Funology
Using the science of positive emotions to make better board games

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ABSTRACT

In this era of digital revolution, it is only natural to think that board games will have a harder time competing against their digital counterparts. The motivation for this article is to find ways to help board games compete with digital games. I have researched the basic underlying concepts of fun, enjoyment and other positive emotions in order to better understand the motivation to play games in general. These findings were applied to theory of computer game design, resulting in a better understanding of the principles of computer game design. Finally, I’ve considered the differences between analog and digital games, to determine what principles from video game design might apply to board games as well, resulting in a list of 13 principles that could serve as basis for a set of tools for designing better board games.

KEYWORDS: Fun, Enjoyment, Game Design, Board Games

1. INTRODUCTION

In the context of the current digital revolution, it is not unnatural to think that board and card games may lose popularity to digital games. There are, however, many, like myself, who regard analog games as a valuable alternative to digital games, and do not want to see them extinct, however likely or unlikely that may be.

In this article, I will research literature about psychology, more specifically about positive emotions and motivation, and literature on game design, to see if there is any insight to be gained regarding how to design enjoyable and fun games. If any, will these be applicable to board games as well?

In chapter 2 and 3 I will explore the general concepts of positive emotions and motivation, not specifically related to games. In the chapters following, I will look to literature on video game design, trying to find factors or methods that might increase enjoyment in games, and if any, view those in the context of findings from chapters 2 and 3 in hopes of gaining a better understanding of them. If successful, this will result in a list of factors or principles of fun, enjoyment or motivation that may be applied to the design of a video game.

In chapter 5, I will determine the major differences between digital and analog games, and use these differences to filter any findings from previous chapters, in hopes of creating a refined list of principles or factors that might be applicable to the design of board games specifically.

1.1 Funology

In order to design for enjoyable experiences, we must first understand enjoyment, fun and positive emotions. There are multiple fields of research that explore the emotions of humans, like psychology, philosophy, sociology and neurology. However, there seems to be a lack of a general term to describe this group of disciplines, specifically the ones concerning positive emotions and motivation. For the purpose of this article, it would be practical to have one term for all of these. The term “Funology”, presumably coined...
in the book by the same name, seems suitable. Though not defined in any dictionary, it seems to be defined as “the science of fun”. As this article does not aim for exclusively fun games, for the scope of this article only, “Funology” will refer to any scientific fields that consider positive emotions and motivation.

Before trying to understand funology, we need a set of consistent definitions.

### 2. DEFINING FUN

Fun – we all know what it feels like. It makes us feel good, it can make us completely absorbed in a single activity, and may even cause time to seem to pass faster. But what is it? And what makes us feel that way? What is its purpose? And why is playing bowling a fun activity for some, and a dull one for others?

Upon literature research performed on the psychology of positive emotions it is clear that the situation is somewhat semantically untidy. What to some means “pleasure”, means “satisfaction” to others. Some use “fun” and “enjoyment” interchangeably while others argue for their difference. A consistent set of definitions within this article is important, to serve as a common basis for understanding and interpreting the content, and in the following section I will present the definitions chosen for this article.

#### 2.1 Semantics

First off, let’s look at the dictionary definition. According to the on-line version of the English Oxford Dictionary, “fun” can mean any of the following things:

- **(Noun)** Enjoyment, amusement, or light-hearted pleasure.
- **(Noun)** Playfulness or good humor
- **(Noun)** Behavior or an activity that is intended purely for amusement and should not be interpreted as having any serious or malicious purpose
- **(Adj.)** Amusing, entertaining, or enjoyable

From this definition, it seems like “fun” is more of a state of receiving positive emotions like enjoyment or pleasure, than an actual emotion in itself. Also, this definition emphasizes the absence of serious purposes in “fun” activities.

“Fun” and “enjoyment” are in some parts of the literature considered to be one and the same, and in other parts not. The Oxford English Dictionary On-line defines “enjoyment” as: *the state or process of taking pleasure in something*. “Enjoyment”, then, like “fun”, is also a state of receiving positive emotions rather than an emotion in itself. Hence, according to these definitions, “fun” is a subordinate of “enjoyment”, characterized by it’s lack of serious purposes.

Now, let’s look at what the actual emotions behind “fun” and “enjoyment” are. “Pleasure” is a part of the definition of both words, and is defined as: *a feeling of happy satisfaction and enjoyment*. Although “enjoyment” and “pleasure” form somewhat of a circular definition, it seems like “pleasure” is an actual emotion.

Then, in this article, I will use the following definitions:

- **(Noun)** Enjoyment: a state of receiving positive emotions, such as pleasure.
- **(Adj.)** Enjoyable: inducing a state of enjoyment
- **(Noun)** Fun: a state of receiving positive emotions, characterized by a lack of seriousness
- **(Adj.)** Fun: inducing a state of fun
- **(Noun)** Pleasure: positive emotion

### 3. FUNOLOGY - UNDERSTANDING FUN

We’ve now understood fun and enjoyment to be psychological states in which we experience positive emotions. The next step is to understand what takes us into these states, and what their purposes are, starting with the neurological explanation of pleasure.

#### 3.1 Reward / punishment

The idea that human behavior is governed or motivated through stimuli of the so called pleasure systems in our brains is universally accepted in the field of experimental psychology [1]. The underlying idea that our emotions serve to motivate certain behaviors can be traced back as far as to the Greeks (e.g., Epicurus), and was embraced into psychology in the late 1800’s. The basic idea is that pleasure is a reward for events that contribute to the survival of an organism, punishment or pain being the opposite. Rewards and punishment serve to motivate organisms to do things that are evolutionary beneficial, or to
refrain from those that are not. This hedonistic basis has since been developed further in the Freudian and behavioristic schools of psychology, but the basic principles are still, to some extent, the same.

The answer, then, to the two questions raised in the start of this chapter, is that when an activity is fun or enjoyable, it is probably also evolutionarily beneficial, and our brains will motivate us to keep doing that activity by giving us neurological rewards - positive emotions.

Furthermore, this means that an activity doesn’t need to be considered fun (non-serious) in order to be a pleasurable one. In other words, an enjoyable game can be played over and over again, equally well as a fun one, which is ultimately what the goal is, whether you label it “fun” or “enjoyable”.

3.2 Fun and enjoyment in an evolutionary perspective

If pleasure means that our brains think something is good for our survival, then how and why would, say, a game of poker create sensations of pleasure for some people?

In research on fun, enjoyment and motivation, there seems to be a clear consensus on two major sources of fun and enjoyment: learning and developing ourselves [3], [4], [8]. Learning new skills and developing ourself makes us better fitted for survival, thus giving us rewards in the form of enjoyable emotions.

Blythe and Hassenzahl [6], however, don’t seem to agree. They argue that the merging of fun and learning (regarded as serious) in educational games is uncomfortable, in that educational games may appear as bribes; “They are the spoonful of sugar that helps the bad medicine go down”, somehow suggesting that fun and learning is incompatible. They do not, however, present any arguments or facts to support this, and it may very well be that their definition of learning is more focused around the traditional school system rather than learning as an independent phenomenon.

3.3 Play and learning

Perhaps the most basic form of fun and enjoyment is play. Mark Prensky, an American expert on learning and education describes the phenomenon of play extensively in his book Digital Game-Based Learning[3]. According to Prensky, “Play has a deep biological, evolutionarily important, function, which has to do specifically with learning.” This is a good point, because if play was not evolutionarily important, why hasn’t natural selection eradicated it? He also quotes Robert Fagan, child psychologist, who defines play as “optimal generic learning by experimentation in a relaxed field.” The fact that many animals play as well also supports this notion[4].

“[Games] are not a human invention. (...) Fortunately, direct recourse to paleontology is unnecessary. A trip to the zoo will suffice. There we find two lion cubs wrestling near their mother. They growl and claw at each other. They bite and kick. One cub wanders off and notices a butterfly (...) These games are deadly serious business. They are studying the skills of survival. They are learning how to approach their prey without being seen, how to pounce, and how to grapple with and dispatch prey without being injured.”[4]

In his talk on play at a Microsoft Research event, Dr. Stuart Brown elaborates on the concept of play behavior, which he has dedicated most of his career to [7]. According to Brown, play is an incredible important state or activity for well-being in humans as well as animals. For instance, rats deprived of play as infants have shown to have smaller brains with fewer connections, whereas their playful counterparts have generally better mating, better immune systems and live longer.

In his talk, he mentions 10 different forms of play, a lot of which apply to games such as:

- Exploratory play
- Social play
- Pretend and imaginative play
- Rough and tumble play, which may be physical or verbal
- Storytelling or narrative play

All of these, according to Brown, benefits us in some way or another, and is therefore experienced as enjoyable. Social play, for instance, gives us a sense of belonging, while rough and tumble play may teach us how to handle ourself in a physical or verbal confrontation.
He also notes that in play, the activity itself is more important than any end goal or any external reward. This is very similar to the flow concept of Hungarian psychologist Mihaly Csikszentmihalyi.

### 3.4 The concept of Flow

Csikszentmihalyi and his theory of the flow state is incredibly frequently cited in literature on the psychology of positive emotions and game design. Studying the creative process some 30 years ago, Csikszentmihalyi discovered an alternate state of mind that occurred in some creative individuals while working. He noticed in painters that when the work was going well, the artist persisted with complete focus, disregarding hunger, fatigue and discomfort for long periods of time, followed by a loss of interest in the creation once completed[5]. For the last 30 years, Csikszentmihalyi and others have been studying this phenomenon, that he calls flow.

According to Csikszentmihalyi, the flow state is an optimal experience, or peak experience, in other words, the most pleasurable human experience possible. The core condition for flow is a balance between a persons subjective perception of a challenge and his subjective perception of his skills.

> "Being ‘in flow’ is the way that some interviewees described the subjective experience of engaging in just-manageable challenges by tackling a series of goals, continuously processing feedback about progress."[5]

The other condition for flow is clear, proximal goals and immediate feedback about the progress being made. The most important characteristics of the flow state are a complete absorption in the activity, distortion of perceived time and an experience that the activity is so rewarding in itself that the end goal is an excuse for the process.

Csikszentmihalyi has developed an interesting model illustrating how the perceived skill / challenge relationship relation can affect our state of mind (Fig. 1). The self mean section in the middle represents the average perceived skill and challenge level across all activities an individual does in daily life. When we do an activity, we compare the challenge level of that activity to the level of challenge we face regularly (self mean) unconsciously, which determines our state of mind. Flow is described by Csikszentmihalyi as being an optimal experience [5]. Looking at the emotions in the lower left quadrant of the circle, we can see the importance of balancing challenge in games, which, as we will see later, is something a lot of game designers are well aware of.

This also helps explaining the vast popularity of sports and games. Both games and sports offer great amounts of potential challenges, ranging in difficulty, making it possible to remain in a positive state of mind for much of the time spent participating. Perhaps for this reason, Csikszentmihalyi is cited in nearly every piece of literature researched for this article.

Video games are especially good vehicles for flow, because of their adaptiveness, meaning that they can respond quickly to the player. Well designed games will have learning curves that will keep the majority of players on the verge of their abilities throughout the game. Csikszentmihalyi notes, though, that flow can occur in any type of activity, however mundane it may be. The important factor is the subjective skill / challenge balance.
3.5 Flow, learning and play

Although flow is not the same as learning, learning will happen through the process.

“As people master challenges in an activity, they develop greater levels of skill, and the activity ceases to be as involving as before. In order to continue to experience flow, they must identify and engage progressively more complex challenges.”[5]

As mentioned earlier, flow and play share similarities, like the fact that they’re both rewarding in and of themselves, and that both can be very pleasurable. There is also some distinct differences, most importantly the requirement of clear goals and feedback on progress for the flow state, which isn’t a requirement for play. Overall, it seems like the concept of flow is more readily applicable to a game design process, while Prensky’s [3] and Brown’s [7] descriptions of play give us subtle hints on how to create enjoyable experiences.

3.6 Absorption and distraction

Blythe and Hassenzahl [6] also addresses the concept of flow, slightly discrediting it’s importance.

“We believe that Csikszentmihalyi’s humanistic (...) views can neglect the psychological reality of individuals - their need to be absorbed sometimes and to be distracted at others. (...) More specifically we argue, that fun and pleasure can be thought of as experiences that generally differ in terms of distraction and absorption. (...) During the fleeting and amorphous experience of fun, we are distracted from the self. Our self-definition, our concerns, our problems are no longer the focus.”

Although a valid point, they seem to have misunderstood the concept of flow. This distraction from ourselves and our concerns and problems is, as we’ve seen, one of the defining characteristics of the flow experience. You might call it a form of distraction through absorption.

I do not assert that distraction can’t exist without flow - quite the contrary. In fact, this might be another important source for pleasure. In the hedonistic school of thought (2.1), aversion from pain / punishment is also an important motivator for human behavior.

“The important thing to note, then, is that pleasure can be thought of both as the elimination of, or absence of, pain and also as the provision of positive, joyful feelings”[6].

Distraction from worries and problems in daily life serves this function. Hence, an important enjoyment factor of games and sports may be the degree to which they distract through absorption (not necessarily inducing flow).

4. APPLIED FUNOLOGY

While the fields of funology are concerned with understanding the concepts of fun, enjoyment and motivation, there is another group of people who devote their lives to creating the most fun, enjoyable and intrinsically motivating products and experiences possible. These are the people who, consciously or not, apply the principles of funology into real experiences, and I refer to them as “applied funologists”. In this article, of course, the applied funologists in question are game designers.

In this chapter, I will extract factors, principles and sources of fun and enjoyment described in literature on game design, and compare these with principles described in preceding chapters. The writings on game design tend to focus more on the applied side of fun and enjoyment, rather than dwelling on the underlying concepts described in chapter 3. An astonishing share of the literature, however, quotes Csikszentmihalyi, to illustrate the importance of game balance as a determinant for fun.

4.1 Fun-factors

The different pieces of literature studied for this article present a number of determinants or factors for fun and enjoyable experiences. As the goal of this article is to find information that can be applied to the design of a board game, it would be beneficial to collect and list all of these different factors, which would make them easier to use. Although totaling at over 30 different factors, a lot of these factors coincide and overlap, making it easier to simplify the list, in turn making it easier to use.
The different factors of this list, then, need to be compared in order to be able to simplify the list. To make this process of comparing different factors easier, I present these factors in a table - Table 1, which contains factors of fun and enjoyment from literature on both funology and applied funology. Similar factors are put in the same row, to enable easy comparison. Table 1 contains the raw material for a list of tools, which will be refined into fun-factors v2.0 and v3.0 in following chapters.

The attentive reader might notice that not all of the literature is represented in Table 1. However, the reader can rest assured that all information considered relevant as use for fun or enjoyment factors is indeed present in the selection in Table 1. There are also several holes in the table. This is mainly due to variations in theme and approach in the different pieces of literature.

I should note that the fun-factors, in this article, refer not only to factors exclusively fun (non-serious), but also the ones that motivate and create enjoyment.

4.2 Motivation versus selection

Crawford [4] raises an interesting point: that it’s important to distinguish between factors that motivate people to play games (fun or motivational factors) and factors that make people choose some games over others (selection factors). He then lists two main factors that he considers selection factors:

- Game play: the subjective quality of the interactions with a video game
- Sensory gratification: pleasant or impressive graphic representation, sound, colors, animation etc.

Sadly he does not give much insight as to why this distinction matters. It seems like his point is that the selection factors do not contribute much to the enjoyment of a game if the fun-factors are not present. In other words, they can be considered not as important as the fun-factors, and should perhaps not be given too much attention before there is a solid base of motivational or fun-factors.

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Table 1: Fun factors v1.0
Other selection factors, according to Prensky, are more related to personal tastes, according to Prensky [3]. He argues that games are extremely culture and age specific, reflecting the culture we grew up in, the environment in which we were raised, our own culture and ethnicity and even religious views.

### 4.3 Fun-factors v2.0

Table 2 presents the processed list of fun-factors from fun-factors v1.0. Similar terms, such as social interaction and social play, are merged into single factors. Also, the factors in Table 2 are graded according on the level of importance, as “must”, “should” and “could”. The absence of any “must” factor will likely make a game nearly unplayable, and the “should” factors are regarded as nearly as important, however, a game without “should” factors could still be playable, though perhaps not very enjoyable. The “could” factors are put in this category because they’re all strong fun boosting factors that do not all need to be present in any game. A game should include some suitable selection of “could” factors, but the entire list of “could” factors are not to be regarded as a check-list [11].

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<th>Importance</th>
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<td>Could</td>
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<td>Physical activity</td>
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**Table 2: Fun-factors v2.0**

**Balance**

This is mainly where flow enters the picture. Balance means keeping the difficulty of the game between “too hard” and “too easy” throughout the game. If done well, flow may occur, which should be highly motivating and enjoyable [5]. According to Prensky [3] and Vorderer [10], balance is crucial for a game. If done right or wrong, it can make or break a game, and is the only factor that will be considered a must. In multiplayer games, balance means a level playing field, that no one player should have an “unfair” advantage over another.

**Goals**

The existence of goals or objectives in games is an important motivator [3], [10], [11], [5], and as we’ve seen, is an important part of the definition of games (chapter 4). If it doesn’t have goals, it’s not a game, hence, goals should be considered a must.

**Feedback and rewards**

Both Prensky [3] and Csikszentmihalyi [5] underline the importance of immediate feedback on the progress being made, and also of in-game rewards, such as acquiring new items [3]. Also, according to Prensky [3], feedback is a condition for learning. Rewards are grouped with feedback because rewards can be viewed as a type of feedback. Rewards for completion of both long and short term goals, instead of penalties for failure, will have a motivational effect, as well as having strong emotional and ego-gratification implications, according to Prensky. Because of the importance of learning (chapter 3) and the possibility of flow, feedback and rewards are considered as a “should”.

**Competition**

Nearly all the literature on researched mentions social competition, as in competition between human players, as a strong motivational factor. According to Crawford [4], competition functions as a system for comparing one’s abilities with other players. The outcome of the competition will likely affect the self-esteem and mood of the participant [10].

The reader might wonder why collaboration is not mentioned anywhere. In this article, I will view collaboration as a combination between competition and social interaction, as the vast majority of games involving collaboration focus the collaboration towards competition and opposition [3].

**Social interaction**

Although competition in games can involve great amounts of social interaction, this factor is about

**Nose-Thumbing**

Nose-Thumbing is presumably a term coined by Crawford [4], described as experimenting with the socially unacceptable (thumbing or picking your nose) in a game environment, safe from the consequences that would apply in real life. This term is highly practical, as it replaces a long sentence, which is why I embrace it into my list. An example of nose-thumbing is playing a bank robber in a video game, or deceiving the other players in a board game.

**Power**

Power, according to Garneau [11] is a very strong motivator, hence the majority of games involve the quest to gain power in some form. In games, this usually means acquiring new and stronger abilities or objects.

**Exploration/discovery**

Exploring environments, possibilities and discovering new places and things is fun, according to most of the literature [3], [4], [10], [11]. Having great opportunities for exploration is a good way to keep a game interesting, because people enjoy new things [11]. This may also be closely tied to learning, although not explicitly stated in the literature.

**Problem solving**

Intellectual problem solving is, according to Prensky [3] and Garneau [5], a challenge we enjoy doing. There are a lot of examples of this, like physical puzzles, riddles or puzzles in non-puzzle video games, where one has to do a series of actions in the right order etc. Intellectual problems, being challenges, are also dependent on balance in order to be enjoyed [5].

**Emotion through story**

Prensky [3] mentions emotion as a motivator for video games. In video games, emotion arises from the story [3], and also from the relationships with in-game characters [11]. Garneau is more specific, only referring to love or lust as a motivator [11]. As an example of the latter, he uses the voluptuous video game character Lara Croft from Tomb Raider. Video game developer Lionhead Studios incorporate love in a lot of their games, like in Fable 2, where the player owns a dog, intended to be loved by the player [12].

“I want you to feel loved. If you can truly feel loved after playing Fable 2, that's worth writing about.” [12]

**Creation**

It's puzzling that only one of the pieces of literature mentions creation. According to Garneau:

“The pleasure of creating something beautiful out of nothing is a feeling which many game developers are familiar with. (...) All forms of creation bring joy to its author.” [11]

A wide range of games incorporate creation in some forms. In the board game Galaxy Trucker, each round of the game starts with building a space ship from small cardboard components. Also, the vastly popular video game Minecraft is centered around extracting different raw materials from the game environment, and crafting these into tools and structures.

**Immersion**

Garneau’s notion of immersion means the degree to which a video game will make the player feel as if inside of the game [11]. Graphics and sound seem to be the most important factors for immersion, contradicting Crawford’s claim that sensory gratification is not a primary motivational factor for playing video games [4]. According to Garneau, the pleasure from immersion seems to come from escaping one’s problems in daily life. As Crawford does not present any argument that counters this, I will regard immersion as a valid fun-factor. I suspect flow could also be a factor that could enhance the degree of immersion. Also, story and emotion could be relevant factors for immersion.

**Comedy**

Garneau [11] does not describe comedy in great detail, other than the fact that humor is scarcely used in video games, despite being a good source of fun and enjoyment.

**Physical activity**

Like with comedy, Garneau does not go into detail on physical activity [11]. The video game console Nintendo Wii, although not stated in the literature as the article precedes the Wii, is a good example of this.
Beauty
Garneau’s notion of beauty seems to mainly regard graphics [11]. As Crawford [4] has argued that graphics is a selection factor rather than a fun-factor, beauty and graphics are left out of fun-factors v2.0.

Adrenaline and thrill of danger
In both Prensky [3] and Garneau [11], adrenaline and thrill of danger seems to raise from competition, either in competition with other players or with the game itself, and it will not be regarded as a separate fun-factor here.

Although the principles of flow and learning from chapter 3 are part of some of these factors, I will revisit them in the context of games to see if they can be utilized to create more fun-factors.

4.4 What about learning and flow?

As we’ve seen in 3.3, flow highly relevant in the context of balancing games, and also as a possible enhancer for the degree of immersion, especially for video games.

Learning, according to Prensky arises from feedback from the game. I claim that learning is intrinsic to some extent in all games. You have to learn about the goals and rules; otherwise, how could you play it? Then, how can one use learning as a motivational factor for a game? By ensuring that there’s always a possibility for new challenges and new things to learn [3]. The phrase “easy to learn, hard to master” pretty much sums this up.

A lot of games, whether intentional or not, support this. Perhaps the prime example is the old Chinese game Go. Go has, barring rules for scoring points and play order, only two rules of play. Yet, it still has a wide array of different tactics and strategies, created by players and not defined in the game rules themselves. Rules, norms, tactics, strategies and methods not defined in the rule set of a game is often called meta-game. A good example of meta-game is the immense amounts of strategies, tactics and plays for chess. One interesting thing about meta game is that it can change. First, a set of optimal strategies may be generally agreed upon, and then new strategies may arise to counter the old ones, a process that in theory might go on forever, allowing for endless amounts of challenge and learning. A lot of big games, analog and digital, have several on-line forums and chat-rooms and even books, devoted to discussing strategies and the meta-game.

Another good example of this is the multiplayer online video game League of Legends, which in 2012 is the most played video game of all time [13]. League of legends is a game in which two teams of five players try to destroy each other’s home base. Each player controls a hero character, chosen from over a hundred different available heroes. The player can then earn gold from doing different things in-game, and use it to buy from a wide range of items, making the hero more powerful. On a regular basis, heroes and items are tweaked and new ones are added, further increasing the possibility space. The huge amount of different choices available allow for a complex and fluid meta-game.

Rich meta-games can be found in analog games as well, as in the card game Dominion. When playing Dominion with all of the available expansion packs, there’s about 200 different cards. However, in each game one only uses a small subset of these, chosen at random, of about 16 to 20 cards. Because of this, each game of Dominion calls for different strategies and counter-strategies, allowing for an incredibly rich meta game.

Given the popularity of these types of games, it seems that allowing for a rich and fluid meta-game can be an important way that learning and development of skills boost the motivational effect and enjoyment of games. Because games with rich meta-games potentially allow for much greater amounts of learning and development than games with little or no possibilities for meta-game, and because, as we’ve seen in chapter 3, that learning is a strong motivator and source of positive emotions, I will add “allowing for rich meta-game” to the list of fun and motivational factors in fun-factors v3.0.

Go, Dominion and LoL all have relatively simple rules. At the same time, they also allow for a huge amount of possibilities. This suggests that the simplicity of the rule sets might also help facilitating rich meta-games. The downside to games like these, though, is that gaps in experience between players might make these games hard on new players playing against experienced ones, which is why I will not consider it a “should” or “must”.

Funology
Another good example of learning in a game is the online space game EVE Online. EVE Online is a gigantic, 7500-solar system space sandbox. The game allows for a wide variety of ways to earn wealth, like mining asteroids, extracting raw materials from planets, refining of raw materials, manufacture of space ships and equipment, trading, running player-created corporations like banks or intelligence agencies, bounty hunting and warfare, all of which are centered around a player-driven market economy. Each of these different “career paths” in the game are complex and requires a lot of learning. In this case, the learning comes from the vast possibilities of complex activities that one can do in the game.

5. BOARD GAMES

Fun-factors v2.0 is based on literature mainly focused on digital games, and all of the factors might not apply to analog ones. In order to have a list of fun-factors for analog games specifically, I will state the major differences between digital and analog games, and use these to filter the fun-factors, resulting in fun-factors v3.0, which should be fully applicable to the design process of an analog game.

5.1 Analog versus digital games

In principle, a computer game and an analog game are one and the same. In theory, one could play a video game in an analog way. In this scenario one or more people would have to receive commands from the player, refer to the game rules, perform calculations, and then draw a picture of the game state for the player to evaluate before giving new commands.

Obviously, this would take incredible amounts of time just to get through a sequence that would take one second on a computer, which clearly illustrates the biggest difference: computer games are much faster. A computer can process input, do the appropriate calculations and evaluations, and render the resulting game state in a matter of milliseconds. Digital games, then, allow for much more complex rule sets, and respond faster to input. In other words, analog games need simpler rule sets and types of input than digital games.

Because of this physical limitation, the degree of immersion possible in a digital game, through graphics and sound, can’t be achieved in an analog one. This means that it’s more difficult to create an analog game that use emotions through stories and characters as a motivator, as the player would have to rely almost solely on his imagination to be emotionally involved in the story. Printed graphics will also have a hard time creating the same degree of immersion possible in a video game. In other words, immersion as a fun-factor is seemingly not a very effective one in analog games.

Another main difference between analog and digital games is that analog games are intended to be played, and usually are, in a physically social situation, in other words face to face. As social creatures, I would suspect that humans have a preference for socializing face to face rather than remote socializing, as over the phone or in a chat room. This may be an important reason that board games still live on despite of the digital game revolution of the last decades, and may in fact be analog games’ biggest strength over digital games. Whether this is the case or not, analog games might still benefit from using this to their advantage, for instance by creating socially interesting or unusual situations, like forcing players to have a lot of physical contact like in the party game Twister, or by having the players do role-play.

Face to face play also allows for more richness in information in the social interaction through body language, and perhaps analog games could use this to enable a richer game experience, for instance by having players lie to and deceive each other, and try to figure each other out. It can also be used on a less subtle way, by including the whole body, like in the card game “Hei knekt”, where participants have to do different physical actions, depending on different cards.

Competition in a physically social situation might also be even more exciting than in an on-line setting. Vorderer describes competition as social comparisons, or performance comparisons, in which the players mood an self esteem will likely change according to the result of the comparison [10]. Thus, comparing oneself against people with whom you share a social bond might be more meaningful, thus raising the stakes and increasing the intensity of the resulting emotions. In other words, analog games could benefit even more than digital games from the use of competition.

Merely speaking from personal experience, it seems like beating or being beat by a buddy, or in the very
least someone you can look in the eye, is a stronger feeling than when playing against a stranger over the Internet.

This may also apply to collaboration. It might be more meaningful and pleasurable to discuss the best course of action face to face. There does exist some collaborative board games, but the collaboration is mostly focused toward a conflict or a competitive situation. Therefore, collaboration can be viewed as a blend of social interaction and competition, and will not be listed as a separate factor.

To sum it up, here’s a list over the major differences between analog and digital games:

- Analog games require simpler rule sets and input from players.
- Analog games will not benefit as much from using emotion as a motivator.
- Analog games might benefit more from creating interesting social situations and relying on body use and language.
- Analog games might benefit more from relying on social competition than digital games.
- Analog games might benefit more from allowing for collaboration.

5.2 Filtering the fun-factors

The differences between analog and digital games from 5.1 will now be used to filter fun-factors v2.0, removing anything that is not considered to be of major relevance to analog games.

Balance

The differences between analog and digital games have no implications for the importance of balance in analog games.

Power

The limitations in 5.1 do not apply to the quest to gain power. It is completely possible to allow the players to gain power through better items or attributes during the course of an analog game.

Competition

As argued in 5.1, competition and collaboration should be of major relevance in analog games, and will be regarded as a “should” factor.

Goals

Analog games have goals, otherwise they would be toys [3].

Feedback and rewards

Analog games also support feedback through win / lose states and outcomes. Analog games can also give feedback on progress toward long term goals, through the use of physical counters etc. Rewards can also apply, for instance through the player gaining power.

Social interaction

Social interaction in an analog game, played physically, is inevitable. As argued in 5.1, this could be leveraged to create interesting and engaging social situations, and this factor will be rephrased as “Utilize social interaction”, to underline the purpose of using social interaction as a tool.

Nose-Thumbing

Analog games can, like digital games, work as a way of experimenting with things socially frowned upon, such as lying, deceiving and backstabbing. A lot of analog games utilize this, like the classics Diplomacy and Risk. Nose-thumbing in the sense of taking the role of, say, a bank robber or a murderer would be much less immersive than in a video game. In other words, nose-thumbing in an analog games context should emphasize the socially unacceptable in the interactions of the players.

Exploration / Discovery

This can, and does work in analog games. The board games Infiltration and Panic Station use this as core strategic elements. In these game, the game environment is uncovered step by step during the course of the game, by revealing environment modules placed at random.

Creation

Although not as usual in analog games, creation can work well in this setting, like in the previously described board game Galaxy Trucker, where part of the game is building a space ship.

Emotion

As discussed in 5.1, emotion is likely a less effective motivational factor in analog games, and will thus be removed.
Problem solving

Intellectual problem solving can work well in analog games, like in the 70's board game Mastermind.

Immersion

Immersion in the sense of sensory gratification will likely not be as effective in analog games as in video games, as argued in 5.1. However, competition could still create a degree of immersion in the sense of being absorbed. This, however, is a quality of the competition factor, and immersion will be left out in the revised list.

Comedy

The limitations from 5.1 should not have a major impact on the use of comedy as a fun-factor in board games.

Physical activity

Physical activity should not be affected by the limitations in 5.1.

Facilitate rich meta games

The facilitation of a rich meta-game, as discussed in 5.1, can create great possibilities for learning, in turn making a game more enjoyable. This can be achieved by giving players a lot of options to help them reach their goal, and presumably also keeping the rule set simple. The meta-game can be enhanced further with the addition of expansions to the game. As argued in 4.4, this is not considered a “must” or a “should”.

5.3 Fun-factors v3.0

The revised list of fun factors are shown in Table 3. Each factor is also briefly explained here. Note, however, that this is just a summary, and that the article as a whole should be read before using the factors.

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<thead>
<tr>
<th>Importance</th>
<th>Fun-factors v3.0</th>
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<td>Balance</td>
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<td></td>
<td>Goals</td>
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<td>Should</td>
<td>Feedback and rewards</td>
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<td>Utilize social interaction</td>
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<td>Physical activity</td>
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<td>Facilitate rich meta-game</td>
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| Table 3: fun-factors v3.0 |

 toward the goal(s), and rewards for reaching goals or sub-goals. Feedback can be implemented in various ways, for instance using physical counters if the goal is to acquire a certain number of points. Rewards usually come in the form of something that increases the players power (see power) or points.

Power means the different things a player can do. The possibility of acquiring more power is a good motivator in games. More power means that the player can do more things, do things more effectively or overcome more difficult challenges, and usually comes in the form of in-game abilities, items or currency.

Utilizing social interactions means using the social situation in a board game to encourage participation apart from the game board, such as relying on secret signs between players or putting players in unfamiliar social situations, like reordering the social hierarchy, role-playing or facilitating physical contact.

Nose-thumbing means letting the players do things that would normally be socially unacceptable, such as lying, deception or stealing from each other. If implemented, this should be clearly stated in the rules, as not to be mistaken for cheating. A classic example is the “hidden saboteur” model, in which one of the players is secretly working against the others.

Exploration / discovery is a great way of keeping a game interesting. This can be implemented in various ways, like creating the game board during the course
of the game in a jigsaw puzzle fashion, or having players draw treasures or rewards from a shuffled deck of cards.

_Problem solving_ means implementing intellectual challenges, puzzles or similar problems, either as part of or as core purpose of the game.

_Creation_, as the name suggests, means letting the players use game pieces to create their own objects that are connected to the game in some way. For instance, drawing pieces from a pile of component pieces to build a space ship, to be used later in the game.

_Comedy_ is a well understood concept, and implementing it should be fairly intuitive, though not necessarily easy.

_Physical activity_ is fun! In a board game, it can be implemented by requiring the players to perform certain physical actions according to different game states.

_Facilitating meta-game_ means having room for a wide array of different tactics and strategies, which ensures constant challenge and replayability. This can be achieved by presenting the player with a lot of options, or ways to reach the goal.

### 5.4 Using the fun-factors

As noted by Garneau [11], these kinds of lists are not to be used as checklists for good games. Each of the different items are tools that can be used to achieve different goals for different target audiences. As Prensky [3] argues, the selection of some games over others, is highly dependent on age, gender, culture and our personal history. The “must” factors, though, are an exception to this, as they are both essential to a game being playable.

However, as argued in 4.1, some of these factors could be generally more effective than others in terms of competing with digital games, like leveraging the fact that board games can be more social, which a lot of analog games do with success.

### 6. CONCLUSION

In this article, I’ve started with researching the foundations of funology, defined as the science of positive emotions and motivation. I have used these foundations to better understand factors of fun and enjoyment found in literature on game design. The factors for game enjoyment found in the literature has been refined in two iterations, resulting in a list of fun or enjoyment factors specifically for board games - fun-factors v3.0.

By reading 5.3, a game designer could gain a very limited understanding of the fun-factors and their implementation, which could be enhanced by reading the article in its entirety. However, for use as an effective tool, much of the in-depth information in this article might be excessive, while the information in 5.3 is too limited. As such, this is only a basis for starting to build a tool set for board game design.

Due to the fact that this article, to some extent, focuses on literature on video game design, the result might be limited and thus lack important information that could exist elsewhere.

I suspect that in general, a lot of experienced game designers might be well oriented in relevant literature, so the results might be better suited for inexperienced game designers. If implemented in a game design process, they should be considered at an early time in the process, as many of the factors might have large implications for the game mechanics and rules.

Further research should include testing of the fun-factors, to reveal if having a conscious relationship to the factors does indeed have a positive effect on the resulting games. If successful, the factors and information in this article could be used to create a set of tools or a framework, or be incorporated into an existing one, if one in fact already exists. Additionally, research on intrinsic motivation has not been studied, which could prove to have valuable information relevant to game design.
REFERENCES