cognitive fictions; (b) even if they are real, they offer only descriptions, not explanations for behavior; (c) the trait construct is incompatible with human growth and development;(d) because traits cannot be changed, they are irrelevant to clinical practice; (e) trait accounts of personality are dry and uninteresting; and (f) traits offer an incomplete account of human psychology or even personality psychology [22].

Although there are several instruments to assess the FFM, the first measuring questionnaire was the Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI). Costa & McCrae thought about domains as sets of traits indicators, and thus identify a set of facets for each domain, which ended up resulting in the scales that work well across a large range of trait levels.

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. Therefore, the ideal instrument would slice each of the domains into a group of facets mutually exclusive and jointly through the domain [22].

The FFM is considered to be the "adequate taxonomy", and the fact that the NEO inventories were translated in a set of several languages, also contributes for them to be so universal. Due to their important feature in providing a quick assessment of general personality using the FFM, these inventories will be the basis of our personality study method.

2.1.4 Five Factor Model in Interpersonal Psychology

One of the FFM applications is in intrapersonal psychology, a type of psychology which mainly focuses on interior aspects of the human being. On the other hand, interpersonal psychology also deals with external aspects, including all the interactions among people. At some point, there will be an intersection between both perspectives, and they can be seen as two approaches for the same topic. The study of individual differences is probably the clearest link between them [23].

Costa & McCrae FFM [23] explored important ways that make them converge to complement each other. The studies began at the level of FFM traits, with empirical correspondences, followed by the theoretical presentation of the Five Factor Theory (FFT), and lastly it might be used in interpersonal theory [23]. As a structural model of traits, the FFM offers a helpful perspective to understand interpersonal behaviors and relationships. It uses a theory in which the human behavior is classified through variability, proactivity, rationality, and scientific knowability [23]. With the work of trait researchers, it became clearer that most traits are only related to the five basic factors.

Conscientiousness is the trait with major impacts in interpersonal psychology, since even the behaviors which are not directly related to us, end up affecting our well-being and relationships with others [23].

Neuroticism is the typical factor associated with interpersonal problems. A high value of Neuroticism includes a variety of distressing emotions that often disturb interpersonal functioning. In an extreme case, it is possible that a person has intense but unstable relationships, since their perceptions of other people become unrealistic [23]. Extraversion and Agreeableness are responsible for the nature of most problems. High values of these two factors led to a certain dependency level [23].

Many characteristics with central importance to psychologists are shaped by personality traits. The distinction between personality traits and characteristics adaptation is recognized as one of the most important contributions of the FFM [23]. In this way, it is possible to emphasize its importance for interpersonal relationships, which also reflects its importance for the analysis of board game players. Since most board games are inherently social, they are not experienced in a solitary way, and such, understanding interpersonal relationships is crucial to this study.

2.1.5 NEO Five Factor Inventory

In personality assessment and research, the Revised Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI-R) constitutes a simple tool used to manage and interpret personality traits. This tool presents numerous advantages, due to extensive research based on finding a proposal for a comprehensive personality analysis. It provides self and hetero-assessments, feedback to the subjects and it is the latest version of the first instrument to operationalize the FFM, the NEO-PI [14].

On the other hand, the NEO-PI is quite extensive, with 240 items, which makes the tool time consuming and not very versatile [14]. This limitation thus led to the construction of reduced versions of it. The NEO Five-Factor Inventory NEO-FFI is a reduced version, with 60 items, echoing the universality of basic dimensions of personality. In attempts to adapt it, difficulties arise in reproducing its original structure.

Several Portuguese carried out studies and tests for the construct validity of it through Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA), using the one factor model with the maximum likelihood method for each dimension of personality, separately.

The five factors were extracted through the PCA and explained 35.1% of the variance, which later were confirmed in the CFA, that revealed adequate adjustment rates. Regarding to internal consistency, values were obtained between .69 for Openness to Experience and .81 for Conscientiousness, what was considered acceptable and similar to values of the original version [14]. The reliability analysis revealed that Neuroticism and Conscientiousness were the most robust dimensions [14], congruent with international research. To assess the validity and fidelity of the Portuguese version of the NEO-FFI and to analyze its structure compared with the original version, a new study [24] on its psychometric properties was developed. Coherency between the results arising from two different methods showed that it is equivalent to the original.

13

The factors explained 21% of the variance and when factoring 30 personality traits, the five dimensions were able to explain 55% of the variance. The reliability values obtained from each of the dimensions were also similar to those of the original NEO-FFI: Conscientiousness =.81, Neuroticism = .81, Extraversion = .75, Agreeableness = .72 and Openness to Experience = .71.

Inter-correlations between the factors were found. Low but significant positive correlations were identified between: (a) Extraversion and Openness to Experience or Conscientiousness and (b) Conscientiousness and Agreeableness. Negative correlations have been revealed between Neuroticism and Extraversion, Openness to Experience or Conscientiousness.

By analyzing these two studies [14] [24], it could be understood that the correlations of the inventory variables, age, gender and education level, should be examined for a better analysis of the influence of these variables on the scores obtained. Mainly, they served to reinforce the importance and potential of this "personality assessment tool" [14] and it will serve as a basis for our study.

2.1.6 Section Summary

Throughout this section, it was possible to understand personality traits in more depth, by presenting concepts, models and assessment tools related to personality. We started by defining personality as being a set of traits and characteristics that describe a person's behavior, followed by the presentation of a model based on a theory that divides a person's personality into five different dimensions, the FFM.

This model was applied to numerous studies, some of them presented here, in order to find a way to assess people's personality. It came to be objected by some authors. However, through the majority of studies, it became clear that it provides a good starting point to study personality.

From what was found, most personality assessment has been based on questionnaires. Questionnaires have scales designed to measure constructs derived from the personality theory. In this way, we explored some of the questionnaires already used as a personality assessment tool. The NEO-PI are operationalizations of the FFM and may solve some of its problems by finding clusters of traits, and thus organize the traits in each dimension. Brief versions of these questionnaires were created, the NEO-FFI. In turn, the NEO-FFI also have several versions, one of which is a Portuguese version that will be the one used for our work.

One of the applications of the FFM is in the area of interpersonal psychology. Since our project focuses on board games, and these include forms of behaviour that reflect a certain degree of solitarism, it becomes interesting to understand these types of behaviors and relate them to the personalities of those who play them.

2.2 Analog Games

This section presents a definition of the existing board game genres. Each game has its own set of characteristics; therefore it will attract certain type of players (e.g. an introverted player will most likely not play/like a game that requires social interaction).

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 Real-Time Strategy (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.

2.2.1 Board Game Genres

According to Sousa [25], and other authors, board games can be divided as follows: (Note that one board game can fit into multiple categories):

Traditional and Classical games are those having no attributed author and no commercial rights (e.g. Chess).

Family games for the general mass market, with mechanics and rules that tend to be similar among various products and with considerable luck mechanics (e.g. Azul).

Party games are simple games for large groups focused on social interaction and entertainment (e.g. Codenames).

Wargames[1] are games that depict military actions. They are set in a variety of timelines, from the Ancient period to present conflicts and even in the future. Thematically, they cover everything from actions between small units on a very small board to larger, extremely detailed conflicts and even global-scale wars (e.g. Twilight Struggle).

Role-Playing Game (RPG) The act of taking on the role of a character. May be done in any of several modes, including 1st-person dialog, 3rd person narration of action, or even 1st person improvisational acting. RPG [25] are usually cooperative, using thumbnails and various registration elements to support a narrative story that is built by the players' choices, with a mediator that controls rules and narratives (e.g. Pandemic).

Collectible Card Games (CCG), also called trading card games (TCG) or customizable card games, are games played using specially designed sets of playing cards. While trading cards have been around for longer, CCGs combine the appeal of collecting with strategic gameplay. Players are challenged to construct a deck within limits set by the CCG's rules that will allow them to outlast decks constructed by other players.

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[1] https://boardgamegeek.com/boardgamecategory/1019/wargame

The modern concept of CCG was first presented in Magic: The Gathering, designed by Richard Garfield and published by Wizards of the Coast in 1993.

American games means games that emphasize a highly developed theme, characters, heroes, or factions with individually defined abilities, player to player conflict, and usually feature a moderate to high level of luck [2] combines elements from Wargames and RPGs (e.g. Twilight Imperium).

Eurogames [25] are games that avoid randomness in mechanics with simplified themes simulations, relatively simple rule systems, for groups and with limited durations, multiple paths to victory. Known for their game mechanics and originality as well as the quality of the components (e.g. Catan).

2.3 Player Types and Motivation models

Players tend to have preferred game genres and usually play games which contents are in accordance with their likes. Their likes derive from the type of players they are [7]. In digital games we know the player's personality is strongly related to the games they like the most [7].

A motivation model allows us to understand the reasons each player wants to play a certain game. A player type model is an attempt to categorise players into different player types, by identifying characteristics that players exhibit within games [26]. Most models were made for video games such as Brainhex [27], GMP [2] or Bartle [28] and although their characteristics are more specific to digital games, there are some aspects in commong with analog games, thus helped us structure our model.

2.3.1 Bartle's Player Type model

Richard Bartle brought us one of the first and most used player models, classifying a player's actions in relation to his personality. Bartle's study [28] analyzed the interaction patterns and four different types of players were found. The four player types are Achiever, Killer, Explorer, and Socializer which are relevant to Massive Multiplayer Online games but not always to other game genres. The Achiever acts on the world and plays to win in games, motivated by achievements and progress set by clear goals within the game. The Socializer is motivated by interacting with other players in an interactive world. Explorers are motivated by exploring their surroundings and interacting with the world to gain new knowledge. Killers find motivation in attacking other players in an attempt to dominate and making their life hard within the virtual environment [26].

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[2]https://boardgamegeek.com/thread/828368/definition-ameritrash-further-defined-and-discusse/page/1

2.3.2 Nick Yee's Gaming Motivation Model

Nick Yee continued the work of Bartle's player type model in a long term study of players in Massively-Multiplayer Online Role-Playing Games. While Bartle assumed that motivations for playing suppressed other types of play and that the four types are independent, at the time, this had not been empirically tested [29]. Yee's motivation for the study was to explore how players are motivated and if there are demographic differences to the players' motivation in relation to the usage patterns and in-game behaviours. Therefore, Yee used Bartle's model and used a factor analytical approach to create an empirically grounded player motivation model.

In 2015, Nick Yee and Nicolas Ducheneaut created the Quantic Foundry (QF). They developed their motivation (and empirical) model known as Gamer Motivation Model (GMM) [3] using established psychometric techniques, such as a statistical method that identifies how preferences cluster together. Over 400,000 gamers worldwide have participated in their Gamer Motivation Profile (GMP), providing data[4] on their motivations, demographics, and their favorite games. The GMP can be taken here[5].

By generating an inventory of motivations gathered from a literary review of existing motivational models, such as the FFM [30]. QF validated and refined their motivations model based on data from thirty thousand gamers around the world to get new motivations and refine the model itself. From that came its second, and most recent version.

In the GMP, as can be seen on Fig.2.2, 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. Then each one of these can be divided into two low-level motivations [7].

From all the five traits of the FFM, we believe that Openness to Experience, Conscientiousness and Extraversion will be more relevant to our work due to the research presented and models developed by Nick Yee. However, since we are considering analogue games, we will not ignore the remaining traits as they might reveal themselves important.

2.3.3 Board Game Motivation Profile

QF developed a player profile more specific to board games[6]. To create a pilot inventory of motivations to test, QF looked for existent proposed taxonomies and participated in forum discussions from different sources[7][8][9], altogether, they had 59 motivation items in the pilot inventory.

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[3]https://quanticfoundry.com/wp-content/uploads/2019/04/Gamer-Motivation-Model-Reference.pdf
[4]https://www.gdcvault.com/play/1025742/A-Deep-Dive-into-the
[5]https://apps.quanticfoundry.com/surveys/start/gamerprofile/
[6]https://quanticfoundry.com/2016/08/03/board-game-profile/
[7]https://boardgamegeek.com/blogpost/27367/schools-design-and-their-core-priorities
[8]https://www.cardboardrepublic.com/gamer-archetypes
[9]https://www.reddit.com/r/boardgames/comments/4m3uti/

Figure 2.2: QF's GMP related with personality [1].

They first used established psychometric techniques and data from 5,000 board gamers to identify key gaming motivations and created an assessment tool, then created an online survey[10] and received a personalized report of their gaming motivations that they could then share on social media. Then, collected the demographic and motivation data from over 90,000 board gamers worldwide along with their favorite genres and game titles.

Factor analysis revealed 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 motivation is often (but not always) aligned with it. For example, gamers who like strategic complexity are often (but not always) interested in exploring game mechanics and systems.

The latest version of Board Game Motivation Profile (BGMP) [11] is explained below. Follow Fig.2.3 for a better comprehension of the motivation clusters:

1) Conflict: Gamers with high Conflict scores tend to be more competitive and enjoy games where players can take hostile actions directly against each other. This could be stealing another player's resources, forcing them to discard, blocking their move, or directly attacking and destroying their units/buildings. Conversely, gamers who score low on Conflict prefer games that minimize direct and hostile confrontations.

Social Manipulation (Secondary Component): Gamers who score high on Social Manipulation enjoy playing mind games, where outcomes aren't determined by dice or rulebooks, but instead by their ability to bluff, deceive, and persuade other players. Conversely, gamers who score low on Social Manipulation prefer concrete gameplay mechanics where deception doesn't play a role.

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[10]https://apps.quanticfoundry.com/surveys/start/tabletop/
[11]https://quanticfoundry.com/2016/09/21/board-game-profile-v2/

2) Strategy: Gamers with high Strategy scores enjoy taking on cognitive challenges. They prefer games that require a lot of thinking and planning and where strategic mastery and skill (rather than luck) are the primary determinants of the game's outcome. Gamers who score low on Strategy want a more relaxed gameplay experience where decisions do not have much long-term impact.

Discovery (Secondary Component): Gamers who score high on this motivation are discoverers who have a broad interest in rule sets, game mechanics, they enjoy keeping up with new game releases and staying up to date with the current meta. Gamers who score low on Discovery prefer more traditional, familiar, tried-and-true game mechanics.

Need To Win (Secondary Component): Gamers who score high on this motivation care a lot about winning. They enjoy soundly beating an opponent. Those who score low on Need To Win don't care about the game's outcome, but focus instead on the journey of playing the game.

3) Immersion: Gamers who have high Immersion scores enjoy taking on a role in a believable alternate world, with its own lore, history, culture, and cast of interesting characters. They like the implicit narrative of being part of an unfolding story as they play the game. Conversely, players who score low on Immersion want to focus on the game mechanics and don't like it when the theme gets too heavy or intrusive.

Aesthetics (Secondary Component): Gamers who score high on Aesthetics like high quality components, amazing artwork that strongly reflect the theme and setting of the game. Gamers who score low on Aesthetics care very little about the artwork and production value of the game.

4) Social Fun: For gamers who score high on Social Fun, playing board games is first and foremost about having a good time with other people. They enjoy the chatting and the social interaction. Gamers who score low on Social Fun prefer games that don't have social interactions and set a more serious tone around the game.

Cooperation (Secondary Component): Gamers who score high on Cooperation enjoy board games where they can work with others players towards a common goal. They would rather team up with other players instead of beating them up. In contrast, gamers who score low on Cooperation prefer games that focus on individual decisions, achievements, and outcomes.

Chance (Secondary Component): Gamers who score high on Chance enjoy luck elements in their board games, usually in the form of card drawing or dice rolling mechanics. Gamers who score low on Chance prefer clear and concrete outcomes to their actions with luck playing a minimal role.

Accessibility (Secondary Component): Gamers who score high on Accessibility prefer games that a broad range of people can pick up and enjoy. After all, if you like playing board games with other people, then it's helpful to have games that a lot of people can get into. In contrast, gamers who score low on Accessibility appreciate games with lots of weight and complexity.

A "Narrative" motivation is interesting from a board game perspective, but most RPG gamers would be in a narrow band on the high end. Similarly, almost all CCGs are 2-player competitive games, so CCG gamers would score in a narrow band of a high conflict and competition motivation with insufficient granularity to tease apart interesting variations. There are also likely more nuanced motivations in CCGs and RPGs that would not be captured in a generic tabletop gaming framework.

Figure 2.3: QF Board Game Motivation Profile [2].

2.3.4 Towards a Tabletop Gaming Motivations Inventory

Digital game inventories, such as the Game Experience Questionnaire (GEQ) [31], have already been used for measuring tabletop gaming experiences and board game player's motivations. However, it is a very high-level measure that does not explore all the relevant aspects of tabletop gaming. Thus, there is no tool with the necessary characteristics to assess the motivations of a board game player.

Following this objective, Kosa and Spronck developed a tabletop gaming motivation questionnaire [6]. To design this questionnaire [6], they took a deductive approach and initially based their tabletop gaming motivation model on the literature of video gaming motivations. With contributions from several studies, it was stated that there are 13 dimensions to video gaming motivation, which was the starting point for Kosa and Spronck's research. They started by adding a new dimension and changing the denomination of one of the existing ones. they ended up with the following dimensions: **Customization** - make the game more appealing, **Escapism** - sub constructs of the imaginal experiences, **Relationships** - share players' personal issues, **Completion** -"completing a game", **Story** - enjoy story driven games, **Socializing** - chat and interact with other players, **Loss Aversion** - feel strongly about wanting to avoid losing, **Fantasy** - include fantasy elements such as out-of-world creatures, fables, tales or time travel, **Competition** - desire to compete with other players, **Arousal** - find it arousing to gain games, **Autonomy-Exploration** - exploration aspect of board games, **Mastery** - enjoy mastery games, **Teamwork** - like to cooperate, and **Aesthetics** - play more aesthetically pleasing games [6].

As a result, a model and a questionnaire with these 14 dimensions emerged. The items formulated by the existing literature have undergone necessary adjustments to the context of tabletop gaming, whenever necessary. The Tabletop Gaming Motivation Inventory (TGMI) was thus developed [6]. Game competence, game frequency or geographic location of players, are some of the variables found for the digital games that may influence their motivations to play. Kosa and Spronck investigated whether these would also apply to board games, collecting some of this information through the questionnaire.

Regarding measures used, the initial pool had 42 items, with 14 subscales of 3 items each. Answers were obtained using a seven-point Likert scale. Each factor contributed to the overall motivation, having its own individual scores. A CFA was carried out to conclude if the developed motivational model is suitable without being modified. The result did not show a good fit, and so another type of analysis was done. The Exploratory Factor Analysis (EFA) verified the adequacy of the 42 items included. Eleven factors explained a variance of 67%. In terms of reliability, convergent and discriminant validities analysis, the results were partially consistent with the starting point. **Escapism, Aesthetics, Relationship, Arousal and Autonomy-Exploration** emerged as motivating factors. After obtaining this list, some of them fused together in a single one. Prior experience of players was negatively correlated with Customization and Arousal, while play frequency was negatively correlated with Socializing and Teamwork.

Although the TGMI took into account the broad definition of tabletop games, there are limitations that can be fixed in future work. To better capture the motivations to play different kinds of board games, more specific inventories might be required. Thus, this study and inventory [6] contribute to serve as a basis and instrument for future research on tabletop gaming motivations, as our project will do, and even for the development of a board game recommendation system.

2.4 Environment and playing context

One of the achievements we wanted to reach with the questionnaires was to get to know the human context around the game, outside the events resulting from the game itself.

2.4.1 The Fascination for Materiality and for Activating Game Systems

Xu et al. explored a new style of board game interaction, which uses digital interfaces with real physical objects to be played in physical spaces [32]. They seek to improve the gameplay experiences, making the best use of human skills. In particular, at the socio-physical level. One of the objectives was to explore design choices when moving from non-digital to hybrid digital-physical. Therefore, they attempted to establish a link between the game artefact (including all its design elements) and the player's experience by analysing interactions through a video from players playing a board game in real time.

Interaction Ritual (IR theory) was used to help understand how small social events between players throughout the game contributed to the entire gameplay experience and influence players social behaviour. Five interaction groups/categories were found throughout the data analysis: Chores, Reflection on gameplay, Strategies, Out-of-game and Game itself [32]. Each category was associated with different board game design elements. They concluded that the interactions of Chores are fundamental to form a focus of mutual attention on the players, and to synchronize their emotions and knowledge. Physical objects, such as dice, direct the players' attention to the action and to the current state of others. Chores are thus considered as the basis and integral part of a social game [32]. Although digital games already have Chores, they are usually only virtual chores performed by individual players (creating avatars, selecting difficulty levels, etc.). Thus, having real Chores in the new media of digital table games might be something essential, if the goal is to capture the social fun of board games.

Due to this recognized importance of board game objects and also the identified parallelism with Digital Games, this article contributed to our study inspiring the creation of questions for the Motivations questionnaire.

2.4.2   Play Board Games as a Hobby and as Identity

Literature is strongly focused on players' motivations to perform actions in the game or to get involved in game structures. To explore a different perspective, Rogerson et al. argue that the game is an experience influenced both by the game itself, and by the player's commitment to the game and the respective experience [33]. Players who play board games as a hobby do not seem to feel the pressure of work, relationships or homework responsibilities as a barrier to play, but rather as factors that determine the choice of game or the time/frequency of play sessions. Their desire to continue the hobby through involvement in their culture always remains stronger [33].

Rogerson et al. aimed to obtain a deep understanding of the playing experiences by conducting interviews covering the participant's history as a player, their favourite types of games, frequency of games, and what they like or dislike about the games. The interviews suggested some patterns of involvement with games that vary throughout the different stages of a player's life. Controlling the context, time, location and ways of playing can be crucial factors in allowing the hobby not to end [33]. Following this idea, the study suggests a set of strategies that board game players can use to keep their hobby active, without devaluing attention to other aspects of their live. All of them are based on four key pleasure dimensions which were consistently described by players as derivation of board games: sociality, intellectual challenge, variety and materiality [33].

Therefore, the findings of Rogerson et al. contributed for ours by adding an important new theme to be addressed in our questionnaire: the impact of gaming on life responsibilities and changes in motivations to play across different life stages.

2.4.3 A Grounded Analysis of Player-Described Board Game Immersion

"Immersion" is a term often used as a selling point for new game releases, mostly in video games, which suggests that it is something that players are interested in [34]. Several of the elements of video games that make them immersive are also found in board games, such as problem solving or world building. However, board games have a strong lack of other key aspects that are potential characteristics for immersion, such as the high realism of the experience.

There is still doubt as to whether traditional board games can achieve the immersion of video games, as immersion in board games is a recent trend [34]. To this end, Farkas et al. collected descriptions of board game immersion from players using a Grounded Theory, trying to find out what conditions are necessary for it, and what experiences are provided by it. Thus, a definition arrived based on real experience of players, and not only through literature [34]. Immersion can be seen as a cognitive phenomenon related to the whole experience of surroundings in the game (not just the game itself) and can contribute to creating an immersive experience in board games.

The results showed that two different theories can be generated: Conditions of immersion (factors that affect and are necessary for immersion to exist) and Experiences of immersion (qualities of an immersive experience). These conditions can be in-game (design decisions) or out-game (external behaviours or conditions). If there are discrepancies between the elements of the game to be maintained and eliminated, their immersion can be broken [34]. These two aspects helped us organizing our motivation questionnaire.

2.4.4 The Materiality of Board Games

In a board game the way to win must offer an intellectual simulation and must offer opportunities to create social interactions between the different players. Players may have a passion not only for the game, but also for knowing in depth the hobby itself, and all the culture that it involves [35]. Rogerson et al. studied the importance of materiality in modern board games, using as a research base a set of interviews with board game enthusiasts to understand the motivations and experiences behind the "hobbyist players" [35].

They identified four areas in which board game players value, customize and protect the physical or material elements in their playing experience, being materiality one of these four significant key factors [35]. Although participants consider the material elements as secondary to the gameplay, they also recognize their importance and like to protect, customize and collect the pieces that are part of the games, and also add new items to improve the total setup. Many also refer to the feeling of unboxing the game boxes as a feeling of exploring every detail of the game step by step and revealing new elements within other elements. The board game box was described as being a fundamental material element.

Its design is valued, as it not only represents the game but also keeps it safe. The smell and sound of the material components have also been highlighted as important [35].

Outside the game, participants describe, and highlight, the importance of the environment surrounding the game itself [35]. They highlight aspects such as the appropriate size of the table, the comfort of the chairs, the furniture around and the suitability of the light of the space in which they are playing, which can directly influence and impact the playing experience. Other attributes related to the game space such as the shelves on which they store their games, the use of game boards and components as works of art, and even the availability of game rooms dedicated solely for this purpose. All this ultimately broadens the player's identity and enhances the game itself, creating a pleasant playing environment.

In this way, this study on the Materiality of Board Games revealed the need to assess the impact of these aspects on our sample of players, understanding how the playing space and the storage area of the games are important. Also to be considered are all the material parts associated with a board game from the box to the elements that compose it, which may have importance for the player.

2.5 Discussion

Among all the solutions explored throughout the previous section, we highlighted some models that we consider relevant and appropriate to use in our study.

The study of personality will be based on the FFM, which defines personality through five dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. This model has proven to be a trustworthy approach that can contribute to achieving our goals [14] [24]. We considered an assessment approach based on it, the NEO-FFI [14], to be an adequate method for our current study. This questionnaire measures the five dimensions of personality defined by this model, and a reduced Portuguese version of these will be the approach used in our project to collect this type of data (see Appendices: NEO-FFI).

Bartle's player type model is well known but does not work for board games, and although GMP from Nick Yee [29] is based on Bartle's, initially we decided to use it because it is the one that most relates gaming motivations to personality. It defines six groups of motivations, each one with two secondary motivations. Most game motivations surveys follow this model 2.2 or a similar one. However, as mentioned earlier, Yee brought to us another model, the BGMP, specific to board games. Despite not having a correlation with personality it revealed to be a better source than GMP for our work since its questions were targeted to analog gaming.

As also mentioned earlier, there is another type of inventory (the TGMI) adapted to tabletop gaming [6]. The TGMI seeks to find out what are the motivations for playing this type of games. However this inventory does not involve the study of the relationship between motivations and player personalities.

Instead, it investigates how motivations vary with respect to prior experience, play frequency and geographical locations of players. The TGMI does not distinguishes between different groups, it presents a set of fourteen dimensions of motivations.

After this discussion we decided to merge the three models mentioned above but mainly BGMP and TGMI (see Fig.2.4) - with the addition of these last two GMP became less relevant - so we gathered questions from each dimension from every model. Thus, we had some overlapping dimensions and questions as all the models have some aspects in common that we had to deal with as explained further. This was our starting point to analyze the correlation between analog gaming motivations and personality.
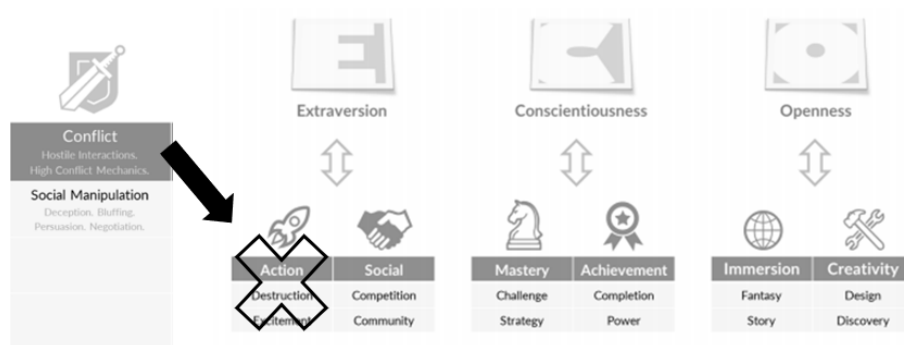
Figure 2.4: Merge of GMP with BGMP. [1] [2].

Regarding the environment and playing context, we analysed a set of studies [32–36] that made us recognise new perspectives of possible events around the game which are completely external to it, but can influence the player's moves and posture. The value of materiality reflected in the physical objects of a board game [32, 35] generated a new dimension (Object) to add to the others already mentioned. This area of study allowed us to introduce a new perspective in our research, to be included in the characterization of the Portuguese population of board game players and their motivations to play.

3

Methods and Procedures

Contents

3.1 Approach

For our approach we considered three points: one to 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, following an existing inventory, the NEO-FFI (see Appendices: 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 between them, and including all different dimensions considered in the literature. Also, we performed some adjustments to them and we created some items from scratch as we felt the need to do so, with questions that were 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.

The described approach structure can be seen on Fig.3.1.
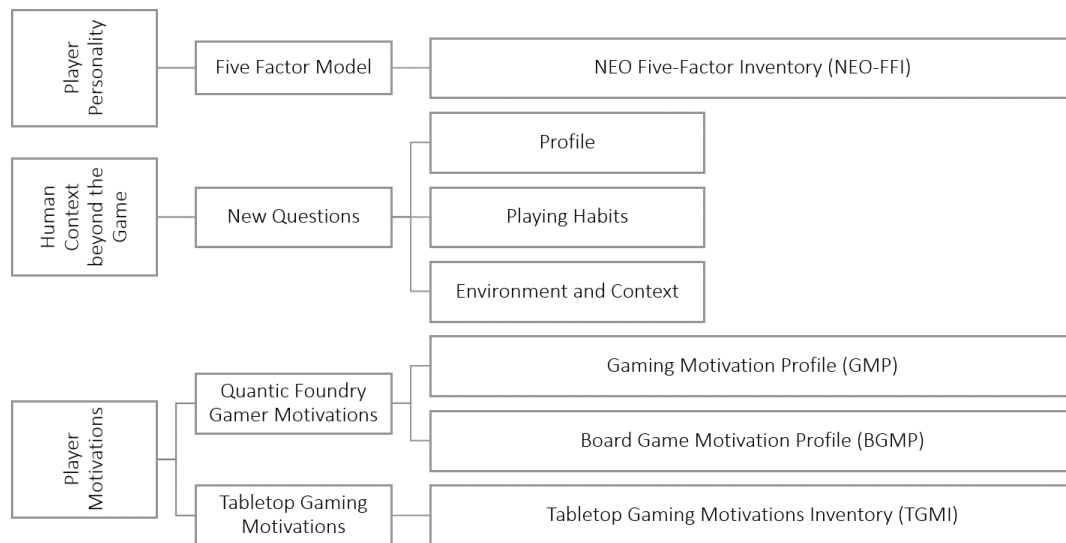
Figure 3.1: Approach to relate gaming motivations and player personality

3.2 Methodology

Our main goal was to research the relationship between players' personality and their motivations to play board games. To understand this relationship, we gathered and analyse data from board game players personality and motivations to play board game. 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. They were also sent by email to association managers and player groups in order to share directly with their members. Lastly, the expert who worked with us on this study allowed to use his social media networks dedicated to modern board players (personal blog, youtube channel, etc), where we include some research-related posts. By using target social media we were able to reach more people who were already identified as hobby board gamers than if we would try to reach the full population that plays board games not as a real hobby [4].

The methodology we followed to achieve the objectives of this work was based on two user questionnaires. We presented the questionnaires to the players through a simple web page with a brief description of our study and the links for them to access the questionnaires. The procedure began with participants signing a consent form, which ensured all answers will remain anonymous. All personal data, if provided by participants, will only be used within the context of this research.

3.3 Evaluation Process

Evaluation of our working approach was divided into three main stages: **Verification, Testing with Users** and **Results Analysis**. However, not all of these steps had to be covered for both questionnaires.

For personality, the questionnaire we used to assess the different dimensions was already validated and accepted for universal use, so no item verification step was necessary. For the Motivations for Playing Board Games, the first evaluation stage was really important as we needed to guarantee to have a good assessment tool for assess the Motivations of our participants to play Board Games.

This Verification stage was compounded of three distinct steps:

(1) Researching and looking closely 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 different dimensions. Taking into consideration that each dimension would have to be composed of at least 3 items in order to be correlated with another dimension;

(3) Using a measure of internal consistency (Cronbach's alpha), 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;

The next stage of the evaluation process was the final testing, both Personality and Motivations for Playing Board Games tests were conducted through questionnaires.

30

Lastly, the analysis of the results obtained in both questionnaires. 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. Before moving on to the correlation of the data, we grouped the aligned dimensions into components, by using a measure of dimensionality reduction (Principal Components Analysis). This reduced the set of principal dimensions onto only the first few 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, Spearman rank or Kendall's Tau Correlation, according to the sample distribution) to analyze and conclude if the dimensions of the Personality Five Factor model were correlated with the dimensions of Motivations to Play Board Games.

The evaluation methodology described was structured according to the diagram on Fig.3.2.
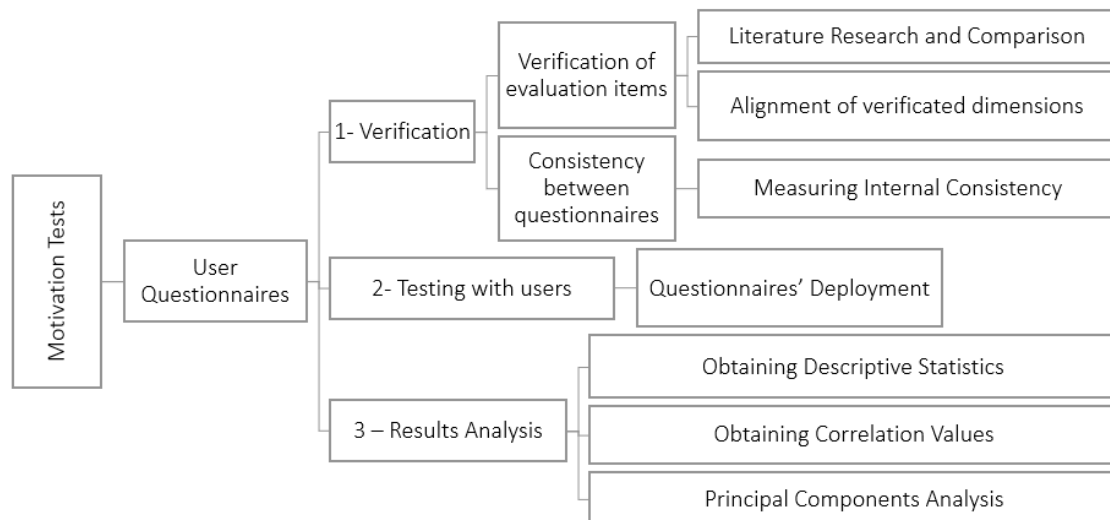
Figure 3.2: Stages of evaluation methodology that will be followed.

There are two basic goals ([37] as cited in [38]) when designing a questionnaire: (1) obtain relevant information for the survey goals, and (2) collect this information with maximum reliability and validity [38].

3.4 Assessing Personality an Human Context of the game

The first part of the experiment measures the participant's personality, through the 60-item Portuguese translation of the NEO-FFI questionnaire by Lima and Simões (2000) [14]. For the second part, we designed a questionnaire that gathered data for the characterization of our participants. In addition to general demographic characteristics, we included questions to capture and describe the environment our participants have and feel when playing board games. 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. All of them were created based on a set of scientific articles associated with the theme [32–36] that reflect on various topics that we considered relevant to add to our questionnaire. These questions were created without being pilot-tested so they underwent several iterations until we felt they were ready for a further pilot test. In particular, there was a need to reduce the long list of questions that we defined when we finished analysing the articles. This topic was measured with a demographic section that assessed the participant profile following by a section to gather playing habits, player decisions towards the game and aspects related to the environment and context in which they play.

3.4.1 Questions

Assessment of this topic will be now specified by presenting which questions were answered by our set of players, and what the aims and explanation behind each one was.

3.4.1.A Demographic information

In addition to questions from the two main sections, the questionnaires begin with a small set of demographics questions about the participant. We asked them about their gender, age, level of education, marital status and professional occupation. With 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.

3.4.1.B 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 this new topic, the environment and context in which they play. In this section, we asked participants for different types of answers according to the most suitable answer format to obtain the desired information. Below we present all questions individually divided into groups/categories, with a brief description of the respective questions. This questions can also be seen in **Appendix** B: **User Questionnaires - First Version**).

1- Characterization of playing time habits and preferences
Q1- Which statement best characterises you? - see statements in **Appendix** B
Q2- Approximately how long have you been playing board games?
Q3- On average, how many gaming sessions per month do you play board games?
Q4- What is your preference regarding the length of a board game?

In this set of questions we obtained a brief description of participants' frequency of playing board game and their type of player they are (casual or dedicated), or even to identify if they play but it is not a hobby they particularly enjoy (**Q1-Q3**). To understand if they like to play fast or long games (**Q4**) we provided different time intervals based on the BoardGameGeek categories [1], and also the options of no preference and depending on the time available.

2- Characterization of impacts, motivations and objectives when playing board games

Q5 [Linear Scale]- My motivation for playing board games...

Q6- I have already felt that I have undermined some responsibilities of my life in order to play board games.

Q7- In your circle of friends does anyone else play board games?

Q8- In your family nucleus does anyone else play board games?

Q9- Who do you usually play board games with?

Q10- Who do you prefer to play board games with?

Q11- I like to take on the role of the host, who picks games, gets to know them and learns them and then teaches someone how to play them.

Q40- In what environment or context do you usually play board games?

We wanted to know about the different stages of their life and how these affected their gaming motivations. So for (**Q5**), a low score in the answer reflects that motivations have decreased, an intermediate score means that they have remained constant throughout their lives, and the higher the score assigned means that they have increased. With regard to the time games take up in their lives, we also considered it important to ask participants whether they feel they leave out or undermine some of their life responsibilities (**Q6**). These responsibilities can range from having an appointment at a certain time, and being late due to a board game, or even compromising on absences from work to stay home and play board games. A low score in the answer reflects that they have never jeopardized any responsibility in their lives, and the higher the score the greater the number or severity of responsibilities affected. Adding to motivations, we also looked into who do they play with (**Q9**), who would they prefer to play with (**Q10**) do they have many relatives (**Q7**) or friends (**Q8**) in this hobby or are they mainly alone ? All these questions might have a relationship with the player's own personality. In regard to motivations we can also consider the possibility that the player's hobby is to teach the game or just be the host and not really play the game (**Q11**). Lastly, we include a question which presents to participants six game contexts to be classified according to importance or playing frequency in each (**Q40**). This question and its options were inspired by listening an episode of the Ludology podcast [39]. Most of the other questions were inspired by the study of Rogerson et al. [33].

3- Dedicated Board Games Room

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[1]https://boardgamegeek.com/

Q12- I have a reserved and exclusive space to play board games.

Q13- I have a reserved and exclusive space to store board games.

Q14- Approximately how many board games do you own?

Q15- I like to own different versions of the same board game (which play exactly the same way, and only differ in visual details or their physical/material elements).

This section addresses the space that players have (or would like to have) dedicated to play/store board games (**Q12** - **Q13**). We also asked about how many games or versions they own (**Q15**) as it can reveal a lot about a player's profile o gaming habits.

4- Board Games vs Digital Games

Q16- I use digital platforms to play board games.

Q17- Have you ever stopped playing digital games to switch to board games?

Q18- Have you ever stopped playing board games to start playing digital games?

Given the great popularity of digital games these days, we asked participants whether they use, or have ever used, digital platforms to play board games (**Q16**). We wished to understand in what ways people have been willing to let go of today's most common games in digital format to play board games in a physical format (**Q17**). We also considered relevant to understand the same in the opposite direction (**Q18**) (these questions were inspired by the study of Xu et al. [32]), which may be related to some specific event in the player's life, such as the covid-19 pandemic which we specifically addressed in the next set of questions.

5- Impact of the covid-19 pandemic and other factors

Q19- The pandemic impacted on my activity of playing board games.

Q20 [Linear Scale]- The pandemic had/has not impacted on my activity of playing board games because ...

Q21- Until this moment, what factor has had the most impact in your activity of playing board games?

Due to the huge impact that the covid-19 pandemic has had on all aspects of our lives, we recognized the importance of addressing this issue in our questionnaire through these two questions. We asked if the participant recognized this impact on their life (**Q19**) and we provided a question for the players to explain in their own words how this impact came about (**Q20**). By being a very particular situation, and not something long-term like the other questions. Also, we were eager to know if there were any other impacts outside the pandemic (**Q21**).

6- Venue and environment of the game

Q22- Do you usually take board games with you to work/study?

Q23- My willingness to play board games outweighs any discomforts of the play space.

Q24- The light type/intensity where I am playing in can influence my moves/behaviour or my concentration throughout the game.

Q25- The decor of the gaming room can influence my willingness and motivation to play (e.g.: room with the walls lined with games, with proper gamers' tables, cup holders and other details like these).

Q26- An environment with distractions during play can contribute to creating a poor gaming experience.

Due to the recent years' trends notably with smaller format games, called fillers, we also asked if our participants have the habit of carrying board games with them to work or study (**Q22**). Regarding the game space, all the physical environment surrounding the players, we wanted the participants to reflect on certain aspects and conclude if these influenced in some way their game posture. More general aspects like eventual discomfort or distractions around the game (**Q23**), and more specific aspects like the type/intensity of light (**Q24**). These questions were based on the study of Rogerson et al. [35].

7- Collection of games - Valuing, Caring and Acquiring

Q27- What do you value most in a game collection?

Q28 [Linear Scale]- With regard to crowdfunding of board games ...

Q29 [Linear Scale]- The crowdfunding of board games ...

Q30- Which of the following types of board games do you like to play?

Q31- What motivates you to be more careful with a board game?

Q32 - What are your preferences for the way you buy board games?

Q33 [Linear Scale]- Concerning second-hand board games ...

To find out the main reason why a player has a board game, which may or may not be related to the number of games they have (which we asked in the (**Q14**), we asked participants to decide what they value most between quantity, quality and collectionism (**Q27**). This question was inspired by the study of Rogerson et al. [35]. In line with the same idea we asked what the participants thought about crowdfunding (**Q28 - Q29**). It was also important to understand which genres/types of board games were within the participants' preferences, so we asked them to choose one or more from themed games, strategy games, family games and party games (**Q30**). Another relevant topic was to understand the reasons why players have care and esteem for their games (**Q31**), if it more due to the financial investment they have made to purchase it, or because of the meaning the game has in their lives. This question was inspired by the study of Rogerson et al. [35]. Lastly, regarding the purchase of games, we asked which purchasing methods players have a preference for when buying board games (**Q32**) and what our participants' relationship is with second-hand games (**Q33**). We therefore created a scale from never having bought a second-hand game to all the games they own having been bought this way. Thus, the lower the score, the less they identify with this form of purchase, and the higher the number of

games purchased in this situation, the more they do.

8- Contact/Relationship with the game, customisation and information search

Q34 [Linear Scale]- When I open a box of a board game...

Q35 [Linear Scale]- Regarding the theme of a board game, for me it is important that...

Q36- I like to make changes, or variations, to the original rules of a board game.

Q37- It is important to me to have the opportunity to be able to customize/modify the material elements of a board game.

Q38- What is more important to you: the theme or the game mechanisms?

Q39- Where do you look for information on new board games?

In order to identify if there is a player's affection for the whole process of getting to know the game piece by piece, before starting to play it, or if on the other hand they are too passionate about the process of playing, and do everything to get the game ready to play as soon as possible, we created a question (**Q34**) to answer through a linear scale. A low score means that participants identify more with the scenario that when they open a board game box they take everything out calmly. The higher the score, the more they identify with the scenario that when they open the box they want everything to be ready as quickly as possible. The (**Q35**) allows to understand in what ways players attach importance to the fantasy or reality behind a board game. A low score answer means that they place more importance on the game having a real scenario, and the higher the score the more importance they place on the game having a fictional scenario. The next two questions (**Q36 - Q37**) were directed to get to know the participant in their more creative/imaginary side regarding their willingness to add a personal touch to board games. In particular we found it interesting and relevant to know if they like to create new rules, or modify the original rules of a board game, and if they like to customize in any way the pieces/physical elements that are part of the board game. These questions were inspired by the study of Rogerson et al. [35] and of Xu et al. [32]. To confront the importance between themes and mechanics, we created a scale of answers between both (**Q38**). Lastly, to understand how participants look for information on new board games, we created this question with a range of different response options (**Q39**).

3.5   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. The items ask the participants to state their agreement with a set of 35 statements organized on multiple dimensions of the play experience, using a 7-point Likert scale (from "1 - totally disagree" to "7 - totally agree") and 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. A process described in the next section, carried out during the Pilot Tests. 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.

3.5.1 Verification procedures

Some methods and strategies to make the Motivations for Playing Board Games Questionnaire universal were used. We translated our gaming motivation questionnaire using back-translation [40]. 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.

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. This coefficient increases with the number of items. If there are low correlations between items, it is likely that they are measuring different traits, and so they should not be included in a test that is supposed to measure only one trait [38]. If, on the other hand, this correlation is high, it may be an indication that there are more items than necessary, as there may be some redundant ones [38]. Thus, Cronbach's alpha was an appropriate measure to apply on our questionnaire's Likert scale questions, helping to determine the internal consistency of the scale used. We measured these values in every phase of our tests. This analysis was useful essentially in the pilot testing phase to ascertain whether the various items we created were aligned, within each dimension.

3.5.2 Pilot tests

Firstly, we applied the initial questionnaires to a sample of 10 players, from which the results were statistically analyzed to conclude whether the items under evaluation were consistent within their dimension. Thus understanding if the questionnaires were formulated in such a way that we could reach our goal of measuring the motivations to play board games. No observations or comments were made for the Motivations for Playing Board Games questionnaire. However, some of participants mentioned that it was a bit extensive. Nonetheless, 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 - (see Appendix B: **User Questionnaires - First Version**) - and then re-test

them to make sure if there was internal consistency in the dimension.

3.5.3   Iterations in the Motivation Questionnaire

The improvements or problems identified in this first pilot test focused on six dimensions of motivation: **Conflict**, **Competition**, **Challenge**, **Strategy**, **Completion** and **Power**. For these dimensions we went through a process of reformulating the initial items based on rewriting, creating or deleting the ones which are causing some inconsistencies.

The mentioned changes are shown in **Table** 3.1 which compares the initial with the final items. Every time the first column has the value "(item did not exist)" means that a new item was inserted in the dimension for the final version of items.

The followed approach was based on moving some items to a different dimension. First, one of the items in the **Conflict** dimension was moved to the **Competition** because in Conflict looked like it was measuring the same as other items from there. Due to this, the remaining items in the dimension were all reformulated in an attempt to better convey the desired idea, and consequently increase the values of internal consistency between them. This rewording was based on the decomposition of one of the initial items into two new items, or in a rewording of an item at the level of assigning more emphasis to units, than to the player. For **Challenge** and **Strategy** dimensions, the same rationale of decomposition was followed. Although Challenge had a good internal consistency value from the beginning, it was considered a good reformulation to do also to its items.

Regarding **Completion** dimension, we decided to no longer include its original items in the questionnaire, as they were not suitable for board games, but for digital games. Although there are already many board games in mixed format with a digital version, these items are more geared towards physical formats. Afterwards, we created a new approach in which participants were asked how much they like to collect the expansions of a board game, replacing the idea of "completion" that exists in video games. Nevertheless, these new items not gather an acceptable correlation value when tested, and so they were not in the final tests.

In items from **Power** dimension, we decided to give more emphasis to the game units, instead of the player, which proved to make more sense for our study. To this end, one of its initial items was changed.

Another method that might help on reaching greater internal consistency between them was through reverse items. These inversions consisted of writing the same item in a positive and negative way, changing only slightly the way it was written. However, it turned out that this strategy could bring more disadvantages than advantages [41] so we did not use it in the end. By having the items coded backwards, it will never be possible to guarantee that the person has understood the issue correctly, or whether the person has failed to invert the scale and thus used the original [42].

In most cases it can be necessary to exclude reversed items since their load factors are generally

low in Confirmatory Factor Analysis. Also, Cronbach's alpha may increase significantly when removing the reverse items from the analysis. In addition to these drawbacks, we also thought that the possibility of expanding the questionnaire, with items in both directions, could cause even more randomness in the answers by some players, because there was a risk that people would assume that they were all alike. Therefore, they would not think isolatedly about the answers they were giving.

In light of these events, we changed one of the initially formulated reverse item from **Story** dimension by splitting it into two items, as it had already been done in some of the cases mentioned above.

Lastly, in the **Design** dimension, being the only one that initially had only two items, we decided to add a third item. This way, it became possible to correlate more than two items.

During the described iterations process we also decided to include two new items related with the Human Context and Environment. These have led to a new dimension that we named "Object" whose items were aimed at understanding the importance of the physical objects of a board game, such as pieces or any element used to play the game. For neither of our items directly addressed this idea and it could be also bound up with Motivations to play a board game. These items are shown in the **Table 3.1**.

Dimension	Pilot Questionnaire	Final Questionnaire
Conflict	I like games that allow players to attack and interfere with resources and units of the other players.	I like games that allow players to interfere with other players' resources or assets.
Conflict	I like games that put players in conflict.	I like games that put units in conflict.
Conflict	(item did not exist)	I like games with conflict mechanisms that allow players to block moves/play moves.
Conflict	I like to dominate other players.	(moved to Competition)
Challenge	I like to dedicate time to learning new systems and game mechanics.	I like to dedicate time to learning and/or improvement my mastery of the new game mechanics.
Strategy	I like board games that give me several options and choices.	I like board games that require planning or complex decisions.
Strategy	(item did not exist)	I like board games where luck and randomization have a limited impact on results.
Power	I like to become more powerful as the game evolves.	I like games where I can improve my units or structures and become more powerful.
Story	I think the stories in board games get in the way of the game.	(item removed)
Story	I like board games with an interesting theme based on an elaborate world and characters.	I like board games with a elaborate story and characters.
Story	(item did not exist)	I like board games that give importance to the plot.
Design	(item did not exist)	I like attention-grabbing board games for its graphic and object design.
Object	(item did not exist)	The texture, material, weight, sound or other detail of a board game piece is important.

Table 3.1: Comparison of the items that changed between the pilot tests and the final tests assessing the motivation to play board games.

It is important to recall that this whole iterative process arose from the fact that same of the dimensions presented an alignment that was not supported by the consistency measure. After all the aforementioned changes to existing questions and the creation of new questions - **Table** 3.1 - this issue was solved in all dimensions. We then 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, that occurred after the several described iterations, Cronbach's Alphas values obtained for the dimensions of Motivations to Play Board Games showed good values for the majority of the dimensions - **Table** 3.2. However, Power and Fantasy dimensions had a low Cronbach's Alpha, which was later solved with the fine-tune small details we needed to improve after the second pilot test that already used the described iterations we made in the items. Apart from the consistency values, the feedback we got indicated that there were no further significant changes to make.

Dimension	First Pilot Test Value	Second Pilot Test Value
Conflict	*	.771
Social Manipulation	.796	.868
Social	.814	.763
Competition	**.690**	.781
Challenge	.706	.641
Strategy	**.568**	.670
Completition	.719	-
Power	**.609**	**.317**
Fantasy	.927	**.275**
Story	*	.957
Design	.939	-
Design + Object	-	.873
Discovery	.798	.854

Table 3.2: Values of Cronbach's alpha obtained in the Pilot Tests. - means that the dimension was not considered or did not exist at that stage of testing.

3.5.4 Motivations Questions

After an overview of the pilot tests and of the content from this part of the motivations questionnaire, we will now specify which final questions were answered by our set of players, and what the aims and explanation behind each one was.

3.5.4.A Motivations associated with the artefact (Decisions of the game designer)

The second section contains the items of all motivation dimensions already tested in the initial pilot tests, with the appropriate corrections mentioned above. Besides the initial items, related to the context outside the game itself, we also added two new items, related to the physical objects of the games which allowed us to assess the players relationship with these specific elements of the game.

All questions in this section followed the same response format. For each item there was a scale from 1 to 7, corresponding to "strongly disagree" to "strongly agree". Thus, participants had to choose the most appropriate answer for themselves, according to their level of agreement with the statement presented. These scales were adequate to understand how the players related to certain scenarios presented, and thus to trace their motivational profile to play board games.

In brief, these items allowed us to understand what characteristics identify a participant regarding player profiles.

Conflict items:

CONFL01 - I like games that allow players to interfere with other players' resources or assets.

CONFL02 - I like games that put units in conflict.

CONFL03 - I like games with conflict mechanisms that allow players to block moves/play moves.

High score in this dimension identifies players who tend to be more competitive and enjoy games where players can take hostile actions directly against each other. This could be stealing another player's resources, forcing them to discard, blocking their move, or directly attacking and destroying their units/buildings. Low scores means that a player prefer games that minimize direct and hostile confrontations.

Social Manipulation items:

SMAN01 - I like games that involve convincing other players of something.

SMAN02 - I like games that involve bluffing, deception or persuasion.

SMAN03 -I like games that involve negotiating or bargaining with other players.

High score in this dimension identifies players who enjoy playing mind games, where outcomes are not determined by dice or rulebooks, but instead by their ability to bluff, deceive, and persuade other players. Conversely, players with a low score attach importance to gameplay mechanics where deception is not involved.

Social items:

SOCIA01 - I like games that promote fun interactions between players.

SOCIA02 - I like board games that help me get to know and talk to other players.

SOCIA03 - I like board games that allow you to help or co-operate with other players.

High score in this dimension identifies players who enjoy chatting and social interaction. For them, playing board games is first and foremost about having a good time with other people. Low score means that a player prefers games that prompts less social interaction and may generate a more serious atmosphere among players.

Competition items:

COMP01 - I like beating my opponents.

COMP02 - I like to be recognized as a top-level player.

COMP03 - I like to play to win.

COMP04 - I like to dominate other players.

High scores in this dimension identifies players who enjoy building strategies that directly oppose other players in the game and pursue goals that are directly conflicting with the goals of the other players. On the other hand, a low score indicates that the player does not like to play for competition, but for other reasons, for example just to have fun without the pressure of competing.

Challenge items:

CHALL01 - I like games that make me think in order to be able to overcome their challenges.

CHALL02 - I like games with difficult challenges to overcome.

CHALL03 - I like to spend time learning and/or mastering new game mechanics.

High scores in this dimension identifies players who are motivated by difficult challenges. They like to overcome obstacles during the game playing as they learn and need to think. Players with a low score do not like to feel challenged, they prefer games with a fluid pacing, unhindered by the difficulty of the challenges.

Strategy items:

STRAT01 - like games that allow me to think and execute a long-term strategy.

STRAT02 - I like board games that require planning or complex decisions.

STRAT03 - I like board games where luck and randomness have a limited impact on outcomes.

STRAT04 - I like games that involve strategic thinking.

High scores in this dimension identifies players who enjoy games that require a lot of thinking and planning and where strategic mastery and skill (rather than luck) are the primary determinants of the game's outcome. Low scores mean that players prefer games which provide a relaxed and casual gaming experience, without the need to plan or think too much about their actions.

Power items:

POWER01 - I like games where I can upgrade my units or structures and become more powerful.

POWER02 - I like board games that allow me to manage resources and build units.

POWER03 - I like to accumulate large amounts of resources during the game.

High scores in this dimension identifies players who are motivated by becoming powerful through their actions, especially by accumulating or building resources over time, which creates the feeling of getting more and more stronger. This can happen for example when upgrading structures or units,

which will later allow them to make better moves, and more "attacks" on other players. A player who has a low score in this dimension prefer games that promote poor game management and low resource accumulation. In other words, a player who prefer games of short duration, where resources are immediately available to them, without the need to accumulate or manage them with a particular strategy. This player likes to be empowered to make immediate decisions.

Fantasy items:

FANTA01 - I like board games that allow me to pretend to be someone different or to be somewhere else when I play.

FANTA02 - I like being able to do something in the game that I wouldn't be able to do in real life.

FANTA03 - I like the excitement of taking on an alternate personality in a game.

High scores in this dimension identifies players who enjoy fantasy-themed games or real-themed games to experience realities different from their own. These games allow players to play as characters that perform fictional tasks that they cannot do outside the game. Low scores mean that players prefer games with tasks connected to the real world.

Story items:

STORY01 - I think narratives in board games are important.

STORY02 - I like board games that place importance on plot.

STORY03 - I like board games that care about having an elaborate story and characters.

High scores in this dimension identifies players who value game elements that help building up a story during play, and this story motivates them to play. On the other hand, a player with a low score does not attach importance to the narrative behind the game.

Design items:

DESGN01 - I like to play board games with appealing pieces and components.

DESGN02 - I attach importance to the aesthetics of the board game.

DESGN03 - I like board games that are eye-catching due to their graphic and object design.

High scores in this dimension identifies players who like the game for its design, and value all the aesthetic part of what is included in the game. A low score on this dimension means that the design and aesthetics of the game are not relevant to the player.

Object items:

OBJCT01 - The manipulation of physical objects/materials during a board game is important because it creates more interaction between the players and the game, not just because they are needed to play.

OBJCT02 - The texture, material, weight, sound or other detail of a board game piece is important.

High scores in this dimension identifies players who find some special feature or affection in physical elements of the game. These players may be motivated by the texture, material, weight, or sound of the pieces that make up a board game. For a player with a low score the constitution of the physical pieces does not convey any kind of feeling or importance. For example, it makes no difference to them what material the pieces are made of.

These two were the subject of considerable debate and discussion as it might make more sense to combine them into a single dimension. However, we concluded that there is a difference between them. The Design dimension addresses the purely visual aspects that result from the visual contemplation of a game. The Object dimension addresses the tactile/sound aspects that result from the direct manipulation of the game by the players.

Discovery items:

DISCO01 - I like to explore and experiment with new ways of playing games.

DISCO02 - I like to try new games and keep up to date with new releases.

DISCO03 - I like to stay informed about new trends in the hobby.

High scores in this dimension identifies players who likes to explore and have a broad interest in rule sets and game mechanics. They enjoy keeping up with new game releases and staying up to date with the current meta. On the other hand, players with a low score prefer traditional games that they already know well the mechanics and rules, without the need to explore them. They have no interest in keeping abreast of new releases.

In the Final Tests, all the dimensions obtained good Cronbach's alpha values many of them rather high which allowed us to confer greater validity to our items - **Table 3.3**.

Dimension	First Pilot Test Value	Second Pilot Test Value	Final Test Value
Conflict	*	.771	.871
Social Manipulation	.796	.868	.814
Social	.814	.763	.706
Competition	**.690**	.781	.762
Challenge	.706	.641	.760
Strategy	**.568**	.670	.799
Completition	.719	-	-
Power	**.609**	**.317**	.699
Fantasy	.927	**.275**	.861
Story	*	.957	.889
Design	.939	-	-
Design + Object	-	.873	.896

Dimension	First Pilot Test Value	Second Pilot Test Value	Final Test Value
Discovery	.798	.854	.741

Table 3.3: Values of Cronbach's alpha obtained in the Pilot Tests and in Final Tests. - means that the dimension was not considered or did not exist at that stage of testing.

3.6 Scores Presentation

After the study is completed we will reveal to the participants their results from both questionnaires, regarding the items, personality and motivation, through two different reports. The report template will contain a short presentation and description of the personality and motivation dimensions assessed, and the respective results/scores of the participant - Fig.3.3.
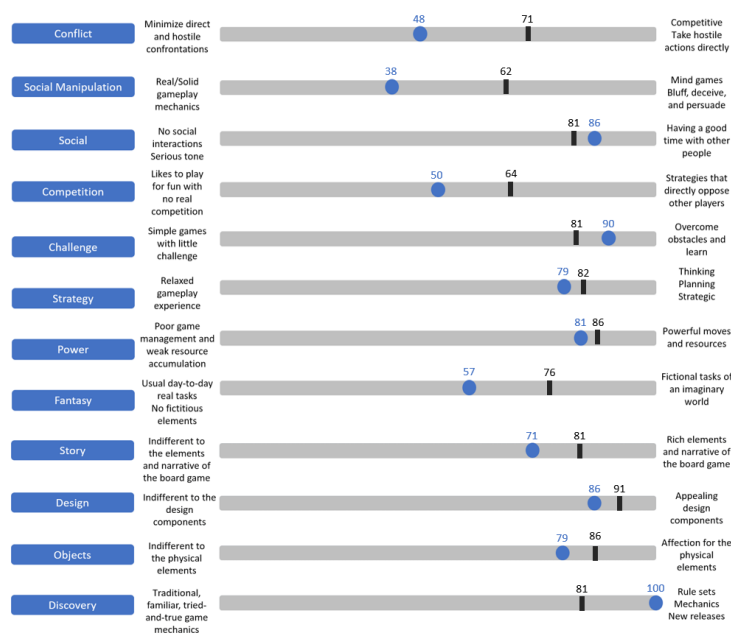
Figure 3.3: Scores Presentation format. A blue mark to indicate the scores of the participants and a black mark to indicate the average scores of all the participants of the study in each dimension, counted according to the average of ratings given in the players' answers in each dimension. All scores are normalized to a scale of 1 to 100.

Through the initial information provided to the participants they are able to interpret and understand the meaning of their scores. By sharing the average score we provide the participant with a baseline, so they have the opportunity to see if they are closer or further from the average score of the other participants. However we will be always available for any further clarification if needed, and we also reinforced the idea to the participant that a value far from the average has no good or bad meaning.

3.7 Summary

This chapter explains the whole process our study went through, containing the steps that allow the reader to replicate it. First the methodology adopted was presented, detailing the construction of the motivation questionnaires and the personality questionnaires we used. We described the changes that arose after the different pilot tests and the revisions and statistic tests performed until we reached the final version of the Motivations for Playing Board Games questionnaire. Afterwards, we listed all the questions from the final Motivations questionnaire, explaining them and justifying, individually, what their objectives were. Still within the description of the questionnaires, we described how the participants met their scores corresponding to their answers. Lastly, there is an evaluation section, which details the evaluation procedure for the questionnaires, including verification procedures and metrics used.

4

Results

Contents

After the final questionnaires were completed, they were distributed to a set of board game players. This chapter presents all the results obtained, together with the respective analyses and conclusions.

4.1 Characterization of Portuguese Board Games Players

This section describes in detail the characteristics of our sample of Portuguese participants. We start with the demographic characterization in terms of genre, age, marital status, level of education and professional occupation. Secondly, the personality results are presented by explaining and describing the scores calculation method and the statistics that characterize our participants's personality.
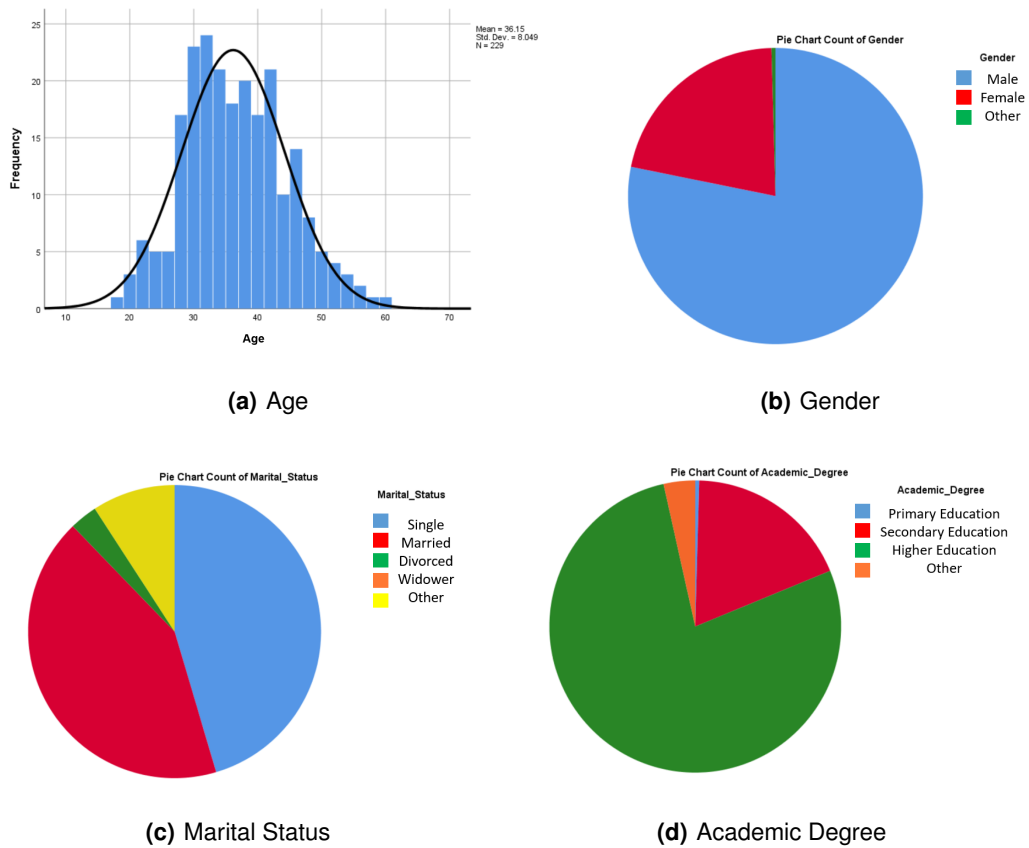
4.1.1 Demographic Results

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.

The demographic spectrum is wide: our group of participants is aged between 18 and 59 - Fig. 4.1(a) - years which shows that it is a fairly wide range of age groups, making it possible to pick up different preferences and habits that may be directly related to age, as people gradually change their player life as their life goes through different phases. However, we identified that the standard deviation of the age is 8.049 and the average age is 36 years.

Regarding gender - Fig.4.1(b) - 78% are male and 21% are female. Participants' Marital Status - Fig.4.1(c) - is also fairly balanced with 45% single and 42% married answering our questionnaires. This is an important factor to consider, as the responsibility and availability of singles and married vary greatly, having responses coming from both in equal quantity allowed there not to be as many biases skewed towards one specific reality or style of play.

Most players have Higher education as their level of education (78%) - Fig.4.1(d) - 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.

Hence, even before analysing all the other responses more directed towards the game component itself, we can already notice here that our spectrum of participants is sufficiently rich and wide-ranging, which provides us with confidence that it could bring validity to our study.

(a) Age

(b) Gender

(c) Marital Status

(d) Academic Degree

Figure 4.1: Demographic Characterization of Portuguese Board Games Players through Histograms with Normal Curve.

4.1.2 Personality Results

The personality test aimed to expose, for each participant, the score they obtained in each of the five personality factors/dimensions. That is, a score of Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism that varies between 0 and 48. This calculation considers which items corresponded to the assessment of each of the five factors, and the histograms with Normal Curve - Fig. 4.2. The results showed that scores were obtained along the whole spectrum.

We also performed a descriptive statistical analysis at dimension level, which is presented below. For each dimension, we obtained the mean, median, standard deviation, minimum, maximum quartiles values - **Table 4.1**.
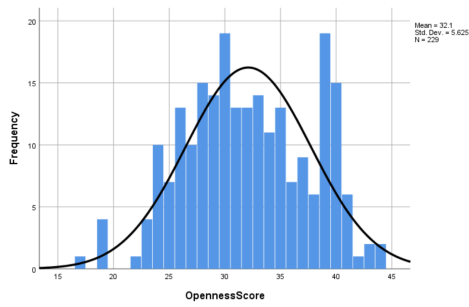
(a) Openness to Experience
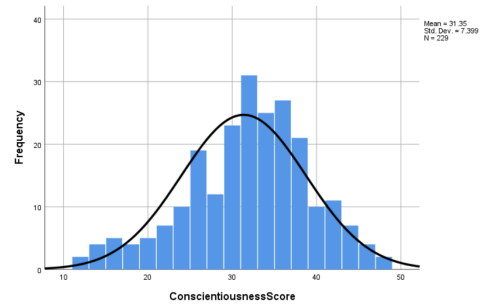
(b) Conscientiousness

(c) Extraversion
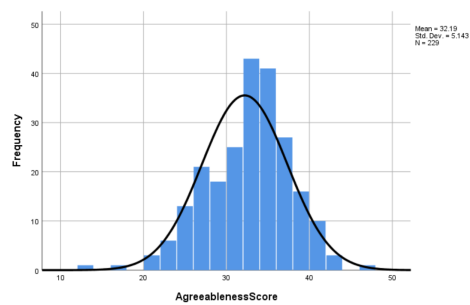
(d) Agreeableness
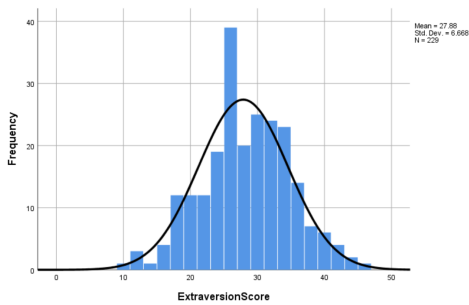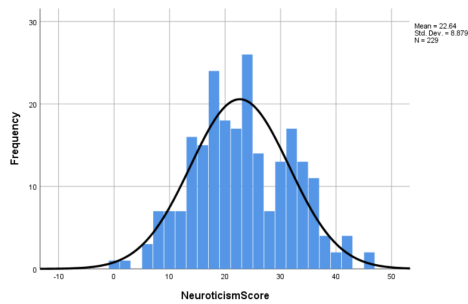
(e) Neuroticism
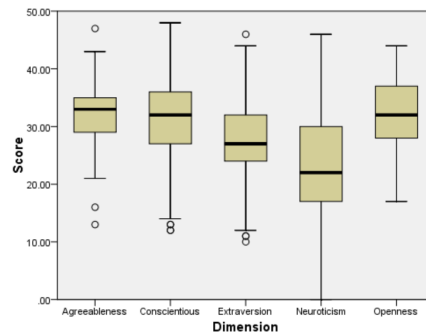
(f) OCEAN

Figure 4.2: Descriptive Statistics of the Personality Dimensions through Histograms with Normal Curve and Box plots.

Dimension	Mean	Median	Std. Deviation	Min	Max	1Q	3Q
Openness to Experience	32.10	32	5.625	17	44	28.00	37.00
Conscientiousness	31.35	32	7.399	12	48	27.00	36.00
Extraversion	27.88	27	6.668	10	46	24.00	32.50
Agreeableness	32.19	33	5.143	13	47	29.00	35.50
Neuroticism	22.64	22	8.879	0	46	16.50	30.00

Table 4.1: Descriptive Statistics obtained for each of the OCEAN personality dimensions.

For a better interpretation of these values, we compared the results obtained with those already obtained by Pedroso-Lima et al. with the same version of the NEO Five Factor Inventory - **Table 4.2**.

We concluded that our results are broadly aligned with the Portuguese results obtained by Lima et al. We are within the ranges of the previous studies and the standard deviation is also similar. Only in the **Openness to Experience** dimension the mean scores of our participants were slightly higher. The most significant difference was found in the **Neuroticism** dimension, with a difference of more than ten points between both studies. Lastly the **Agreeableness** dimension was the one that gathered the most similarity. In the standard deviations there is also a difference that can be highlighted. While for the Lima participants, these values were very balanced between the different dimensions of Personality, consistently around 6, in our sample of players they were between 5 and 8. In terms of minimum scores, ours were higher in all dimensions except **Neuroticism** which was zero in both. The maximum values were very similar, with no significant difference to point out.

Dimension	Mean	Std. Deviation	Min	Max
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 4.2: Descriptive Statistics obtained for each of the OCEAN personality dimensions by Pedroso-Lima et al. in 2014 with N=1178 participants [14].

4.1.3 Distribution of the Personality Scores by demographic characteristics

An important point of analysis to complement the demographic characterization of the Portuguese Board Game playing population is to look at the data in a distributed perspective. In other words, it is important to understand how the statistics already presented of age, gender, marital status, academic degree and professional occupation apply to each personality dimension. Analysing the distribution of ages by each personality factor we noticed that the general average of scores was very close, around score 30 in most ages, with some oscillations above and below 30. The main point is that this demographic data allowed us to verify the wide coverage of our sample, with ages spread over the entire age spectrum.

With regard to the gender factor inside each dimension - Fig.4.3 - both genders, male and female, appear to show similar mean scores for most dimensions with the average score around 30, besides Neuroticism which seems to be slightly below. When applying t-test for Equality Means, Neuroticism showed in fact statistically significantly different scores between genders (t(226) = -2.766, p = 0.006) (see **Table** 4.3). Comparing the means, we observe Neuroticism is statistically significantly higher in Females than Male. However, the comparison needs to be done with caution, as our sample is 78% male players.

(a) Openness to Experience

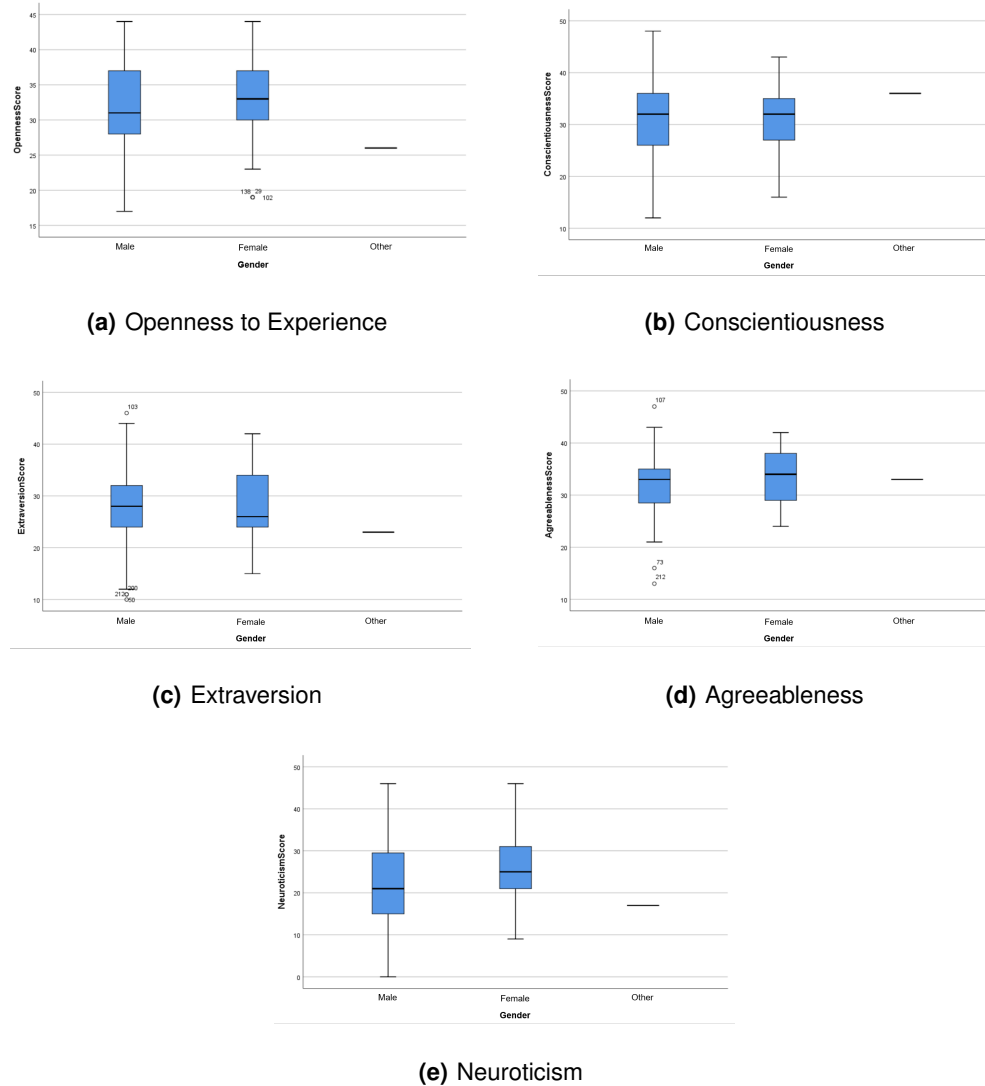**(b)** Conscientiousness

(c) Extraversion

(d) Agreeableness

(e) Neuroticism

Figure 4.3: Distribution of the Personality Scores by Gender.

Dimension	t	df	Sig. (2-tailed)	Mean difference
Openness to Experience	-.761	226	.448	31.98 (Male) 32.67 (Female)
Conscientiousness	.051	226	.960	31.35 (Male) 31.29 (Female)
Extraversion	-.240	226	.811	27.84 (Male) 28.10 (Female)
Agreeableness	-1.848	226	.066	31.86 (Male) 33.39 (Female)
Neuroticism	-2.766	226	**.006**	21.83 (Male) 25.73 (Female)

Table 4.3: Independent Samples t-test for Equality of Means obtained for each of the OCEAN personality dimensions by gender. Statistically significantly different: Sig. (2-tailed) less than 0.05.

The scores between single and married people look to be quite balanced within each dimension - Fig.4.4. When applying a t-test we observed that Extraversion, Agreeableness and Neuroticism scores were statistically significantly different between both marital status (see **Table** 4.4). Extraversion and Agreeableness are higher in married participants and Neuroticism is higher in participants who are single.
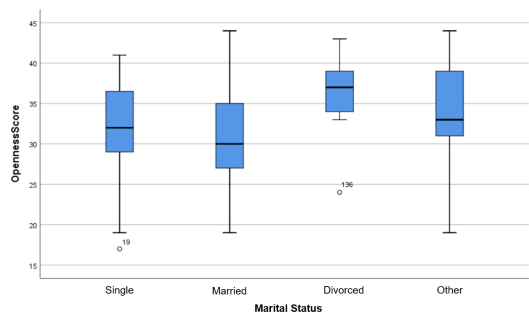
(a) Openness to Experience
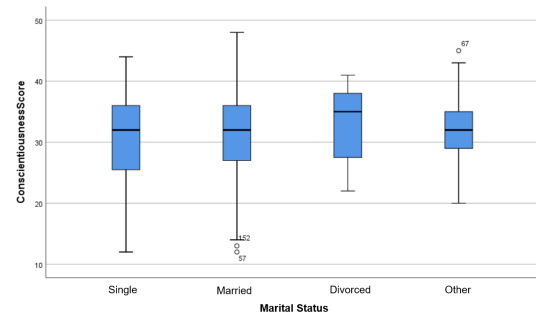
(b) Conscientiousness
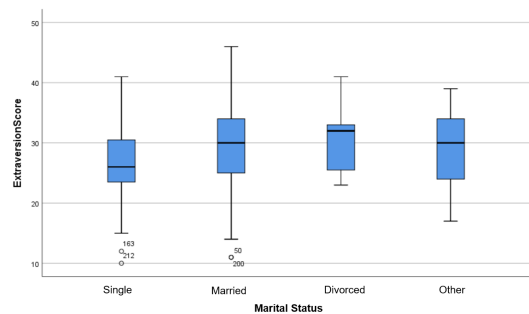
(c) Extraversion
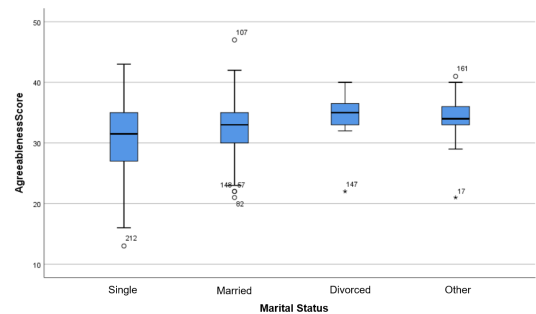
(d) Agreeableness
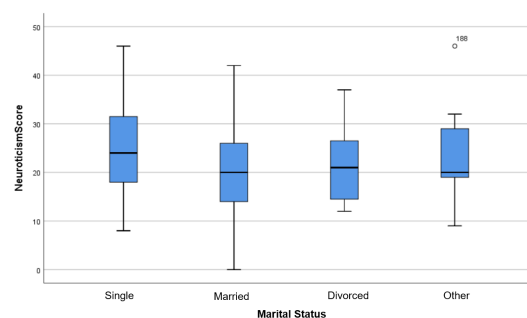
(e) Neuroticism

Figure 4.4: Distribution of the Personality Scores by Marital Status.

Dimension	t	df	Sig. (2-tailed)	Mean Difference
Openness to Experience	.975	199	.331	32.18 (Single) 31.42 (Married)
Conscientiousness	-1.116	199	.266	30.67 (Single) 31.86 (Married)
Extraversion	-2.935	199	**.004**	26.35 (Single) 29.08 (Married)
Agreeableness	-2.068	199	**.040**	31.23 (Single) 32.73 (Married)
Neuroticism	3.554	199	**.000**	24.76 (Single) 20.39 (Married)

Table 4.4: Independent Samples t-test for Equality of Means obtained for each of the OCEAN personality dimensions by marital status. Statistically significantly different: Sig. (2-tailed) less than 0.05.

For Academic Degree, at first it seems that there were no significant differences to point out within each personality dimension - Fig.4.5 and Fig.4.6. However, as for gender and marital status we performed a t-test which revealed that the only statistically significant difference occurs with Openness to Experience, which is higher in participants with Higher Education ($t(218) = -2.359$, $p = 0.019$) (see **Table** 4.5).

| Dimension	t	df	Sig. (2-tailed)	Mean Difference
Openness to Experience	-2.359	218	**.019**	30.14 (Secondary) 32.40 (Higher)
Conscientiousness	-.909	218	.364	30.36 (Secondary) 31.51 (Higher)
Extraversion	-1.263	218	.208	26.64 (Secondary) 28.09 (Higher)
Agreeableness	-.046	218	.963	32.19 (Secondary) 32.23 (Higher)
Neuroticism	-.922	218	.358	21.45 (Secondary) 22.87 (Higher)

Table 4.5: Independent Samples t-test for Equality of Means obtained for each of the OCEAN personality dimensions by academic degree. Statistically significantly different: Sig. (2-tailed) less than 0.05.
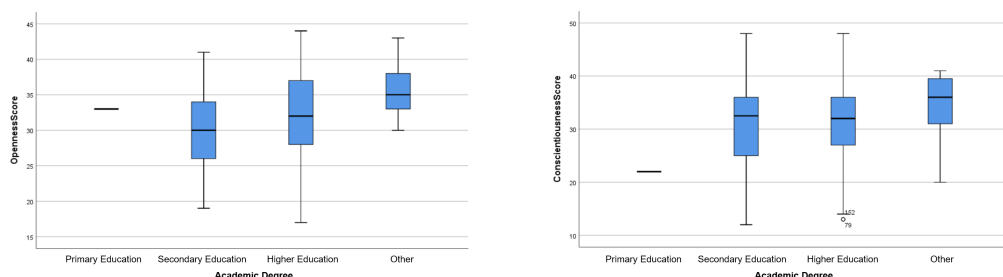
(a) Openness to Experience

(b) Conscientiousness

Figure 4.5: Distribution of the Personality Scores by Academic Degree.

(a) Extraversion

(b) Agreeableness

(c) Neuroticism
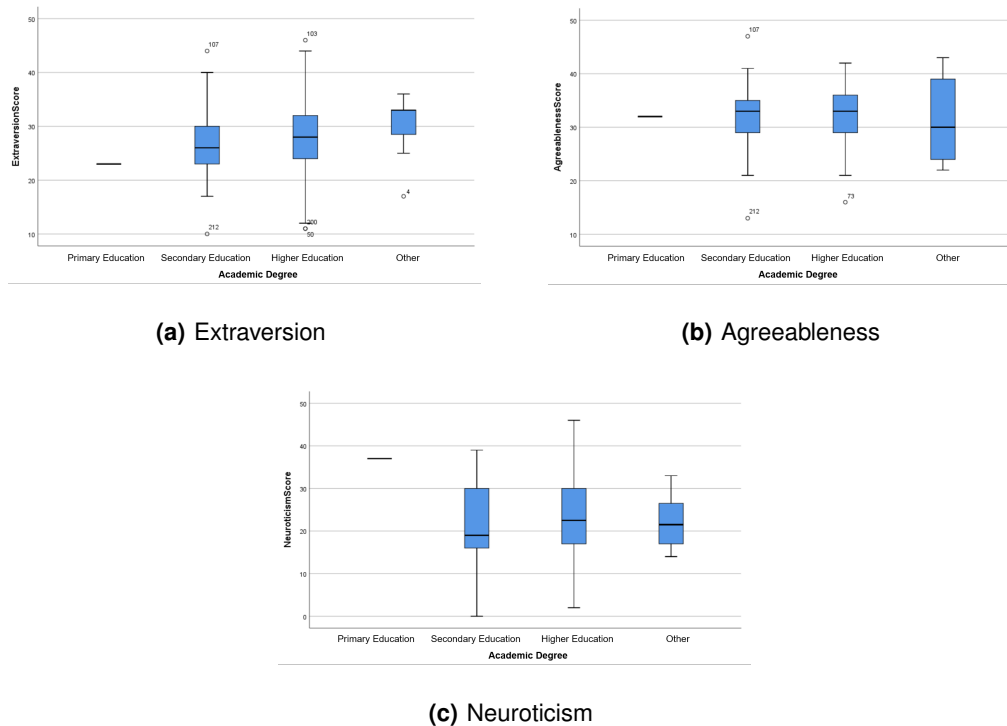
Figure 4.6: Distribution of the Personality Scores by Academic Degree.

Analysing the occupational groupings of our participants, associated with the personality dimensions, we concluded that there are not significant differences to report as the average scores are similar for the different occupations and even at an average level of the scoring scale itself.

4.1.4 Personality Pearson's Correlation

To understand if our sample of participants presented some personality characteristics related with different dimensions we performed an analysis of Pearson's correlation.

Pearson's correlation values measure the strength and direction of **association** that exists between two **continuous** variables. The correlation coefficient can also be used to support the orthogonality of the dimensions measured by the items. If a correlation is found between some dimensions of the questionnaire, then we can conclude that they could be a single dimension. A correlation value between 0.1 and 0.3 means that the correlation is small, a value between 0.3 and 0.5 corresponds to a medium correlation and a value higher than 0.5 is considered a strong correlation [1]. We first looked at existing correlations within the set of OCEAN personality dimensions - **Table 4.6**.

By looking at the correlation values obtained between the Personality Five Factors, the first noticeable fact was that correlations were not strong, but only small and medium. Among the significant correla-

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[1] https://statistics.laerd.com/statistical-guides/pearson-correlation-coefficient-statistical-guide.php

56

tions, just by looking at obtained values for our participants, we can conclude that **Extraversion** and **Agreeableness** were the dimensions that correlated most with the remaining four personality factors as they showed significant correlation values with all of them. On the other hand, **Openness to Experience** has only been proved to correlate with **Extraversion** and Agreeableness. **Conscientiousness** and **Neuroticism** have been revealed to correlate with two of the other dimensions. Due to the fact that the personality model we used is already validated, these conclusions only aim at understanding the correlational behavior between the dimensions of our model, for possible comparison with other studies using the same model. Pedroso-Lima et al. study found correlations between the five factors around less than .800. With this information we infer these scores were significantly higher than ours.

Dimensions	Openness to Experience	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Openness to Experience			.175** (small)	.191** (small)	
Conscientiousness			**.377** (medium)**	.253** (small)	**-.398** (medium)**
Extraversion				**.325** (medium)**	**-.456** (medium)**
Agreeableness					-.297** (small)
Neuroticism					

Table 4.6: Values of Pearson's Correlation obtained between Personality dimensions. **. Correlation is significant at the 0.01 (2-tailed) level. *. Correlation is significant at the 0.05 level (2-tailed).

4.2 Motivations for Playing Board Games

In this step, we go through the analysis of all the questions in the Motivations to Play Board Games questionnaire related to the participants' gaming preferences and habits, both the first section more related with Human Context and Environment and the second section with items into the dimensions - (see Appendix B: **User Questionnaires - Final Version**).

4.2.1 Preferences and Gaming Habits of Board Game Players

Our players can be classified into dedicated players and casual players. 52% say they plan their day or week to make time to play board games, while 46% say that although they do not set aside time for it, they enjoy playing board games when the opportunity presents itself. On the other hand, 0.4% state that although they play board games, it is not a hobby that they particularly enjoy (**Q1**).

Regarding playing time, 75% of the participants have been playing for less than 10 years (**Q2**). On average, they do about 9 board game sessions per month, with 79% playing a maximum of 10 sessions per month (**Q3**). Most participants (41%) stated that they prefer games with a duration of 1-2 hours (**Q4**). When asked whether their motivations for playing board games had changed over different stages of their lives, 93% revealed that they have increased (**Q5**). A percentage of 12% acknowledged that board games have already hindered some responsibilities in their life (**Q6**).

In terms of people involved in the hobby, 91% stated that they have friends who play board games (**Q7**), and 74% have relatives in their core family who play board games (**Q8**). By analysing, and confronting, the people with whom our participants usually play, and with whom they prefer to play, we conclude that most players regularly play with the same people they prefer to play with (**Q9** and **Q10**). The most striking differences between the habit and the preference 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 play with them. It can be due to the enjoyment of finding someone in the same niche as they are of people who likes board games. On the other side, 38% of the participants have the habit of playing alone and 26% actually prefer to play on their own. Some people do not mind taking on the role of host that makes people acquainted with the game and teaches them how to play it (21%), however 64% of the participants really enjoy hosting game sessions (**Q11**).

On average, players in our study own 99 board games, 81% owns up to 100 games (**Q14**), and 16% like to have different versions of the same game (**Q15**). Although board games are normally associated with physical/real objects, around half of the sample (58%) had already used digital platforms to play them (**Q16**). On the other hand, 60% have moved from playing digital games to playing board games (**Q17**), and only 7% have moved from playing board games to playing digital games (**Q18**).

Between our participants 23% have a reserved and exclusive space to play board games (**Q12**), 70% say they have a reserved and exclusive space to store board games (**Q13**) and 30% take board games into the workplace or study (**Q22**). Nevertheless, 87% states that their will to play board games overcomes possible discomforts of the game space (**Q23**), but it was also nearly unanimous (80%) that an environment with distractions can contribute to creating a bad gaming experience (**Q26**). About the room lighting, 58% state that the type and/or intensity of light of the space in which they are playing can influence their behaviour or concentration throughout the game (**Q24**). Even for the game room decoration, 28% say it is a factor than can influence their willingness to play (**Q25**).

In a collection of games, participants value first the number of games (71%), second their quality (39%) and lastly only 9% attaches importance to the collecting part (**Q27**). Regarding crowdfunding, 36% participants have never invested and 20% consider to be their preferred way of acquiring board games (**Q28**). 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%). The second most mentioned (31%) was the fact that they are limited editions and therefore more exclusive (**Q29**). Confronting financial investment with the personal meaning that gaming has for the player, 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 (**Q31**). The most frequently purchasing method was online shops (76%) and the least mentioned was Kickstarter (31%) (**Q32**). When it comes to acquiring games, 45% already purchase a second hand game (**Q33**).

The favourite game type is the strategy games (74%) and the type of game they less like (38%) was the "party games" type (**Q30**).

Confronting whether players attach more importance to game's theme or the mechanisms, we conclude that the mechanisms stood out with 55% of the players valuing it more than theme to which only 10% claimed to attach more importance (**Q38**). Concerning the theme, 14 % say they prefer the game to create a real scenario and 23 % say they prefer it to create a fantasy, fictional scenario. Most thereby focused on assuming they had no preference for either (**Q35**).

In the process of opening a board box, most players (66%) prefer to take everything out calmly because they like to see all the components in detail, considering that an important process, rather than placing everything quickly on the table (11%) to start playing as quickly as possible (**Q34**). Regarding the personal personalized touch that players like to apply to games, the majority (80%) stated they like to keep the original rules, rather than considering making small changes to them (16%) (**Q36**). Still on this theme, only 16% considered it important to have the opportunity to customise/modify the material elements of a board game, while 64% do not feel this need, or do not attach any importance to this option (**Q37**). Our participants mainly look for information about board games on Board Game Geek (BGG) (80%), on direct personal relationships with friends or family (52%) and through the group of players they usually play with (50%). Only 32% resorts to shops for information (**Q39**).

Relating to the context or environment in which they usually play board games (**Q40**), we succeeded in finding some facts. The social dimension factor is the most predominant with 92% of the players, followed by the learning process with 76% enhancing it as an enjoyable environment to play. Also, 56.8% says they like to play for escapism/fantasy dimension and 41% are attracted by the simulation component. The lowest-scoring factors were collection (22%) and competition (19%) components.

Lastly, regarding a very particular situation of nowadays with an huge impact in everyone's lives, the covid-19 pandemic, 80% of our participants recognized that it impacted on their activity of playing board games (**Q19**). For the majority (62%) it caused a decrease and/or change in the group of players they usually played with (**Q20**). Apart from the pandemic, the factors most commonly mentioned as impacting on our participants' board game playing activity mentioned was the social life and influences (41%) and 1.3% did not identify any impact factor (**Q21**).

4.2.2 Dimensions of Motivations to Play Board Games

The second section of motivations for playing board games aimed to show, for each participant, the score they obtained in each of the 12 motivations dimensions according to their items. Items can be ranked between 1 and 7 and each dimension has a different number of items, so the score obtainable in each dimension was measured by taking the average of the ranks of the respective items.

As for the personality, firstly we performed a descriptive statistical analysis at dimension level, which is presented below. For each dimension, we obtained the mean, median, standard deviation, minimum, maximum quartiles values - **Table 4.7**. Most of the dimensions obtained an average rating of around 5. Strategy and Discovery dimensions reached the highest average of responses. The standard deviation values are also similar in most of dimensions. There is a slightly higher tendency for them to like to explore and practice strategic thinking throughout their moves, and they do not identify particularly with competition and manipulation. However, we noticed that the whole spectrum of answers was used, in practically all dimensions.

Dimension	Mean	Median	Std. Deviation	Min	Max	1Q	3Q
Conflict	4.59	5.00	1.381	1	7	3.67	5.67
Social Manipulation	4.31	4.33	1.420	1	7	3.33	5.33
Social	5.45	5.67	1.048	2	7	5.00	6.33
Competition	4.19	4.25	1.259	1	7	3.25	5.00
Challenge	5.59	5.67	.994	1	7	5.00	6.33
Strategy	5.82	6.00	.967	1	7	5.00	6.50
Power	5.24	5.33	1.019	1	7	4.67	6.00
Fantasy	4.57	4.67	1.481	1	7	3.67	5.67
Story	4.98	5.00	1.382	1	7	4.00	6.00
Design	5.52	5.67	1.279	2	7	5.00	6.50
Object	5.27	5.50	1.263	1	7	4.50	6.00
Design + Object	5.42	5.60	1.188	2	7	4.80	6.20
Discovery	5.60	6.00	1.115	1	7	5.00	6.33

Table 4.7: Descriptive Statistics obtained for each of the Motivations for Playing Board Games dimensions.

4.2.3 Motivations for Playing Board Games Pearson's Correlations

As for the Personality, we followed the same procedure for the Motivations for Playing Board Games - **Table 4.8** to obtain the correlations between each dimension.

Through the values represented in this table, it is visible that most of the dimensions of Motivations to play Board Games have some significant degree of correlation with the others. The **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.

Dimensions	Conflict	Social Manipulation	Social	Competition	Challenge	Strategy	Power	Fantasy	Story	Design	Object	Discovery
Conflict		.496** (medium)	.181** (small)	.405** (medium)	.321** (medium)	.283** (small)	.411** (medium)	.175** (small)	.227** (small)		.194** (small)	.190** (small)
Social Manipulation			.300** (medium)	.286** (small)	.246** (small)	.199** (small)		.148* (small)	.185** (small)			.216** (small)
Social						.138* (small)	.407** (medium)	.457** (medium)	.384** (medium)	.241** (small)		
Competition					.332** (medium)	.404** (medium)	.480** (medium)	.160* (small)	.221** (small)	.160* (small)	.184** (small)	.234** (small)
Challenge						.742** (strong)	.455** (medium)	.152* (small)	.227** (small)	.219** (small)	.323** (medium)	.601** (strong)
Strategy							.560** (strong)		.231** (small)	.213** (small)	.322** (medium)	.499** (medium)
Power								.276** (small)	.336** (medium)	.325** (medium)	.381** (medium)	.405** (medium)
Fantasy									.695** (strong)	.375** (medium)	.360** (medium)	.245** (small)
Story										.478** (medium)	.463** (medium)	.307** (medium)
Design											.733** (strong)	.412** (medium)
Object												.453** (medium)
Discovery												

Table 4.8: Values of Pearson's Correlation obtained between Motivation dimensions. **. Correlation is significant at the 0.01 (2-tailed) level. *. Correlation is significant at the 0.05 level (2-tailed).

4.2.4 Board Game Player Motivation Model

Following the correlation values found, we performed a Principal Components Analysis for grouping dimensions that are correlated. PCA analysis is a variable-reduction technique, it aims to reduce a larger set of variables into a smaller set of variables. To understand whether some of the variables should be grouped together, we applied a PCA analysis which allowed us to examine all the possible grouping for the dimensions. In our case, given the twelve dimensions of our model, we looked to the variance it explained and explored the best viable solution.

We ran the PCA test with a fixed number of factors, with two, three, four and five factors, in order to compare with the combinations of dimensions in the three factors suggested. These number of factors were chosen by looking at the scree plot generated - Fig. 4.7 - a line plot of the eigenvalues of factors or principal components, and analysing up until what number it would make sense to consider. By looking at the variance they explained, the most viable solution has 5 components as it justify 78% of our data variance based on the eigenvalues. In the rotated component matrix - **Table** 4.9 - 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 [43]. From this analysis was born the concept of a model which we called Competitive Interaction, Intellectual Challenge, Sensory Experience, Social Challenge, Imaginative Experience (CISSI):
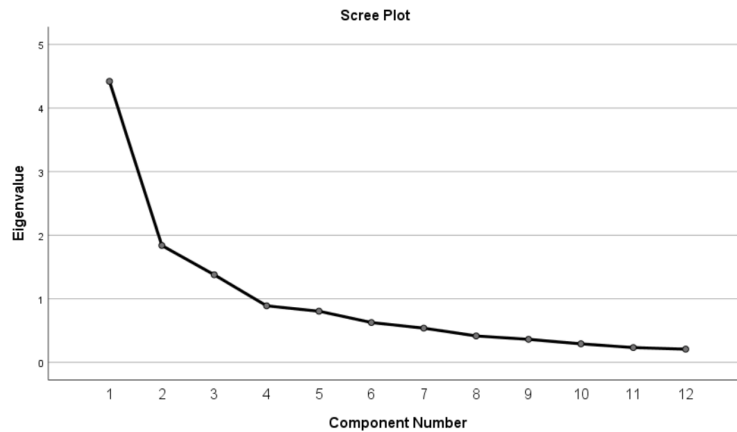
Competitive Interaction - Competition + Power + Conflict

Intellectual Challenge - Challenge + Strategy + Discovery

Sensory Experience - Design + Object

Social Challenge - Social + Social Manipulation + Conflict

Imaginative Experience - Fantasy + Story + Social

Figure 4.7: PCA Scree Plot of the eigenvalues of Motivations For Playing Board Games principal components.

Dimension	Intellectual Challenge	Imaginative Experience	Sensory Experience	Competitive Interaction	Social Challenge
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 4.9: Rotated Component Matrix for 5 components with absolute value below 0.4.

Competitive Interaction 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.

Intellectual Challenge embraces the interest in game mechanics and its progression, how their exploitation can lead to victory, in a way that depends more on individual skill and strategy than on social 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.

Sensory Experience 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.

Social Challenge 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. This group composed by Conflict, Social Manipulation and Social also made sense for us. Social Manipulation and Conflict are two dimensions that relate to each other seamlessly, because who enjoy conflicts needs to use some Social Manipulation and social interaction is implicitly in both types of interactions, being needed in both.

Imaginative Experience leads to a component related to the fictional experience of the game, such as its setting and the lore behind the characters. This met our expectation, due to the fact that all the dimensions Story, Fantasy linked by common characteristics. Players who enjoy fantasy and story will also feel attracted by the lore of the games. This may be the situation with the narrative that emerges from the game system. At times this type of narrative is not remembered even though it exists.

4.2.4.A   Board Game Player Motivation Model with 3 components

Recalling the initial mentioned extraction based on eigenvalues, Principal Components Analysis suggested a more compact approach with three components but it would only justify 64% of our data variance. We called this model Social Challenge, Imaginative Experience, Mechanism Exploration (SIM). These components were:

Social Challenge - Social Manipulation + Conflict + Competition

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

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

Mechanism Exploration adds to itself the object dimension, as game pieces can contribute to the feeling of control and strategy. Also, the size or shape of these pieces is something that these players value a lot. Imaginative Experience is a merge of component Sensory Experience and Social Challenge from the previous approach. Social Challenge is also a combination of dimensions from two different components of the 5-model, Competitive Interaction and Social Challenge.

Since PCA included a strong variance value of Competition in two different groups, we needed to deeply analyze in which of the groups this dimension would fit better, or if it made sense to be in both. In our qualitative interpretation, we did not feel that it can be considered a single dimension, and therefore we should consider this dimension as two distinct types of conflict:

(1) A conflict related to competence in using mechanisms and exploring game rules, fitting the concept of mechanics identified with the remaining dimensions of the second group.

(2) A conflict related to direct confrontation with other players, fitting the concept of human/social interactions of the game experience.

Similarly, a few other dimensions in the rotated component matrix - **Table** 4.10 - cross loaded on more than one component: items with a loading less than 0.4 were removed as recommended and standard process [43].

Dimension	Mechanism Exploration	Imaginative Experience	Social Challenge
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 4.10: Rotated Component Matrix for 3 components with absolute value below 0.4.

As expected, there is a hierarchy between both the 3 and 5 component models, and a merge of dimensions is visible between components - Fig.4.8.
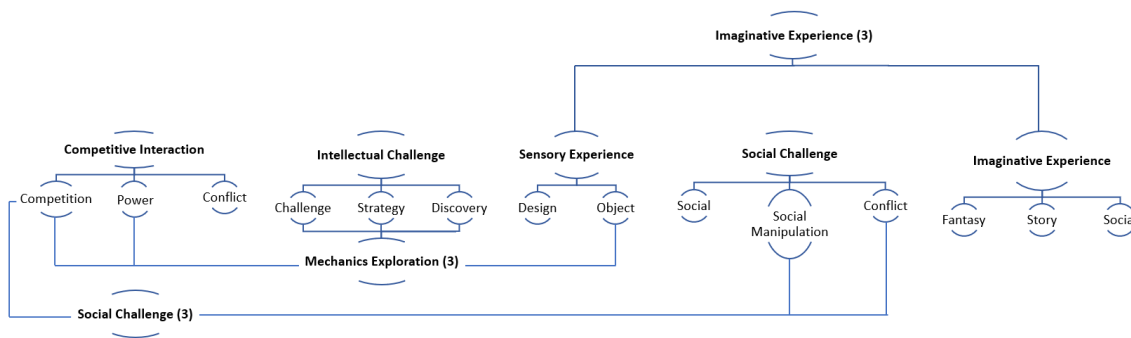
Figure 4.8: Hierarchy between both Board Game Player Motivation Models. SIM Model Components are marked with (3).

The decision came down to choose between using a model with 3 or 5 components: As mentioned before, the latter revealed itself a better option as it justifies 78% of our data. We considered that the model with 3 components could be little bit reductive in some situations and justifying only 64% of our data was not enough for our criteria. Although our model is composed by five components, we will maintain the model with 3 components for the purpose of comparison with other existing models with 3 components.

4.2.4.B Board Game Player Motivation Model in Literature

While comparing our results with literature, we found a new related work that coincidentally identifies three types of player profiles composed by similar dimensions as our three components suggested by PCA: The Engagement Design model. This consists in three streams that helps adjusting and choosing games to engage users: (1) The Abstracters, (2) The Thinkers and (3) The Dramatics [44].

The Abstracts like to simplify and generalize everything, they are feeling comfortable by dealing with doubts and do problem-solving by themselves. The Thinkers like new experiences and are led by imagination, curiosity, and creativity. The Dramatics are human people, they show understanding with other players worries, empathy and trust [44]. This model can be applied to different types of games, not limited to board games. In considering the description and structure of the three types of users engaged in games, we noticed that they correspond, or are very close, to the three components suggested by the PCA in our study. The Abstracts are the Component 1 (Mechanics), although our component includes an interaction part that Abstracts does not. The Thinkers are the Component 2 (Fictional Experience) and lastly, the Dramatics are represented by the Component 3 (Social). For this third component, the CISSI introduces a more confrontational side to social interaction, somewhat distinguishing itself from Zagalo's model. Therefore, although it could be a good work to support the model with 3 components, suggested by PCA, we proceeded with the decision to pursue a 5-component model because of the variance explained.

Yee's model [2] organized the dimensions in four main different components - Conflict, Immersion, Strategy and Social Fun. With PCA suggestion of three components, we obtained a model that brings together the components of "Immersion" and "Social Fun", as it joined together Story, Fantasy, Design, Object and Social, which Yee's model separates. Secondly, Yee keeps together Conflict and Social Manipulation, however, our model with three components suggested the existence of another type of conflict, which is not related with a social component, but with the strategy elements.

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: Design and Object dimensions are placed in a different component than Story and Fantasy are, and so looking at this perspective they are still linked with Social. We now have Competition in only one component (which did not happen in the 3 component model), 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.

4.2.5 Distribution of the Motivations for Playing Board Games Components by demographic characteristics

As for the Personality, also for Motivations for Playing Board Games it was important to complement the demographic characterization of the Portuguese Board Game playing population by looking at the data in a distributed perspective. How do age, gender, Marital Status, Academic Degree and professional occupation is spread by each component of Motivations dimensions?

Analysing the distribution of ages by each dimension of Motivation and also for the respective components defined, we observed that the average scores were all close to each other, with some oscillations around 5. Only component 3 has ages where the average scores were more closely around 3.

With regard to the gender factor both genders there appeared to be no significant differences for most dimensions, within each, with the average around 5. This held true even when analysing by component - Fig.4.9 and Fig.4.10. A t-student test suggests that Conflict, Social Manipulation, Social and Discovery have statistically significant difference between Male and Female (see **Table** 4.11), with male participants reporting more Conflict and Social Manipulation as motivation for playing, and female participants reporting more the Social component of play.

(a) Component 1   **(b)** Component 2
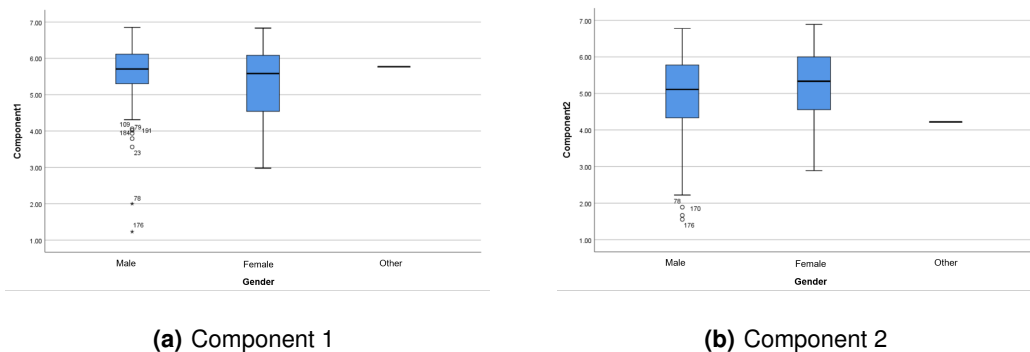
Figure 4.9: Distribution of the Motivations for Playing Board Games Components by Gender.

(a) Component 3

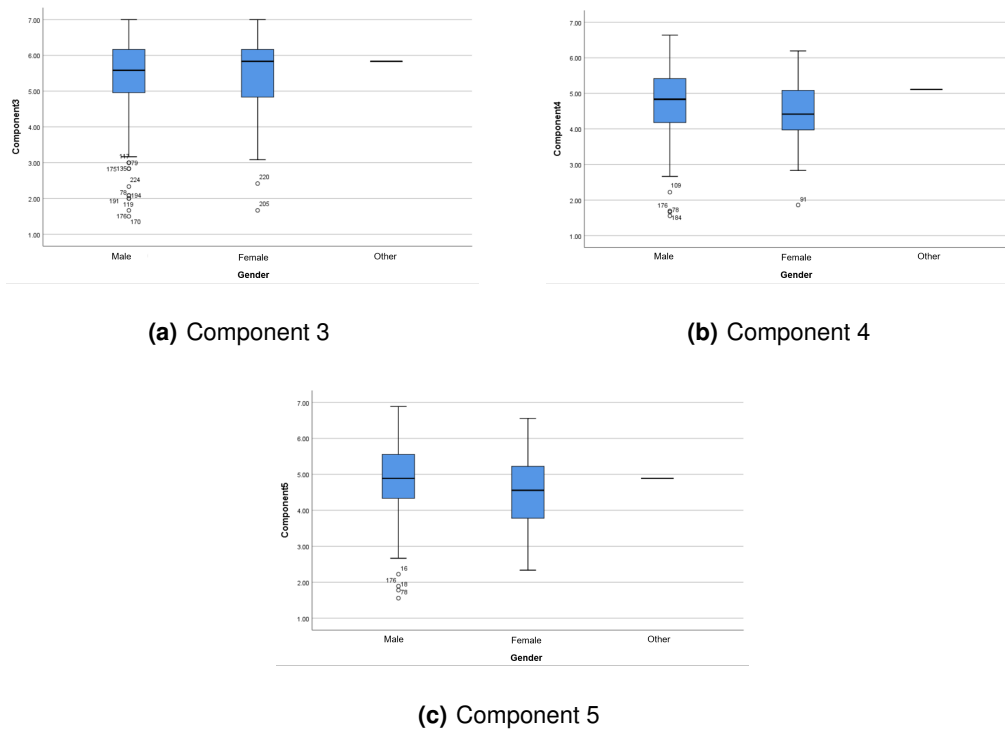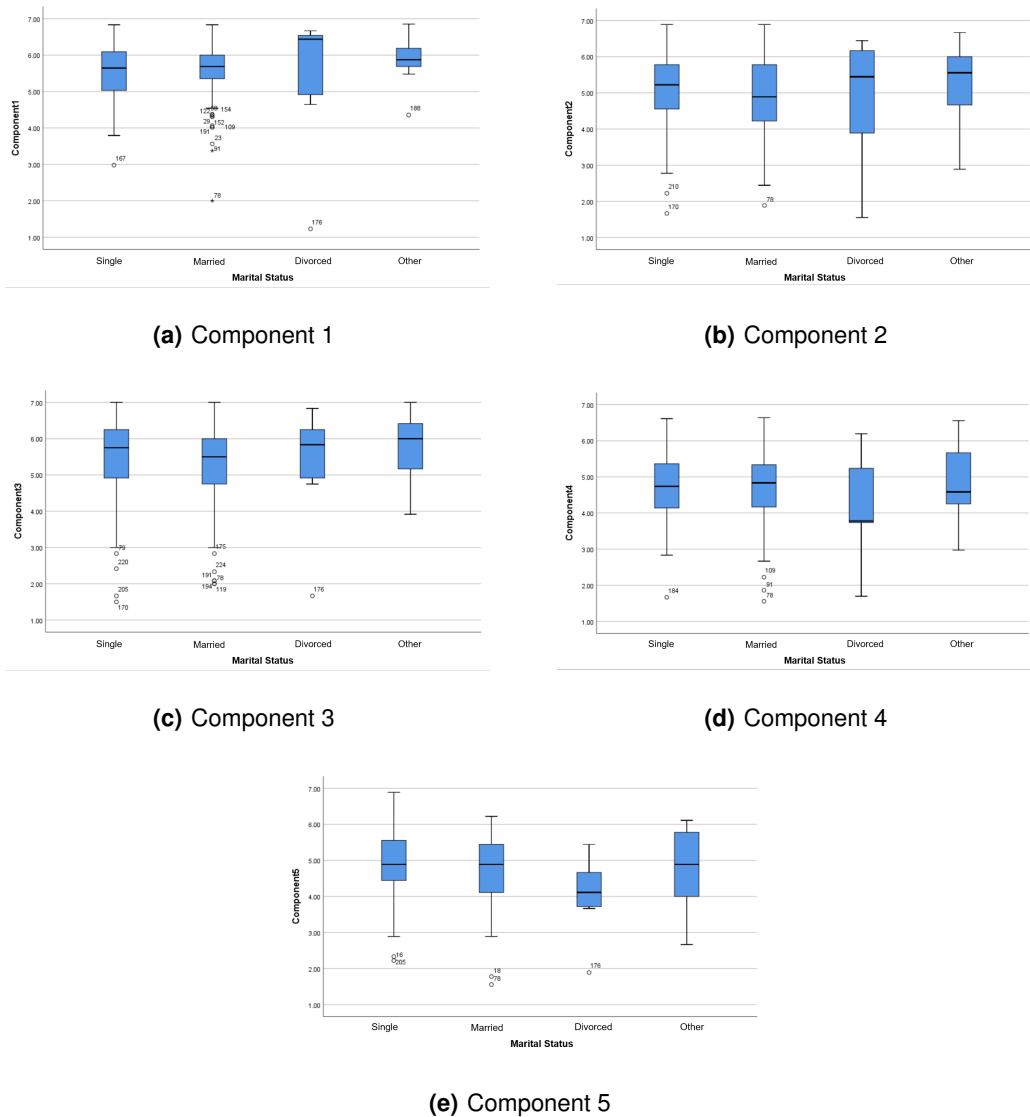**(b)** Component 4

(c) Component 5

Figure 4.10: Distribution of the Motivations for Playing Board Games Components by Gender.

Dimension	t	df	Sig. (2-tailed)	Mean Difference
Conflict	3.295	226	**.001**	4.74 (Male) 4.02 (Female)
Social Manipulation	2.803	226	**.006**	4.44 (Male) 3.81 (Female)
Social	-3.013	226	**.003**	5.34 (Male) 5.84 (Female)
Competition	.145	226	.885	4.19 (Male) 4.16 (Female)
Challenge	1.558	226	.121	5.64 (Male) 5.39 (Female)
Strategy	1.812	226	.071	5.87 (Male) 5.59 (Female)
Power	-.509	226	.611	5.23 (Male) 5.31 (Female)
Fantasy	-.534	226	.594	4.55 (Male) 4.67 (Female)
Story	-1.819	226	.070	4.90 (Male) 5.30 (Female)
Design	-.751	226	.453	5.48 (Male) 5.64 (Female)
Object	.970	226	.333	5.31 (Male) 5.11 (Female)
Design and Object	-.073	226	.942	5.41 (Male) 5.43 (Female)

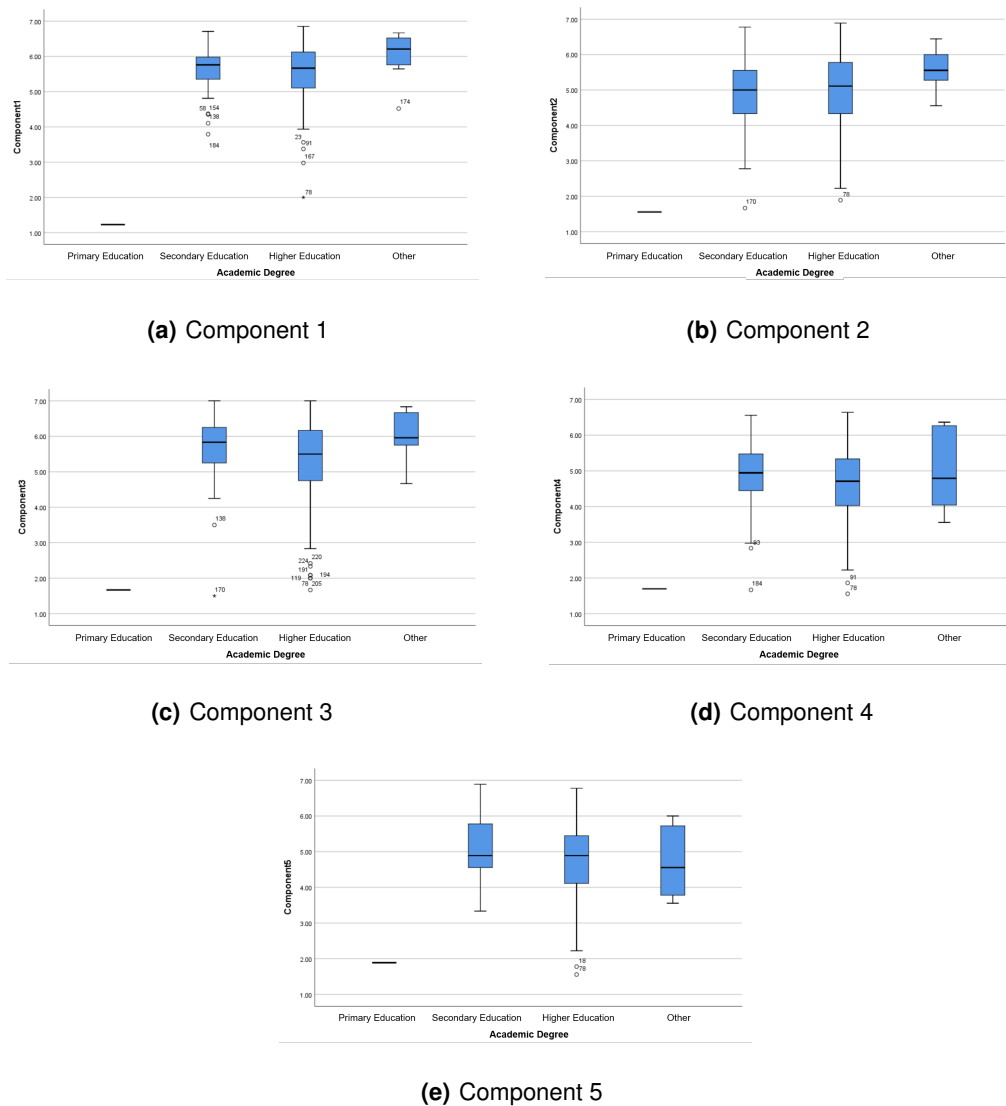| Dimension	t	df	Sig. (2-tailed)	Mean Difference
Discovery	2.697	226	**.008**	5.70 (Male) 5.22 (Female)

Table 4.11: Independent Samples t-test for Equality of Means obtained for each of the Motivations for Playing Board Games dimensions by gender. Statistically significantly different: Sig. (2-tailed) less than 0.05.

The scores were also well-balanced between single, married and divorced people, with an average score around 5 within the most of the dimensions individually and per component - Fig.4.11. With the application of t-test, no statistically significant difference were found when looking at motivation to play through a marital status.

(a) Component 1

(b) Component 2

(c) Component 3

(d) Component 4

(e) Component 5

Figure 4.11: Distribution of the Motivations for Playing Board Games Components by Marital Status.

Regarding the distribution of the scores for Academic Degree, all the Motivations Dimensions seem to obtain similar scores in all degrees within them, with an average around 5. When analysing the dimensions per component, the scenario remained the same - Fig.4.12. A t-test revealed a statistically significant difference in the motivation to play when comparing participants with different levels of education. Participants with secondary education reported more Conflict and Social Manipulation as their motivation to play (see **Table** 4.12).

(a) Component 1

(b) Component 2

(c) Component 3

(d) Component 4

(e) Component 5

Figure 4.12: Distribution of the Motivations for Playing Board Games Components by Academic Degree.

Dimension	t	df	Sig. (2-tailed)	Mean Difference
Conflict	2.063	218	.040	4.99 (Secondary) 4.51 (Higher)

Dimension	t	df	Sig. (2-tailed)	Mean Difference
Social Manipulation	2.362	218	**.019**	4.79 (Secondary) 4.22 (Higher)
Social	.429	218	.669	5.52 (Secondary) 5.44 (Higher)
Competition	.394	218	.694	4.24 (Secondary) 4.16 (Higher)
Challenge	1.213	218	.226	5.75 (Secondary) 5.55 (Higher)
Strategy	.197	218	.844	5.85 (Secondary) 5.82 (Higher)
Power	.004	218	.997	5.25 (Secondary) 5.25 (Higher)
Fantasy	-1.305	218	.193 .196	4.29 (Secondary) 4.62 (Higher)
Story	-1.112	218	.267	4.75 (Secondary) 5.01 (Higher)
Design	1.377	218	.170	5.75 (Secondary) 5.45 (Higher)
Object	1.224	218	.222	5.48 (Secondary) 5.22 (Higher)
Design and Object	1.414	218	.159	5.64 (Secondary) 5.36 (Higher)
Discovery	1.015	218	.311	5.75 (Secondary) 5.57 (Higher)

Table 4.12: Independent Samples t-test for Equality of Means obtained for each of the Motivations for Playing Board Game dimensions by academic degree. Statistically significantly different: Sig. (2-tailed) less than 0.05.

Lastly, by analysing the scores in each group of Professional Occupations, we continued concluding that both at level of dimensions and at level of components the scores were very similar between them. The average score, as for the other demographic aspects, are around 5.

4.3 Correlations between Personality and Motivations for Playing Board Games

The section contains the main point of this study: the final conclusions that will answer our initial questions regarding the correlation between player's personality and their motivations to play board games: How individual personality traits affect and correlate with tabletop gaming motivations? To decide which correlation test was more suitable to find the correlation between the data obtained in both questionnaires, we applied the Central Limit Theorem [2] which states that as the sample size gets larger, its distribution approaches a normal distribution. As our sample is higher than 200, we could assume that it followed a normal distribution which means that we can use the Pearson's Correlation statistical test.

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[2]https://www.statisticshowto.com/probability-and-statistics/normal-distributions/central-limit-theorem-definition-examples/

4.3.1 Pearson's Correlation

After obtaining and analysing these relationships within both models, we turned our focus to the aim of this study. Thus we also obtained the values of the existing relationships between the dimensions of motivation to play board games and the OCEAN personality dimensions.

Regarding our main goals in the study, this type of statistical correlation test allowed us to obtain the correlation values between all the dimensions - **Table 4.13**. 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. When applying the Pearson's Correlation between the components of Motivations none of them obtained any significant correlation with dimensions of Personality.

Dimensions	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 4.13: 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).

First, we can point out that **Extraversion** and **Neuroticism** are those that are correlated most to motivations to play board games, and that **Agreeableness** is the personality dimension that correlates least with motivations. Another quick conclusion that can be observed through the obtained results is that there are four Motivation dimensions which are only affected by one personality dimension: **Extraversion**. They are **Conflict**, **Social Manipulation**, **Competition** and **Story**. All of them except the **Competition**, show a small positive correlation. That is, **Confict**, **Social Manipulation** and **Story** values increase when **Extraversion** increases, while **Competition** decreases as it shows a negative small correlation. The first two represent people oriented dimensions as they require interaction with other players which meets the definition of extroverts. In addition to **Extraversion**, **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 dimension ex-

cept **Agreeableness**. This is due to 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**, which can be justified 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. 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 game design aspects.

Among all the significant correlations and from the carried out analysis, there are four negative correlations: **1-** Competition - Extraversion; **2-** Challenge - Neuroticism; **3-** Strategy - Neuroticism; **4-** Discovery - Neuroticism. In this way, we observed that the Neuroticism contrasts with Challenge, Strategy and Discovery, which may indicate the need for control that these people have and prevents them from challenging themselves, discovering new things and developing strategies.

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.

4.4   Discussion

Throughout this chapter, we have reported and explained all the results that emerged during the analysis of questionnaire responses. In total 229 participants' answers were analyzed.

For the characterization of Portuguese Board Game Players, we achieved a very wide sample, covering people of different demographic profiles. Participants are aged between 18 and 59 and 78% are male players. The most frequent academic degree was higher education, however in terms of occupational fields we obtained very varied professional areas.

We found out that players of board games focus much 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 [4]. Also enhancing the social impact of a board game,

72

62% of them prefer to meet new people through the hobby than play with people they already know before starting to play. Due to this, 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 play with them. This is a point worth to highlight since board 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 [4]. Also, there are people who like taking on the role of host that teaches other players how to play a game instead of just play them, which may be a part of their ideal experience of playing a board game as Booth concluded when studying this particular situation [4]. Thus, learning and teaching may be also seen as a social activity. We also concluded that the importance of mechanisms for players stood out comparing to the importance of the game theme. Booth also found out the same fact concluding that most board game players enjoy a great variety of game mechanics [4].

Regarding playing time, 75% of our participants have been playing for less than 10 years, which complements the sample of players gathered by Booth which play for 10 or more than 10 years [4]. This shows how board game players can varied from sample to sample. The ideal length of time for a game is not completely clear, there are players who seems to like short games and others who like to play long marathon games, as Booth also concluded [4].

Board games are still associated with objects, but around half the sample (58%) had already used digital platforms to play board games. On the other corner, 60% of the players have moved from playing digital games to playing board games. Therefore, although a great percentage already used digital platforms to play board games, a greater part seems to never had this curiosity or the opportunity before, or they preferred a lack of technology to do a break from the daily life which already is full of technology [4]. This was a conclusion which Booth also extracted from his sample of players. Physical environment of the activity may have an impact in building the ideal experience [4] 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 [4]. Although 87% states that their will to play board games overcomes possible discomforts of the game space, it was also nearly unanimous that environment distractions can cause bad gaming experience. We also concluded that aspects like smell, temperature or room lighting may contribute to improve or worsen the experience of playing a board game [4].

The most favourite game type is the strategy (74%) as for Booth participants [4] which can be a tendency among board gamers, and the type of game they less like (38%) was the "party games" type (**Q30**), 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 the our participants value first the number of games they have and second their quality. Regarding crowdfunding

which is a good way to expose a game [4], only 20% consider it their preferred way of acquiring board games. However, for those who considered it important, the reason most indicated was financial support for an initiative that might otherwise have no future.

For both Personality and Motivations a few statistically significant differences were found within the groups concerning demographic aspects. In personality, for gender Neuroticism stood out with difference between Male and Female board game players, for marital status Extraversion, Agreeableness and Neuroticism scores were the dimensions that showed more significantly differences between Single and Married board game players, and for academic degree the statistically significant difference between Secondary Education and Higher Education is in Openness to Experience. Regarding the Motivations, for gender there are statistically significantly differences in Conflict, Social Manipulation, Social and Discovery. For academic degree, Conflict and Social Manipulation are the dimensions that differed more between board game players with Secondary and Higher Education. Overall, for personality all dimensions obtained an average score around 30 (being the scale range up to 48), with the exception of Neuroticism whose average score was close to 20. These results were mostly aligned when comparing them with Pedroso-Lima et. al results for the same version of the Inventory. In regard to the motivation dimensions, the same scenario of balanced scores was maintained, with the average score of the different dimensions being around 5 (with a range up to 7).

For motivations, we defined a model that grouped the 12 dimensions under study into five distinct components. This grouping was carried out using the Principal Components Analysis test and we named it CISSI. This model explained almost 80% of our data variance and its components are: Intellectual Challenge; Imaginative Experience; Sensory Experience; Competitive Interaction; Social Challenge. Despite in other studies like the TGMI from Kosa and Spronck [6] the model explained 67% of the data variance, with this model we managed to achieve a significantly higher percentage of explanation closer to 80%.

Lastly, going back to the main point of our study of finding if there is a relationship between a Board Player's Personality and his/her motivation to play Board Games, among the conclusions found we highlight some important points: We concluded that Extraversion and Neuroticism are the Personality dimensions that are correlated most to motivations to play board games. In a global perspective, through the obtained results, it can also be observed that there are four Motivation dimensions which are only affected by one personality dimension: Extraversion. They are Conflict, Social Manipulation, Competition and Story. Among all the significant correlations, four of them are negative correlations (Competition - Extraversion, Challenge - Neuroticism, Strategy - Neuroticism and Discovery - Neuroticism). In general, all the correlations found can be explained according to the personality characteristics inherent to each dimension and the corresponding motivations of the dimensions they relate to. As a main conclusion, there is in fact a correlation between Personality and Motivations but it is a small correlation.

5

Conclusions

Contents

After extensive research, what was initially stated as a problem ("there are few studies that address the measuring of tabletop gaming motivations/experiences, let alone relating those motivations with personality.") was revealed as a current fact. Although research on tabletop gaming has become more diverse, and despite the existence of some tools to measure players' motivations to play these types of games, none of them is sufficiently focused on this objective.

5.1 Overview

Board games have been a trend that is increasingly being explored, thus it is relevant to understand what motivates people to play them. Current approaches to understand the motivations to play do not take into account the individual characteristics of each player, therefore, it became relevant to consider personality in our study.

We assessed Personality of our participants by using the NEO-FFI [14] questionnaire. In order to get the motivations of the players, we designed a questionnaire that gathered data for the characterization of our participants. In addition to a section of demographic characteristics, we included a section with questions to capture and describe the environment our participants have and feel when playing board games, and how these can interfere and influence gameplay, and also a last section which contains the items of 12 Motivation dimensions. This last section allowed us to identify whether the participants fit into the characteristics of the player profile that each dimension represents.

The dimensions were composed of a set of items which were defined in line with what the literature points out as being relevant to capture these types of motivations. They were subject to several iterations before reaching their final version. One of the guidelines of the iteration process was to obtain good consistency values between the items of each dimension. Once established, they underwent a grouping process, during which the Principal Components Analysis test was applied to define a model with the initial dimensions distributed over 5 components: Intellectual Challenge; Imaginative Experience; Sensory Experience; Competitive Interaction; Social Challenge, which we called CISSI, using the initial letter of each component in an order that would give an accessible name.

By analysing our participants' answers, we concluded that our sample has a well-balanced demographic distribution, as we gathered people of many different ages. There are a few statistically significantly differences when analysing the distribution of the scores within each dimension for different demographic groups, for both Personality and Motivations dimensions. 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.

Regarding the Motivations, for gender there are statistically significantly differences in Conflict, Social Manipulation, Social and Discovery. Male obtained higher scores in Conflict, Social Manipulation and Discovery. Female obtained higher scores in Social dimension. For academic degree, Conflict and Social Manipulation 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.

Through these two questionnaires the main objective was to study the relationship between motivations and personalities of the players who participate in our study. We mainly observed that Extraversion and Neuroticism are the Personality dimensions that most are related to the dimensions of Motivations to play board games. Another fact is that there are four Motivation dimensions which are only affected by Extraversion. Among the significative correlations, they are all small correlations, and four of them are negative correlations. Overall, they make sense and in fact associated with each dimension characteristics they relate to. As a major conclusion, the presented hypothesis about the existence of correlation is verified by the results obtained; however, since it is a week correlation, care must be taken when analyzing it and in making associations, as this may lead to wrong conclusions.

5.2   Limitations

At a conceptual level related to board games, there is not yet in place a universal vocabulary that can be applied to every study. This may make it difficult for different players to interpret the spelling and meaning of questions and item scales from the questionnaires, and consequently make it difficult for us to actually compare answers. Concepts such as narratives, dynamics or game mechanics may have different meanings or origins for different players, and so, when asked about it, their answers may turn out to be the same by coincidence and not because they have the same vision of them. We often face some subjectivity in the analysis of results due to the fact that different questions may relate to one or more specific dimensions, which is not something linear to evaluate.

Another factor that limited our study was the fact that many hobby board game players do not attend online communities or organized groups, so it was not possible for them to answer our questionnaires, which due to the pandemic would be impossible to answer in person. We needed to collect much more data to be able to ensure a diversity of viewpoints from all corners of the community [4]. This scenario had already been predicted to happen, as it makes sense that an activity like playing board games is still a thing that many people do offline and face-to-face or just with their group of friends.

Regarding the demographic sample, the nationality might have been more varied in order to avoid the entire population under study being from a unique country, which consequently approaches the identical culture and habits that may influence the results which aimed to be applied to any country. Also, players are not homogeneously distributed across the different demographic categories.

5.3 Future Work

All the results and conclusions regarding our sample of Portuguese Board Game Players may lead to new researches. We suggest the exploration of several demographic niches of Portuguese Board Game Players that we have only approached in a general way. From this exploration, we propose to establish the association between experiences, preferences and gaming habits and the respective demographic niches. Lastly, we suggest an exploration at the level of the Motivation dimension components by analyzing the Personality-Motivation correlations across players from different demographic niches, and across different preferences and playing habits. This type of more targeted exploration will allow for less generic patterns and may make it possible to find more striking correlations within particular groups of board game players.

In terms of environment and context, a factor that could be interesting to introduce in the scope of board games studies is the mood of the players. Although it adds some complexity due to the difficulty to be measured, it could bring important conclusions regarding motivations to play.

For future work, we also suggest the application of our model in other study contexts related with Board Game Motivations, as it gathers important aspects from other literature existing models. CISSI model could serve as the basis for a Personalised Board Game Recommender System.

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A

Results Analysis

A.1 Personality reversed items coding

Dimension	Items
Openness to Experience	**3**,**8**,13,**18**,**23**,28,**33**,**38**,43,**48**,53,58
Conscientiousness	5,10,**15**,20,25,**30**,35,40,**45**,50,**55**,60
Extraversion	2,7,**12**,17,22,**27**,32,37,**42**,47,52,**57**
Agreeableness	4,**9**,**14**,19,**24**,**29**,34,**39**,**44**,49,54,**59**
Neuroticism	**1**,6,11,**16**,21,26,**31**,36,41,**46**,51,56

Table A.1: Distribution of the 60 items of the NEO-FFI questionnaire used for each of the five dimensions. Reversed items are in bold.

A.2 Distribution of the Personality Scores by Professional Occupation

(a) Openness to Experience

(b) Conscientiousness

(c) Extraversion

(d) Agreeableness

(e) Neuroticism
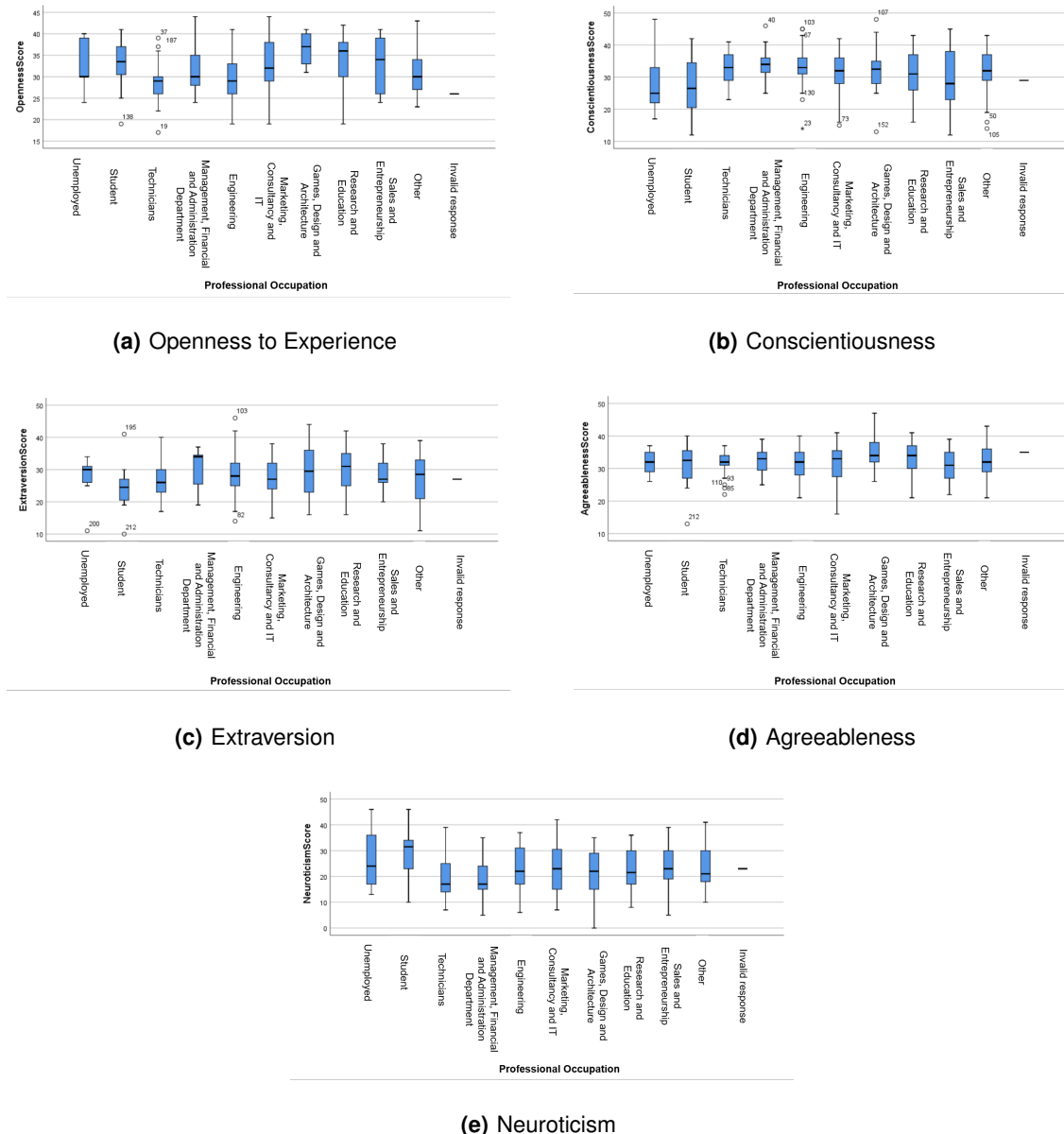
Figure A.1: Distribution of the Personality Scores by Professional Occupation.

A.3 Distribution of the Motivations for Playing Board Games Scores by Professional Occupation

(a) Component 1

(b) Component 2

(c) Component 3

(d) Component 4
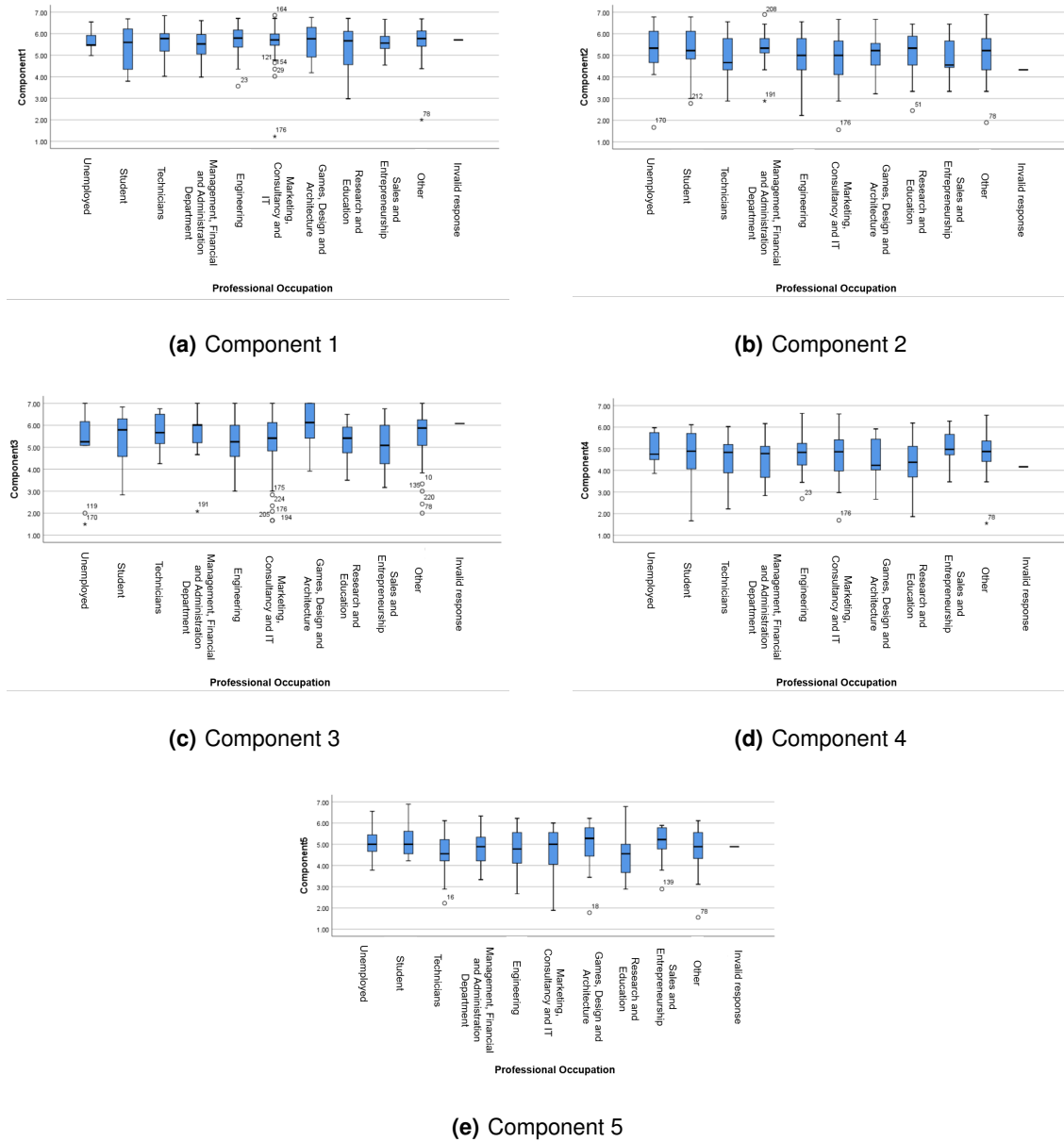
(e) Component 5

Figure A.2: Distribution of the Motivations for Playing Board Games Components by Professional Occupation.

B

User Questionnaires

B.1 First Version

Conflict (Conflict and Social Manipulation)

Conflict1 High conflict mechanics that let players attack and interfere with each other's resources and units.

Conflict2 Gameplay where players can backstab or betray each other.

Conflict3 Game mechanics that allow hostile, confrontational player interactions.

SocialManip.1 Gameplay that depends a lot on luck and chance (ex.: dice). (negative form)

SocialManip.2 Gameplay that involves bluffing, deception or persuasion.

SocialManip.3 Gameplay that involves negotiating or bargaining with other players.

Social (Competition, Community)

Socializing1 Games that elicit lots of silly, funny interactions between players.

Socializing2 I enjoy chatting with other players.

Socializing3 I enjoy helping or co-op with other players.

Competition1 It is important to me to beat me opponents.

Competition2 Being known as a highly skilled player.

Competition3 I play the game to win.

Mastery (Challenge and Strategy)

Challenge1 Games that are cognitively challenging to play.

Challenge2 Gameplay with several difficult challenges to surpass

Challenge3 Take the time to learn about new game systems and mechanics.

Strategy1 The game allows you to formulate and execute a long-term strategy.

Strategy2 I like board games that offer you a lot of options and choices.

Strategy3 Gameplay with a lot of decision making and strategic thinking

Achievement (Completion and Power)

Completition1 I like to complete all the scenarios that the game offers.

Completition2 I like to understand all aspects of a board game that I am playing.

Completition3 I like to figure out all possible strategies when playing board games.

Power1 Becoming more powerful as the game evolves.

Power2 Ability to build resources or units

Power3 Accumulating large amounts of in-game resources / currency

Immersion (Fantasy and story)

Fantasy1 Board games allow me to pretend I am someone/somewhere else.

Fantasy2 I like to do something I could not normally do in real life through a board game.

Fantasy3 I enjoy the excitement of assuming an alter ego in a game.

Story1 Board game stories are important to me.

Story2 Stories in board games just get in the way. (negative form)

Story3 The game world has elaborate history/lore/characters and a rich theme.

Creativity (Design and Discovery)

Design1 I like to play board games that have nice components.

Design2 The color, shape and feel of the components of a board game are important for me.

Design3 I care if the board looks beautiful or not.

Discovery1 I like to explore, tinker or experiment within the game world.

Discovery2 Trying out new games to stay up to date.

Discovery3 I keep up with new game releases and current meta.

B.2 Final Version

Secção Demográfica

Qual o seu género? *

Mark only one oval.

◯ Masculino

◯ Feminino

◯ Other: _____

Qual a sua idade? *

_____

Qual o seu grau de escolaridade? *

Mark only one oval.

◯ Ensino Básico

◯ Ensino Secundário

◯ Ensino Superior

◯ Other: _____

Qual o seu estado civil? *

Mark only one oval.

◯ Solteiro

◯ Casado

◯ Divorciado

◯ Viúvo

◯ Other: _____

Qual a sua profissão? *

_____

O Jogar

1 - Qual a afirmação que melhor o/a caracteriza? *

Mark only one oval.

◯ Planeio o meu dia ou a minha semana para ter algum tempo para jogar jogos de tabuleiros

◯ Apesar de não reservar tempo para isso, gosto de jogar jogos de tabuleiro quando a oportunidade se proporciona

◯ Apesar de jogar jogos de tabuleiro, não é um passatempo que eu aprecio particularmente

◯ Não costumo jogar jogos de tabuleiro

2 - Aproximadamente, há quanto tempo joga jogos de tabuleiro como um hobby? *

Escreva apenas um número aproximado, em anos, entre 0 e 100

_____

3 - Em média, quantas sessões de jogo, por mês, joga jogos de tabuleiro? *

Escreva apenas um número aproximado, em número de vezes por mês, entre 0 e 90.

_____

4 - Qual a sua preferência relativamente à duração de um jogo de tabuleiro? *

Selecione pelo menos uma opção

Check all that apply.

☐ Até 30 min
☐ 30 min a 1 hora
☐ 1 a 2 horas
☐ 2 a 3 horas
☐ Mais que 3 horas
☐ Depende do tempo que tenho disponível
☐ Sem preferência

5 - A minha motivação para jogar jogos de tabuleiro ... *

Mark only one oval.

	1	2	3	4	5	
Diminuiu ao longo da minha vida	◯	◯	◯	◯	◯	Aumentou ao longo da minha vida

5 - A minha motivação para jogar jogos de tabuleiro ... *

Mark only one oval.

	1	2	3	4	5	
Diminuiu ao longo da minha vida	◯	◯	◯	◯	◯	Aumentou ao longo da minha vida

6 - Já senti que prejudiquei responsabilidades da minha vida para poder jogar jogos de tabuleiro. *

Mark only one oval.

	1	2	3	4	5	
Não, nunca	◯	◯	◯	◯	◯	Sim, completamente

7 - No seu grupo de amigos mais alguém joga jogos de tabuleiro? *

Mark only one oval.

◯ Sim

◯ Não

8 - No seu núcleo familiar mais alguém joga jogos de tabuleiro? *

Mark only one oval.

◯ Sim

◯ Não

9 - Com quem costuma jogar jogos de tabuleiro? *

Mark only one oval per row.

	1 - Nunca	2	3	4	5 - Sempre
Costumo jogar com amigos/família.	◯	◯	◯	◯	◯
Costumo jogar com pessoas com quem estou apenas no âmbito de jogo.	◯	◯	◯	◯	◯
Costumo jogar com qualquer pessoa, mesmo que não conheça, o que me importa é estar a jogar.	◯	◯	◯	◯	◯
Costumo jogar sozinho.	◯	◯	◯	◯	◯

10 - Com quem prefere jogar jogos de tabuleiro? *

Mark only one oval per row.

	1 - Nunca	2	3	4	5 - Sempre
Prefiro jogar com amigos/família.	◯	◯	◯	◯	◯
Prefiro jogar com pessoas com quem não partilho mais nenhuma atividade além dos jogos de tabuleiro.	◯	◯	◯	◯	◯
Não tenho preferência, posso jogar com qualquer pessoa, mesmo que não a conheça, o que me importa é estar a jogar.	◯	◯	◯	◯	◯
Prefiro jogar sozinho.	◯	◯	◯	◯	◯

11 - Gosto de assumir o papel de anfitrião, que escolhe os jogos, os conhece e aprende e depois ensina alguém a jogá-los. *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

12 - Tenho um espaço reservado e exclusivo para jogar jogos de tabuleiro. *

Mark only one oval.

○ Sim, tenho um espaço específico.
○ Não, mas gostava de ter.
○ Não, jogo em qualquer lado.

13 - Tenho um espaço reservado e exclusivo para armazenar jogos de tabuleiro. *

Mark only one oval.

○ Sim, tenho um espaço reservado e exclusivo.
○ Não, mas gostava de ter.
○ Não, guardo-os em qualquer lado.

14 - Aproximadamente, quantos jogos de tabuleiro possui? *

_____

15 - Gosto de possuir diferentes versões de um mesmo jogo de tabuleiro (que se jogam exatamente da mesma forma, e apenas diferem em detalhes visuais ou dos seus elementos físicos/materiais). *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

16 - Utilizo plataformas digitais para jogar jogos de tabuleiro. *

Mark only one oval.

	1	2	3	4	5	
Nunca	○	○	○	○	○	Sempre

17 - Já deixou de jogar jogos digitais para passar a jogar jogos de tabuleiro? *

Mark only one oval.

	1	2	3	4	5	
Não, nunca	○	○	○	○	○	Sim, totalmente

18 - Já deixou de jogar jogos de tabuleiro para passar a jogar jogos digitais? *

Mark only one oval.

	1	2	3	4	5	
Não, nunca	○	○	○	○	○	Sim, totalmente

19 - A pandemia teve impacto na minha atividade de jogar jogos de tabuleiro. *

Mark only one oval.

	1	2	3	4	5	
Discordo Totalmente	○	○	○	○	○	Concordo Totalmente

20 - A pandemia teve/não teve impacto na minha atividade de jogar jogos de tabuleiro porque ... *

_____

21 - Qual o fator que, até hoje, teve mais impacto na sua atividade de jogar jogos de tabuleiro? *

_____

22 - Costuma levar jogos de tabuleiro para o local de trabalho/estudo? *

Mark only one oval.

○ Sim

○ Não

23 - A minha vontade para jogar jogos de tabuleiro ultrapassa eventuais desconfortos do espaço de jogo. *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

24 - O tipo e/ou intensidade de luz do espaço em que estou a jogar pode influenciar os meus comportamentos ou concentração ao longo do jogo . *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

25 - A decoração da sala de jogo pode influenciar a minha vontade para jogar (Ex: sala com as paredes revestidas de jogos, com mesas próprias de gamers, suportes para copos e outros detalhes como estes). *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

26 - Um ambiente com distrações durante o jogo pode contribuir para criar uma má experiência de jogo. *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

27 - O que valoriza mais numa coleção de jogos? *

Escolha no máximo duas respostas

Check all that apply.

☐ Quantidade: gosto de ter muitos jogos.

☐ Qualidade: gosto de ter apenas jogos que gosto.

☐ Colecionismo: gosto de coleccionar edições limitadas.

28 - No que diz respeito a crowdfunding de jogos de tabuleiro ... *

Mark only one oval.

	1	2	3	4	5	
Nunca investi	○	○	○	○	○	É a minha forma preferencial de aquisição de jogos de tabuleiro

29 - O crowdfunding de jogos de tabuleiro ... *

Check all that apply.

☐ É importante porque permite-me apoiar financeiramente iniciativas que, de outra forma, nunca veriam a luz do dia

☐ É importante porque permite-me ser das primeiras pessoas no mundo a experienciar um jogo

☐ É importante porque dá-me acesso a edições limitadas de um jogo, a que poucos vão ter acesso

☐ É um risco investir em produtos em desenvolvimento que poderão nunca ser concluídos

☐ É-me indiferente / Não tenho opinião

Other: ☐ _____

30 - Quais dos seguintes tipos de jogos de tabuleiro gosta mais de jogar? *

Selecione pelo menos uma opção

Check all that apply.

☐ Jogos temáticos, por exemplo: Pandemic, Gloomhaven, Star Wars: Rebellion, Twilight Imperium, War of the Ring

☐ Jogos de estratégia, por exemplo: Terraforming Mars, Twilight Struggle, Brass: Birmingham, Through the Ages: A New Story of Civilization, Gaia Project

☐ Jogos para a família toda, por exemplo: Ticket to Ride, Stone Age, Splendor

☐ Jogos para festas ("Party games"), por exemplo: Passa o Desenho, Codenames, Just One, Dixit

☐ Não tenho familiaridade suficiente com jogos de tabuleiro para conseguir responder à questão.

31 - O que o motiva a ter mais cuidado com um jogo de tabuleiro? *

Mark only one oval.

	1	2	3	4	5	
Investimento financeiro	◯	◯	◯	◯	◯	O significado que tem para mim

32 - Quais as suas preferências pelo modo de compra de jogos de tabuleiro? *

Selecione pelo menos uma opção

Check all that apply.

- ☐ Lojas virtuais (tenho conhecimento suficiente e não preciso de ajuda ou mexer/explorar a caixa)
- ☐ Lojas físicas (importa a ajuda dos vendedores e a magia de mexer e explorar a caixa)
- ☐ Jogos usados (através da comunidade e implica a noção de confiança, por vezes entre estranhos)
- ☐ Kickstarter (exige ainda mais conhecimento e a disponibilidade para estar 1 ano ou mais à espera do jogo, relaciona-se com fenómenos de FOMO)
- Other: ☐ _____

33 - Relativamente a jogos de tabuleiro em segunda mão ... *

Mark only one oval.

	1	2	3	4	5	
Nunca comprei um jogo em segunda mão	◯	◯	◯	◯	◯	Todos os meus jogos foram comprados em segunda mão

34 - Quando abro uma caixa de um jogo de tabuleiro... *

Mark only one oval.

	1	2	3	4	5	
Retiro tudo com calma, pois é importante para mim ver os seus componentes ao pormenor	◯	◯	◯	◯	◯	Coloco as componentes todas pa

35 - Quanto à temática de um jogo de tabuleiro, para mim é importante que simule: *

Mark only one oval.

	1	2	3	4	5	
Um cenário real	◯	◯	◯	◯	◯	Um cenário de fantasia/ficção

36 - Gosto de fazer alterações, ou variações, às regras originais de um jogo de tabuleiro. *

Mark only one oval.

	1	2	3	4	5	
Manter as regras originais	◯	◯	◯	◯	◯	Fazer alterações ou variações às regras

37 - É importante para mim ter oportunidade de poder personalizar/modificar os elementos materiais de um jogo de tabuleiro. *

Mark only one oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

38 - O que é mais importante para si: o tema ou os mecanismos de jogo? *

Mark only one oval.

	1	2	3	4	5	
Tema	◯	◯	◯	◯	◯	Mecanismos

39 - Onde procura informações sobre os novos jogos de tabuleiro? *

Selecione pelo menos uma opção

Check all that apply.

☐ Relações pessoais diretas (amigos, familiares, etc)

☐ Grupo de jogadores com quem joga

☐ Lojas (incluindo lojas online)

☐ BGG (boardgamegeek.com)

☐ Youtubers e criadores de conteúdos sobre jogos de tabuleiro

☐ Reddit

Other: ☐ _____

Indique a sua concordância com as seguintes afirmações, no contexto da atividade de jogar um jogo de tabuleiro. *

Mark only one oval per row.

	1 - Discordo Totalmente	2	3	4 - Neutro	5	6	7 - Concordo Totalmente
38 - Gosto de jogos que permitem aos jogadores interferir com os recursos ou bens dos outros jogadores.	◯	◯	◯	◯	◯	◯	◯
39 - Gosto de jogos que coloquem as unidades em conflito.	◯	◯	◯	◯	◯	◯	◯
40 - Gosto de jogos com mecanismos de conflito que permitem aos jogadores bloquear os movimentos/jogadas.	◯	◯	◯	◯	◯	◯	◯
41 - Gosto de jogos que envolvem convencer os outros jogadores de algo.	◯	◯	◯	◯	◯	◯	◯
42 - Gosto de jogos que envolvem bluff, engano ou persuasão.	◯	◯	◯	◯	◯	◯	◯
43 - Gosto de jogos que envolvem negociar ou regatear com os outros jogadores.	◯	◯	◯	◯	◯	◯	◯
44 - Gosto de jogos que promovem interações divertidas entre os jogadores.	◯	◯	◯	◯	◯	◯	◯
45 - Gosto de jogos de tabuleiro que me ajudem a conhecer e conversar com os outros jogadores.	◯	◯	◯	◯	◯	◯	◯
46 - Gosto de jogos de tabuleiro que permitam ajudar ou cooperar com os outros jogadores.	◯	◯	◯	◯	◯	◯	◯
47 - Gosto de derrotar os meus adversários.	◯	◯	◯	◯	◯	◯	◯
48 - Gosto de ser reconhecido como um jogador de alto nível.	◯	◯	◯	◯	◯	◯	◯
49 - Gosto de jogar para ganhar.	◯	◯	◯	◯	◯	◯	◯
50 - Gosto de dominar outros jogadores.	◯	◯	◯	◯	◯	◯	◯
51 - Gosto de jogos que me obriguem a pensar.	◯	◯	◯	◯	◯	◯	◯
52 - Gosto de jogos com desafios difíceis de ultrapassar.	◯	◯	◯	◯	◯	◯	◯
53 - Gosto de dedicar tempo à exploração, aprendizagem e/ou aperfeiçoamento do meu domínio de novas mecânicas de jogo.	◯	◯	◯	◯	◯	◯	◯
54 - Gosto de jogos que me permitem pensar e executar uma estratégia a longo prazo.	◯	◯	◯	◯	◯	◯	◯
55 - Gosto de jogos de tabuleiro que requerem planeamento ou decisões complexas.	◯	◯	◯	◯	◯	◯	◯
56 - Gosto de jogos de tabuleiro onde a sorte tenha um impacto limitado nos resultados.	◯	◯	◯	◯	◯	◯	◯

57 - Gosto de jogos que envolvem pensamento estratégico.

58 - Gosto de jogos onde posso melhorar as minhas unidades ou estruturas e tornar-me mais poderoso.

59 - Gosto de jogos de tabuleiro que me permitem gerir recursos e construir unidades.

60 - Gosto de acumular grandes quantidades de recursos durante o jogo.

61 - Gosto de jogos de tabuleiro que me permitem fingir ser alguém diferente ou estar noutro lugar quando jogo.

62 - Gosto de ser capaz de fazer algo no jogo que não seria capaz de fazer na vida real.

63 - Gosto do entusiasmo de assumir uma personalidade alternativa num jogo.

64 - Penso que as narrativas nos jogos de tabuleiro são importantes.

65 - Gosto de jogos de tabuleiro que dão importância ao enredo.

66 - Gosto de jogos de tabuleiro que se preocupam em ter uma história e personagens elaboradas.

67 - Gosto de jogar jogos de tabuleiro com peças e componentes apelativos.

68 - Dou importância à estética do jogo de tabuleiro.

69 - Gosto de jogos de tabuleiro que chamem à atenção pelo seu design gráfico e de objetos.

70 - A manipulação de objetos físicos/materiais durante um jogo de tabuleiro é importante porque permite criar uma maior interação entre os jogadores e o jogo, e não apenas por serem necessários para jogar.

71 - A textura, material, peso, som ou outro detalhe de uma peça de um jogo de tabuleiro é importante.

72 - Gosto de explorar e experimentar novas formas de jogar.

73 - Gosto de experimentar jogos novos e manter-me atualizado sobre novos lançamentos.

74 - Gosto de me manter informado sobre as novas tendências do hobby.

Agradecemos o tempo que disponibilizou para participar neste questionário!

Obrigado!

98