

PLAY ME! Influencing Game Decisions through Suggestions made by Game Card Characters

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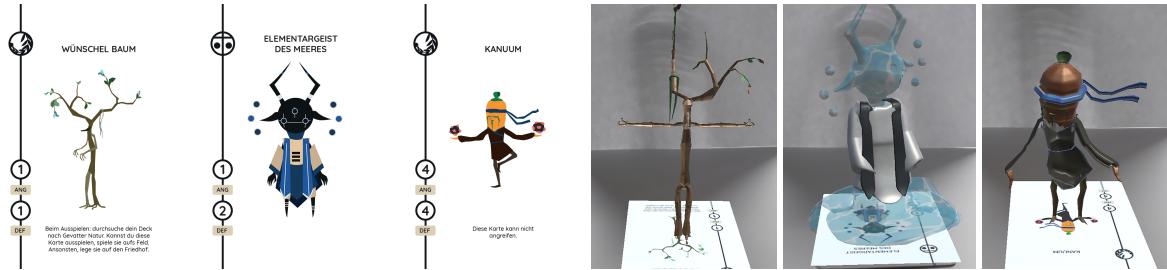


Figure 1. Three physical Trading Game Cards on the left, same cards with their AR characters in idle position on the right

ABSTRACT

Augmented Reality (AR) is a growing field and is expanding into many application areas such as gaming. AR games are usually very straightforward and the movements and behaviour of the characters are often scripted and cannot be influenced by the player. We present animated characters as AR game components that act both as team players and opponents to get 3 advances and improvements. (1) To enrich the physical game by bringing its characters to life, (2) to integrate new challenges through both helping and bluffing characters, and (3) to investigate whether it is worthwhile to further explore our new complementary approach to socially acting game components as desired at the time. In a user study we compared different behaviors of game-situation dependent animated card characters in different game situations using an AR trading card game. Our results indicate that AR characters that act socially through body postures cannot only non-verbally propose a player to make a certain game decision, they can indeed influence the player's moves. Our approach of suggestive characters joining the game has not only shown to successfully add to the complexity of augmented games' design, it, moreover, enriched the game design space and make the game more challenging. Therefore, more research on augmenting games with social behaviour, such as bluffing, helping, chatting, and distracting is worth doing as it can create a novel game genre of games embedding (and challenging) social skills.

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Augmented Games, Augmented Reality, Human Computer Interacting, Behavior change

CCS Concepts

•Human-centered computing → Human computer interaction (HCI); Mixed / augmented reality; Empirical studies in HCI;

INTRODUCTION

Making suggestions, like bluffing in a Poker game, does not only add excitement and fun to a game; it can also be an essential strategic game element, for example, when players hide their intention or suggest to have another one to fool the other players. Making suggestions requires different social skills and can be challenging, and so does recognizing bluffs and misleading game suggestions. According to game theory, challenges are important for the game flow [14, 15]. Also previous research showed the importance of challenges for a better flow during a game and keep the player interested and entertained [10, 11, 34, 44]. Suggestive games incorporate such challenges through strategic thinking [15] and interdependence [14]. Consequently, suggestions have the potential to be a game element that can not only add fun, but also introduce more complexity to a game. However, suggestions are an established component in traditional games, they are missing in current AR games.

In this paper, we are introducing suggestive characters as AR game components that are designed in a way that they try to influence game decisions. In a user study, we are investigating whether or not such card characters can have the power to move a player's decision in a certain direction using as example an AR card game.

However, we are not the first ones who bring AR card characters to life, the so far introduced AR characters were mainly pure 3D visualizations of game characters, sometimes with a spatial location, but always without an own behavior, which could be seen as independent game element.

Nintendo introduced AR applications when they brought out their first Nintendo 3DS¹ and until today it is the same state of the art for them. They delivered AR cards together with their console which could be used to create Nintendo characters and make photos together with them in your personal environment. Also every user was able to take a picture of his own and put this image into an AR game that was called face raiders². Here the picture of the users face was put on flying drones, augmented models in your room, were attacking the user from every side of his room. AR applications and games spread more and more and become increasingly popular which can be seen in different statistics^{3 4}. The most popular and most played AR application nowadays is Pokemon GO⁵. Due to the success of Pokemon GO, the game principle has also been adapted by other manufacturers so that you can shoot zombies⁶ or hunt dinosaurs⁷, and also Microsoft and Mojang bring out their own mobile AR game⁸. The characters of existing AR games are not interacting with the player. They are animated characters that always acts in the same linear way. Hence, their behavior has aesthetic and joy-of-play functions, without having a meaning, such as the by us proposed suggestions to the player to play or avoid a specific card.

While previous work mainly focused on the effect of character design on games' UX [22, 28, 47] as well as on adding content through that remote players are represented regarding their gaze, gestures and representing the user in a digital world [1, 29, 37, 41], we add a social component to the game itself that it part of the game and not part of the players behavior. As no current game provides the suggestive design opportunity we propose here, we created an AR Trading Card Game where the characters become alive and interact socially with the players through suggestive poses and gestures. Our game approach of bringing card characters to live and to create social interaction between them and the player was tested in a user study, those results indicate that the AR characters can influence the players' decisions by nonverbal suggestions, such as poses and gestures. Qualitative feedback even indicates that players can develop empathy for the animated and socially acting characters. In conclusion, our findings uncover a novel opportunity to design digital games through adding social behavior to game elements. Our results also show that is would be worth to explore further opportunities of characters'

¹<https://www.nintendo.co.uk/Nintendo-3DS-Family/Nintendo-3DS-Family-94560.html>

²<https://www.nintendo.co.uk/Nintendo-3DS-Family/Instant-Software/Face-Raiders/Face-Raiders-115459.html>

³<https://www.statista.com/statistics/591181/global-augmented-virtual-reality-market-size/>

⁴<https://www.emarketer.com/content/virtual-and-augmented-reality-users-2019page-report>

⁵<https://www.pokemongo.com/en-us/>

⁶<https://www.thewalkingdeadourworld.com/>

⁷<https://www.ludia.com/en/games/jurassic-world-alive>

⁸<https://www.minecraft.net/en-us/earth>

behavior beyond suggestions, which could not only extend the design space of digital games towards behavioral games, but also creates many open research questions, for example, about how game elements should behave.

RELATED WORK

While viewing previous research, we focus on three topics: (1) on the social aspects in board games and digital games, (2) on how AR games connect the real and the digital world and (3) on the design of game characters.

Social Aspects in Games

A large body of research in board as well as in digital games is investigating how social aspects and interactions differ in analog versus in digital games [17, 27, 35], how the user experience (how do the users like to play the game) changes, depending on the social and virtual environment (playing an analog or digital game alone, physical together with others or together online) [7, 39, 31] as well as where the enjoyment of playing games comes from [38].

Mandryk et al. [27] explored the difference of playing against a friend versus against a computer and found that it is more boring and less fun to play against a computer and that psychological arousal is higher. Ravaja et al. [35] showed that playing against other humans leads to higher spatial presence, higher engagement, and an increase of positive emotions. Gajadhar et al. [17] and de Kort et al. [13] showed that social setting influence player experience positively by letting a human play a game against a computer and against a mediated human. Gajadhar et al. [18] also found that the social context when playing a game against a machine can be important. Having a co-located co-player increases fun, challenge, and perceived competence; but the finding cannot entirely generalized for older players [19]. Lankes et al. and of Maurer et al. were focusing on the improvement and positive impact of shared gaze on collaboration and perceived social presence [24, 23, 29]. Jurgelionis et al. [21] found that a social context can also have negative effects on user experience, in particular in a user study playing in an Internet cafe led to worse user experience than in a private setting. An important fact here could be that the other persons were no friends or co-located players they were just able to watch the studies by playing a game.

In summary, it has been shown that social aspects are influencing the user experience in a game. While playing with human beings positively effects the game experience, playing in a semi-public place where other people are around but not involved in the game can reduce the user experience.

Social Aspects in Hybrid Games

Research on hybrid games explores the combination of digital and analogue gaming, which, for example, aims at enhancing the natural and enjoyable interaction between friends when gaming [28] as well as on combining the existing benefits of both, analogue and digital games [22]. The advantages of board games are the intellectual challenge, the variety in games, the haptic experience of physical game component, and the possibility to socialize. Cooperation, competition and social interaction are actually main drivers for playing board

games [39]. When trying to bring analog and digital game elements together in hybrid games, existing concepts often add visual graphic layers onto analog games [41]. Tiny et al. [46] explored how hybrid games can add value to tactile, physical, or material experiences. They compared seven example cases and found that in some cases the digital and material halves merge into a common experience, while in others they alternate.

Recent works also explore the opportunity to integrate the social component into the game experience, which preserves social interaction, enhances immersion, and offloads unwanted tasks as shown by Hartelius et al. [20]. Kosa et al. showed benefits and disadvantages of hybrid tabletop games [22]. A benefit is to keep all advantages of the classical board game and adding technology as support, which can decrease tediousness. The disadvantages were obsolescence of technology, presence of electronics or the imitation of video games.

A large body of hybrid game research investigates embodied experience. Baudisch and Lopes found that muscle-propelled force feedback is preferred against vibrotactile feedback [26]. Maurer et al. observed how digital decisions with an impact to the real life would influence the participants. The participants had a stronger feeling of realism and a higher level of empathy [30]. Also the improvement of game controllers is a growing part in this field of research. An increased in body movement imposed by the game controller results in an increase of the player's engagement [6]. These researches shows that the way of interacting with the game is an important point.

While previous work on hybrid games primarily looked at how to preserve aspects of traditional physical games, such as the social dynamics between players, the possibility to create social interaction between players and game characters has not been explored yet.

Design of Game Characters

It has been shown that the visual appearance of game characters significantly influences how viewers and players accept and perceives the characters. Schwind et al. showed that at a high level of realism, small atypical features can cause the uncanny valley. Further they found that unrealistic characters are accepted when they stay consistently unrealistic. To increase affinity to characters childish features can be used to elicit protective instincts and feelings of care taking [40]. For the design and identification with non humanoid characters of a game it was also found that gender does not have any effect to male or female players. They are all accepted in the same way [37]. Research on the visual appearance of AR avatars showed that a higher realistic level of an avatar is better received by users than an abstract one [36].

You and Katchabaw, investigating the impact of non player characters (NPCs) on players, found that psycho-social models (characters with cultural aspects, psychological traits or improved socialization) are more believable and lead to more immersive experience [48]. Ferstl et al. showed that facial features of NPCs can influence moral decisions of the players and their trust in the digital characters [16]. Merrick found that NPCs that evolve with the players and their decisions,

which means that they fit their behavior to players decisions, lead to a more immersive game experience [32].

Tychsen et al. looked into the design of avatars representing the user and found that also other attributes than visual appearance influence the player's engagement with the character, such as personality, demographical background, and shown stats, e.g. about health, endurance, and strength [45]. Smith found that customizing the personality of a game character is an essential part for the player to identify with the character [42]. When a user wants to have a good representation of themselves, the look of the avatar is important. Here, beside highly detailed clothes and accessories, the creation and customization of the face was highlighted to be essential [8]. A good appearance of the avatar can lead to more self-confidence by the users [2]. Lankoski found that goals are the very basis of character immersion and emotional experience. When players evaluate the characters goals and take them as their own, i.e. the NPC and player both want to attack an enemy and not one wants to attack and the other to defend, shared emotions occur [25].

In summary, previous work was mainly investigating the visual appearance of digital characters to lead to a better immersion and better game experience. How the behavior and showed feelings of the characters can have an influence, for example on players' decision, has not been investigated yet.

SUGGESTIVE CHARACTER DESIGN

We aim at contributing to research on game characters through adding behavior to them. As human behavior and shown emotions can influence the behavior of others, e.g. influencing the decision how to react in a certain situation, we see potential to use such social interaction in digital game design. As a simple scenario, we use bluffs as way to influence players actions. Bringing AR game characters to live and enable them to socially interact or communicate with the player through body language, posture, and gestures, we hope that we can create a novel game component of Suggestive Character Design. We design the characters in a way that they try to suggest certain game strategies to the player during the game, in other word: the characters pose and gesticulate to suggest a certain game action, such as playing or avoiding to play a certain game card. The poses and gestures of the game characters we designed show three different suggestions: (1) drawing the player's attention to a game card, (2) influencing the player to play this card or (3) influencing the player to not play this card.

Game Design

We decided to chose a Trading Card Game as research apparatus as such game usually have characters visualized on their cards, and more importantly, it is not 100% clear what card is the right one to play in most situations. Hence, we have many game situations where suggestions can be applied. Surely, the decision to play a card is always dependent on a game situation and on the player's game type. Trading Card Games support situations in which an attack, a defense or a neutral action often are possible at the same time, and none of them would be a totally wrong turn. The decision made does not only depend on a game situation, but also on the

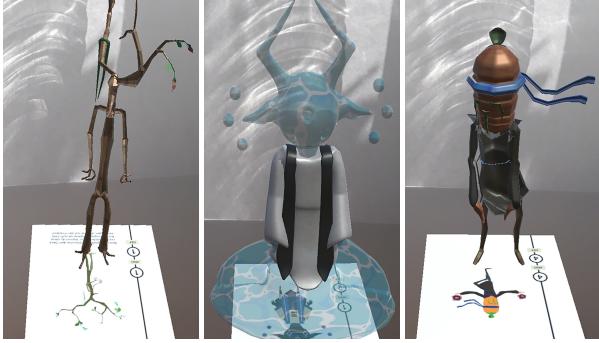


Figure 2. All three characters in neutral position. Fragile looking "Wünschelbaum" (left), neutral looking "Water Ghost" (middle) and the warrior-looking "Kanuum" (right)

players type [4]. Thus, we have to have in mind that different people act differently in same game situations, which we will consider when designing our user study.

Thus, we will later analyze the decisions made in game situation in dependence of different players with different Trading Card Game experience and different common play-styles.

Current (Trading Card) Games not allow to add behavior to characters as we propose to do. Hence, we designed a Trading Card Game to be part of our apparatus including game cards, character models and animations as well as game rules, which were following the common principle of Trading Card Game.

The character design was chosen in a way that the characters represent different levels of strengths, a fragile and rather weak one, a stronger and more warrior-looking like one, and a neutral one, see Figure 2.

Our designed game ensured that – unlike in most state-of-the-art AR games – the characters would not only be a visual game addition but a game component which interacts with the players in the three beforehand mentioned ways. Consequently, during the game, our characters have to be played to either attack or defend, while a neutral, neither attack nor defend action is always possible. Each of the three characters was available in every game situation and could attack, defend or do neither one or another action.

To suggest a certain game action, in particular to make a player play a certain character, first, the players' attention had to be drawn to the character. Second, so that the animation should communicate whether the character wants to be played, not, or does not mind, the animation has to be understood. Finally, the animation intended, if being understood, has to result in the corresponding game decision, e.g., playing a card those character suggests an attack.

Drawing Player's Attention To The Card

As motions captures with our eyes are a powerful way to draw human's attention, which is known as orientational reflex [43]. Hence, we animated the characters and let them become alive to grab the attention of game players. As shown in Figure 2, characters were displayed as moving creatures standing on top of the cards.

Influence Player To Play The Card

To convince a player to play a card, the behavior of the characters has been chosen to be an encouraging gesture and body posture representing self-confidence as such behavior of the character has been shown to make the players more willing to play offensive and attack [3, 9, 33].

To ensure that not the character's look itself influences the players, but the behavior across all characters, we implemented the encouraging animation for all three figures. In detail, the encouraging behavior is represented through waving hands in the direction of the enemy while directly facing them. That animation should tell the players that there is nothing to be scared about and it would be a god decision in this situation to attack.

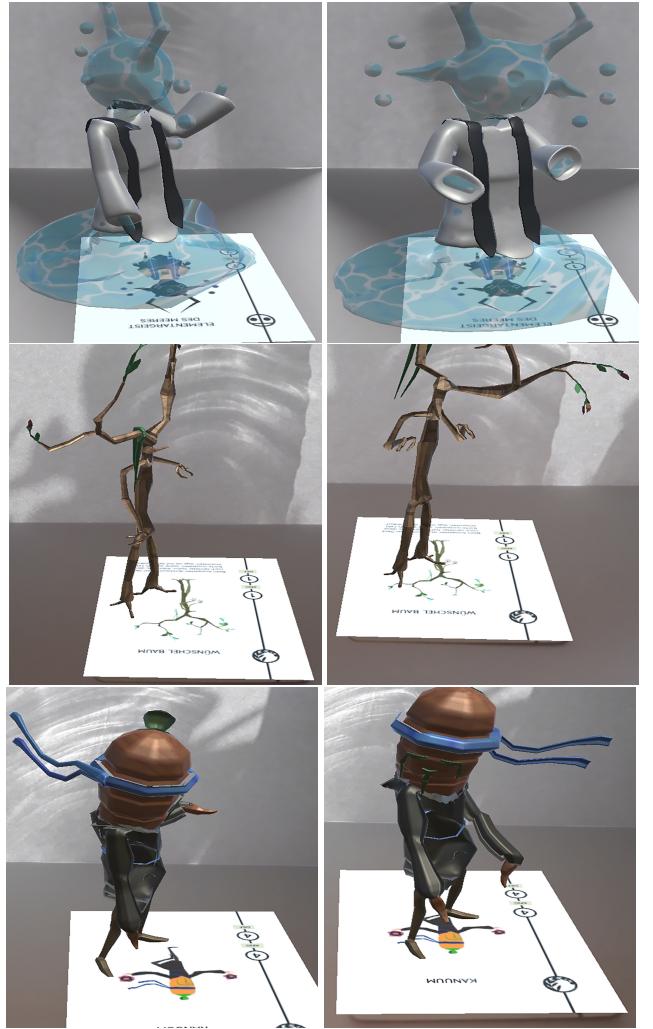


Figure 3. Encouraging behavior of the three characters

Influence Player To Not Play The Card

For influencing the players to not play the card we chose an animation that should show fear of the character, which potentially generates empathy of the players for the character. When the players recognize that their character is frightened and anxious, the player may not send their characters into a

fight, but potentially make them want to protect the scared character so that nothing bad can happen to them [5, 12].

As sign of fear and weakness, we let the character turn away from the enemy as a kind of hiding behavior putting their hand as protection gesture in front of their face.

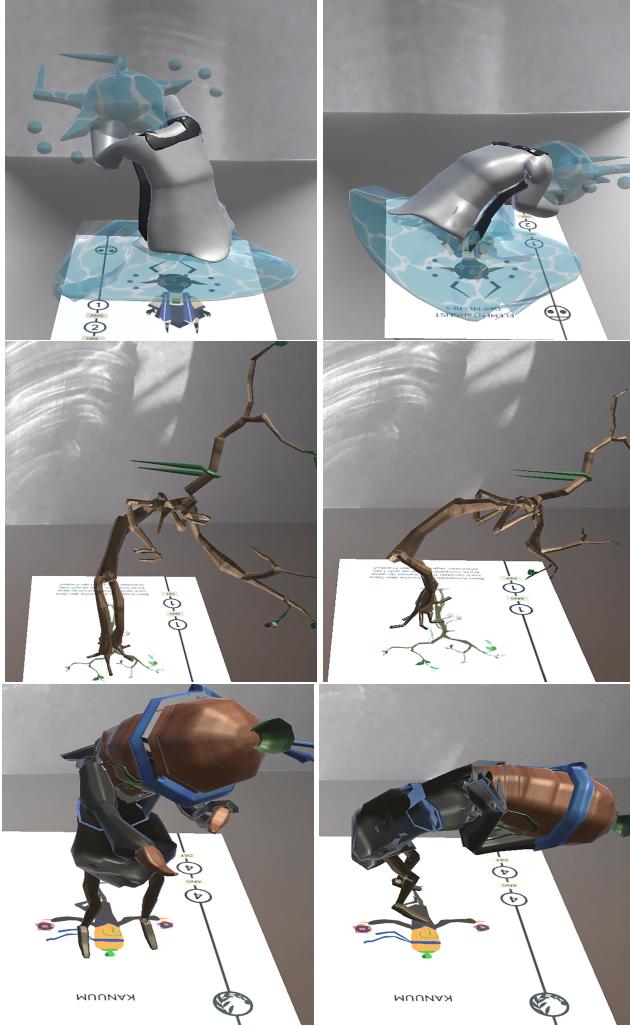


Figure 4. Discouraging behavior of the three characters

This behavior shows the players that the character is scared of this situation and don't want to take a fight. Therefor, the players may either feel sorry for their character or just not believe the character might win the attack, and hence, the character card might not be played.

METHOD

To see if characters can influence the players' decision through suggestive behavior, we conducted a controlled proof-of-concept study. Participants played in exemplary game situations using our AR card game.

Experiment Design

The experiment is based on a 3x3 within subject design with the two independent variables *game situation* (attack, defense, neutral) and *suggestive behavior* (encouraging, discouraging,

none). To evaluate our game concept, we measured (1) if the animation has been perceived (2) if the intended message of the animation has been understood, and (3) if the card the character was suggestively proposing has been played. Each of the three measures were recorded in questionnaires with radio buttons for each possible answer. To better understand why our suggestive design succeeded or failed, we use a mixed-method approach and asked in a semi-structured interview what aspects had influenced the decision towards as well as against playing the animated card (which varied across the tasks representing the conditions).

Participants

We recruited 18 participants for our study (14 male, 4 female) with an age range from 22 to 50 years and an average of 28 years ($SD = 7,38$). Half of the participants had experience with Trading Card Games. 10 participants rated themselves as offensive players and 8 as defensive ones.

Apparatus

The apparatus consisted out of a physical Trading Card Game and a Samsung Gear Head-Mounted Display (HMD) using a Samsung A6. In the study, 4 game cards were used by the participants (3 characters which were the same in each *game situation* (attack, defense, neutral) and the Action-Points (AP) card (which could be chosen in the neutral situation to win by strategy). **The three characters varied in body size and in visual appearance (Figure 2). Even though all characters and game situations were designed that no matter which character is played it would lead to success.**

6 different cards (Figure 5-7) were used to symbolize the opponent's card, 2 different characters for every situation. The digitally augmented card characters were displayed on the HMD. The Android AR application was developed in Unity3D version 2018.2.16f1. Vuforia served for recognizing the game cards as markers to place the digital characters developed in Blender 2.79 above them. The characters who were animated in the 9 variations representing the 3x3 conditions were selected randomly. Only one character was animated at a time to not confuse the participants.

The randomly selected animated character as well as the independent variables were saved in a CSV file on the phone. Another CSV file was saved on a laptop to store questionnaire and interview answers , as well as the chosen card .



Figure 5. Courage behavior of the Water Ghost, in the front row on the right, in the attack situation



Figure 6. Discourage behavior of the Water Ghost in the *defense* situation



Figure 7. None behavior of the Water Ghost in the *neutral* situation

Task

The tasks the participants had to solve was to decide which card they would play in three exemplary game situations using the Trading Card Game. The game situations were an *attack*, a *defense*, and a *neutral* situation. In each situation, the participants had three cards and the opponent (represented by experiment leader) had two. The cards of the opponent were changing depending on the situation, see Figure 5 representing an *attack*, Figure 6 a *defense*, or Figure 7 representing a *neutral* situation.

In the *attack* situation, participants had to chose with which character they would attack the opponent. On the opponent's side in this game situation were always the small mushroom and the harmless wooden ghost (Figure 5). Both were not be able to defend no matter with which character the participant would attack. **Every character would lead to success so the choice of the character is not just a strategic decision.** In the *defense* situation a characters used to defend the opponent's attack had to be chosen. The opponent always had the angry golem and the intimidating elemental ghost on his side and was attacking with the golem (Figure 6). **The golem was chosen as attacking character, because this card can be successfully defend by every of the participants cards.** In the *neutral* situation, the participants could either choose a character to

attack the opponent or they could play the AP-card to win by strategy. The characters was chosen in a way that both would have the same game outcome. In this situation the friendly fire ghost and the giant tree were representing the opponents hand (Figure 7).

To vary the independent variable *suggestive behavior*, in each game situation one of the participants' characters was animated to behave *encouraging*, *discouraging*, or not suggestive through a neutral behavior animation, corresponding to our *none* suggestive behavior. While always one of the participant's characters was animated, the other two were not.

In every game situation it would not make a difference which character is played. Every decision would lead to the same game result. This information was not given to the participants.

Procedure

After participants had signed a content form and filled in demographic questionnaires, we explained the game rules to them using our game situations as examples.

The tasks represented through the three *game situations* were counter-balanced. In each *game situation*, each of the three suggestive behaviors occurred in randomized order.

Participants sat on a table opposite from the experimenter and were equipped with the AR glasses.

Before each *game situation*, the participants got informed which *game situation* was presented.

The task for each *game situation* was to chose the card the participants could imagine choosing is a real game situation. For that decision, no time limit was given.

After choosing a card in each *game situation*, participant filled in a questionnaire containing the questions mentioned in the experiment design and answered the two questions of the semi structured interview. **The participants also filled in which card they have chosen, to check if it was really the animated card. If they did not played the animated card it gave us the information which card they played instead.**

As each participant played each *game situation* three time, one with each behavior animation (*encouraging*, *discouraging*, *not suggestive*) each participant played 9 rounds.

RESULTS

ein kurzer introtext ist hier gut, z.B. We analyzed the quantitative results (actual card selections, the questionnaire ratings) using methods xyz and qualitative feedback on choices made an oping coding approach.

Quantitative results

Animation perception

In each of the nine conditions, one of the cards that the participants had to choose from was animated. Asking what card had been animated shows that in 97.5% of the cases participants recognized which card was animated, while this was not the case for 2.5%. For these 2.5% of non perceived animations, the characters was animated with neutral behavior. Consequently,

an animation was perceived in 93 % of the cases when only taking a looks at the neutral animations, while encouraging and discouraging animations were always recognized (as animation without distinguishing if the animation type was guessed correctly, which the following section is focusing on). This question serves as basic check if the following results allow for being interpreted.

Animation Behavior recognition

To ensure that our animations were able to work as intended suggestions, we also tested if they were designed correctly through asking what behavior the animated cards showed.

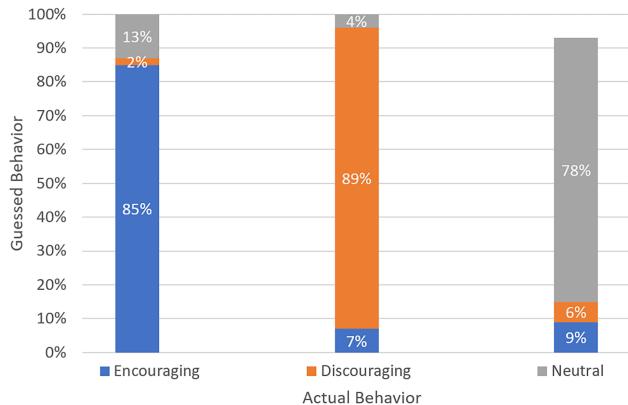


Figure 8. Behavior guessed by participants for each behavior animation

The animated character behaviors were mostly correctly recognized. The encouraging behavior was understood in 85% of the cases, while that behavior was misunderstood as neutral in 13% and as discouraging in 2% of the cases. The discouraging behavior was recognized in 89% of the cases, while being understood as encouraging in 7% and as neutral in 4% of the cases.

The neutral behavior was recognized in 78% of the cases, but misunderstood as encouraging in 9% and as discouraging in 6% of the cases. Please note that neutral here does not add up to 100% due to the fact that some neutral animations were not perceived.

we should include a significance test if neutral is sign. less recognized than dis- / encouraging. I guess this is not significant. @Jens: I would look at how many correctly recognized the animation, which results in binary data, e.g. 0 for false and 1 for true for each participant and each behavior.

Suggestive Behavior Success

Aiming at influencing game decisions through suggestions, we analyzed the suggestion success. The suggestion of an animation would be successful if (a) the encouraging card is played (when it occurs) as it suggests to be the right one in the game situation, (b) the discouraging played card is NOT played as it suggests to NOT be a good choice in the game situation. During the third possible situation, when (c) the animation shows a neutral, neither en- nor discouraging behavior) we do not actively suggest a game action, but we make the participant recognizing that card as humans tend to draw

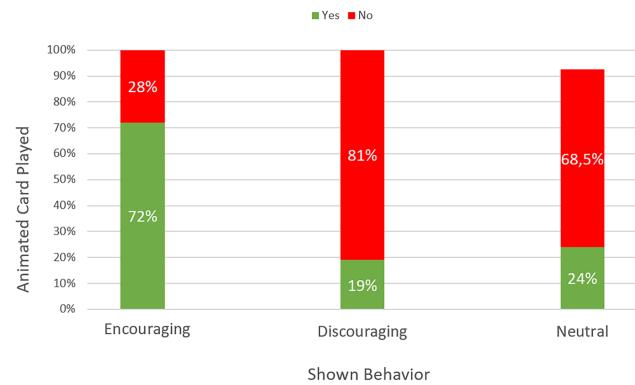


Figure 9. Decision made to play a card (Yes or not (No) for each suggestive behavior bitte Konsistenz beim kursiv schreiben. hier ist die Variable kursiv, bei Fig. 8 und an vielen anderen Stellen nicht...

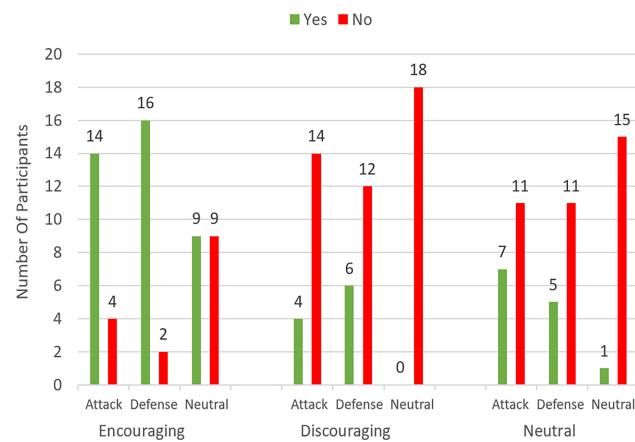


Figure 10. Was the animated card played by the participants split to the suggestive behavior and game situation

attention to moving things which is explained as orienting response or reflex. [please add reference here](#)

Overall, the animation showed suggestion success for the encouraging and for the discouraging behavior. For the encouraging behavior, in 72 % neue Absätze bitte als Enter. Das ist um vieles übersichtlicher für mich. of the cases participants were encouraged to play that card, while in 28% they were not (of which 27% were not recognized as encouraging) For the discouraging behavior, in 81% of the cases participants did not play the card, while they did in the remaining 19% (of which 30% were not recognized as discouraging behavior), see Figure 9.

@Jens: zur statistik: hier sollten wir schauen, ob eine animation erfolgreich war, also yes bei encouraging, no bei discouraging und nach interaction effects gucken und zwar einmal bzgl. situation, s. Fig. 10, und einmal bzgl. game character, s. Fig. 11. ich erwarte interaktionseffekte bei neutral und die brauchen wir auch für eine sinnvolle discussion.

By a neutral behaving character the animated card was also played just a few times (24 %). In the neutral behavior are again just the cases where an animation was recognized by

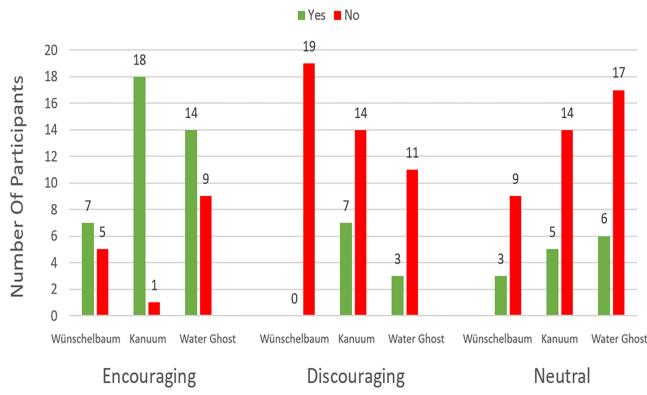


Figure 11. Was the animated card played by the participants split to the suggestive behavior and animated character

the participants. When the neutral behaving card was played, a wrong behavior was recognized in 29 % of the cases and nearly all in the attack situation. So by taking a look at the cases where the right behavior was recognized the neutral behaving card was played in 20 % and not played in 72 % of the cases.

By taking a look at the behaviors in the different *game situations* even more results come out (Figure 10). If we take just the two *game situations* where a character has to be chosen (attack and defense) by the participants we can see that the encouraging behaving character was played in 83 % and the discouraging behaving character in 28 % of the cases. In the *game situation* where the participants also could play another card than a character the encouraging animated characters was played in 50 % and the discouraging animated characters in none of the cases. Here it becomes even more obvious that if the participants have to choose a character they will take the encouraging one in first place. If the behavior is discouraging they will take another card and if they don't have to take one character the discouraging behaving character is completely not selected.

For the neutral behavior it can be said that the character is more often not played in every *game situation*. Also here we can figure out that if there is even a choice to play completely another card than a character, the animated character receives little consideration.

Which card did you play

The fourth question related to which card the participants chose.

The most commonly card chosen by the participants was Kanuum, which also had the strongest appearance by looking like a fighter. This card was the most chosen card when participants did not play the animated card and when they played the animated card. In the cases where the animated card was not played Kanuum is far ahead of the other characters. When the animated card was played Kanuum and the Water Ghost are close together. The card that was played the least was Wünschelbaum, which also seemed like the weakest character.

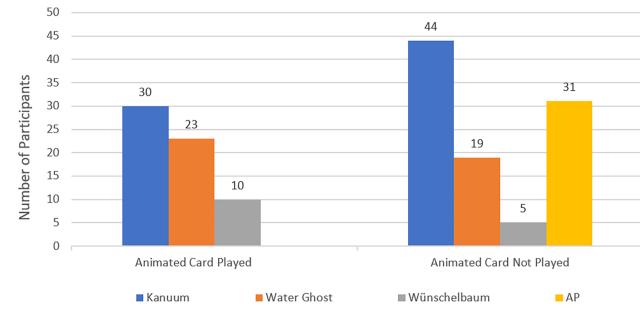


Figure 12. Which card did you play

The AP card could just be chosen in one situation and therefore it was played very often. Like mentioned before especially by frightened and neutral behaving characters.

Qualitative results

The last two questions in the study, in the form of a semi-structured interview, related to the thoughts of the participants they made when selecting a card. No matter if the participants selected the animated or a none animated card they should answer the following questions:

- What made you think about choosing the animated card?
- What kept you from choosing the animated card?

The answers were evaluated qualitatively using Open Coding. The answers of the participants were divided in different categories so that we are able to take a look at their thoughts in the different game situations and at the different *suggestive behaviors* of the characters.

Animated card played

Most of the time the animated card was played when the behavior of the animated character was encouraging. If you take a look at the different *game situations* the courage behaving character was played 14 times if the participants had to attack the opponent. The most called reason for that was the animation of the character. After that was also mentioned that the character look ready to fight and had good values. Just one participant wrote down that he took the animated card just because of its values.

- The character looks offensive and challenges to fight. (Exp. 12)
- The card was animated and had the highest values, so of course i took it. (Exp. 17)
- Highest values means it wins in every way and will not be defeated. (Exp. 7)

In the *game situation* of defending an attack of the opponent the encouraging behaving character was chosen 16 times by the participants. Also in this situation was the most called reason the animation of the characters. Just 4 times the values themselves were mentioned and two times a mix out of values and animation.

- Looked brave. Made a safe impression. (Exp. 10)

- Good defense values. (Exp. 2)
- The defense value but also the challenging expression. (Exp. 1)

When the participants were confronted with the third *game situation* (neutral) where they had to decide to attack or to win by saving points the courage behaving character was played 9 times so by the half of the participants. All 9 participants that played the animated card did that because of the animation of the character

- He looks like he is willing to fight. (Exp. 6)

This is the lowest count of participants that played the animated card in a game situation but it is also the game situation where the animated was played only by a courage behavior of the character except one time by a neutral behavior. So it can be seen that when a card was played in the neutral game situation it was when the character challenged the participant to fight. In both of the other situations the animated characters were played by every behavior of the characters. But even when the participants played the animated card they had to mention their thoughts why they perhaps would not play the animated character. The answers were the same in every game situation. Most of the given answers were just "nothing" and the second mentioned thought that were given were the values of the card.

- Nothing. (Exp. 13)
- The values are low. (Exp. 12)

In comparison to that the discourage behaving character was never played in the neutral game situation. In the attack situation the discourage character was played 4 times and in the defend situation it was played 6 times. In the attack situation the reasons were the values and the look of the character.

- Highest values. He will make good damage and not be defeated. (Exp. 7)
- the head band looks badass, because of that i attacked with him. (Exp. 9)

In the defend situation were the reasons why the discourage character was played were the values.

- The higher values. (Exp. 11)

When the characters had a neutral behavior they were played by the participants in every single situation because of their look and also because of their values.

- She had an attack value that was higher then two, and was able to defeat the opponent. (Exp. 17)
- Because of the animation and the position in the middle. (Exp. 3)

You can see that the animated character is played most when it is behaving courage and challenge the player to fight. When the characters were behaving discourage or neutral they were mostly played because of their values like 4 times Kanuum by an discourage behavior in the attack situation. When the character was courage he was played because of the animation

and that nearly by all participants. So when you look at that results it seem that the players are influenced by the behaveng of the characters. So here it seems that non verbal suggestion takes place. So now we take a look at the cases where the animated card was not played and what reasons were mentioned by the participants.

Animated card not played

The animated character was played the less when the behaveng of the characters were discourage. In the neutral game situation the discourage behaving character was never played by the participants and the reason for that was 15 times the animation of the characters. Other reasons were that the participants have chosen the other strategy and one participant just mentioned "nothing".

- The character looked discourage and not ready to fight. (Exp. 4)
- Easy win by saving the AP card. (Exp. 2)
- nothing (Exp. 16)

Also in the other situations the most called reason for not playing the discourage character was the animation and the discourage look of the characters. Just some participants said that the bad values of the characters were the reason for choosing another card.

- The Elementargeist is discourage and intimidated. (Exp. 12)
- The Wünschelbaum card is the weakest, but it is enough to defend. (Exp. 18)

Some participants mentioned as reason for not playing the discourage character empathy for the character. They had a feeling of bringing someone into a situation in which they are not comfortable with. Because of that empathy the participants decided to choose another character.

- I had the feeling to be rude if i play the character even though it is anxious. I also had another opportunity. (Exp. 5)
- The character was frightened. So i thought bad things could happen to it. To protect it i played another card. (Exp. 13)
- The character was anxious and so i got the feeling that it would be without chances even though it had enough defense points. The fear could also come of an elementary disadvantage and to keep my character from unnecessarily been beaten and suffer. (Exp. 17)

When the behavior of the card was courage but the card was not played by the participants it was because of the values or that the participants thought that in the neutral game situation it is the easier way just to save the AP card to win. In the defend situation was no reason mentioned. The participants said that it would make no difference which card they would play because the result is always the same.

- It makes no difference which card i play so i took the Elementargeist because he looks better. (Exp. 17)

The last behavior we have to take a look at is the neutral behavior. The characters with a neutral behavior were not often played by the participants. In the neutral game situation they did not chose another character, but just saved the AP card because it made most sense for them.

- Easy win by the AP card. (Exp. 2)

Other reasons were the values of the cards and in the attack situation it was also the look and the animation that kept the participants from playing the neutral characters. The neutral behavior suggested the participants a kind of exhaustion.

- The animation looked like exhaustion and because of that i played the Elementargeist. (Exp. 17)

Even when the participants did not played the animated card they could mention for what reasons they could imagine to play the card. By the discourage and the neutral behavior the answer was mostly just "*nothing*". Only by the courage behavior and in the neutral game situation the animation of the characters could have been a reason for playing the animated character.

- A big and ready-to-fight animation. Looks like the other figures would sleep and only one is active. (Exp. 8)

In the other game situations the courage card was mostly played.

So after we took a look at these results we could say that the courage character was played the most and the discourage behaving characters were play the less by the participants and the reason for that is the animation. By a neutral behavior the participants took a look at the values or were influenced by the look of the characters themselves. In the neutral game situation by a neutral and discourage behavior most time the strategy of saving the AP card to win was taken. So we can see that the behavior of the character can suggest the players and lead their decisions in a direction. Some participants also established a relationship to the characters and felt sympathy for the characters in some situations.

DISCUSSION

First of all, it becomes clear that 97.5 percent of the animations on the figures were perceived by the participants and therefore the results do not have to be differentiated according to whether movements were detected or not, which would have had a considerable influence on the results, since the study was concerned precisely with the animations and their influence on the participants' decisions. Furthermore, it can be stated that almost all animations were assigned to the correct behavior. This point is also very important, which is shown in the results by the fact that the participants played the animated card above all when a courageous/prompted gesture was recognized.

The card that has been played the most was Kanuum which is also the card where there was the most confusion when recognizing the behavior. Even if Kanuum had a neutral behavior, it was rarely perceived as courageous and challenging. Some participants continued to say that he looked bravest and strongest no matter which behavior he really had, which is probably due to his fighting outfit and look itself. So not only

the animation but also the appearance of the characters influenced the decisions of the players.

But most of all the players were obviously influenced by the behaviour of the figures. The courageous figure was played 72 percent of the time. If only the game situations of the own attack and the own defense are considered, the courageous card was played 83 percent of the time. This shows that if the participants only had the choice between the three character cards and one of these cards seemed courageous, the participants chose it very often.

The choice of the card was mostly based on the fact that the card appeared to be successful in the given situation compared to the other situations. The aggressive cards gave the participants a sense of security and through their behavior the figures made a safe and strong impression, which made the players believe that playing this card will definitely make them successful. The other cards and also the values of the cards found virtually no mention of this type of behavior.

The participants often recognized the courageous card as the best choice and had the opinion that it looked strong and would definitely win the situation. So the card signaled the players in advance what the outcome of the decision would be and a certainty as to how to proceed. However, it was not only the animation and the apparent anticipation of the outcome that influenced the participants' choice of the card. It was the basic appearance of the characters and the participants built a relationship with the characters and evolved an empathy for them. The animated cards were also played the least when the characters gave an discourage impression. In only 19 percent of the cases was a card played when an discourage behavior of the character could be seen. This was due both to the sympathy with the character and to the fact that the test persons felt that they were losing safely with the card and thus had a disadvantage in the game.

Each player tries in every situation of course to choose the move that is best for him in the current situation. Here it also becomes clear once again that it is important from a strategic point of view to foresee what consequences own decisions will have and, on base of that, to choose which decision would be the best. A courageous behavior signaled the participants a right decision and an discourage Character's behavior signaled a wrong decision. Since it would have led to the same result in all situations, no matter which card was selected, it shows what influence the animations had on the participants. If the characters behave courageously and encouragingly, it becomes clear that a suggestion of the characters to the player has took place and these suggestions have an impact on their strategic choices. By a neutral behavior of the character in relation to the other two behaviors, the participants most often made their decision depending on the values of the individual cards. The animation or the appearance of the figure was hardly mentioned, which was not the case with courageous and encouragingly behavior, where it appeared in almost every answer.

Furthermore, in the case of neutral behavior, there was often uncertainty among the participants about the choice of card. Especially in the strategic situation of the game, almost every respondent played the action points card. There was also uncertainty in other statements, as words were often used as to how could or seemed, while in situations with courageous and

discourage behavior was not responded to in the conjunctive, but rather the participants were firmly convinced of their answer. If the neutral animated character was played, very often the better values were mentioned as the reason for this. Also there are no difference between players with TCG experience and players without TCG experience.

The findings from the game theory are reflected here well, since the players like to have a certainty in their decisions and positive consequences from their strategic choices, they play the card, that gives them the most positive outcome. If a negative outcome is suggested, the card is not selected by the players, because the players want to achieve an advantage for themselves and would like to recognize this in advance. A critical aspect of the study could be that only one character was animated at a time, attracting attention and possibly influencing the players.

In future there are more possibilities that can be done with the findings and for further research. The game design we chose extends the classical Trading Card Game by one component. The living characters can make suggestions to the players and influence their decisions. This can be used in two different ways. (1) New players can get a faster access to the game because the characters will suggest them the most usable strategy or decision in every situation. So the process of learning rules and get into a game can be fasten up. But this is not only positive for new players. Also players that don't have much time to spend to become better can kept motivated because of the help of the game itself. Through the help of the characters it doesn't look like the game would help, but just like your figures will give advises to the players and work together with the players. (2) Experienced players can get a new level and a hole new experience to play a Trading Card Game through the suggestions of the characters, which might not only be helpful, but also can be misleading the players. The difficulty can get higher and it is a new way to keep the game interesting by a large number of variations because of adding the new component of living characters. Both points open new fields for research. The advises and the behaviors of the characters should be noticed by the players but should still be suggestions. The players still have to think about their decisions by themselves. Suggestions of the characters are different from the game situation and depends on the time when the suggestion takes place. The characters can try to influence the players (1) before they play the card, (2) during they play a card, or (3) after they play a card. Also the way of suggestion can be extended by talking characters. Also this gives us more opportunities for research in the future.

In summary, it can be said that the animated characters can suggest something to the players - positive or negative - and the players will be ready for these suggestions. This supports our idea that suggestion can take place in the digital game and even occur as a strategic element. The players get more opportunities for their decisions and it leads to more strategic possible choices which make the game more interesting and offers a wider and multifaceted game play.

CONCLUSION

The results of the study and the resulting interpretations lead to the conclusion that suggestion can also function as a strategic

element in digital games. The participants were guided by the behavior of the characters and often only gave this behavior as the reason for their choice of which card they played. They were told whether it was wrong or right to play a certain card and they were told before the move what the consequences of their choice could be. The study therefore reflects the considerations that were made in the apron as correct and thus also gives a lot of potential for future studies and prototypes. These results can be used as a basis for future work, how the players are influenced when several figures are animated and have a suggestive effect.

But not only the influence of the player on the behavior of the figures is a possibility in the future, but also the influence on other ways, like verbal statements. Mixing of different suggestion possibilities can be investigated in the future as well as situations in which the opponents also move or make statements. How do players behave when both their opponents and their own characters appear courageous and do not shy away from battle? How does it change the decisions when two players really play against each other, have their opponent's pieces manipulated, and can you really see the effects decisions made will have in the future? These are questions that can and should be further explored in the future.

Similarly, we have only considered the case before taking any action. The cases of suggestion during a player's own action and after a player's own action must also be considered and examined in the future, since at certain times there are also special forms of possible suggestion, such as mocking a player after he has executed an action. Here we can say that digital and analog games can be combined and characteristics from the classic analog game can also be transferred into the digital game and even expanded. This conclusion was clearly reflected in the responses of the participants. There was a relationship between participants and animated characters and compassion was developed, people felt more confident in their decision even though the figures were self-confident and had compassion when they were anxious. These results show that the idea of living game characters can be realised.

The participants themselves were partly surprised to find that when considering the animated character their thoughts were directed quite differently and they could not believe that they could develop compassion or let themselves be distracted from actually clear decisions. It is also important to mention that the animations are recognized and assigned right, because otherwise they cannot fulfill their meaning and convey something wrong. Also, there should be no classification of a certain type (here courageous or anxious) in the basic attitude and the appearance of the character, because this would influence the players unintentionally in advance, before the actual suggestion should arise.

The idea of the developed concept turned out to be correct and feasible. So we can say that nonverbal suggestion can also be a part of digital games and not only of board games. A transfer is possible and can give digital games a new structure and new possibilities to play the game. The players can use it as a strategic element inside of the game and the participants felt well with and it was not a strange feeling for them that the characters were interacting with them in a way and gave them advises and influenced their decision.

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