Exploring the Relationship between Motivation, Mechanics and Genre for Tabletop Games

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ABSTRACT

This thesis aimed to make a contribution to the sparse availability of academic research in the tabletop gaming industry by examining the underlying relation between gaming motivations, genres, and mechanics. To investigate this relation, two archetypal analyses were performed, resulting in five player archetypes and four game archetypes. The present study did not have enough conclusive results to make strong claims about the underlying relation between the player and game archetype (and thus the genres and mechanics). However, the archetypal analyses are a new contribution to the academic field and can be used as a basis for future research.

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CHAPTER 1: INTRODUCTION

Tabletop games have been played for literally thousands of years as they contribute to fun, relaxation, and education (Magerkurth, Memisoglu, Engelke, & Streitz, 2004). Some of the oldest games include *Backgammon* (3000 BC), *Checkers* (3000 BC) and *Go* (2000 BC), but the oldest game ever recorded is believed to be *Senet*, dating back to Predynastic Egypt in 3100 BC (White, 2014). Even though we are currently living in a very digital world, tabletop game sales are increasing (Birkner, 2017). According to the Board Games Market Global Outlook and Forecast 2018 – 2023, the global board games market is expected to reach values of over $12 billion by 2023, with a compound annual growth rate of 9% (ARCognizance, 2018). It is not just the sales of games which are increasing, but also establishments were gamers can meet up are becoming more common (Fox, 2019). For players who prefer to game alone, or cannot find partners, there is also a growing number of games that allow solo play (Leorke, 2018).

Even though tabletop games are rising in popularity, relatively little scholarly work has been written about games. Most of the existing material is focused on the place of games in society (i.e. historical, sociological, and cultural issues), but less attention has been paid to the games itself: what it is like to play them, what features differentiate games from one another, or what features make a game more or less enjoyable for players (Elias, Garfield, & Gutschera, 2012). Although research in this area is becoming much more diverse, there are only a few studies that address tabletop gaming motivations. Some studies use digital game inventories such as the Game Experience Questionnaire (Poels, Ijsselsteijn, & de Kort, 2007).The GEQ is a self-report measure targeted to describe the many-sided experiences of playing video games. This has been used to validate the measurement of player experiences in tabletop gaming as well (Al Mahmud, Mubin, Shahid, & Martens, 2008). However, it is very general and covers only a limited amount of aspects present in tabletop gaming (Barbara, 2017).

Kosa & Spronck (n.d.) have attempted to bridge the gap between validated measurement tools for digital games and a similar need for tabletop games. The Tabletop Gaming Motivation Inventory (TGMI) was designed to specifically measure tabletop gaming motivations. This study was carried out among 867

tabletop game players. The majority of these respondents (N = 542) also left their BoardGameGeek username.

BoardGameGeek (hereafter referred to as BGG) is a database for boardgames. It hosts a collection of data and information on traditional boardgames. The information is intended for posterity, research, and (user-contributed) ratings. All information has been entered on a game-by-game basis by users, and is available for queries and data mining (BoardGameGeek FAQ, n.d.).

Research on the tabletop gaming motivation inventory aimed to understand what motivates people to play a certain tabletop game. Combining this data with user information from the BGG website can introduce more insights, specifically by tying these motivations to game genre and mechanics. The results can be used to identify typical players and their preferred game features. This is interesting for game developers, but it may also support to better identify the often vague and overlapping labels present in the industry.

The following problem statement has been formulated to guide this study:

To what extent can the relation between gaming motivation, game genre and game mechanics be unfolded?

This problem statement will be answered by examining the following three research questions:

***RQ1:** What archetypes of players exist?*

***RQ2:** What archetypes of games exist?*

***RQ3**: How can the archetypes be used to tie in tabletop gaming motivations with game genre and game mechanics?*

According to the Cambridge Online Dictionary (2019) an archetype is *"a typical example of something, or the original model of something from which others are copied"*. The third research question will be used to link the player archetypes (RQ1) to the game archetypes (RQ2).

In Chapter 2 the theoretical framework will be provided to give more background and context to this specific research. Chapter 3 will explain the methodology behind this research. In Chapter 4 the results for the research questions are presented. Chapter 5 will discuss these results and Chapter 6 will

formulate the conclusion. To enhance readability all mentioned sections, figures, and tables are linked. Use control + click to see the linked item.

CHAPTER 2: THEORETICAL FRAMEWORK

In this chapter the theoretical framework is discussed. Section 2.1 will provide more background information as to what a tabletop game actually is and will help understand different classifications. Section 2.2 provides more information on BoardGameGeek. In section 2.3 more background information is discussed on gaming motivations. Section 2.4 will provide a succinct explanation on the Archetypal Analysis. Section 2.5 briefly summarizes the take-aways from the theory.

2.1 What is a tabletop game?

Whitehill (2008) defines a game as *"a pastime, a form of play, in which players compete, each trying to emerge the winner according to a specific set of rules and a predetermined end; the winning player is the first to reach a particular goal, be it to attain a certain position or accumulate the pre-requisite requirements".* The exception to this definition is for solitaire games, where a player is trying to better their scores, accomplishing a goal in a shorter timeframe, or playing against the game itself.

A "tabletop game" is harder to define. Parlett (2018) defines it as a "board game", where board is derived from a word originally meaning "plank", and secondarily "table". A board game is then any game that can be played on a flat surface such as a table or floor. Kosa & Spronck (n.d.) add to this that these games also feature physical components that are made of cardboard, plastic, wood, and similar materials. This definition is broad enough to include games varying from *Monopoly* to *Chess* (Rollins, 2018). Due to this broad definition, examining more distinct classifications may improve the understanding of this study.

2.1.1 Classifying tabletop games

Many different approaches exist in classifying tabletop games. The majority of the work on classifying the different types of games has been done by Murray (1952), Bell (1960), and Parlett (1999). Their categories are summarized in Table 1.

Table 1 Classification of games according to Murray (1952), Bell (1960), and Parlett (1999)

Murray	**Bell**	**Parlett**
Race	Race	Race games
Alignment	Alignment	Space games
Hunt		Chase games
War	War/Hunt	Displace games
Mancala	Mancala	Theme games

For race games the aim is being the first one to get one's piece(s) home, usually in accordance with the throw of a dice or other lots. Games of alignment have the aim to get pieces arranged in a line or a specified configuration (e.g. *Noughts and Crosses*). Parlett (1999) adds that the basic pattern underlying these games is that players enter or move pieces upon a two-dimensional board and reframes it as space games. Murray's (1952) hunt games, such as *Fox & Geese*, are games in which one player has a larger number of pieces and attempts to immobilize the other's force. Bell (1960) combined this category with war. Parlett (1999) based his category chase games on Murray's hunt games, but includes also games where the number of pieces is symmetrical (i.e. both teams have the same number of pieces), because when one classifies solely on the mechanism, all asymmetrical games would be hunt games in Murray's classification. War games, according to Murray (1952), have the aim to capture or immobilize all enemy pieces (e.g. *Chess*). Parlett (1999) notes that since Murray's classification a new trend for war-themed games has begun. He categorizes these under theme games. War games are classified according to their method of capture. Murray's (1952) and Bell's (196) mancala category are games in which the aim is to capture a majority of neutral pieces such as beans and seeds. Parlett (1999) differentiates by adding a fifth miscellaneous group, classified as theme games, which cover the games characterized by a thematic subject matter, such as property trading or crime detection.

Classification according to target audience

It is possible to classify games based on their target audience. Whitehill (2008) suggests three categories which are most common: children's games, family games, and adult games. Children's games are usually more simplistic and may have an educational purpose. Examples of popular children's games

are *Chutes and Ladders, Scrabble Junior*, and *Cariboo* (Drevitch, n.d.). Family games are suitable for play with the entire family, such as *The Game of Life* and *Monopoly* (Rabideau, 2019). The final category, games for adults, are games that have a more complex method of play or are adult themed. Some examples are *Cards Against Humanity, Scythe,* and *Betrayal At House On The Hill* (Quinn, 2018; Cassano, 2019).

Classification according to game board

Most tabletop games have a board to guide the movement or style of play. According to Whitehill (2008) a game board can either be one of two types: fixed or variable. A variable gameboard is usually laid out in sections at the beginning, but will change each time the game is played, like with *The Settlers of Catan*. A classification according to game board is proposed to have seven categories. First of all, the gameboard can be made for alignment, such as with *Pente* and *Four-in-a-Row.* The second type, race games, have a gameboard on which pieces have to be moved around in order to win (e.g. *Ludo* and *Snakes & Ladders*). A third board game type is games of capture, where the objective is to capture a rival's pieces or capture the most territory. Players can have identical pieces, which makes it a symmetrical game, or can have a different number of pieces or pieces with different strengths. Some examples are *Othello, Chess,* and *Stratego*. A fourth type are building games. The objective for this type is to build or acquire ownership of the opposing team, like with *Risk.* The fifth type are trading & negotiation games, where players have to negotiate or barter with each other (e.g. *Diplomacy, Cluedo,* and *Catan*). The sixth type are games of survival, where players should not lose pieces when parts of the gameboard disappear, such as in *Atlantis*. The seventh category are all games which do not fall under the abovementioned categories.

Classification by Woods (2012)

Woods (2012), largely relying on the work by Murray (1952), Bell (1960), and Parlett (1999) as well, defines "tabletop games" as an umbrella term consisting of classical, mass-market, and hobby games. Classical games have no clear authorship and were passed down from generation to generation, such as *Chess* and *Backgammon*. Mass-market games are sold in large quantities over multiple years, and are

most often the common association with board games by most humans. Woods (2012) distinguishes three different types of mass-market games. First of all, there are a number of successful games that were produced in the 19th and 20th century, and are still sold in large numbers. Examples of these are *Scrabble*, *Monopoly*, and *The Game of Life*. The second type that can be distinguished within mass-market games are "party games" such as *Trivial Pursuit*, *Pictionary*, and *Cranium*. The focus is here on simple rules and large groups of players. The final type of mass-market game is "licensed games". The origins for this type can largely be traced back to the rise of television. Hobby games attract players with a specific interest. Hobby games are considered to have four main genres: wargames, role-playing games, collectible card games, and Eurogames.

2.1.2 Game theme and mechanic

In addition to the abovementioned classifications, it is also possible to take a more practical approach and distinguish game themes and mechanics. The game's theme (or category, as they call it on BGG) is the flavor of the game, while the mechanics are the rules governing it. Comprehensively, Järvinen (2009, pp. 251-252) describes it as "*a functional game feature that describes one possible or preferred or encouraged means with which the player can interact with game elements as she is trying to influence the game state at hand towards attainment of a goal".* As an example: *Monopoly*'s primary mechanic is called "roll and move". A player rolls the dices and moves the number of spaces accordingly. The consequences are determined by the space on which the player lands. This mechanic has nothing to do with the theme of the game: hotel barons building real estate. Both these characteristics can be important for the enjoyment of the game, and may determine whether someone likes a game or not (Levine, n.d.). A total list of game genres and mechanics, as defined by BGG, can be found in Appendix A and B.

2.2 BoardGameGeek

BoardGameGeek is an online forum for board gaming hobbyists, devoted to cataloguing and discussing games. The platform was founded in 2000 by Scott Alden and Derk Solko (Woods, 2012). It holds a game database with reviews, images, forums, ratings, and videos for over 106,000 different tabletop games. Apart from that extensive database, it is also home to an active community of gamers who can discuss, argue, buy, sell, trade, and play board games. The site is updated on a real-time basis due to its

large user base, which makes it the biggest source to get game-related information (“Welcome to BoardGameGeek”, n.d.).

A survey by Woods (2012) among BGG users suggests that only 7% of the users are female. The majority of the respondents were around 36 years old, with a large proportion over 40 years. Most of the users are married (62%) or in a serious relationship (16%). The majority of the respondents (62%) have achieved an undergraduate degree or higher, with 10% even holding a doctoral title. Given that 1% of the U.S. population has doctoral degree and 28% has an undergraduate degree, it can be concluded that most of the hobby gamers on BGG represent a highly educated segment of the population. The majority of the players come from North-America (68%) or Europe (25%).

In 2010 BoardGameGeek won two awards. The Diana Jones Award for Excellence in Gaming was presented to them as a recognition for the best resource for players of board and card games. The panel was especially enthusiastic about the site’s internal economy which rewards those users that contribute in making the site bigger, deeper and stronger. They even go as far as to state that BoardGameGeek’s “exhaustive knowledge base, devoted community, and collaborative bedrock exemplify the absolute best that the Internet has to offer society” (“The 2010 Award”, 2010). It also won the INNO-Spatz award for its outstanding performance in highlighting the position, role, and work of designers ("INNO-Spatz Award goes to BoardGameGeek", 2010).

Due to its successes, BoardGameGeek expanded to two other fields as well: RPGs and video games. They also host different annual conventions.

2.3 Motivation to play games

2.3.1 What motivates people to play games?

Despite the resurgence of interest in games, not much (academic) research on motivations for tabletop games has been performed (Rogerson, Gibbs, & Smith, 2016; Kosa & Spronck, n.d.; Woods, 2012). An attempt was made to measure player experiences with the use of the Game Experience Questionnaire (GEQ; IJsselsteijn, Poels, & De Kort, 2008) in an augmented tabletop game for senior citizens (Al

Mahmud et al., 2008), but the GEQ is too high level and does not involve aspects which are important for tabletop gaming specifically (Barbara, 2017).

Rodriguez (2006) argues that play is intrinsically motivating in itself, and the social, cognitive, and physical benefits arising from play are not seen as necessary ingredients in the motivation the play. People play purely for the experience it provides. This state, called "flow", is also associated with video games (Holt and Mitterer, 2000; Sherry, 2004; Cowley et al., 2008).

Koster (2005), a game designer, believes that the act of mastering a problem mentally is what makes a game enjoyable. A different model has been proposed by Lazzaro (2004), basing player enjoyment on four key emotions: (1) the "hard fun" found in problem solving, (2) the "easy fun" of immersion, (3) the "altered states" resulting from the play experience, and finally (4) the "people factor" obtained from the social experience. In a proposal which is based on video games, LeBlanc (2005) suggest eight kinds of fun: (1) sensation, (2) fantasy, (3) narrative, (4) challenge, (5) fellowship, (6) discovery, (7) expression, and (8) submission.

Rogerson et al. (2016) investigated the importance of materiality in tabletop games among enthusiasts. Their qualitative research suggests that a major part in the enjoyment of games is the social experience, intellectual challenge, variety, and materiality. Within materiality four domains were identified that players value: the gameboard & components, the game box, the immediate play environment (e.g. at home or in a pub), and customizing the home (e.g. framing special editions).

The most comprehensive study of hobbyist board gamers so far was done by Woods (2012). In order to understand the hobby players community, he analyzed texts produced by these players as a meta-aspect of the hobby. Besides publications focusing on hobby games, he also used discussions on BGG as a source. In addition, he conducted interviews with gamers and community representatives and published a survey on the BGG website (N = 650).

Users were asked to make a binary decision for each mechanic listed on BGG. The results indicate that not one particular mechanic stands out, but the mechanics associated with the Eurogame genre are most enjoyed. The least popular mechanisms are the ones that limit the player in making

meaningful decisions (see Appendix C) The experience provided by the use of mechanics in games was more favored in describing motivations. Therefore, Woods (2012) also surveyed what elements were favored in a game. The most important element is replayability, followed by strategic depth, tactical play, and direct player interaction. Players also believe that a game's graphical presentation is important. A game's production quality contributes to the enjoyment of the game more than its theme and innovative mechanics, although this is still important to large group in the sample. This relationship is, however, highly subjective. One element which was not deemed important in the enjoyment of a game was the presence of random elements to introduce luck and chaos. This is in line with the preference for strategy formation, which is deemed very important, as random elements reduce the possibility for it (see Appendix C). The primary aspect that forms the motivation for the enjoyment of a game is social interaction, which was chosen by 60% of the respondents (see Appendix C).

2.3.2 Tabletop Gaming Motivation Inventory (TGMI)

The Tabletop Gaming Motivation Inventory (TGMI) was developed by Mehmet Kosa & Pieter Spronck (n.d.) to gain more understanding of player engagement. Prior to the TGMI, no dedicated measurement tool existed to research these motivations. The goal of this research was to provide more perspective on the factors influencing one's motivation to play tabletop games. In addition, it aimed to develop and validate a tabletop gaming motivation questionnaire, which can be reused by other researchers interested in this area.

The TGMI measures the motivation for the following items:

- Customization
- Escapism
- Relationship
- Mastery
- Story and fantasy
- Socializing
- Competition
- Arousal
- Autonomy
- Teamwork
- Aesthetics

For more information on the abovementioned items see Appendix D.

2.4 Archetypal analysis

The archetypal analysis is an unsupervised clustering method. Rather than "typical" observations made with clustering, the aim of this analysis is to represent observations in a multivariate data set as convex combinations of extremal points (Eugster & Leisch, 2009). Each "individual" in the dataset is represented as a mixture of "individuals of pure type", otherwise known as "archetypes". As it is a human tendency to represent a group by its extreme factors, this analysis is especially interesting in applied sciences (Seth & Eugster, 2016)

Presented is a *n* x *m* matrix *X* representing a multivariate dataset with *n* observations and *m* attributes. For a given *k* the archetypal analysis finds the matrix *Z* of *k m*-dimensional archetypes according to two fundamentals:

1. The data are best approximated by convex combinations of the archetypes, i.e. they minimize RSS $= || X - \propto Z^{\top} ||_2$ with α, the coefficients of the archetypes, an *n* x *k* matrix; the elements are required to be greater equal 0 and their sum must be 1, i.e., $\sum_{j=1}^{k} \alpha_{ij} = 1$ with $\alpha_{ij} \geq 0$ and *i* = 1, …., *n*. $\|\cdot\|_2$ denotes the matrix norm.
2. The archetypes are convex combinations of the data points: $Z = X^{\top}\beta$ with β, the coefficients of the data set, a *n* x *k* matrix where the elements are required to be greater equal 0 and their sum must be 1, i.e., $\sum_{i=1}^{n} \beta_{ji} = 1$ with $\beta_{ji} \geq 0$ and *j* =1, …, *k* (Eugster & Leisch, 2009).

The archetypal analysis has already been adopted in videogame research. It is for example used to cluster players, analyze social group activities, create group games based on gaming-interest models, and to generate game bots (Sifa, Bauckhage, & Drachen, 2014).

2.5 Chapter summary

What can be derived from the theoretical framework is that there are no set rules to classify tabletop games nor its features and components. Categorizing and labeling tabletop games can be highly subjective. The same holds for the ideas on what can motivate players. The most comprehensive research by Woods (2012) suggests that for most players social interaction is the most important motivation.

CHAPTER 3: METHODOLOGY

This chapter will outline the setup for this research. It will begin by outlining the procedure on data collection in 3.1, and is followed by more information on the dataset in 3.2. Demographic information on the participants is discussed in 3.3. Section 3.4 outlines the methods and models used, and 3.5 will conclude with the used hard- and software.

3.1 Procedure

The dataset supplied by Kosa & Spronck (n.d.) was used to obtain the BGG usernames. The participants who provided their username were extracted from the dataset. Any columns that did not provide data were removed from the dataset using R. The BGG1tool (version 1.21.4) (Nand, 2018) allows to download both game and user-information from the website into an Excel file. The program downloads the games that a user rated with a 9 or higher, as well as NAs. For some reason, it was impossible for the program to avoid downloading NAs, but this was easily cleaned afterwards. The downloaded information includes additional information about each game as well such as its designers, publishers, year of publication, minimum and maximum number of players, difficulty, and playing time. See 3.2.3 Final dataset for more information.

One user was downloaded at a time, and the resulting sheets were joined manually in Excel. Only base games were downloaded, expansions were not included as this would lead to "double entries" in that an expansion will likely have similar features as the base game. Although 542 participants left their username, information was downloaded for 384 users. This is due to some reasons: (1) the username was wrong, removed, or could not be found, (2) the user did not give any ratings or not enough (high) ratings, or (3) the user had no games in the collection.

3.2 Data

All data preprocessing, cleaning, and analyses were done using RStudio (version 1.1.463).

3.2.1 Dataset cleaning

The BGG dataset supplied by Kosa & Spronck (n.d.) was created using SPSS. The file was loaded into the R environment. It contained some empty columns (recipient's last name, first name, email, external

reference). These were removed from the data frame. In addition, all users who did not supply their BGG username were removed, which resulted in a sample size of 542 participants.

The BGG1Tool converts downloaded information to a .xlsx extension. This Excel file was read into R. First, redundant columns were removed, which were “1player” to “15 player”. Because the BGG1Tool also included NA ratings, these were removed. This meant that only user submitted ratings of 9 and higher were kept in the data frame. This data frame was merged with the original BGG dataset supplied by Kosa & Spronck (n.d.).

The merged data frame contained information on 384 BGG players. Some participants had only a few games that adhere to the criteria for this research. Players with less than five games in the dataset were removed, resulting in a sample size of 334 participants with a total of 5598 games.

3.2.2 Board game genres and mechanics

According to the BGG website, there are a total of 84 different board game genres available. The games in the dataset can have up to seven categories. To make this more compact for analysis, the number of genres were compressed. The following labels were combined:

- **Book:** Book, Comic Book / Strip, Novel-based;
- **Civilization:** City Building, Civilization;
- **Economic:** Economic, Industry / Manufacturing;
- **Entertainment:** Movies / TV / Radio theme, Music, Video Game Theme;
- **Fantasy:** Fantasy and Mythology;
- **Historical:** Ancient, Medieval, Prehistoric, and Renaissance;
- **Horror:** Horror and Zombies;
- **Negotiation:** Negotiation and Political;
- **Number:** Number, Math;
- **Transportation:** Aviation/Flight, Nautical, Trains, Transportation and Travel;
- **Wargame:** American Civil War, American Indian Wars, American Revolutionary War, American West, Civil War, Pike and Shot, Korean War, Modern Warfare, (Post-)Napoleonic, Vietnam War, Wargame, and World War I & II.

Ideally, one would use a correlation technique to detect similarities between genres. However, due to the limited timeframe for this study the combinations were chosen based on judgement. This dataset consists solely of base games, so expansion for base-game and fan expansion as a genre are removed. The following labels were removed as they fit better with mechanics: card game, dice, electronic, and game system. This results in a total of 45 different genres. See Appendix A for more information.

There is a total of 53 different mechanics according to BGG. The distinction between these mechanics are clearer compared to the categories and can help to explain a game, so these are all kept. See Appendix B for more information.

3.2.3 Final dataset

The final dataset consists of all players, their highly-ranked game collection, and its corresponding information. This includes:

1. BoardGameGeek name
2. Name *(of the game)*
3. A1 fit
4. A2 fit
5. A3 fit
6. A4 fit
7. A5 fit
8. G1 fit
9. G2 fit
10. G3 fit
11. G4 fit
12. Id
13. Designer
14. Publisher
15. Artist
16. Year published
17. Minimum number of players
18. Maximum number of players
19. Playing time
20. Minimum playing time
21. Maximum playing time
22. Age
23. Users rated
24. Average
25. Rank
26. Number of comments
27. Number of weights
28. Average weight
29. Standard deviation
30. Number of people who own the game
31. Amount of trade offers for the game
32. Number of players who want the game
33. Number of players who wish for the game
34. User rating
35. Categories
36. Mechanics
37. Comment *(by the player)*
38. Description
39. Reimplement
40. Reimplemented name
41. Contains
42. Contains name
43. Is contained
44. Is contained name
45. Number of plays
46. User weight
47. Wish priority
48. Expansions
49. Domain
50. Family
51. Age poll
52. Number of plays

3.3 Participants

A separate data frame was created to obtain demographical information about the sample, where all users were only present once instead of mentioned per game. Users came from six different continents, and the majority (51%) is a citizen of the United States of America, followed by 38 users (11%) from the UK, 22 (7%) from Canada, and 13 (4%) from the Netherlands as well as Australia. See Figure 1 for a visualized map where the light grey areas refer to little or no users and darker areas to a larger set of users.

Figure 1 Visualized world map based on participant distribution

The average age of the participants was 40 years old (*SD* = 10.26). The majority (87%) was male (*N* = 291). All participants had at least a middle or high school degree. Most participants had a college degree (50%), a Master's degree (31%) or even held a doctoral title (10%). Furthermore, most of the participants had a fulltime job (78%) or were employed part-time (7%). The majority of the participants rated their income as a middle-bracket (40%) or upper-middle (29%). A small portion indicated a lower bracket (7%), lower-middle (19%), or upper-bracket income (5%). These results are consistent with those found by Woods (2012).

Participants were also asked to indicate how many days per week they play tabletop games. The majority plays approximately two to three times (52%) or zero to one time (32%) per week. A small group plays four to five times (11%) and only few play a game almost every day (4%). A lot of the players have over twenty years of history with board games (43%). Most of the participants however,

have less experience. Around 21% has been playing games for only one to five years, and 19% for six to ten years. A smaller selection has been playing games for 11 to 15 years (11%) or 16 to 20 years (6%).

The abovementioned information can be found as tables in Appendix E.

3.4 Archetypal analysis

Two archetypal analyses were performed to investigate distinct profiles in the dataset. The first analysis was run to discover archetypes based on player motivations. There is no strict rule for choosing the correct number of archetypes *k*. The analysis has been tested for *k* 1 to 9. One could use the Elbow Criterion for a scree plot, which gave ambiguous results (see Figure 2). Examining different distributions indicated *k* = 5 (Figure 4) as a good number of archetypes. The best performing model was found after 95 iterations and three repetitions with a residual sum of squares of 0.05360331.

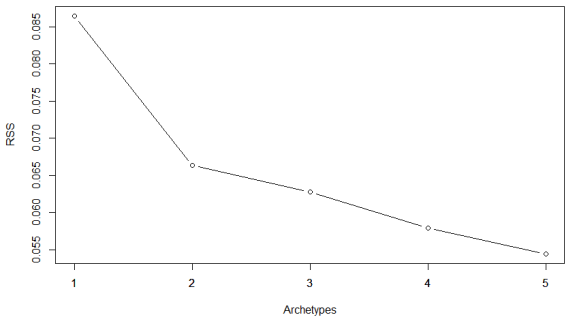


Figure 3 Scree plot for player archetypes

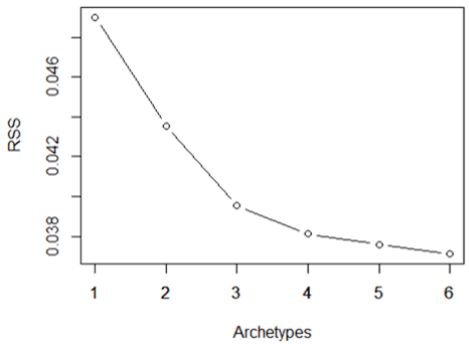


Figure 2 Scree plot for tabletop game archetypes

A similar analysis was run for the game archetypes. Based on the Elbow Criterion (Figure 3) and an assessment of the distribution of data (Figure 6), the choice was made to use *k* = 4. The best performing model was obtained after 39 iterations and three repetitions with a residual sum of squares of 0.03812.

3.5 Soft- and hardware

User-information from BGG was downloaded using BGG1tool (version 1.21.4). This information was joined together using Excel 2016. All data preprocessing, cleaning, and analyses were done using RStudio (version 1.1.463). All used packages and its purposes are listed in Table 2.

Table 2 R Packages used in this research

R Package	Version	Use
Archetypes	2.2-0.1	Archetypal Analysis
Base	3.6.0	The R Base Package
Datasets	3.6.0	The R Datasets Package
Dplyr	0.8.01	A Grammar of Data Manipulation
Graphics	3.6.0	The R Graphics Package
grDevices	3.6.0	The R Graphics Devices and Support for Colors and Fonts
Haven	2.1.0	Import and Export 'SPSS', 'Stata', and 'SAS' files
LSA	0.73.1	Latent Semantic Analysis
Methods	3.6.0	Formal Methods and Classes
Mefa	3.2-7	Multivariate Data Handling in Ecology and Biogeography
Modeltools	0.2-22	Tools and Classes for Statistical Models
Nnls	1.4	The Lawson-Hanson Algorithm for Non-Negative Least Squares (NNLS)
Openxlsx	4.1.0	Read, Write, and Edit XLSX files
rJava	0.9-10	Low-level R to Java Interface
SnowballC	0.6.0	Snowball Stemmers Based on the C 'libstemmer' UTF-8 Library
Stats	3.6.0	The R Stats Package
Stats4	3.6.0	Statistical Functions using S4 Classes
Tidyr	0.8.1	Easily Tidy Data with 'spread()' and 'gather()' functions
Utils	3.6.0	The R Utils Package

The majority of the analyses were run on an Asus Zenbook UX305FA-FC120H with an Intel(R) Core (TM) M-5Y10c (CPU @ 0.80GHz) and 4 GB RAM memory. The archetypal analysis is a computationally heavy analysis. Therefore, it was carried out on a custom-build desktop-PC with an Intel(R) Core (TM) I7-8700K (CPU @ 3.70GHz) and 16 GB RAM memory.

CHAPTER 4: RESULTS

This chapter provides the results for the three research questions. Each question is dedicated to a separate section. Section 4.1 presents the results for the archetypal analysis on players, whereas section 4.2 does the same for the games. Section 4.3 combines the results found in the previous two sections.

4.1 RQ1: The Player Archetypes

This section answers the first research question: what archetypes of players exist? The archetypal analysis revealed five different archetypes of players found in the dataset. These archetypes are plotted in a simplex plot in Figure 4 below.

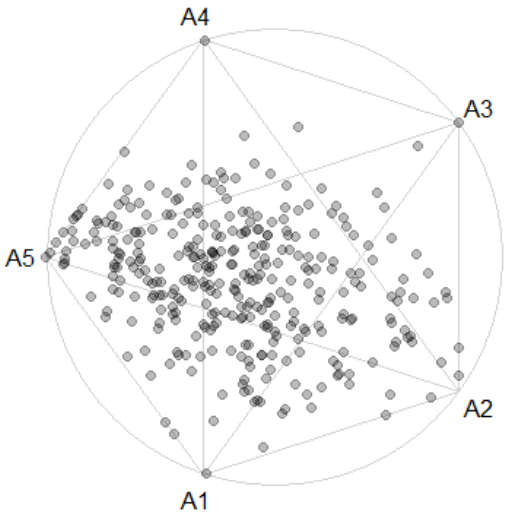
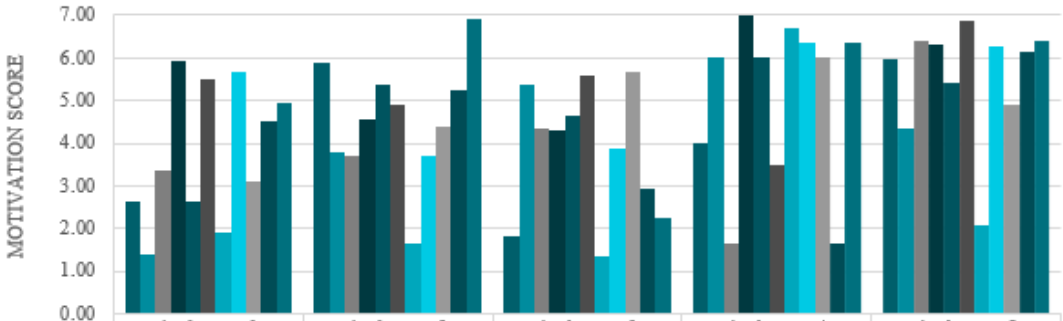


Figure 4 Simplex plot for player archetypes based on motivation

What can be derived from the simplex plot in Figure 4 is that Archetype 3 and 4 are more unique and extreme users in the dataset. There is no distinct user resembling Archetype 2, but there are multiple users closely related to this archetype. The majority of the users lie somewhere between Archetype 2 and 5, where the latter one seems to resemble the most common user. Archetype 1 also features an extreme user, but seems to have multiple players closely related. The five archetypes discovered in the dataset are plotted in Figure 5.



	Archetype 1	Archetype 2	Archetype 3	Archetype 4	Archetype 5
Customization	2.65	5.89	1.82	4.00	5.95
Escapism	1.38	3.78	5.36	6.01	4.35
Relationship	3.35	3.68	4.35	1.65	6.41
Mastery	5.93	4.55	4.28	7.00	6.33
Story & Fantasy	2.64	5.37	4.63	6.01	5.43
Socializing	5.48	4.90	5.58	3.49	6.86
Competition	1.91	1.66	1.35	6.68	2.08
Arousal	5.68	3.70	3.88	6.34	6.27
Autonomy	3.10	4.38	5.69	6.01	4.88
Teamwork	4.50	5.24	2.92	1.65	6.16
Aesthetics	4.95	6.93	2.25	6.34	6.38

Figure 5 The motivation scores for each player archetype

Each archetype represents a certain value for one of the aspects of the Tabletop Gaming Motivation Inventory (TGMI). Each score is based on a 7-scale, where 1 is a strongly disagree, and 7 is a strongly agree. What can be derived from the graph in Figure 5 is that aesthetics is a major important component in the motivation to play games, where only for Archetype 3 the score is lower. For most of the archetypes, socializing is another key motivation. This is consistent with the results found by Woods (2012). The precise scores can be found in Figure 5 below the graphs. More information on the measurement of the motivations can be found in Appendix C.

4.1.1 Profile for each archetype

This section will briefly summarize each archetype.

Archetype 1: The "Try Everything" Player

The first defined archetype does not have extremely distinctive scores, making this a player who probably likes to try multiple types of games. Playing games does excite this player quite a lot, and the social aspects of gaming are important as well.

Archetype 2: The Tactile Player

This player scores high on aesthetics (6.93) and customization (5.89). This infers that this player likes games which are aesthetically pleasing, but also of high quality. In addition, customizability gives this player extra motivation to collect additional pieces and miniatures.

Archetype 3: The Abstract Player

This player prefers to play abstract games such as *Chess*, where customizability (1.82) and aesthetics (2.25) are not that important. A high score for autonomy & exploration (5.69) suggests this player likes games with a lot of choices, but does not like it when a game has too many constraints. The high score for socializing (5.58) can be explained as player interaction is highly important for abstract games. Lewis Pulsipher (2009) suggests that the systems of most abstract games can be understood after only one play. The intellectual challenge can then be assumed to be the player interaction arising from these systems.

Archetype 4: The (Individual) Competitive Player

This player is characterized by a high score for competition (6.68) and mastery (7.00), indicating that this player is playing to win. Preferably, this player does not game in team formation, but solo against the others. This is derived from the low score for teamwork and relationship (1.65). During a game this player does not prefer to help others, and he does not care for a personal relationship with his fellow players.

Archetype 5: The Sociable Player

This player is characterized by a high score for socializing (6.86), relationship (6.41), and teamwork (6.16). The main motivation to play games is the social aspect of it, including chatting and getting to know the other players, building personal relationships, and supporting the others players.

4.2 RQ2: The Game Archetypes

This section answers the second research question: what archetypes of games exist? In addition to defining archetypes in player motivations, another archetypal analysis was performed to discover archetypes for games based on each game's categories and mechanics. This resulted in four distinct archetypes.

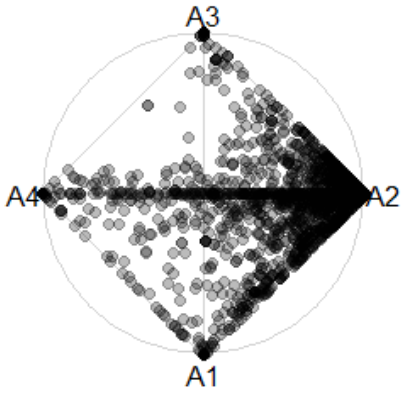
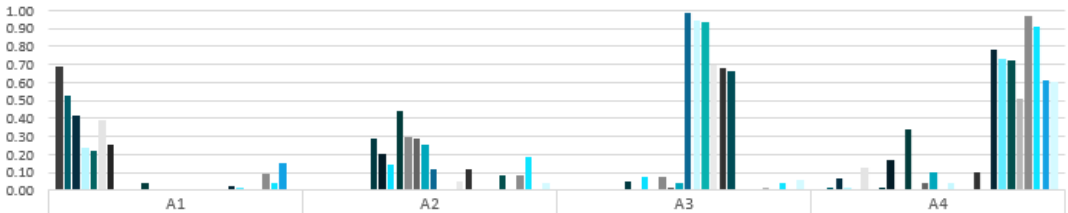


Figure 6 Simplex plot for archetypes based on games

What can be deduced from the plot (Figure 6) is that the majority of the games conform Archetype 2, or are somewhere between Game Archetype 1 and 2, Game Archetype 2 and 3, or Game Archetype 3 and 4. Not many games share features common for Archetype 3 and 4.

Figure 7 shows the features that were most present in each game archetype along with the fit for each archetype. Because an archetypal analysis looks for extreme representations in the data, there is little overlap in favored features for each archetype. This is especially true for the game categories. Some mechanics are popular for all sorts of games and have some fit with multiple archetypes.



	A1	A2	A3	A4
Party game	0.69	0.00	0.00	0.00
Deduction	0.53	0.00	0.00	0.02
Bluffing	0.42	0.00	0.00	0.07
Humor	0.24	0.01	0.00	0.02
Trivia	0.22	0.00	0.00	0.00
Partnerships	0.39	0.00	0.00	0.13
Voting	0.26	0.00	0.00	0.00
Historical	0.00	0.29	0.05	0.02
Wargames	0.00	0.20	0.00	0.17
Civilization	0.00	0.14	0.07	0.00
Hand management	0.04	0.44	0.00	0.34
Set collection	0.01	0.30	0.07	0.00
Card drafting	0.00	0.29	0.02	0.04
Area control / influence	0.00	0.25	0.04	0.10
Economic	0.00	0.12	0.99	0.00
Transportation	0.00	0.00	0.95	0.04
Route network building	0.00	0.00	0.93	0.00
Auction / bidding	0.00	0.05	0.70	0.00
Tile placement	0.01	0.12	0.68	0.10
Stock holding	0.00	0.00	0.66	0.00
Fighting	0.02	0.01	0.00	0.78
Adventure	0.02	0.00	0.00	0.73
Fantasy	0.00	0.09	0.00	0.72
Exploration	0.00	0.00	0.01	0.51
Variable player powers	0.10	0.08	0.01	0.97
Dice rolling	0.04	0.19	0.04	0.91
Cooperative play	0.15	0.00	0.00	0.61
Modular board	0.00	0.05	0.06	0.60

Figure 7 Game features for each game archetype

The results presented in Figure 7 can be used to summarize each game archetype.

Game Archetype 1: The Party Game

The most common category for this archetype is party game (0.69), followed by deduction (0.53), bluffing (0.42), humor (0.24) and trivia (0.22). Partnerships is the most common mechanic (0.39), followed by voting (0.26). Other popular mechanics include features that can be described as typical for party games such as cooperative play and acting.

Some games that score high for this archetype are *Deception: Murder in Hong Kong*, *Spyfall*, *Secret Hitler*, *Linq*, and *Codenames*. A list of the top 50 games can be found in Appendix F.

Game Archetype 2: The Medium-Light Eurogame

Game Archetype 2 is the least clearly defined archetype. It contains several low scoring tags such as historical (0.29), wargames (0.20) and civilization (0.14) games. Other low scores are for tags which are not really corresponding to any of the other archetypes, making it a bit of a residual category. The most popular mechanic is hand management (0.44), followed by set collection (0.30), card drafting (0.29) and area control / influence (0.25).

Some games that score high for this archetype are *Stone Age*, *Azul*, *Great Western Trail*, *7 Wonders Duel*, and *Lords of Waterdeep*. A list of the top 50 games can be found in Appendix F.

Game Archetype 3: The Economic Game

Game Archetype 3 contains two very high-scoring categories: economic (0.99) and transportation (0.95). All other categories score significantly lower for this archetype. The most common mechanic is route network building (0.93), auction / bidding (0.70), tile placement (0.68), and stock holding (0.66).

Some games that score high for this archetype are all *18xx* games. A list of the top 50 games can be found in Appendix F.

Game Archetype 4: The Thematic Game

This archetype is a more extreme point in the dataset. The most dominant categories are fighting (0.78), adventure (0.73), fantasy (0.72) and exploration (0.51). For mechanics these are variable player powers (0.97), dice rolling (0.91), cooperative play (0.61) and a modular board (0.60).

Some games that score high for this archetype are *Mansions of Madness*, *Gloomhaven*, *Dungeons & Dragons*, and *Descent: Journeys in the Dark*. A list of the top 50 games can be found in Appendix F.

4.2 RQ3: The Linked Archetypes

This section answers the third research question: how can the archetypes be used to tie in tabletop gaming motivations with game genre and game mechanics?

To answer this question two matrices were constructed. Both are based on the sum of each player archetype fit multiplied by each game archetype fit. The first matrix in Table 3 has been normalized over the rows.

Table 3 Matrix with average archetype fit for each combination (normalized over rows)

	"Try Everything" player	Tactile player	Abstract player	Competitive player	Sociable player
Party game	0.19	0.21	0.16	0.10	0.35
Medium-Light Eurogame	0.21	0.18	0.16	0.10	0.35
Economic game	0.18	0.20	0.16	0.10	0.36
Thematic game	0.20	0.16	0.18	0.09	0.37

What can be derived from the results in Table 3 is that all the game archetypes fit well with the sociable player archetypes. The other scores do not differ much. The medium-light Eurogame seems to be a good fit for the "try everything" player. None of the games seem to fit the preferences of the competitive player.

The second matrix has been normalized over the columns. See Table 4 for more information.

Table 4 Matrix with average archetype fit for each combination (normalized over columns)

	"Try Everything" player	Tactile player	Abstract player	Competitive player	Sociable player
Party game	0.47	0.51	0.47	0.48	0.48
Medium-Light Eurogame	0.25	0.22	0.23	0.23	0.23
Economic game	0.20	0.21	0.21	0.22	0.21
Thematic game	0.08	0.06	0.09	0.08	0.08

What can be derived from the results in Table 4 is that all player archetypes seem to have a preference for party games, where the tactile player would prefer this game archetype the most. The medium-light Eurogame is the second favorite game archetype for all player archetypes as well. None of the players seem to appreciate the thematic game archetype.

CHAPTER 5: DISCUSSION

This chapter will discuss the results found for each research question in Chapter 4: Results. These questions were formulated to answer the problem statement of this study:

To what extent can the relation between gaming motivation, game genre and game mechanics be unfolded?

5.1 Research question 1: What archetype of players exist?

The results for the first research question indicate that five different player archetypes exist within the dataset: (1) the "try everything" player, (2) the tactile player, (3) the abstract player, (4) the (individual) competitive player, and the (5) sociable player.

The most extreme archetypes in this dataset are the abstract and competitive players. According to BGG, an "abstract game" often refers to games of perfect information with alternating turns and no randomness (e.g. *Chess* and *Go*), or to games without a theme (e.g. *Backgammon* and *Tantrix*) (BoardGameGeek, n.d.). Abstract games are a smaller portion of the total games on BGG compared to some other labels, which can explain why this is a more distinct archetype. However, it does not explain the preference for thematic games in Table 4.

The (individual) competitive player is characterized by a motivation to win games, and preferably as a solo player rather than in team formation. As Woods (2012) found in his survey (Appendix C, figure 7.4)Information presented in Woods (2012), winning is not the most important aspect of play for the majority of the BGG community. Most of the participants (approximately 60%) indicated that social interaction is the most pleasuring. This also explains why far more players are approximated around the sociable player archetype. Similarly, this information (figure 7.4) can be used to explain the averaged distribution around the tactile player archetype. Attributes surrounding this archetype, e.g. interesting theme and attractive components, were ranked somewhere in the middle.

The "try everything" player is the archetype with the least distinctive scores, and is thus a bit of a residual category. The player representing this archetype (with a fit of 99%) plays games such as *Puerto*

Rico and *Twilight Struggle*. Most of his games correspond to the party game or medium-light Eurogame archetypes.

5.2 Research question 2: What archetype of games exist?

The results for the second research question indicate four different archetypes exist within the dataset: the party game, the medium-light Eurogame, the economic game, and the thematic game.

Most of the games share similarities with the medium-light Eurogame archetype (alternatively called designer board games, German-style board games, family strategy game, or hobby game). This is one of the most popular classifications on BGG. Examples of such games include *The Settlers of Catan* and *Carcassonne*.

Eurogames have characteristics that make it well suited for social interaction, where there is usually no fixed number of players and the game is easy to explain. Not all Eurogames are necessarily European, nor do they have to be boardgames. There are some elements by which Eurogames can be defined, but a game does not necessarily have to fit all criteria. Player conflict is indirect and combat is rare, more often the game involves competition over resources or points. This is also suggested by the archetypal analysis (Figure 7). No player is eliminated from the game during play. In addition, there is very little randomness and luck involved. Research by Woods (2012) and Kosa & Spronck (n.d.) previously suggested randomness and luck is not a favored feature of a game. Artwork and components are typically of high quality. An Eurogame's theme often has little to do with its gameplay. A game about space may use similar mechanics as a game about history. Woods (2012) adds to this that information is usually imperfect, and the duration is often between one or two hours. In general, Eurogames require a bit more thought and strategy compared to party games, which is the second most popular archetype.

The party game archetype are games that encourage social interaction, and are generally easy to set up and play. Usually, the games can be played with a large group of people and in a relatively short amount of time. Social interaction is suggested to be the most important motivator. It is not uncommon to have team-based play. Examples of games are *Codenames* and *Time's Up!* (BoardGameGeek, 2019).

Another interesting result from the archetypal analysis is that there seems to be that little to none similarities are shared between the economic and thematic game archetypes. What can be derived from Figure 7 is that both have very high distinctive fits with a certain feature, where the first two archetypes (party and medium-light Eurogames) have relatively lower scores. This makes it two very different archetypes. The economic game archetype also includes wargames. These games are usually very detailed, which does not appeal to a typical thematic player. It also has a high fit for games with a transportation theme. The main goal of an economic game is to develop and manage a system of production, distribution, and trade. The highest scoring mechanics for these games are typical for the categories: route network building, auction / bidding, tile placement, and stock holding.

Thematic games (sometimes called Ameritrash) have a highly integrated theme, characters with defined abilities, player to player conflict, and some level of luck. Well-known thematic games include *Battlestar Galactica* and *Twilight Imperium* (BoardGameGeek, n.d.). Categories are focused on adventure, fantasy, or fighting. A distinctive component of thematic games can be a modular board.

According to BGG thematic games and Eurogames focus on very different aspects of gaming. Where the Eurogames focus on well-balanced play with a minimal theme and abstract mechanics, the thematic games focus on the theme and gameplay (BoardGameGeek, n.d.). However, the archetypal analysis does suggest some overlap between both archetypes. Several forums on BGG address this observation. As science fiction and fantasy elements are entering mainstream entertainment more, it blurs genre lines. This is referred to as a hybrid game (Edelen, 2012; Probulski, 2019; Spain, 2013; Vodkaman, 2016).

5.3 Research question 3: How can the archetypes be used to tie in tabletop gaming motivations with game genre and game mechanics?

Table 3 suggests that all game archetypes fit well with the sociable player archetype. As previously mentioned, the social aspect of playing games is very important, which can explain the higher scores. The medium-light Eurogame seems to be a good fit with the “try everything” player, which is logical as this is a broad category and speaks to a lot of players. None of the game archetypes seem to be made

for the (individual) competitive player. It could be that adding more archetypes (i.e. increasing to $k = 5$ or higher) might discover a game archetype fit for the competitive player. The remainder of the scores within this matrix do not seem to have a certain preference.

In Table 4 the party game is indicated as the most popular archetype for all players. Even though a lot of party games are thought of as being too simplistic by the BGG community, there are a lot of games which have this label, including some "light entertainment" games such as *the Resistance*. Such games are very popular and accessible, and therefore occur more often in the dataset. Thematic games are the least appreciated for all player archetypes. However, there are fewer thematic games compared to the other game archetypes. In addition, players would mainly rate a thematic game for its theme. If a player does not like a certain theme that game will not receive a high rating or it will not be played at all.

What can be concluded from both matrices is that the ratios between each player and game archetype are quite similar. This infers that players give a "good" game a high rating, regardless of its type. Ratings seem to represent a game's quality rather than personal preferences. These results are not enough to clearly link each player archetype to a game archetype. More information, such as the number of plays or a combination of different ratings, could help in this regard.

CHAPTER 6: CONCLUSION

This chapter will conclude the results found for each research question in Chapter 4: Results and its corresponding discussion section in Chapter 5: Discussion, as well as the problem statement guiding this research. Section 6.2 will outline the academic contribution and future research.

6.1 Conclusions

RQ1: *What archetypes of players exist?*

Five archetypes were found in the dataset. Mind that these archetypes are based on a community of hobby gamers and may not fully represent all tabletop players. The five archetypes are: the "try everything" player, the tactile player, the abstract player, the (individual) competitive player, and the sociable player.

RQ2: *What archetypes of games exist?*

Four archetypes of games were discovered in the dataset: the party game, the medium-light Eurogame, the economic game, and the thematic game.

RQ3*: How can the archetypes be used to tie in gaming motivations with game genre and game mechanics?*

With the current analysis there is not enough information to thoroughly support claims. The differences between the ratios are too small. What can be concluded based on this information is that a game appears to be objectively good, and this is recognized by the player archetypes. Even when they may not have played a game a lot, they can still give it a high rating.

The abovementioned questions were formulated to answer the problem statement of this study:

To what extent can the relation between gaming motivation, game genre and game mechanics be unfolded?

This study has been able to partially unfold this relation. The Tabletop Gaming Motivation Inventory has been used to determine player archetypes. This allowed to gain insight into what types of player exist in the dataset and what motivates them to play certain games.

Similarly, the game archetypes revealed more information on the genres and mechanics that belong to each game archetype. However, further analysis is necessary to tie both these results together to form a strong conclusion for this problem statement. One possible way to do this is by accounting for the number of times a player has actually played the game or combine multiple different ratings. With this current approach it can only be concluded that every player can see the value in a "good" game, regardless of its type.

6.2 Contribution and future research

Due to the limited timeframe of this study there are some improvements that could be made. The current dataset only holds games that have been rated with a nine or higher. Not all players will give such scores to games. A game rated with an eight for one player could be similar to a ten for the other. It can be worthy to look into the number of plays, especially to further discover the underlying relation between the archetypes. In addition, it might be interesting to also see which games each archetype really dislikes. This will help to further complete the profile surrounding each archetype. There is a lot of unused information present in the dataset. It could be interesting to see if there are any relations between the archetypes and for example designers, number of players, or play time. Furthermore, a different number of *k* archetypes might lead to other results. Finally, it should be kept in mind that the participants in this dataset are mostly "fanatic" gamers who enjoy playing and collecting games, which can affect external validity.

Consumers nowadays face an overload of choice. The results of the archetypal analysis can also be used to develop a recommender system. Something similar has been done for computer games by Sifa, Bauckhage, and Drachen (2014), who developed a Top-L recommender system based on items the player owns. Some recommender systems for tabletop games already exist, mainly developed by hobbyists. The majority of these use collaborative filtering techniques based on user-ratings for

predictions (D'Agostino, 2017; "Board Game Finder", n.d.), or find a game based on preferred game length, size of group, and player ages ("Board Games For Me", n.d.).

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APPENDIX A

Game genres according to BGG

See description on BGG.

1. Abstract Strategy
2. Action / Dexterity
3. Adventure
4. Age of Reason
5. American Civil War
6. American Indian Wars
7. American Revolutionary War
8. American West
9. Ancient
10. Animals
11. Arabian
12. Aviation / Flight
13. Bluffing
14. Book
15. Card Game
16. Children's Game
17. City Building
18. Civil War
19. Civilization
20. Collectible Components
21. Comic Book / Strip
22. Deduction
23. Dice
24. Economic
25. Educational
26. Electronic
27. Environmental
28. Expansion for Base-game
29. Exploration
30. Fan Expansion
31. Fantasy
32. Farming
33. Fighting
34. Game System
35. Horror
36. Humor
37. Industry / Manufacturing
38. Korean War
39. Mafia
40. Math
41. Mature / Adult
42. Maze
43. Medical
44. Medieval
45. Memory
46. Miniatures
47. Modern Warfare
48. Movies / TV / Radio theme
49. Murder / Mystery
50. Music
51. Mythology
52. Napoleonic
53. Nautical
54. Negotiation
55. Novel-based
56. Number
57. Party game
58. Pike and Shot
59. Pirates
60. Political
61. Post-Napoleonic
62. Prehistoric
63. Print & Play
64. Puzzle
65. Racing
66. Real-time
67. Religious
68. Renaissance
69. Science Fiction
70. Space Exploration
71. Spies/Secret Agents
72. Sports
73. Territory Building
74. Trains
75. Transportation
76. Travel
77. Trivia
78. Video Game Theme
79. Vietnam War
80. Wargame
81. Word Game
82. World War I
83. World War II
84. Zombies

Game genres in this study

Every italicized category has been combined in the abovementioned category.

1. Abstract Strategy
2. Action / Dexterity
3. Adventure
4. Age of Reason
5. Animals
6. Arabian
7. Bluffing
8. Book:
    a. *Book*
    b. *Comic Book / Strip*
    c. *Novel-based*
9. Children's Game
10. Civilization:
    a. *City Building*
    b. *Civilization*
11. Collectible Components
12. Deduction
13. Economic:
    a. *Economic*
    b. *Industry / Manufacturing*
14. Education
15. Entertainment:
    a. *Movies / TV / Radio theme*
    b. *Music*
    c. *Video Game Theme*
16. Environmental
17. Exploration
18. Fantasy:
    a. *Fantasy*
    b. *Mythology*
19. Farming
20. Fighting
21. Historical:
    a. *Ancient*
    b. *Medieval*
    c. *Prehistoric*
    d. *Renaissance*
22. Horror:
    a. *Horror*
    b. *Zombies*
23. Humor
24. Mafia
25. Mature / Adult
26. Maze
27. Medical
28. Memory
29. Miniatures
30. Murder / Mystery
31. Negotiation
32. Number:
    a. *Number*
    b. *Math*
33. Party Game
34. Pirates
35. Print & Play
36. Puzzle
37. Racing
38. Real - time
39. Religious
40. Science Fiction
41. Space Exploration
42. Spies / Secret Agents
43. Sports
44. Territory Building
45. Transportation:
    a. *Aviation / Flight*
    b. *Nautical*
    c. *Trains*
    d. *Transportation*
    e. *Travel*
46. Trivia
47. Wargame:
    a. *American Civil War*
    b. *American Indian Wars*
    c. *American Revolutionary War*
    d. *American West*
    e. *Pike and Shot*
    f. *Korean War*
    g. *Modern Warfare*
    h. *Napoleonic*
    i. *Post-Napoleonic*
    j. *Vietnam War*
    k. *Wargame*
    l. *World War I*
    m. *World War II*
48. Word Game

APPENDIX B

Game mechanics according to BGG

See description on BGG.

1. Acting
2. Action / Movement Programming
3. Action Point Allowance System
4. Area Control / Area Influence
5. Area Enclosure
6. Area Movement
7. Area-Impulse
8. Auction / Bidding
9. Betting / Wagering
10. Campaign / Battle Card Driven
11. Card Drafting
12. Chit-Pull System
13. Commodity Speculation
14. Cooperative Play
15. Crayon Rail System
16. Deck / Pool Building
17. Dice Rolling
18. Grid Movement
19. Hand Management
20. Hex-and-Counter
21. Hidden Traitor
22. Line Drawing
23. Memory
24. Modular Board
25. Paper-and-Pencil
26. Partnerships
27. Pattern Building
28. Pattern Recognition
29. Pick-up and Deliver
30. Player Elimination
31. Point to Point Movement
32. Press Your Luck
33. Rock-Paper-Scissors
34. Role Playing
35. Roll / Spin and Move
36. Rondel
37. Route / Network Building
38. Secret Unit Deployment
39. Set Collection
40. Simulation
41. Simultaneous Action Selection
42. Singing
43. Stock Holding
44. Storytelling
45. Take That
46. Tile Placement
47. Time Track
48. Trading
49. Trick-taking
50. Variable Phase Order
51. Variable Player Powers
52. Voting
53. Worker Placement

APPENDIX C

Information presented in Woods (2012)

Figure 7.2 (pg. 150): To what degree do you generally enjoy the following mechanics/game styles in board and table games? (summarized for clarity).

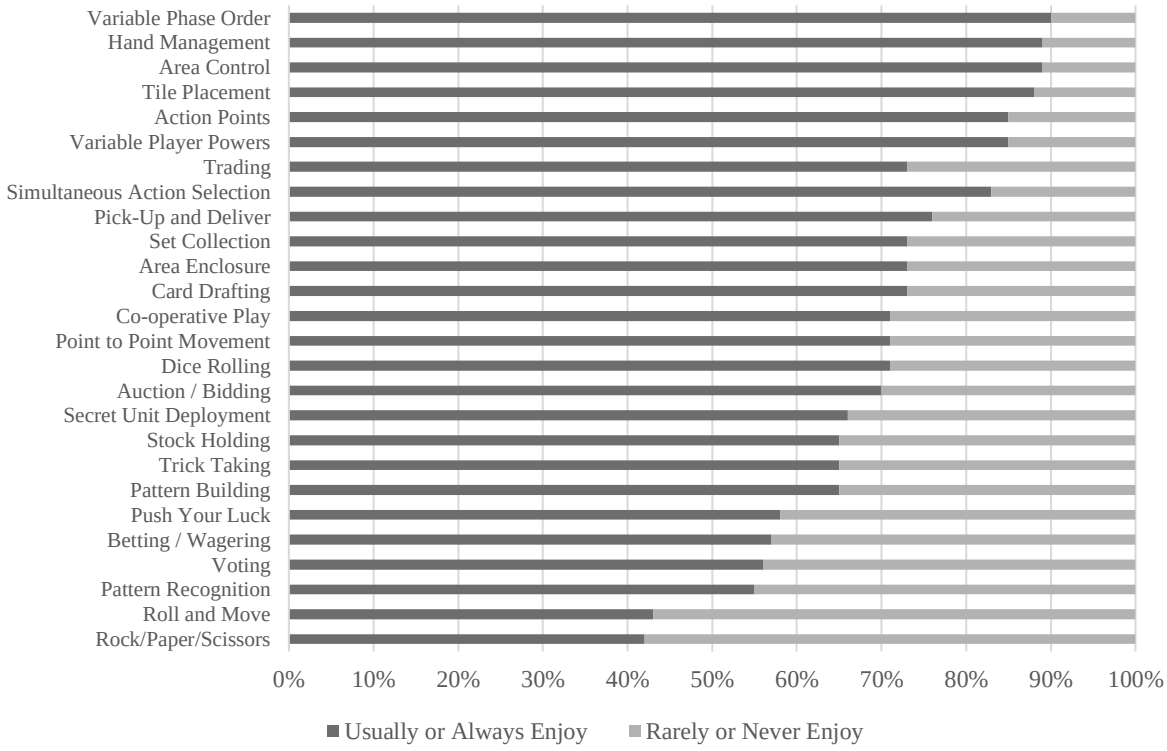


Figure 7.3 (pg. 151): To what degree is the presence of the following elements important to your enjoyment of board and table games?

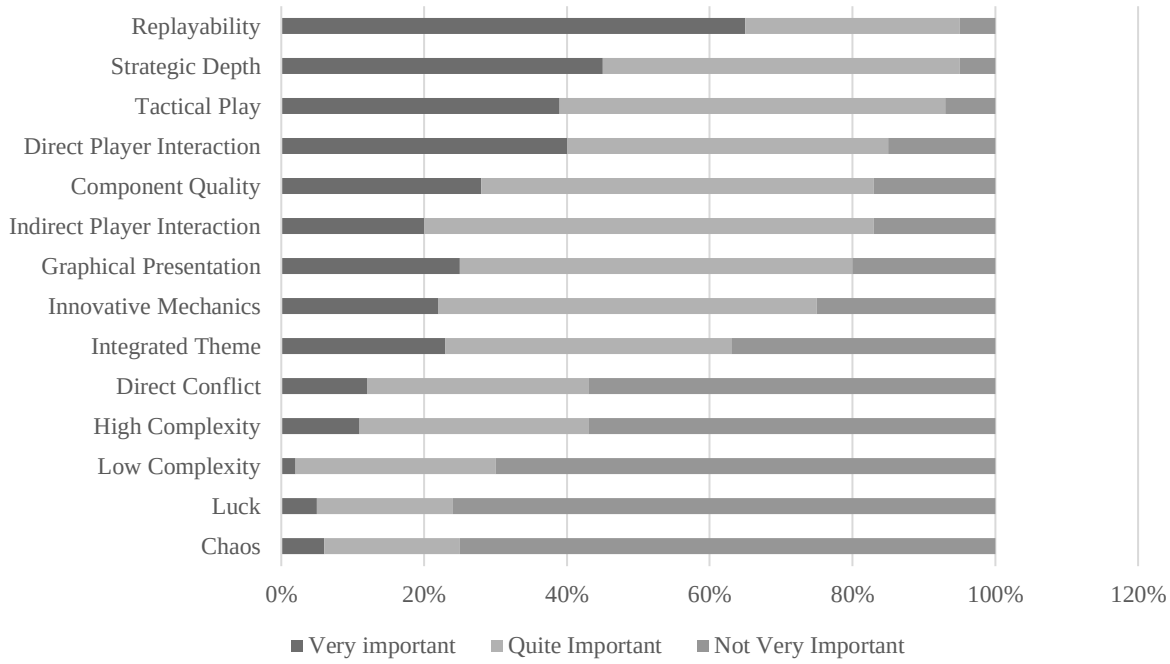
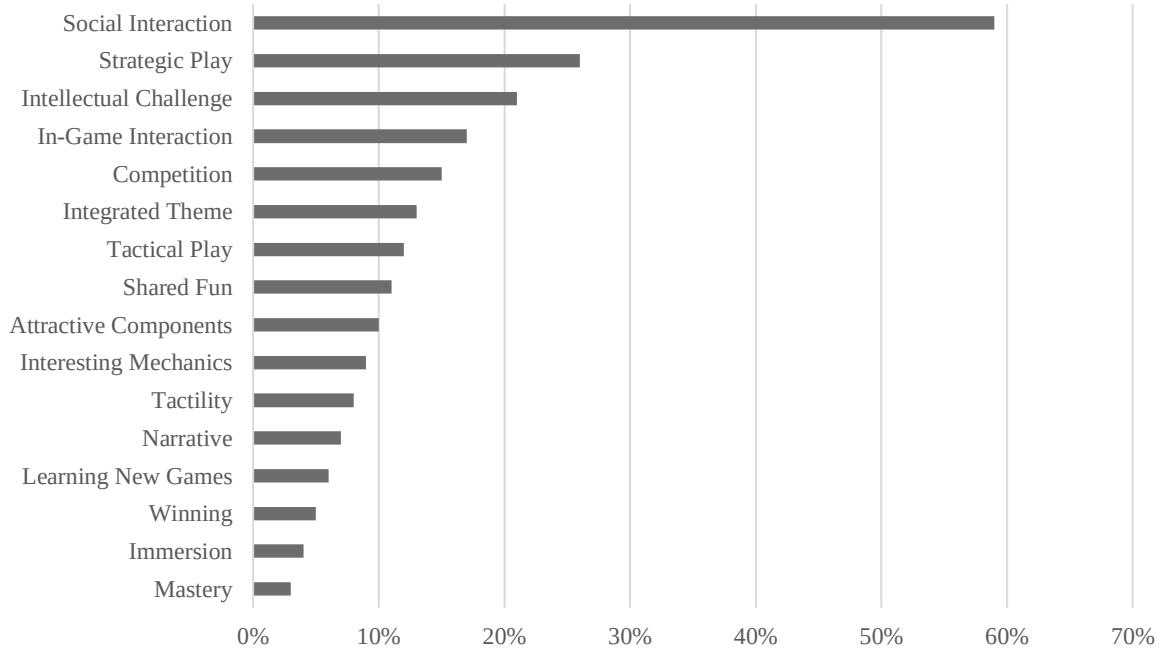


Figure 7.4 (pg. 167): From what aspects of play do you derive the most pleasure generally? (open-ended).



APPENDIX D

Information on measured motivation items in the TGMI.

Every item in the TGMI corresponds to a set of statements which users could rate on a scale of 1 (strongly disagree) to 7 (strongly agree).

Customization:
- CUSTOMIZATION2 I like to make my board games prettier.
- CUSTOMIZATION3 I like to improve the components of my board games.

Escapism:
- ESCAPISM1 I like to play board games because it allows me to escape from the problems with everyday life.
- ESCAPISM2 I play board games because it allows me to escape real life.
- ESCAPISM3 I play board games to keep my mind of my problems.

Relationship:
- RELATIONSHIP1 I talk to my board gaming friends about my personal issues.
- RELATIONSHIP2 My board gaming friends offer me support when I have a real-life problem.
- RELATIONSHIP3 I find myself having meaningful conversations with other players.

Completion and challenge:
- COMPLETION2 I like to understand all aspects of a board game that I am playing.
- COMPLETION3 I like to figure out all possible strategies when playing board games.
- MASTERY1 I find it very rewarding to get better in a board game.
- MASTERY2 I feel proud when I master an aspect of a board game.

Story and fantasy:
- STORY1 Board game stories are important to me.
- STORY2 Stories in board games just get in the way (r).
- STORY3 I am excited to find out what happens next in the story of a boardgame.
- 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 boardgame.
- FANTASY3 I enjoy the excitement of assuming an alterego in a game.
- CUSTOMIZATION1 I like to personalize my character if the game allows it.

Socializing:
- SOCIALIZING1 I enjoy getting to know other players.
- SOCIALIZING2 I enjoy chatting with other players.

Loss aversion and competition:
- LOSSAVERSION1 Losing is frustrating and detracts from my experience.
- LOSSAVERSION2 Losing is not fun.
- LOSSAVERSION3 Losing a game always makes me mad – what a waste of time.
- COMPETITION1 It is important to me to be the most skilled person playing the game.
- COMPETITION2 I like to play to prove to my friends that I am the best.
- COMPETITION3 I get upset when I lose to my friends.

Arousal:
- AROUSAL1 I play board games because they excite me.
- AROUSAL2 Board games keep me on the edge of my seat.
- AROUSAL3 I find that playing board games raises my level of adrenaline.

Autonomy and exploration:
- AUT_EXP1 I prefer board games that allow me to play however I want.
- AUT_EXP2 I like board games that do not put a lot of constraints on the player.

- AUT_EXP3 I like board games that offer you a lot of options and choices.

Teamwork:

- TEAMWORK1 I would rather play as part of a team than solo.
- TEAMWORK3 It is important to me that I can support other players well.
- SOCIALIZING3 I enjoy helping other players.

Aesthetics:

- AESTHETICS1 I like to play board games that have nice components.
- AESTHETICS2 The color, shape, and feel of the components of a board game are important for me.
- AESTHETICS3 I care if the board looks beautiful or not.

APPENDIX E

Demographical information on participants (*N* = 334)

Age: What is your age?

Min	Median	Mean	Max	*SD*
17.00	38.00	39.55389	78.00	10.26182

Gender: What is your gender?

Gender	Male	Female	Other	Prefer not to say
N	291	38	2	3
Percentage	87.13%	11.37%	0.60%	0.90%

Education: what is your education level?

Education	Elementary	Middle/High School	College	Master	Doctorate
N	0	26	168	105	35
Percentage	--	7.78%	50.30%	31.44%	10.48%

Employment: What is your employment situation?

Employment	Employed full time	Employed part time	Unemployed looking for work	Unemployed not looking for work	Retired	Student	None of the above
N	261	22	10	7	6	15	13
Percentage	78.14%	6.59%	2.99%	2.10%	1.80%	4.50%	3.89%

Income: How would you rate your income bracket?

Bracket	Lower	Lower-middle	Middle	Upper-middle	Upper
N	23	62	133	98	18
Percentage	6.89%	18.56%	39.82%	29.34%	5.39%

Days per week: How many days on average do you play per week?

Days	0-1	2-3	4-5	6-7
N	23	62	133	98
Percentage	6.89%	18.86%	39.82%	29.34%

Years of playing: For how many years have you been playing boardgames?

Years	1-5	6-10	11-15	16-20	More than 20
N	69	63	36	20	146
Percentage	20.66%	18.86%	10.78%	5.99%	43.71%

Country: In which country do you reside?

Country	***N***	**%**	**Country**	***N***	**%**
Australia	13	3.89%	Austria	4	1.20%
Belgium	7	2.10%	Brazil	1	0.30%
Bulgaria	1	0.30%	Canada	22	6.59%
Colombia	1	0.30%	Czech Republic	1	0.30%
Denmark	4	1.20%	Dominican Republic	1	0.30%
Finland	3	0.90%	France	5	1.50%
Gabon	1	0.30%	Germany	12	3.59%
Guatemala	1	0.30%	Iceland	1	0.30%
Ireland	1	0.30%	Israel	1	0.30%
Italy	6	1.80%	Japan	2	0.60%
Lithuania	1	0.30%	Mexico	2	0.60%
Netherlands	13	3.89%	New Zealand	2	0.60%
Norway	1	0.30%	Peru	1	0.30%
Poland	3	0.90%	Serbia	1	0.30%
Slovakia	1	0.30%	South Africa	2	0.60%
Spain	4	1.20%	Sweden	4	1.20%
Turkey	2	0.6%	United Kingdom of Great Britain & Northern Ireland	38	11.38%
United States of America	171	51.20%			

Country: In which country were you born?

Country	***N***	**%**	**Country**	***N***	**%**
Australia	10	2.99%	Austria	4	1.20%
Belarus	1	0.30%	Belgium	8	2.40%
Brazil	1	0.30%	Canada	19	5.69%
Cape Verde	1	0.30%	Costa Rica	2	0.60%
Czech Republic	1	0.30%	Denmark	5	1.50%
Dominican Republic	1	0.30%	Finland	4	1.20%
France	5	1.50%	Germany	13	3.89%
Guatemala	1	0.30%	Iceland	1	0.30%
India	1	0.30%	Italy	5	1.50%
Japan	2	0.60%	Jordan	2	0.60%
Lebanon	1	0.30%	Lithuania	1	0.30%
Mexico	2	0.60%	Netherlands	11	3.29%
New Zealand	3	0.90%	Norway	1	0.30%
Peru	1	0.30%	Philippines	1	0.30%
Poland	3	0.90%	Serbia	1	0.30%
Singapore	1	0.30%	Slovakia	1	0.30%
South Africa	1	0.30%	Spain	4	1.20%
Sweden	3	0.90%	Turkey	2	0.60%
United Kingdom of Great Britain and Northern Ireland	40	11.98 %	United States of America	168	50.3%

APPENDIX F

List of top 50 games for the Game Archetypes

Game Archetype 1: The Party Game

Game	A1 fit		
Deception: Murder in Hong Kong	0.998	Dixit: Odyssey	0.98
Spyfall	0.998	Monikers	0.978
Ultimate Werewolf: Deluxe Edition	0.998	Codenames	0.976
The Resistance	0.998	1000 Blank White Cards	0.974
Two Rooms and a Boom	0.998	Telestrations	0.972
Secret Hitler	0.998	Wits & Wagers	0.969
Spyfall 2	0.998	Escape the Room: Mystery at the Stargazer's Manor	0.967
Ultimate Werewolf: Ultimate Edition	0.998	A Fake Artist Goes to New York	0.959
One Night Ultimate Werewolf	0.997	Time's Up! Title Recall!	0.947
The Resistance: Avalon	0.997	Wise and Otherwise	0.94
One Night Ultimate Werewolf Daybreak	0.997	Time's Up!	0.935
Werewords	0.997	Time's Up! Deluxe	0.935
Werewords Deluxe Edition	0.997	Decrypto	0.914
Linq	0.997	Utter Nonsense: Naughty Edition	0.914
Insider	0.997	Internal Affairs	0.896
Off Your Rocker	0.997	Roots: A Game of Inventing Words	0.886
Dixit: Journey	0.997	Mafia de Cuba	0.876
Beyond Balderdash	0.997	When I Dream	0.871
Stolen Hearts	0.997	Mysterium	0.868
Don't Mess with Cthulhu	0.997	Sherlock Holmes Consulting Detective: Carlton House & Queen's Park	0.864
Funemployed	0.997	Sherlock Holmes Consulting Detective: Jack the Ripper & West End Adventures	0.864
Balderdash	0.997	Ugg-Tect	0.857
Guesstures	0.997	Lap Dance	0.84
Letters from Whitechapel	0.981	Dixit	0.836

Game Archetype 2: The Medium-Light Eurogame

Game	**A2 fit**		
Stone Age	0.997	Hannibal: Rome vs. Carthage	0.997
Azul	0.997	Olympus	0.997
Great Western Trail	0.997	San Marco	0.997
7 Wonders Duel	0.997	The Great Dalmuti	0.997
Dominion	0.997	Lewis & Clark	0.997
Lords of Waterdeep	0.997	Here, Kitty, Kitty!	0.997
Pax Renaissance	0.997	Coimbra	0.997
7 Wonders	0.997	El Gaucho	0.997
Agricola	0.997	Architects of the West Kingdom	0.997
Bios: Megafauna (Second Edition)	0.997	Catan Card Game	0.997
Combat Commander: Europe	0.997	Bunny Kingdom	0.997
Village	0.997	Ginkgopolis	0.997
Everdell	0.997	Karmaka	0.997
Caesar & Cleopatra	0.997	Fabled Fruit	0.997
Dominion: Intrigue	0.997	Saint Petersburg (second edition)	0.997
Jaipur	0.997	A Few Acres of Snow	0.997
La Isla	0.997	Rise of Empires	0.997
Samurai	0.997	Dream Home	0.997
Bohnanza	0.997	Songbirds	0.997
Trajan	0.997	Samurai	0.997
Glory to Rome	0.997	Hanamikoji	0.997
The Staufer Dynasty	0.997	Iliad: The Siege of Troy	0.997
Gang of Four	0.997	Combat Commander: Pacific	0.997
The Road to Canterbury	0.997	Fleet Wharfside	0.997

Game Archetype 3: The Economic Game

Game	A3 fit		
Iberian Rails	0.999	1889: History of Shikoku Railways	0.999
18NEB	0.999	1862	0.998
1830: Railways & Robber Barons	0.999	1846: The Race for the Midwest	0.99
1856: Railroading in Upper Canada from 1856	0.999	1850	0.99
1870: Railroading across the Trans Mississippi from 1870	0.999	1853	0.99
1822CA	0.999	1854	0.99
1844/1854	0.999	1829 Northern Board	0.99
1844: Switzerland	0.999	18CZ	0.99
1861: The Railways of the Russian Empire	0.999	18Dixie with 18MS and 18GA	0.99
1880: China	0.999	18MEX	0.99
18OE: On the Rails of the Orient Express	0.999	18Scan	0.99
1860: Railways on the Isle of Wight	0.999	Empire Builder	0.978
1829	0.999	Eurorails	0.978
1835	0.999	North American Rails	0.978
1822: The Railways of Great Britain	0.999	Indonesia	0.929
1824: Austria-Hungary	0.999	1869: USA West	0.919
1832: The South	0.999	2038: Tycoons of the Asteroid Belt	0.913
1839 The Netherlands	0.999	Steam	0.91
1848: Australia	0.999	1831	0.883
1862: Railway Mania in the Eastern Counties	0.999	1825 Unit 2	0.883
18EC: USA East Coast	0.999	1825 Unit 3	0.883
18Ireland	0.999	1826: Railroading in France and Belgium from 1826	0.883
18Rhl: Rhineland	0.999	1829 Mainline	0.883
1849: The Game of Sicilian Railways	0.999	Union Pacific	0.881

Game Archetype 4: The Thematic Game

Game	A4 fit		
Mansions of Madness: Second Edition	0.998	Xia: Legends of a Drift System	0.994
Gloomhaven	0.998	Dungeons & Dragons Basic Game	0.981
Assault on Doomrock	0.998	Heroes of Terrinoth	0.977
Star Wars: Imperial Assault	0.998	Warhammer Quest: The Adventure Card Game	0.977
Big Trouble in Little China: The Game	0.998	Eldritch Horror	0.961
Mice and Mystics	0.998	Dungeon Twister 2: Prison	0.958
Descent: Journeys in the Dark (Second Edition)	0.998	Arkham Horror	0.953
Fallout	0.998	Betrayal Legacy	0.948
The City of Kings	0.998	Claustrophobia	0.939
Dungeons & Dragons: Castle Ravenloft Board Game	0.998	Arkham Horror (Third Edition)	0.933
Dungeons & Dragons: The Legend of Drizzt Board Game	0.998	Dead Men Tell No Tales	0.925
Dungeons & Dragons: Wrath of Ashardalon Board Game	0.998	Robinson Crusoe: Adventures on the Cursed Island	0.917
HeroQuest	0.998	Mechs vs. Minions	0.914
Shadows of Brimstone: Swamps of Death	0.998	Mordheim: City of the Damned	0.913
Descent: Journeys in the Dark	0.998	Defenders of the Realm	0.909
Warhammer Quest	0.998	Middle-earth	0.896
Lobotomy	0.998	Nemesis	0.895
Claustrophobia 1643	0.998	Skull Tales	0.889
Mage Knight Board Game	0.997	Talisman (Revised 4th Edition)	0.882
Arkham Horror: The Card Game	0.997	Talisman	0.882
Zombicide: Black Plague	0.997	Talisman (third edition)	0.882
Super Dungeon Explore	0.997	Arcadia Quest	0.88
Earth Reborn	0.997	Arcadia Quest: Inferno	0.88
Kingdom Death: Monster	0.995	Betrayal at House on the Hill	0.88