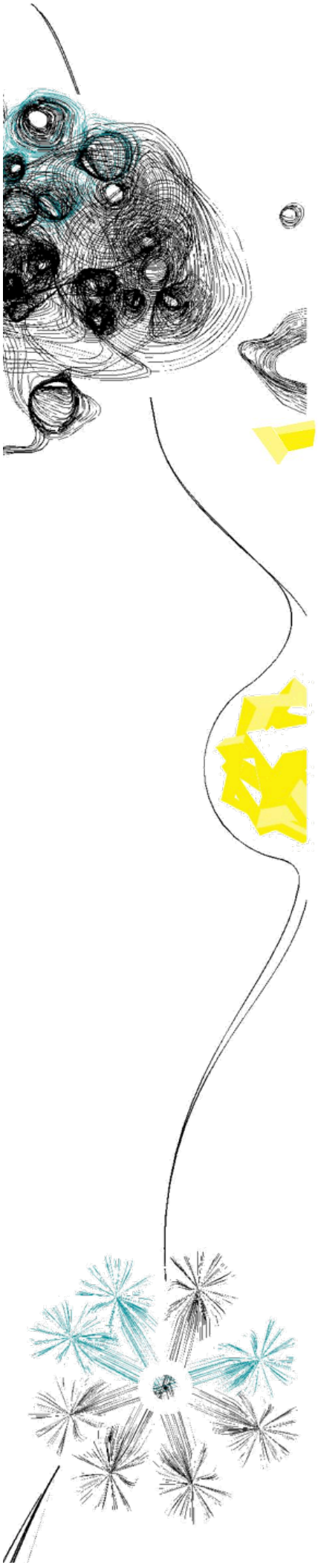

As long as they play, they are happy

The Effect of Gamification and Emotional Framing on the Overall Satisfaction of Waiting at a Dentist

Master Thesis

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Abstract

Objective

This study analyzed the effect of (in)congruent Gamification and emotional framing on the Overall Satisfaction of waiting at the dentist. Previous studies have already shown the positive effect of Gamification on waiting situations in hospitals (Ehrler et al., 2016; Hassan et al., 2016). This study builds upon these findings and aims to make a distinction between congruent and incongruent Gamification in order to further improve the satisfaction with the waiting situation. Additionally, emotional framing was used to see if the positive effect of Gamification holds, irrespective of the emotional state of a person. Moreover this study used different waiting situations to evaluate whether the positive effect is also transferable to other medical institutes.

Method

A total of 159 participants, split into two comparable groups participated in the study. Group A received a positively framed waiting situation and Group B a negatively framed waiting situation, which comprised a scenario that they were asked to read. The emotional state was tested with a short questionnaire followed by the waiting situation. Within the groups the waiting situation was manipulated with either no game or with a congruent (Game 1) or incongruent game (Game 2). Thereafter, participants were asked to complete a questionnaire that measured their Overall Satisfaction with the waiting situation. The experiment took place in premises of the University of Twente and Saxion University of Applied Sciences.

Results

Gamification produced higher Overall Satisfaction compared to no Gamification for waiting at the dentist. The effect of Gamification on Overall Satisfaction is mediated by Time Appraisal. Gamification moreover resulted in a lower Level of Stress and Frustration. The type of Gamification produced no significant difference on the Overall Satisfaction or Level of Stress and Frustration. Moreover, Emotional Framing had a main effect on Mood and Perceived Waiting Time but not the Overall Satisfaction. No interaction effect between Gamification and Emotional Framing on Overall Satisfaction was found.

Conclusion

This study showed that Gamification had a positive influence on Time Appraisal and the Overall Satisfaction of the waiting situation at the dentist. The type of game that one plays, and the emotional setting he/she is in, may not influence Overall Satisfaction. Based on the findings, dentists may consider adding Gamification to their waiting process in order to improve the Overall Satisfaction of their patients.

Keywords: Gamification; Overall Satisfaction; Waiting Situation; Congruence; Emotions

Table of content

Introduction

Waiting is inherent in our daily life. We are waiting in line at the checkout of the supermarket or when calling a service desk of customer service hotline because the TV connection does not work. We are waiting for the train to arrive and for the airplane to take off. It is a part of our life we do not enjoy (Norman, 2008, Taylor, 1994).

Another waiting situation we are confronted with is in medical institutes, like hospitals or at the dentist. Hospitals often present anxiety-provoking waiting situations because of the uncomfortable surrounding, including not being sure what will happen. Uncertainty in a waiting situation can elicit negative feelings such as anxiety and stress (Dube-Rioux, Schmitt & Leclerc, 1989; Osuna, 1985; Pruyn & Smidts, 1998). This would explain why waiting in hospitals is described as one of the worst waiting experiences (Norman, 2008). How patients perceive the waiting experience is, however, a key determinant in how satisfied they are with their visit. Satisfaction is critical for future interaction, but also for recommendations towards ones' social environment (Ehrler et al., 2016). Hence, a positive waiting experience leads to customer return, which is necessary for a profitable company (Norman, 2008). This can be extrapolated to medical institutes as well.

Previous research suggests that the overall customer satisfaction is strongly influenced by the waiting process (Pruyn & Smidts 1998, Redden, 2016; Taylor, 1994). In a situation where waiting is unavoidable, waiting time needs to be perceived as passing fast and pleasantly (Pruyn & Smidts, 1998; Redden, 2016; Soremekun, Takayesu, & Bohan, 2011). Waiting customers need to be kept in a good mood through activities that create positive emotions (d'Astous, 2000). In order to keep patients distracted in a fun way, Ehrler et al. (2016) added Gamification to the waiting process in a hospital. For their study, an innovative information screen was developed (based on service evaluation models) showing patients were highly satisfied and did not report stress or frustration. The screen that was developed, together with experts, displayed five lanes that represented triage levels. All patients where represented with an individual avatar on the screen. According to their results adding Gamification can lead to higher satisfaction and patients showing no signs of stress or frustration while they were waiting. An explanation why Gamification has a positive influence on the waiting evaluation is that games in hospitals keep patients occupied (Patel, 2006; Primack, 2012; Twyman, Fui-Hoon Nah & Siau, 2016), which works as a distraction (Ehrler et al., 2016; Hassan et al., 2016; Patel, 2006; Primack, 2012; Twyman, Fui-Hoon Nah & Siau, 2016) and decreases the Perceived Waiting Time (Soremekun, Takayesu, & Bohan,

2011). This in turn is relevant for patients' satisfaction with the waiting situation (Hassan et al., 2016).

Although Gamification shows to improve the level of satisfaction with the waiting situation, some notable limitations in previous research need to be addressed. Therefore, this study aims to extent on previous research by including two important variables in the experiment: the congruence of the Gamification and emotional setting. Until now experiments were carried out with a congruent Gamification, meaning they used a game that fits the waiting situation (Ehrler, et al. 2016; Hassan, et al. 2016). However, it is said that stimuli, which are incongruent, are more difficult to process (Krishna, 2012) and hence could lead to a higher level of distraction and in return a higher satisfaction. Thus, one could assume that when aiming to distract participants from the waiting situation however, incongruent Gamification might have the preference. Therefore, this study investigates the extent to which the type of the Gamification (congruent versus incongruent) has a different impact on the Overall Satisfaction of the waiting situation.

Another aspect that was not taken into consideration in previous research is the assumption that patients can be in different emotional states (e.g. relieved versus anxious about the results they receive) when visiting medical institutes. Emotions influence our decision-making, but also judgment (Bandyopadhyay, Pammi, & Srinivasan, 2013; Normans 2008) and subsequently our evaluation of the waiting situation. This research will test Gamification in two emotional settings (positive and negative) using emotional framing, in form of a positively and a negatively framed scenario. This helps to measure if the positive effect of Gamification holds on irrespective of the emotional state patients are in.

Finally, it is important to analyze whether the positive effect of Gamification is generalizable and applicable in other medical institutes as well. Waiting situations at the dentist that are evaluated rather negatively, may lead to patients not going to the annual check-up (Woolgrove and Cumberbatch, 1986). Therefore, a waiting situation at the dentist is chosen as a medial institute with the ambitions to create a more positive evaluation of the waiting situation, which leads to patients visiting the dentist more regularly.

In summery the following research question is developed:

RQ: What effects do (in)congruent Gamification and positively/ negatively framed waiting situations have on the Overall Satisfaction of the waiting situation at the dentist?

Theoretical framework

The theoretical framework is based on a literature review and divided into five parts. First, waiting is explained in general and in medical institutes. The next part contains an elaboration of Gamification in general and how it can be used as a distractor. Additionally, the difference between congruent and incongruent Gamification based on the congruence theory is explained. The third part discusses the role of emotions in waiting environments, as well as emotional framing and mood. Furthermore, emotions and Gamification are brought together. In the final part of this section, the research model and research design are presented.

2.1 Waiting

First of all it is important to understand what waiting in general as well as waiting in medical institutes means. Therefore this paragraph will further elaborate on these two points.

Waiting in general

Waiting is "frustrating, demoralizing, agonizing, aggravating, annoying, time consuming and incredibly expensive" (Maister, 1984, p1). Yet we cannot escape it (Pruyn & Smidts, 1998) and hence it is part of our daily life (Norman, 2008). Waiting takes place before, during or after a process (like a transaction). People can wait actively (short time frame), such as waiting for the helpdesk to receive your call, or they can wait passively (long time frame) when, for example, waiting for results of a test. Waiting can occur anywhere, for instance hanging in line on the phone or in physical settings like waiting in a hospital (Maister, 1984).

It is however not always possible to decrease the actual waiting time. Pruyn and Smidts (1998, p.331) advise service managers to be "less focused on shortening waiting time, but to pay special attention to their customers' waiting conditions instead". This is because the waiting environment more strongly determines whether a customer is satisfied with the service, rather than the objective waiting time. One possibility to build an enjoyable environment is to keep people that are waiting occupied. When a person is occupied the time is perceived shorter than when the person is unoccupied (Maister, 1984). According to Norman the theme parks of Disneyland can be used as an example of how time can effectively be filled. Disney provides entertainment that engages people while waiting in line. They enjoy themselves and therefore do not have the feeling of waiting in line. Another possibility is adding positive experiences during the wait, which the person will remember after the visit. This can increase customer satisfaction, as the memory of a waiting situation is more important than the actual experience (Norman, 2008).

Unsurprisingly, waiting is often perceived negatively and can decrease customer satisfaction, as recorded on service evaluation sheets (Pruyn & Smidts, 1998; Taylor, 1995). Previous studies have already discovered that there is a relationship between waiting and Overall Satisfaction, suggesting that longer waiting times are connected with lower patient satisfaction (Bielen & Demoulin, 2007; Camacho et al., 2006). When looking into the association between Perceived Waiting Time and satisfaction, Mowen and colleagues (1993) confirmed that increased waiting time is an important cause of patient dissatisfaction in hospitals. They further suggest that satisfaction can be increased through reducing waiting time, which inferentially would lead to a higher return rate (Mowen, Licata & McPhail, 1993). Willingness to return is crucial for any service oriented business.

Additionally, the attractiveness of the waiting room is shown to reduce the Perceived Waiting Time (Pruyn & Smidts), while frequent information about the reason for the delay reduces uncertainty and prevents anxiety (Maister, 1984). Both of these considerations provide customers with a reasonable explanation as to why they have to wait. According to Norman (2008) this makes the waiting situation more acceptable.

Waiting in medical institutes

In medical institutes it might be the case that patients have to wait, although they have an appointment, due to emergencies that need to be treated first. The way patients perceive the wait is important as it influences their judgment of the complete encounter and future choices. This also includes positive or negative reviews of the hospital to other potential patients, such as friends and family. Within the service industry, customer satisfaction is key for a profitable company. A visit should, therefore, include as few negative experiences as possible (Ehrler, 2016). Still waiting in the hospital is described as one of worst waiting experiences. "Anxious patients and family wait in limbo, often in dull, dreary surroundings that help set the negative anxiety, coupled with a complete lack of information, thus stimulating all levels of negative emotions" (Norman, 2008, p.4). Scholars argue whether there is enough time, effort, and money spent on a calming atmosphere within waiting rooms (Hassan et al., 2016; Norman, 2008). Almost half of all patients' experience waiting rooms in a hospital negatively with associations of boredom, anxiety, or both.

For patients', the most important factors relating to satisfaction include the waiting environment, Perceived Waiting Time, as well as whether and how one is informed about (the reason) of the delay (Hassan et al., 2016). When the waiting time increases in medical

institutes, patients (chronic or routine patients) feel that their time is being wasted and they are being neglected (Hassan et al., 2016). The second factor (providing information) has already been researched as presented in the work of Maister (1984) and Norman (2008) and will not be included in this study. Findings by Camacho and colleagues (2006) show another factor of influence: stress. High Level of Stress reactivity is independently associated with lower Overall Satisfaction of patients. Stress can, for example, arise out of uncertainty about the duration of the wait (Bielen & Demoulin, 2007). Another factor influencing perceptions of the wait in medical institutes is frustration (Soleimanpour et al., 2011), which often leads to dissatisfaction (Thompson & Yarnold, 1995). According to Bitner (1990) not only can the service environment influence consumers' emotions but the emotions also affect their evaluation. Therefore, it is important to analyze the effect of emotions on the waiting situation. Emotions in waiting environments are further elaborated in paragraph 2.3.

In order to improve the waiting situation one can make use of positive distraction in the environment. Fenko (2014) for example showed that ambient features (music and scent) used separately can reduce the Level of patient's anxiety. According to Good et al. (2005) music offers a form of distraction and has relaxation components. Thus, it does not come as a surprise that a recent systematic review suggested it reduces dental anxiety (Moola, Pearson, & Hagger, 2011). Distraction is moreover shown to reduce stress (Ulrich, 1991).

When it comes to waiting in medical institutes, studies have focused mainly on hospitals. Visiting other medical institutes however, also consists of making an appointment, going to the institute, is connected with waiting until the examination of the doctor or further treatment. Whether the positive effect of Gamification also holds for a different healthcare will be tested in this study, which at the same time makes the positive effect of Gamification more generalizable. The setting of a dentist practice was selected for this study as it has been shown that people avoid annual check-ups at the dentist because they are anxious, despite being considered very important (Woolgrove and Cumberbatch, 1986). When one can provide a more satisfying environment, by using distraction this might have a positive impact (Gagne & Toye, 1994). In summary the following can be assumed

H1a: The lower the Perceived Waiting Time, the higher the Overall Satisfaction with waiting at the dentist.
H1b: The lower the Level of Stress, the higher the Overall Satisfaction with waiting at the dentist.

H1c: The lower the Level of Frustration, the higher the Overall Satisfaction with waiting at the dentist.

In order to improve these three variables this study will make use of Gamification, which is explained in the following paragraph.

2.2 Gamification

In order to improve the Perceived Waiting Time, one can make use of distractors (Pruyn & Smidts, 1998), which can be in the form of Gamification (Ehrler et al., 2016; Hassan, Patel, 2006; Primack, 2012; Twyman, Fui-Hoon Nah & Siau, 2016). It is however, important to understand what exactly is Gamification?

Gamification a definition

Gamification is "a process of enhancing a service with affordances for 'gameful' experiences in order to support user's overall value creation" (Huotari & Hamari, 2012, p.19). It is further defined as a process where the design elements of the game are applied to none-game situations (Simpson & Jenkins, 2015). According to Zichermann and Cunningham (2011), Gamification has three main pillars: mechanics, dynamics and aesthetics. Mechanics could be badges, points and scoring a goal, dynamics include how the mechanics interact with each other and affect the user experience. Aesthetics encompasses the aforementioned considerations relating to the visual package, which includes a feedback and reward system.

Gamification can be used in the field of service marketing where it is seen as "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation" (Huotari & Hamari, 2012). In hospital settings it has been shown that a "gamified application creates an environment for the user to integrate themselves into" (p.420). Ehrler et al. (2016) for example, developed an innovative information screen in order to improve waiting situations for patients. They based their idea on previous models of service evaluation, which had already highlighted the importance of informing patients about their waiting process. This study measured how patients perceived quality of stay when adding Gamification to the waiting situation, which was enhanced by adding Gamification. This confirms the argument of Huotari and Hamari (2012), that engagement produces better-informed patients who are then more likely to have a positive experience while they wait. Another study developed a Gamification called Hero in collaboration with the emergency department (ED), which is a tablet-based application that can be used in waiting rooms. It introduces patients to ED professionals and operations through mini-games and story-like interaction on tablets. The Gamification helped patients to be better informed about their situation and therefore improved participants experience with waiting in hospitals (Hassan et

al., 2016).

It is important to note that although Gamification might be useful in a waiting environment, the definition of a game and the experience to playing it are individual (Cugelman, 2013; Huotari & Hamari, 2012). The design of the video game, which includes the visual appeal and the flow it provides, influences whether people like a game.

In summery, a Gamification is any type of application with game-design elements and game principles in a non-game context and can be used in waiting environments.

H2: When waiting at the dentist Gamification leads to a higher Overall Satisfaction compared to no Gamification.

Gamifiation as a distractor

Distractors (in general) have been shown to decrease customer's perception of the waiting time (Pruyn & Smidts, 1998; Zakay, 1989). Distractors can be applied in different ways, for example through noises and lighting (Soremekun, Takayesu, & Bohan, 2011) but also putting toys, reading materials, and multimedia systems in the waiting rooms. People are distracted from waiting because they are occupied (Maister, 1984; Norman, 2008; Pruyn & Smidts). Technology of the past years has made it possible to create an occupied environment for patients, by adding Gamification, which also works as a distraction (Ehrler et al., 2016; Hassan et al. 2016; Patel, 2006; Primack, 2012; Twyman, Fui-Hoon Nah & Siau, 2016). Patel et al. (2006) argue that the positive effect of games lies in preventing boredom and keeping patients engaged during the process. In this case, video games are seen as a pleasurable and familiar activity, thus keeping patients occupied. This would mean that Gamification distracts the patient from the time expended and the stress and frustration they may experience at the dentist. Therefore, the following can be assumed:

H3a: Gamification leads to a lower Perceived Waiting Time when waiting at the dentist, compared to no Gamification.
H3b: Gamification leads to a lower Level of Stress when waiting at the dentist, compared to no Gamification.
H3c: Gamification leads to a lower Level of Frustration when waiting at the dentist, compared to no Gamification.

As mentioned in the first paragraph, it is expected that the perception of the waiting time and the Level of Stress and frustration influence the Overall Satisfaction at the dentist. At the same time, these three variables are assumed to be influenced by Gamification and that Gamification increases the Overall Satisfaction. Thus, an indirect effect is expected between Gamification and Overall Satisfaction, which can be explained by the variables: (a) perception

of the waiting time and the (b) Level of Stress and (c) Level of Frustration. Therefore, the following is assumed:

H4a: The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Perceived Waiting Time.
H4b: The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Level of Stress.
H4c: The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Level of Frustration.

According to Sherry (2004) the appeal of video games lies in the challenge of solving a puzzle. Therefore this study will make use of a puzzle as Gamification, which is further explained in 3.2.2 – Gamification.

Congruent vs. incongruent Gamification

As mentioned earlier, the studies by Ehler et al. (2016) and Hassan et al. (2016) made use of Gamification to increase patients' satisfaction in waiting environments. Both studies used Gamification that fit the situation (screens showing lines with avatars for the waiting times and mini-games/ story-like interaction on tablet to introduce patients to ED professionals and operations). In the field of Multisensory Marketing it is shown, that multiple stimuli in different modalities that are congruent with each other (meaning agreeable with each other), are more easily processed and therefore perceived as more attractive (Krishna, 2012). This could explain why, up until till now, research has used Gamification that fits the situations, or put differently made use of congruent Gamification. At the same time, when aiming to distract participants from the waiting situation (measured by the perception of the waiting time and the Level of Stress and frustration) however, incongruent Gamification should lead to better results as it is harder to process and they therefore have to think about it more deeply.

The congruity principle is developed by Osgood and Tannenbaum (1955) and assumes that when two sets of information are congruent (fit each other), the observer will not experience pressure towards an attitude change. Moreover, Meier (1989) states that when people's occupational choice is congruent with their vocational interests it will lead to a higher Level of satisfaction (Meier, 1989). Additionally congruent stimuli have been shown to enhance behavioral performance, such as speeding responses, increasing accuracy, and/or improving stimulus detection (Laurienti, Kraft, Maldjian, Burdette & Wallace, 2004). Furthermore, the literature explains that incongruity (like imbalance) is unpleasant and motivates audiences to change their attitudes (Osgood & Tannenbaum, 1955). In summery,

this results in the following hypothesis:

H5a: A congruent Gamification leads to a higher Overall Satisfaction with the waiting situation, compared to an incongruent Gamification.
H5b: An incongruent Gamification leads to a higher Level Distraction and in return to a higher Overall Satisfaction with waiting at the dentist.

2.3 Emotions in a waiting environment

Oscar Wilde wrote, "The advantage of the emotions is that they lead us astray" in *The Picture of Dorian Gray* in 1891. But what role do emotions play in a waiting environment?

Emotions and waiting situations

Norman (2008) developed eight design principles for waiting for service. Next to (1) the emotions dominate, the principles include (2) to eliminate confusion, that (3) the wait must be appropriate and (4) fair. Furthermore, the organization should (5) set expectations then meet or exceed them and (6) the experience should start and end strongly. Finally, the (7) memory of an event is more important than the experience itself. The scholar argues that although all principles are essential in order to create a positive emotional reaction, the most important one is (1) emotions dominate. This first principle explains that "Emotions color the experience and, more importantly, how the experience will be remembered" (p.3). Norman's principles fit with findings showing that emotions play a key role when it comes to people's everyday cognitive and behavioral functioning. This includes not only our decision-making but also judgment. Emotional reactions towards something guide our choices for a specific moment but are moreover memorized for a later point in time (Bandyopadhyay, Pammi, & Srinivasan, 2013; Normans 2008). For example, an emotional reaction can evoke towards a waiting situation and what perception a person has about the situation for the future. If this situation is perceived negatively (e.g. frustrating, annoying or stressful) the experience will be remembered in a negative way. It is therefore important to create a positive emotional response towards the waiting situation. Especially for a return to and/or recommendation of the service. This also applies to service environments such as a medical institute (Ehrler et al., 2016), which otherwise risk that patients switch to another institution.

It is shown that the waiting environment can have a (positive) effect on the emotional states of patients. Adding music to the waiting environment for example can keep the mind of the patient occupied (Thorgaard et al., 2005), which helps to relax and can even reduce patients' anxiety (Korhan, Khorshid, & Uyar, 2010). Lehrner et al. (2005) have confirmed previous research, stating that odors are capable of altering emotional states. The study

moreover explored the possibilities of orange and lavender odor on reducing the anxiety of dental patients. Another possibility to influence the emotional state is to distract a patient by shifting their focus towards a task (Kanske, 2010).

Something else to take into account is that positive emotions can lead to an upwards spiral of more positive emotions (Frederickson, 2013). Negative emotions like sadness, anger, disgust and fear that are related to uncertainty, on the other hand, have been shown to lead to a downwards spiral towards more negative emotion. The effects of negative emotions like verbal hostility; glaring behavior; sarcasm; closed body language and/ or people scowling or rolling their eyes, influences not only for customers but also employees (Redden, 2012). This additionally indicates that it is valuable for an organization to create positive emotions for higher satisfaction (Anderson, Fornell & Lehmann, 1994).

Emotions, regardless of whether they are positive or negative, can be considered as an important factor when it comes to waiting. Nevertheless, previous studies (e.g. Hassan et al., 2016), did not take this variable into account when testing the effect of Gamification. Therefore this study will include emotion as a variable into the model. According to Green (1992, p.171) "we have an intuitive idea that emotions can be distinguished as positive or negative. Gladness and sadness, love and hate, pride and shame, hope and fear, for example, seem to fall rather neatly on either side of this distinction." Thus, this research will distinguish between these two basic emotions. Choosing the experiential criterion to differentiate between both emotions: positive emotions should then be experienced as pleasant (feeling relieved), whereas negative emotions are experienced as unpleasant (feeling anxious). In order to evoke these specific emotions, emotional framing will be used, which is further explained in the following section.

Emotional framing

According to framing theory, the perspective of the message and/or how the information is presented to a person, affects the way a person understands, evaluates and reacts to it (Goffman, 1974). Put differently "a frame is a perspective infused into a message that promotes the salience of selected pieces of information over others" (Nabi, 2003). The frame (in form of a scenario in this case) will guide individuals' thinking about the event or issue in predictable ways towards a certain conclusion (Gross & D'Ambrosio, 2004; Nabi, 2003). Thus, a person who receives a positively/negatively framed written scenario, will be put in a positive/negative emotional state.

H6: A positive emotional frame leads to a higher Overall Satisfaction with the waiting

situation at the dentist, compared to a negative emotional frame

Mood

Not only emotions but also the (positive and negative) mood of a person can be the guidance for his/her decision-making and judgment (Bandyopadhyay, Pammi, & Srinivasan, 2013). Research has already shown that the mood of a person can bias the use of perception, evaluation, and general thinking (Luomala & Laaksonen, 2000). According to Norman when being in a positive mood little setbacks (like waiting) are seen as minor problems rather than a major issue. The mood of a person can have several causes. It can be provoked by the reaction towards certain general conditions of the environment or activities (heat, noise, changes in surroundings, stress) but also through the human system (sickness, fatigue, previous exercise, and good health) (De Rojas & Camarero, 2008). Thus, when a person is put in a positive/negative emotional setting (through emotional framing for example) this should influence his/her mood. At the same time the mood of a person influences his/her evaluation, for example the satisfaction with the waiting situation at the dentist. Meaning that the effect of emotional framing on the Overall Satisfaction becomes indirect and as such the following can be assumed:

H7: Mood mediates the effect of the emotional framing on the Overall Satisfaction with the waiting situation at the dentist.

It is essential to acknowledge at this point that emotion and mood are difficult to differentiate (Bagozzi, Gopinath & Nyer, 1999). According to De Rojas & Camarero (2008, 529) this has three explanations: (1) mood is a longer lasting state (from a few hours to days), and is lower in intensity than an emotion; (2) emotion is intentional (it has an object or reference object), while mood is unintentional and global or diffused (3) moods are not as directly connected to intentions of action or explicit actions, as are many emotions.

Therefore it might be the case that even when being positively framed (feeling relieved), the person still can evaluate the waiting situation negatively because of his/her mood (and vice versa).

Emotion and Gamification

Although the previous review showed that congruent Gamification (for example: being at the dentist and playing a game related to the dentist) is preferable, this might be different when taking emotions into account. Assuming that people can be in different emotional settings, it might be that a person in a negative emotional state is in higher need for distraction. Meaning,

that the person might prefer a game, which helps him/her to derive his/her thoughts away from the current situation and thus be more satisfied with the situation. Therefore it is assumed that there is an interaction effect between Gamification and Emotional Framing, resulting in the following hypothesis:

H8: Gamification leads to a higher Overall Satisfaction, especially when people are in a negative emotional condition; under a positive emotional condition the effect of Gamification on the Overall Satisfaction will be smaller.

2.4 Research Model

The aim of this study is to explore if there is an effect of (in)congruent Gamification and emotional framing on the Overall Satisfaction of waiting at the dentist. Based on the literature review, a research model is proposed including the relationships of the different variables. As shown in the Figure 2 this research suggests that the Overall Satisfaction of the waiting situation is influenced by Gamification and Emotional Framing. The effect of the type of Gamification is mediated by the Perceived Waiting Time, Level of Stress and Level of Frustration. Moreover, the Level of Congruence is assumed to influence the Level of Distraction and in return the Overall Satisfaction with waiting at the dentist. Mood is assumed to mediate the effect of Emotional Framing on the Overall Satisfaction. Finally, it is expected that there is an interaction effect between Type of Gamification and emotional framing on the Overall Satisfaction.

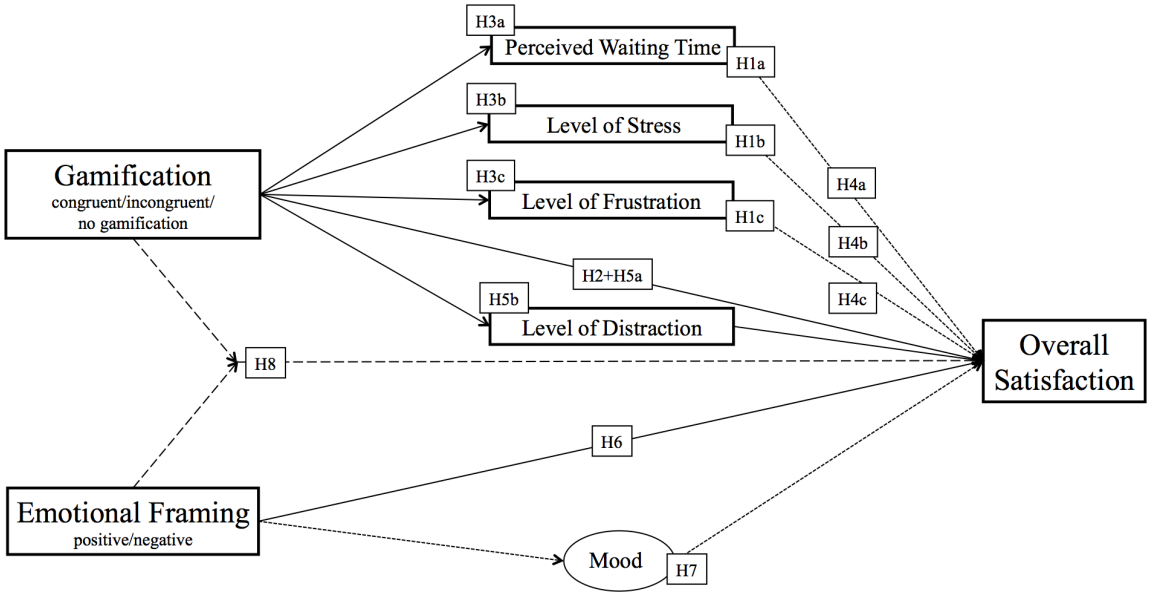


Figure 2: Research Model: Overall Satisfaction of waiting at the dentist

2.5 Research Design

The different components of the literature review are combined towards a 3x2 experimental design (Table 1) for the dependent variable Overall Satisfaction of waiting at the dentist. The total of six groups are manipulated with one of the three Gamification conditions (no game, congruent game, incongruent game) plus one of the two Emotional Frame conditions (positive or negative). The procedure and the stimulus materials for this study are further explained in the methodology section.

Table 1.
Research design

	Positive emotional frame	Negative emotional frame
Congruent game	N1= 26	N4= 25
Incongruent game	N2= 25	N5= 29
No game	N3= 26	N6= 28

Note: Research Design including the sample size for each condition

Methodology

In this section the pre-test as well as the main study are described. Moreover, the procedure, stimulus material and questionnaire of the main study are explained as well as the validity and reliability analysis.

3.1 Pre-Test

Before carrying out the main study, a pilot was performed in order to verify the two stimuli (Gamification an Emotional Framing) and test the questionnaire. Ten participants proceeded through the experiment as followed: Each participant was invited to a room and provided with the instruction that the study consists of partly a questionnaire and partly an experiment. There was no further explanation in order to avoid bias based on previous knowledge. The participant proceeded with the questionnaire on a laptop, starting with questions regarding his/her current mood. Thereafter, the participant received a scenario (N = 5 received the positive scenario and N = 5 the negative scenario) and was asked to put him-/herself in the situation (see Appendix 1). Thereafter the participant was asked to wait. The waiting time was ten minutes, which was not revealed to the participant. During the wait they were asked to

solve a puzzle ($N = 5$ received the congruent game and $N = 5$ the incongruent game). After the waiting time the participant filled in the rest of the survey.

All constructs were tested on internal consistency. The reliability of the items in each construct was checked with a Cronbach's alpha (Appendix 2). Most of the constructs showed an acceptable Cronbach's alpha ($\alpha > .700$). Although the survey seemed to deliver a good outcome, the reliability of the pre-test is low due to insufficient power. Additionally, the construct distraction ($\alpha = .634$) and likability of the game ($\alpha = .550$) were not satisfying. This let to the decision that the main study will make use of Game Experience questionnaire by IJsselsteijn, de Kort and Poels (2013) including items for both variables.

An Independent Samples t-Test showed that the two groups (positive frame: $M = 3.8$; $SD = 1.01$ and negative frame: $M = 3.9$; $SD = .481$) started with a comparable mood ($p = .846$). Moreover it is shown that the Emotional Framing was effective on the emotional dimension of Pleasure ($p = .015$). The group receiving a positive scenario was more pleased ($M = 3.48$; $SD = .687$) compared to the group that received a negative scenario ($M = 2.36$; $SD = .434$). The dimensions of Arousal (positive frame: $M = 2.6$; $SD = .418$ and negative frame: $M = 2.4$; $SD = .224$) and Dominance (positive frame: $M = 2.52$; $SD = .911$ and negative frame: $M = 2.16$; $SD = 4.34$) where, however, not significantly different (arousal: $p = .373$ and dominance: $p = .453$). This could be explained with the remarks of the participants saying that the positive frame was perceived as rather neutral due to the fact that the scenario described that the patient still felt pain. Therefore they may have felt lack of control over the situation and were not enthusiastic. As a result some changes were made in order to create a clearer positive/negative emotional framing. The new version was pre-tested again with ten participants. All participants evaluated the positive scenario to be positive and the negative scenario to be negative, which are therefore used in the main study. Moreover, participants indicated that some questions (mainly from the construct mood and emotion) were similar to each other. It was decided to keep the constructs as proposed by Mehrabian & Russel (1974). However, based on this insight it is necessary to perform a factor analysis within the main study in order certify the constructs as suggested.

Participants with the congruent puzzle were asked if they thought the puzzle fits with the situation of waiting at the dentist, which they all agreed on. After the experiment all participants were asked if the two puzzles were comparable. Nine of the ten participants indicated that the puzzles were worthy of comparison, for the reason that they both show a stressful situation (dentist and fire) and are drawn by the same artist. Participants were shown

alternative puzzles (Appendix 3) to compare other options for the incongruent game but all participants chose for the puzzle used in the pre-test.

Lastly, participants answered in steps of five (five, ten, or 15 minutes) when asked how long the wait was. In order to see if there is a difference, it is chosen to increase the waiting time towards 12 minutes (instead of ten) for the main study.

3.2. Main study

This section will outline the sample and procedure, followed by an explanation of the stimulus materials and the measurement instruments.

3.2.1 Procedure

Based on convenience sampling, a total of 159 participants were recruited from the surrounding area of the University of Twente and Saxion University of Applied Sciences. Potential subjects for the study were approached through Social Media (Facebook, Whatsapp), email or other personal contact (e.g. through sport associations). Furthermore people at public areas of the Universities (mainly the Bastille and DesignLab) were asked to participate in the experiment. In order to avoid systematic differences between the groups, the participants were randomly assigned to one of the six conditions by the researcher (Dooley, 2001, p.168). All experiments took place in quiet areas or separate rooms with a chair and a table. The experiment started with instructions what the research is about and the informed consent, which every participant had to sign before starting. Thereafter the participants were given either scenario A or B (both scenarios are in 3.2.2 Scenarios) and were displayed on a laptop and then asked to fill in the first questionnaire including the construct Mood and Emotional Dimensions. This first questionnaire served as a stimulus check for the emotional setting of the participant.

The participants were then asked to wait in the room. The duration of the waiting time was 12 minutes, which the participants were not informed about. In order to make sure that the participants will not know the actual waiting duration and also to prevent distraction during the experiment, no other items (e.g. clock or paintings) were available in the area/ room. Additionally the participants were asked to turn off their cellphone. For participants, in the condition of Gamification, they were given a puzzle and asked to solve it while they waited. Depending on the experimental condition they received either Game 1 (congruent game) or Game 2 (incongruent game), which are further explained in 3.2.2 Gamification). To prevent frustration, they were told that they were not required to finish it and that it was not a

test of how far they can solve it.

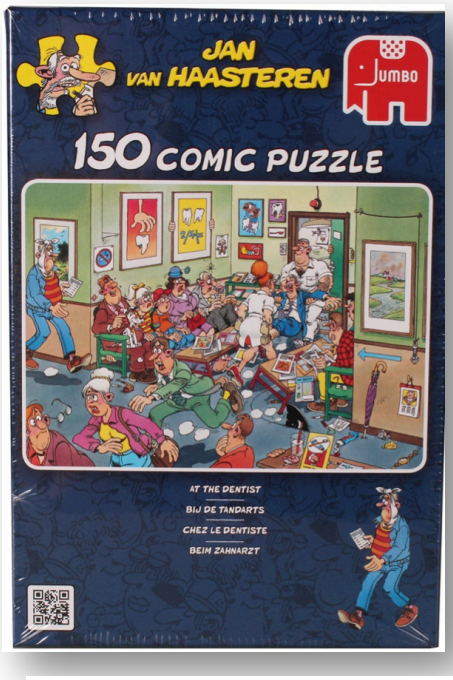
After the wait the participants were asked to complete the second questionnaire including the constructs: Distraction, Perceived Waiting Time, Stress, Frustration, and Overall Satisfaction on the laptop. After finishing the survey, the participants had the opportunity to sign up to a lottery for two cinema tickets as a reward for their participation. Thereafter, they were thanked for their time and asked not to talk with anybody about the experiment in order to avoid bias due to prior knowledge for the following participants.

3.2.2 Stimulus materials

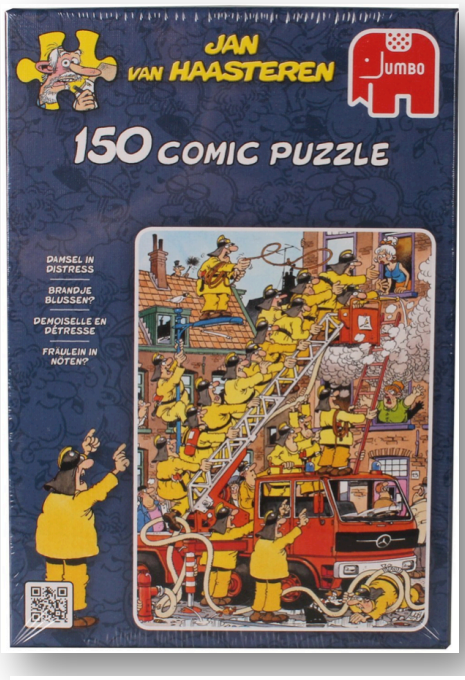
For the main experiment, two Gamifications (congruent and incongruent) and two emotional settings (positively framed scenario and negatively framed scenario) were used. Both stimulus materials are explained in this paragraph.

Gamification

According to Sherry (2004) the appeal of video games lies in the challenge of solving a puzzle. Therefore this study used a puzzle as Gamification. In order to prevent different results based on the design of the puzzle, both consisted of 150 pieces by Jan van Haasteren, with comparable painting styles. Game 1 is the congruent game, which matches with the waiting situation (waiting at the dentist). Game 2 is the incongruent game, which has nothing to do with the waiting situation (rescue operation of the fire brigade). Both puzzles are comparable according to the pre-test and have the same challenge level with the same amount of puzzle pieces.



Game 1 - Congruent Game 1



Game 2 – Incongruent Game 1

Scenarios with Emotional Framing

In order for a sufficient framing effect to occur, specific knowledge or schemas about the situation need to exist in the audience mind (Nabi, 2003). Thus, the framing that was given in this study needed to be reliable to the audience in order to work properly. It was therefore chosen for two scenarios at the dentist for an annual control, which participants could rely on. Within a positively framed situation (Scenario A) participants should feel relieved, in this case they don't show any inflammation. While in the negatively framed situation (Scenario B), people should feel anxious because they have an inflammation, which will be treated today with an injection for the local anesthetic. This made it possible to compare two different (emotional) perspectives (Ramirez, Mukherjee, Vezzoli, & Kramer, 2015).

Scenario A

You have an appointment at the dentist for your annual control. First, an assistant did a general control, during which she checked for any inflammation. She explained that any sign of an inflammation would need direct treatment today in order to prevent greater damage on your other teeth. Fortunately, she found no inflammation and asked you to take a seat in the waiting room till the dentist sees you.

Imagine now that you are sitting in the waiting room at the dentist. How do you feel right now? Try to put yourself in this situation. Do you feel relieved that there is no inflammation? Are you relaxed knowing that it will be just a control visit?

Scenario B

You have an appointment at the dentist for your annual control. First, an assistant did a general control, during which she checked for any inflammation. She explained that any sign of an inflammation would need direct treatment today in order to prevent greater damage on your other teeth. Unfortunately, she found an inflammation under one of your teeth. She explained that it is necessary to perform a tooth treatment, which will include an injection for the local anesthetic. She then asked you to take a seat in the waiting room till the dentist sees you.

Imagine now that you are sitting in the waiting room at the dentist. How do you feel right now? Try to put yourself in this situation. Do you feel concerned that there is an inflammation? Are you anxious knowing that it will not only be a control visit but that you need a treatment?

3.2.3 Questionnaire design

Two questionnaires were used as the measurement instrument, as it is a cost and time-efficient method of anonymously collecting data. The first survey consisted of the constructs mood and the emotional dimensions (pleasure, arousal, dominance). The second questionnaire consisted of four or five constructs, depending on the experimental condition. Participants who received a puzzle during the wait started with the questions regarding game experience including distraction and Aesthetic Appeal. Thereafter, Perceived Waiting Time, Stress, Frustration, and Overall Satisfaction were measured (for all participants). The questionnaire ended with Demographical questions.

The majority of the questions were measured on five-point Likert Scale, ranging from totally disagree to totally agree. All constructs are discussed further in the following section. The questionnaire is displayed in Appendix 4.

Mood

Mood was measured with the scale of Peterson and Sauber (1983): Mood Short Form: MSF. According to Bearden, Netemeyer and Haws (2010) it is agreed that, "mood has a state of emotional or affective arousal that is varying and transient". This nature of mood is punctuated in the scale of Peterson and Saube, which is the reason why this scale was chosen. The items were adjusted towards a clear focus on the adjectives (*cheerful, comfortable, irritated, good mood*).

Emotions

The constructs for emotion were tested with the three emotional dimensions – pleasure, arousal and dominance of Mehrabian and Russel (1974). Each dimension is measured in a separate sub construct consisting of 6 items (e.g. 1= *I feel unhappy* and 5= *I feel happy*). This scale is commonly used in the field of environmental psychology in order to describe people's state of feeling (Bakker, Voordt, Vink, & de Boon, 2014). In this study it served as a stimulus check in order to see if the emotional framing was successful, assuming the positive framing leading to positive emotions (high level of pleasure, low level of arousal and high level of dominance) and vice versa for the negative framing.

Game Experience

This construct is inspired by the Game Experience Questionnaire (IJsselsteijn, de Kort & Poels, 2013), in order to measure the experience of the group that puzzled, as this is pointed

out to be of influence (Cugelman, 2013; Huotari & Hamari, 2012). A total of 16 questions were asked, including: distraction and Aesthetic Appeal. When measuring distraction (e.g. *'I forgot everything around me'*), it is important to measure the Level of distraction of congruent and incongruent Gamification. The Aesthetic Appeal was measured with for example *'The final picture of the puzzle was aesthetically pleasing'*.

Time

Based on the theoretical framework this study focuses on the Perceived Waiting Time. The construct was measured with a single item *'Please estimate (in minutes) the total time spent in the waiting room'* and is based on an earlier study by Pruyn and Smidts, (1998). However, to receive more in-depth information on the Time Appraisal of the participants as well, items measuring this construct were added to the questionnaire as well. The construct of Time Appraisal is based on the same study, consisting of a total of six items such as *'The waiting time was irritating.'*

Stress

This construct measured the respondents' degree of stress. The three items are based on earlier scales (Bruner, Hensler & James, 2005; Tansik & Routhieaux, 1999), but needed adjustment in order to fit the study and avoid repeating questions. The new items focused on how the participants perceived the situation (e.g. *'I was concerned'*). A high score on this item shows a low Level of Stress meaning that the participant felt calm.

Frustration

Much like the measure of stress, the same applies for the Frustration. This construct was also adjusted to fit the purpose of this study. According to Fox and Spector (1999) the Level of Frustration is associated with counterproductive behavior. This is applicable to waiting situations as the participant is waiting, but still not doing anything. Thus, the following question was developed: *'Not knowing how long I had to wait was frustrating'*. Additionally the participants were asked if *'This was a frustrating waiting experience'* and to answer whether their *'Level of Frustration was low'*. A high score on these items shows a low Level of Frustration meaning that the participant felt calm.

Overall Satisfaction

As Overall Satisfaction is extensively debated in the marketing literature (Bowen, 2001; Oliver, 1980, 1993; Yuksel & Yuksel, 2001), this study combined several scales towards a

construct consisting of six questions. This was necessary, in order for the questions to fit the situation of waiting. All questions have been used in previous research (Bruner, Hensler & James, 2005; Ehrler et al., 2016; De Rjoas & Camarero, 2008). In total this construct concerning how participant liked the waiting situation (e.g. '*I am happy with the process at this dentist'*) and if they would be likely to recommend the dentist to friends/family (e.g. *'I will recommend this dentist to friends/family'*).

Demographic questions

Although, findings by Boudreaux et al. (2000) suggest that there is no relation between demographic variables and patient Overall Satisfaction, this did not include Gamification. A later study by Conaway and Garay (2014) has shown that there can be demographic differences pertaining to Gamification. Therefore questions about gender, age and profession were added to the survey as well as how often the participant puzzles.

3.3 Validity analysis

In order to measure the validity of the developed constructs a factor analysis was performed. The analysis did not confirm the three constructs (Pleasure, Arousal and Dominance) as proposed by Mehrabian and Russel (1974). However, two factors could be filtered out of all 16 items: Feeling Active and Feeling Positive. In the following analysis this will be used to indicate the emotional dimension instead of Pleasure, Arousal and Dominance as intended.

A second factor analysis was performed on all items of Game Experience revealing two constructs. The construct Level of Distraction was confirmed and the construct Aesthetical Appeal was expended and labeled Game Experience. Both factor analyses are displayed in Appendix 5 and 6.

3.4 Reliability analysis

To what extent all constructs are reliable is discussed in this paragraph, with an overview of the results in Table 2.

Table 2.
Reliability – Cronbrach's Alpha

		# of items	α	α if item deleted	N	Final # of items
Mood		4	.864	-	159	4
Emotion	Feeling Active	3	.599	-	159	3
	Feeling Positive	8	.653	.763	159	7
Game Experience	Level of Distraction	3	.722	-	105	3
	Game Review	8	.879	-	105	8
Time Appraisal[1]		6	.854	-	159	6
Stress		3	.742	-	159	3
Frustration		3	.814	-	159	3
Satisfaction		4	.879	-	159	4

The scale's internal consistency of the items within the construct was calculated with Cronbach's alpha. All constructs showed satisfying values for Alpha. In order to increase the reliability of Feeling Positive one item was deleted from the construct. The final constructs and deleted items are displayed in Appendix 8.

3.5 Subjects

For the experiment a total of $N = 159$ people were asked to participate in the experiment. The majority of the participants were students of the University of Twente (78%) followed by students of Saxion University of Applied Sciences (15,1%). The other participants were in paid employed (6,3%) or had a different employment status (0,6%). The age ranged from 17 to 63 years with an average age of 23 years ($SD = 4.28$). The majority of the participants were not afraid of the dentist ($M = 2.06$, $SD = .99$).

Table 3.
Gender and Age

	Mean	*N*	*SD*
Male	23	84	5.03
Female	23	74	3.22
Non Confirming	26	1	4.28

[1] Perceived Waiting Time only consists of one item and is therefore not included here.

Results

In this section, the results of the main study are discussed. First, the correlation matrix is described followed by the manipulation check. Next, the main effects of Gamification and Emotional Framing are tested as well as an analysis for the interaction effect of both variables. Finally, a regression analysis on the Overall Satisfaction is performed followed by an overview showing which hypotheses are (not) supported.

4.1 Correlation Matrix

First, a Pearson's correlation was performed in order to measure the correlation coefficient between all the variables (Appendix 7). It showed that Mood correlates with the constructs regarding the emotional state (Feeling Active and Feeling Positive), as well as Stress, Frustration and Perceived Waiting Time. It also gave an insight that the Game Review is correlated to Level of Distraction, Time Appraisal, Stress, Frustration and Overall Satisfaction. Distraction showed to correlate with Time Appraisal, Stress, Frustration and Overall Satisfaction. When looking at the theoretical framework it is surprising that the Perceived Waiting Time only correlates with Mood but no other Constructs. The matrix showed however, that Time Appraisal has several correlations to different items. It was therefore chosen to include the construct in the further analysis. All in all this outcome was in line with the

4.2 Stimulus material

Before analyzing the data, the stimulus material needed to be verified. First it was checked if the two scenarios (positive and negative Emotional Framing) led to significant different results on Mood and the two emotional dimensions (Feeling Active and Feeling Positive).

Table 4.
Stimulus Check for Emotional Framing

	Positive Frame			**Negative Frame**		
	N	***M***	***SD***	***N***	***M***	***SD***
Mood	77	3.66	.77	82	2.26	.8
Feeling Active	77	2.37	.76	82	2.86	.79
Feeling Positive	77	3.38	.57	82	2.63	.06

The analysis showed that there is a significant difference between the emotional frames on Mood [$F(1, 157) = 126{,}757$, $p < .001$], Feeling Active [$F(1, 157) = 15{,}848$, $p < .001$] and Feeling Positive [$F(1, 157) = 67, 353$, $p < .001$]. Thus the group receiving a positive frame had a more positive Mood, felt less active and more positive, compared to the group receiving a negative frame. This indicated that the scenarios worked as intended.

During the pre-test the games were verified as being congruent and incongruent. Therefore, the questionnaire did not include questions, asking the participants whether they would say the game was (in)congruent with the situation. Nevertheless, it was important to see if the games are comparable.

Table 5.
Stimulus Check for comparison of the Gamifications

	Congruent			**Incongruent**		
	N	***M***	***SD***	***N***	***M***	***SD***
Level of Distraction	51	3.8	.68	54	3.55	.98
Game Review	51	3.9	.76	54	3.89	.78

The analysis showed no significant difference between the congruent and incongruent Gamification on Level of Distraction [$F(1, 103) = 2.134$, $p = .147$] or the Game Review [$F(1, 103) = .022$, $p = .881$]. This indicated that the games are equal when it comes to Level of Disrtaction and Game Review.

Finally, it was examined if there was a significant difference between No Gamification and Gamification on Stress[2], Frustration[3], Perceived Waiting Time and Overall Satisfaction.

Table 6.
Stimulus Check for Gamification

	No Game			**Game**		
	N	***M***	***SD***	***N***	***M***	***SD***
Stress	54	3.22	1.09	105	3.68	.78
Frustration	54	2.9	1.08	105	3.85	.86
Overall Satisfaction	54	2.66	.79	105	3.74	.7
Perceived Waiting Time	54	2.17	1.19	105	1.98	1.24
Time Appraisal	54	2.84	.73	105	3.87	.64

[2 & 4] A low Level of Stress/ Frustration indicates that the participant felt relaxed/ calm

Several ANOVA's were performed showing that there is a significant difference between No Gamification and Gamification on the Level of Stress [$F(1, 157) = 9{,}465$, $p = .002$], Level of Frustration [$F(1, 157) = 36{,}793$ $p < .001$], Time Appraisal [$F(1, 157) = 82.24$, $p < .001$] and Overall Satisfaction [$F(1, 157) = 9.776$, $p < .001$]. Gamificaion let to higher Time Appraisal ($M = 3.87$, $SD = .64$) and a more relaxed and calm state of the participants (Stress: $M = 3.68$, $SD = .78$; Frustration $M = 3.85$, $SD = .86$[4]). There is no significant difference between No Gamification and Gamification on the Perceived Waiting Time [$F(1, 157) = .817$, $p = .367$].

4.3 Main- and Interaction Effect of Gamification and Emotional Framing

A MANOVA was performed in order to indicate the impact of Gamification and Emotional Framing (see Table 7). Univariate Analysis was performed for more in-depth analyses (Overview between subjects analysis in Table 8).

Table 7.
Overview Multivariate Analysis Results

	λ	***F***	***p***
Emotional Framing	.60	10.76	< 0.01
Gamification	.94	1.06	.39
Gamification x Emotional Framing	.94	.95	.46

Note for goes: Degrees of Freedom of 5, 97.

Table 7 presents that Emotional Framing had a significant effect on the outcome variable ($\lambda = .60$, $F(6.\ 96) = 10.76 < .001$). Thus, Emotional Framing seemed to have a main effect, whereas Gamification had not. There was no interaction effect between both variables.

[4]A low Level of Stress/ Frustration indicates that the participant felt relaxed/ calm.

Table 8.
Overview Univariate Analysis Results

Independent Variable	Time Appraisal		PWT		Stress		Frustra-tion		Satisfac-tion		Mood	
	F	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*
Emotional Framing	.66	.42	5.72	.02	2.91	.09	.16	.7	.14	.71	61.07	<.01
Gamification	.17	.69	.01	1.0	0.01	.96	.51	.48	.91	.34	1.72	.19
Emotional Framing x Gamification	.21	.65	.05	.83	.46	.50	1.46	.23	.10	.75	1.09	.30

The separate ANOVAs showed a significant effect of Emotional Framing on Perceived Waiting Time ($F(6, 96) = 5.72$, $p = 0.02$) and Mood ($F(6, 96) = 61.07$, $p < 0.01$) but not on the other items. A positive Emotional Frame led to a lower Perceived Waiting Time (M = 9.84, SD = 3.23) compared to the Negative Emotional Frame (M =11,59, SD = 4.12). It led to a more positive mood (M = 3.55, SD = 8.25) compared to the Negative Emotional Frame (M = 2.29, SD = 1.04). The main effect of Emotional Frame on Perceived Waiting Time and Mood is visible in the plot below.

4.4 Regression analysis

A multiple linear regression analysis was performed to predict the Overall Satisfaction based on the Perceived Waiting Time, Level of Stress, Level of Frustration and Mood as stated in H1a-c. A significant regression equation was found ($F(5, 99) = 27.218$, $p <.001$) with R^2 of .579. The analysis revealed that only Time Appraisa[5] had a significant influence on the Overall Satisfaction β = .808, t = 7.86, p <.001 showing that the higher the

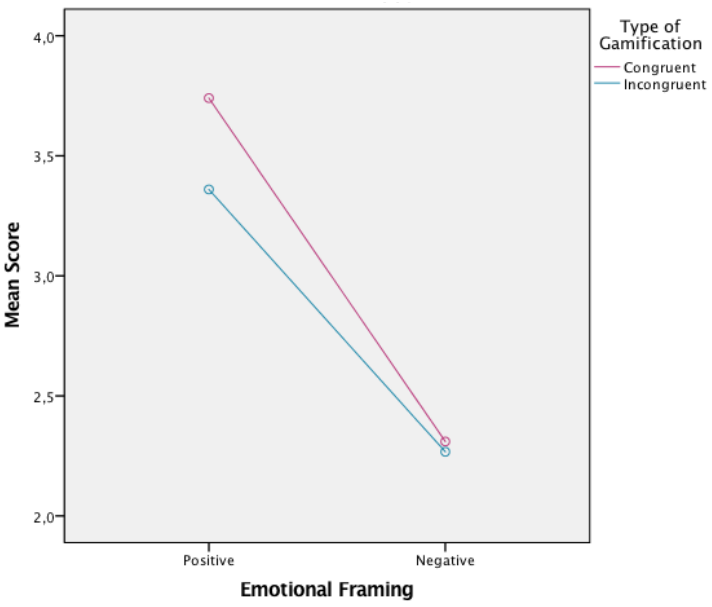


Figure 4: Effect of Emotional Framing on Mood

[5] As noted previously, the construct of Time Appraisal was added to the analysis, although it was not an assumption based on the literature review

Time Appraisal the higher the Overall Satisfaction. A high Time Appraisal describes a more positive waiting experience, which showed to increase the Overall Satisfaction. The results for the full analysis are further displayed in Appendix 9.

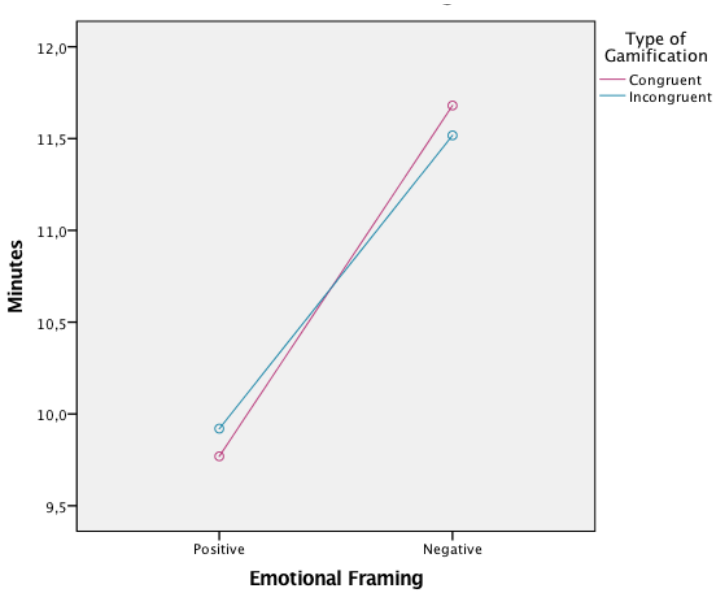


Figure 3: Effect of Emotional Framing on Perceived Waiting Time

4.5 Mediation analysis

Mediation can only occur if there is a direct effect of the independent variable on the mediating variable as well as on the dependent variable (Field, 2009). The previous results already showed that Emotional Framing only had a direct effect on the moderating variables Perceived Waiting Time and Mood. It had no direct effect on the dependent variable Overall satisfaction. The Type of Gamfication had no direct effect. However, based on the previous results this study further looked into the effect of Gamification (versus no Gamification) on Overall Satisfaction with Time Appraisal as the mediating variable. A mediation analysis using the PROCESS of Hayes (2017) showed Gamification (versus no Gamification) to have a direct effect on Overall Satisfaction ($F(1, 157) = 78.16$, $p < 0.01$, $R^2 = .33$ with $b = 1.08$, $t(157) = 8.84$, $p < 0.01$). Gamification (versus no Gamification) no longer predicts Overall Satisfaction when adding Time Appraisal ($F(2, 156) = 155.2$, $p < 0.01$, $R^2 = .67$ with $b = .30$, $t(156) = 2.77$, $p = .01$) revealing Time Appraisal as a mediator ($Z = .77$, $p = < .01$, $\kappa^2 = .11$).

4.5 Overview of supported and rejected hypothesis

Considering the previous results, the hypotheses of this study are either supported or rejected. Table 9 provides an overview of the hypotheses.

Table 9.
Overview of supported and rejected hypothesis

	Hypothesis	*Supported*
H1a	*H1a: The lower the Perceived Waiting Time, the higher the Overall Satisfaction with waiting at the dentist.*	**No**
H1b	*H1b: The lower the Level of Stress, the higher the Overall Satisfaction with waiting at the dentist.*	**No**
H1c	*H1c: The lower the Level of Frustration, the higher the Overall Satisfaction with waiting at the dentist.*	**No**
H2	*When waiting at the dentist Gamification leads to a higher Overall Satisfaction compared to no Gamification.*	**Yes**
H3a	*Gamification leads to a lower Perceived Waiting Time when waiting at the dentist, compared to no Gamification.*	**No**
H3b	*Gamification leads to a lower Level of Stress when waiting at the dentist, compared to no Gamification.*	**Yes**
H3c	*Gamification leads to a lower Level of Frustration when waiting at the dentist, compared to no Gamification*	**Yes**
H4a	*The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Perceived Waiting Time.*	**No**
H4b	*The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Level of Stress.*	**No**
H4c	*The effect of Gamification on Overall Satisfaction with the waiting situation at the dentist is mediated by the Level of Frustration.*	**No**
H5a	*A congruent Gamification leads to a higher Overall Satisfaction with the waiting situation compared to an incongruent Gamification*	**No**
H5b	*An incongruent Gamification leads to a higher Level Distraction and in return to a higher Level of Satisfaction with waiting at the dentist.*	**No**
H6	*A positive emotional frame leads to a higher Overall Satisfaction with the waiting situation at the dentist, compared to a negative emotional frame*	**No**
H7	*Mood mediates the effect of the emotional framing on the Overall Satisfaction with the waiting situation at the dentist.*	**No**
H8	*Gamification leads to a higher Overall Satisfaction, especially when people are in a negative emotional condition; under a positive emotional condition the effect of Gamification on the Overall Satisfaction will be smaller.*	**No**

Discussion

This study aimed to get insights into *The effect of (in)congruent Gamification and positively/ negatively framed waiting situations, on the Overall Satisfaction of the waiting situation at the dentist.* All results are discussed in this chapter followed by implications as well as limitations of the research. The final part includes a conclusion answering the main research question.

5.1 Discussion of the results

Effect of Emotional Framing

Although there was a significant difference between the two emotional frames on Mood and Perceived Waiting Time, no significant difference was found between both frames on the Overall Satisfaction and therefore H6 is rejected. The study showed that participants in a Positive Emotional setting were in a more positive Mood and had lower Perceived Waiting Time.

Effect of Gamification

The results of this study confirmed previous findings showing that Gamification has a significant positive influence on the Overall Satisfaction of patients in a waiting room. Moreover, Gamification positively influenced the Level of Stress and Level of Frustration. Thus, H2, H3b and H3c are supported. The Perceived Waiting Time however, was not affected by the presence of Gamification and therefore H3a is not supported. Although there was no effect found on the Perceived Waiting Time, this study revealed a positive effect on Time Appraisal. To be more precise, adding Gamification to the waiting process led to the waiting time being experienced as less irritating, boring, stressful and annoying (see Appendix 10). When looking at congruent versus incongruent Gamification, no main effect could be found. As a result H5a and H5b are not supported.

Interaction of Gamification and Emotional Framing

No interaction effect was found between Emotional Framing and Gamification on the overall Satisfaction and therefore H8 is rejected.

Perceived Waiting Time, Level of Stress, Level of Frustration and Mood

A regression analysis revealed no influence of Perceived Waiting Time, Level of Stress, Level of Frustration or Mood on the Overall Satisfaction, rejecting H1a, H1b and H1c. As there

were no direct effects of Type of Gamification or Emotional Framing on the Overall Satisfaction, none of the constructs were mediating variables. Therefore, H4a, H4b and H4c as well as H7 are rejected.

Time Appraisal as Mediator

Even though Time Appraisal was not added as a separate variable into the research model, the correlation matrix showed several interactions of Time Appraisal with other constructs. Therefore this variable was included throughout each analysis and revealed to be a mediating variable for the effect of Gamification (versus no Gamification) on Overall Satisfaction.

All results are combined towards a new model shown below.

Model of the results

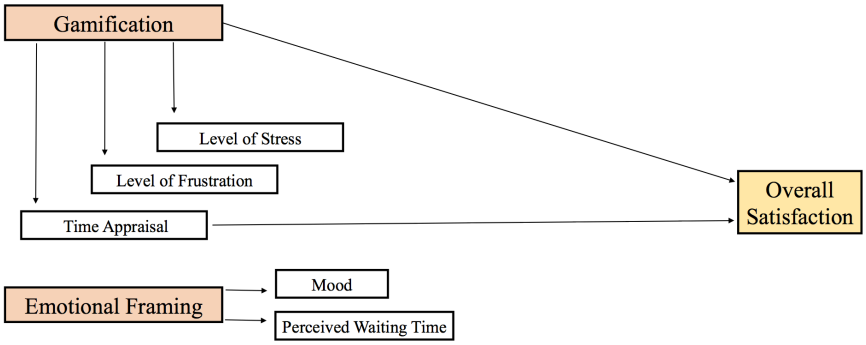


Figure 5: New model based on the results

5.2 Limitations and suggestions for future research

The characteristics of the design for this study are not without limitations, which challenges the reliability of the results. At the same time these limitations are an additional explanation why most of the hypothesis had to be rejected. Moreover, this section provides some recommendations for future research.

Limitations to this study

First, it is important to acknowledge that this study made use of scenarios to get the participants into the situation of waiting the dentist. Thus, participants did not actually wait at the dentist. This helped to control irrelevant variables in the study (such as other distractions) but simultaneously created an artificial situation. Further, the procedure described in the scenario may be different to what the participants are used to from their own dentist. Thus, it

is more difficult for people to engross the mind in the situation (Nabi, 2003). Another shortcoming regarding the scenario is the manipulation of emotions. Although the stimulus check has shown that a positive scenario let to positive emotions and vice versa for negative emotions, the emotions were not real emotions.

The other manipulation in the study (in form of a puzzle) can also be considered a limitation to this study. Even though the puzzles were validated during the pre-test, it is possible that the participants would not certify the puzzle as congruent or incongruent in the main study. This may be the reason that they focused more on finding matching puzzle pieces instead of the final picture itself.

The language chosen for the study was English for the reason that it is the global language. Although most of the participants are highly educated und thus assumed to have an advanced knowledge of the English language, it might have come to misunderstandings in the scenario or the questionnaire. Mistranslations could have occurred due to technical terms such as 'inflammation'. During the experiment several participants asked for a translation but there is a possibility that not everybody felt comfortable to ask. Thus, it cannot be ruled out that some participants understood the scenario and/or words in the questionnaire differently.

This study used convenient sampling at the University of Twente and Saxion University of Applied Sciences, which reduces the data's generalizability. The study is not representative for the whole population as the participants can be characterized as highly educated and on average 23 years old. At the same time the similarities of the participants could explain the homogeneity between groups. In addition the manipulations might have worked differently on older or lower educated people.

Recommendation for future research

In this study, participants were asked to make use of the Gamification instead of the Gamification generally being available for usage. To what extent patients will make use of a Gamification without being asked, as well as the usage of Gamificaton if other commonly used distractors (e.g. television, magazines) are present in the waiting environment, is an interesting topic to address. It should then be tested if Gamification still leads to a higher Overall Satisfaction. Moreover, the participants in this study were unaware of the duration of the waiting time. In future research it would be interesting to test what effect Gamification has when the waiting time is known regarding Time Appraisal.

It is also advisable that future research explores other areas where Gamification might be applicable as a distractor. One possibility is the reduction of patients' acute or chronic pain (Primack, 2012). The waiting room is the first stop before seeing the dentist or any other physician, where patients stay for some time. This provides an opportunity to reduce patient's anxiety and provide for a more comfortable (waiting) environment (Gagne & Toye, 1994).

As mentioned in the restriction section, the scenario was artificial. Due to ethical as well as time restriction this study, the experiment could not take place at the dentist. Therefore the final suggestion is to choose a real life setting in future research.

5.3 Conclusion

This study confirmed the positive effect of Gamification on the Overall Satisfaction. Moreover, Gamification (versus no Gamfication) leads to a lower Level of Stress and Frustration as well as Time Appraisal, which is a positive outcome. Moreover, Time Appraisal is mediating the effect of Gamification (versus no Gamification) on the overall Satisfaction. The type of game and the emotional setting have no significant influence on the Overall Satisfaction. Furthermore, emotional Framing has a main effect on Mood and Perceived Waiting Time. Finally, this study tested in a medical setting, which makes the positive effect of Gamification more generalizable.

Based on this study, it is advisable for dentists as well as medical institutes in general to consider the opportunity of adding Gamification to the waiting process. Gamification showed to increase satisfaction. A high level of satisfaction might avoid patients visiting other facilities and increases the likeability for recommending the doctor's surgery to their social circle (Ehrler et al., 2016). Additionally, the positive effects of Gamification provide the possibility that more patients will go to the annual check-up in the long term (Woolgrove and Cumberbatch, 1986).

In summary, this study showed that it is possible to make waiting a more positive experience by adding Gamification.

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Appendix

Overview

Appendix 1 – Scenarios for pre-test

Scenario A (pre-test version)

You went to dentist because you're suffering from toothache for a few weeks. After the first examination the dentist decided to make X-ray images (pictures of your teeth and jaw). He explained, that this would show if there is any inflammation under your tooth that is causing your pain. The dentist said that he might need to perform a root canal treatment, which means that you would need to undergo surgery. After the images have been taken it is shown that fortunately there is no inflammation. The dentist asked you to take a seat in the waiting room, in order to discuss the further procedure.

→ *Imagine now that you are sitting in the waiting room at the dentist. How do you feel right now? Try to put yourself in this situation. Do you feel relieved that there is no inflammation? Are you relaxed to know that there is no need to undergo surgery?*

Scenario B (pre-test version)

You went to dentist because you're suffering from toothache for a few weeks. After the first examination the dentist decided to make X-ray images (pictures of your teeth and jaw). He explained, that this would show if there is any inflammation under your tooth that is causing your pain. The dentist said that he might need to perform a root canal treatment, which means that you would need to undergo surgery. After the images have been taken it is shown that unfortunately there is a inflammation. The dentist asked you to take a seat in the waiting room, in order to discuss the further procedure.

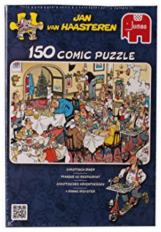
→ *Imagine now that you are sitting in the waiting room at the dentist. How do you feel right now? Try to put yourself in this situation. Do you feel concerned that there is an inflammation? Are you worried to know that you may need to undergo surgery?*

Appendix 2 – Cronbach's Alpha for pre-test

Cronbach's Alpha

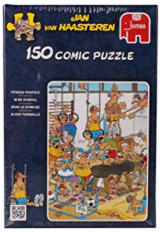
Construct	N of items	Cronbach's alpha
Mood	10	.774
Perceived Waiting Time	7	.792
Stress	5	.915
Frustration	3	.682
Overall Satisfaction	6	.728
Distraction	3	.634
Likability of the game	5	.550
Emotional framing	12	.673

Appendix 3 – Puzzle options for Game 2



Jumbo 17464 - Jan van Haasteren - Chaotisches Adventsessen - 150 Teile

Jumbo 17317 - Jan van Haasteren - Fräulein in Nöten Puzzle, 150 Teile



Jumbo 17455 - Jan van Haasteren - Fitnessstudio Puzzle, 150 Teile

Jumbo 17219 - Jan van Haasteren - Der Campingplatz - 150 Teile

Appendix 4 – Questionnaire

Mood + Emotion

When you put yourself in the situation you just read. How are you feeling right now?

	Totally disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Totally agree
I feel cheerful	○	○	○	○	○
I feel comfortable	○	○	○	○	○
I feel irritated	○	○	○	○	○
I am in a good mood	○	○	○	○	○

When you put yourself in the situation you just read. How are you feeling right now?

I feel unhappy	○ ○ ○ ○ ○	I feel happy
I feel pleased	○ ○ ○ ○ ○	I feel unpleased
I feel unsatisfied	○ ○ ○ ○ ○	I feel satisfied
I feel melancholic	○ ○ ○ ○ ○	I feel contented
I feel bored	○ ○ ○ ○ ○	I feel entertained
I feel despaired	○ ○ ○ ○ ○	I feel hopeful

When you put yourself in the situation you just read. How are you feeling right now?

I feel relaxed	○ ○ ○ ○ ○	stimulated

I feel inactive	○ ○ ○ ○ ○	I feel active
I feel sleepy	○ ○ ○ ○ ○	I feel wide awake
I feel nervous	○ ○ ○ ○ ○	I feel at ease
I am not aroused	○ ○ ○ ○ ○	I am aroused
I feel calm	○ ○ ○ ○ ○	I feel excited

When you put yourself in the situation you just read. How are you feeling right now?

I feel controlled by the situation	○ ○ ○ ○ ○	I feel in control of the situation
I feel neglected	○ ○ ○ ○ ○	I feel cared for
The situation dominates me	○ ○ ○ ○ ○	I dominate the situation
I am influenced by the situation	○ ○ ○ ○ ○	I influence the situation
I feel unimportant	○ ○ ○ ○ ○	I feel important
I am dependent in this situation	○ ○ ○ ○ ○	I am independent in this situation

Please indicate to the researcher that you have finished this part. You will then receive further instructions.

Scenario B

The experiment will start with a short scenario.
Please read the following text carefully and try to put yourself in the situation. If you have any questions regarding the scenario feel free to ask them.

You have an appointment at the dentist for your annual control. First, an assistant did a general control, during which she looked for any inflammation. She explained that any sign of an inflammation would need direct treatment today in order to prevent greater damage on your other teeth. Unfortunately, she found an inflammation under one of your teeth. She explained that it is necessary to perform a tooth treatment which will include an injection for the local anesthetic. She then asked you to take a seat in the waiting room till the dentist sees you.

Imagine now that you are sitting in the waiting room at the dentist. How do you feel right now? Try to put yourself in this situation. Do you feel concerned that there is an inflammation? Are you anxious knowing that it will not only be a control visit but that you need a treatment?

Game Experience

Please answer the following questions regarding the puzzle:

	Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
I was interested in the final picture	○	○	○	○	○
I was fully occupied with the puzzle	○	○	○	○	○
I felt happy while doing the puzzle	○	○	○	○	○
It gave me a bad mood	○	○	○	○	○
I thought about what the dentist will do today	○	○	○	○	○
I found it tiresome	○	○	○	○	○
I thought it was hard to solve the puzzle	○	○	○	○	○
The final picture of the puzzle was aesthetically pleasing	○	○	○	○	○
I forgot everything around me	○	○	○	○	○
I felt bored	○	○	○	○	○
I felt successful	○	○	○	○	○
I enjoyed doing the puzzle	○	○	○	○	○
I was fast at finding matching puzzle pieces	○	○	○	○	○
I felt pressured to finish the puzzle	○	○	○	○	○
I lost track of time	○	○	○	○	○
I felt challenged	○	○	○	○	○

Evaluation

The following questions are regarding the waiting situation.

Please estimate (in minutes) the total time spent in the waiting room:

The waiting time was

- ○ 1 very short
- ○ 2
- ○ 3
- ○ 4
- ○ 5 very long

The wait was

	Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
Irritating	○	○	○	○	○
Annoying	○	○	○	○	○

Boring	○	○	○	○	○
Stressfull	○	○	○	○	○

The waiting time was fair

Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
○	○	○	○	○

How did you perceive the waiting procedure at the dentist?

- ○ 1 very dissatisfying
- ○ 2
- ○ 3
- ○ 4
- ○ 5 very satisfying

How did you feel while you were waiting?

	Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
I was concerned	○	○	○	○	○
I felt at rest	○	○	○	○	○
I felt untroubled	○	○	○	○	○

Please answer the following questions

	Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
This was a frustrating waiting experience	○	○	○	○	○
Not knowing how long I had to wait was frustrating	○	○	○	○	○
My level of frustration was low	○	○	○	○	○

Please answer the following questions

	Totally disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Totally agree
I am happy with the process at this dentist	○	○	○	○	○
I can say positive things about the waiting procedure at this dentist	○	○	○	○	○
I will recommend this dentist to friends/family	○	○	○	○	○
Waiting at the dentist was better than I expected	○	○	○	○	○

Please indicate (in minutes) the maximum acceptable time for a waiting situation (like the one you have been in):

Please answer the following questions

	Not at all 1	2	3	3	4	Very Much 5
Are you afraid of the dentist?						
Generally, do you like playing games?						

What is your gender?

- Male
- Female
- Non conforming

How old are you?

Are you currently:

- Employed for wages
- A student at the University of Twente
- A student at Saxion
- Other

Do you want to win two cinema tickets? Please fill in your email below:

You have now completed the study. I would like to thank you again for your participation in this study!

Appendix 5 – Factoranalysis Pleasure, Arousal, Dominance

Factor Matrix[a]

	Factor	
	1	2
I feel unhappy:I feel happy	,865	
I feel nervous:I feel at ease	-,858	
I feel unsatisfied:I feel satisfied	,779	
I feel pleased:I feel unpleased	,679	
I feel controlled by the situation:I feel in control of the situation	,631	
I feel despaired:I feel hopeful	,615	
I feel melancholic:I feel contented	,609	
I am not aroused:I am aroused	-,401	
I feel inactive:I feel active		,864
I feel sleepy:I feel wide awake		,639
I feel bored:I feel entertained		,534

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 17 iterations required.

Appendix 6 – Factoranalysis Game Experience

Pattern Matrix[a]

	Factor	
	1	2
It gave me a bad mood	,811	
I felt happy while doing the puzzle	,783	,217
I enjoyed doing the puzzle	,746	,229
I felt bored	,700	,281
I felt successful	,676	
I found it tiresome	,649	
I was fast at finding matching puzzle pieces	,620	
I thought it was hard to solve the puzzle	,566	-,367
I lost track of time		,755
I forgot everything around me		,658
I felt challenged	,230	,539

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Appendix 7 – Overview final constructs

Part I			
Construct 1	Mood	QM1-QM4	
Construct 2	Emotion	Level of Activeness	QE_Arousal 1+2; QE_Pleasure 5
		State of Happiness	QE_Arousal 3+5; QE_Pleasure 1-4+6; QE_Dominance 1
Part II			
Construct 3	Game Experience	Level of Distraction	QGE (9;15;16)
Construct 3		Game review	QGE (3;4;6;7;10-13)
Construct 4	Time	Perceived Waiting Time	QT1
		Appraisal of the Waiting Time	QT2; TQ3_1-QT3_4; QT5
Construct 5	Stress	QS1- QS3	
Construct 6	Frustration	QF1; QF3; QF4; QT3_1; QT3_2	
Construct 7	Overall Satisfaction	QSF1-QSF 4; QT5	
Construct 8	Demographics	QDemo1- QDemo5	
Items which were deleted after the factor analysis		QE QE_Domiance 2: *When you put yourself in the situation you just read. How are you feeling right now?* *(I can not influence the situation – I can influence the situation)* _Domiance 3: *When you put yourself in the situation you just read. How are you feeling right now?* *(neglected – cared for)* QE_Domiance 4: *When you put yourself in the situation you just read. How are you feeling right now?* *(I feel unimportant - I feel important)* QE_Domiance 5: *When you put yourself in the situation you just read. How are you feeling right now?* *(unimortant - important)* QE_Arousal 4: *When you put yourself in the situation you just read. How are you feeling right now?* *(I feel sleepy – I feel wide awake)*	

Appendix 8 – Correlation Matrix

		1	2	3	4	5	6	7	8	9	10
1	Mood	1									
2	Feeling Active	-.279**	1								
3	Feeling Positive	.827**	-.120	1							
4	Game Review	-.086	-.027	-.092	1						
5	Distraction	-.084	.173	-.097	.321**	1					
6	Time Appraisal	.112	.026	.161*	.592**	.339**	1				
7	Perceived Waiting Time	-.167*	.052	-.070	.037	-.013	-.132	1			
8	Stress	.331**	-.231**	.286**	.280**	.226*	.597**	-.135	1		
9	Frustration	.198*	-.061	.202*	.469**	.309**	.808**	-.128	.602**	1	
10	Overall Satisfaction	.061	.058	.085	.619**	.434**	.806**	-.103	.424**	656**	1

N=159

*Correlation significant at the .05 level (2-tailed)

**Correlation significant at the .01 level (2-tailed)

Appendix 10 – Time Appraisal

Table 10.
The Effect of Gamification on Time Appraisal

	No Game			Game		
The wait was	***N***	***M***	***SD***	***N***	***M***	***SD***
Irritating	54	3.11	1.16	105	1.0	1.16
Annoying	54	3.35	1.17	105	.98	1.17
Boring	54	4.07	1.13	105	1.0	1.13
Stressful	54	2.02	1.31	105	.99	1.13

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N=159

*Correlation significant at the .05 level (2-tailed)

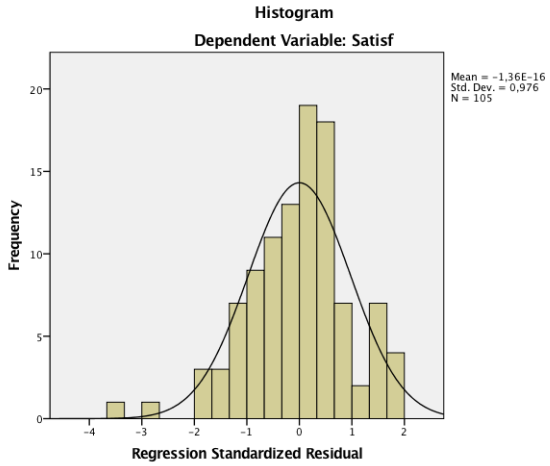
**Correlation significant at the .01 level (2-tailed)

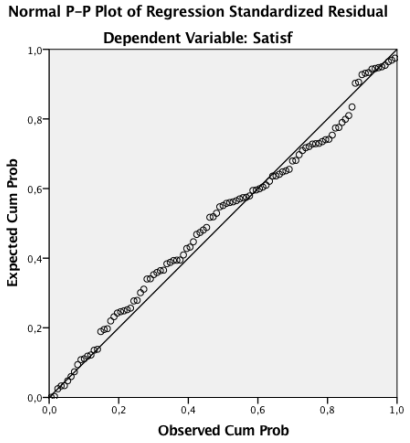
Appendix 9 – Regression analysis

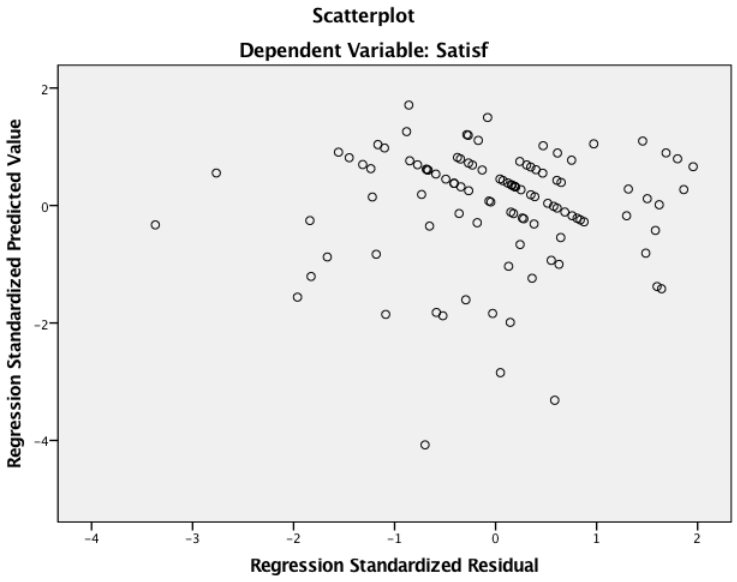
Predicting Overall Satisfaction

	β	*t*	*p*
Perceived Waiting Time	.03	.37	.71
Time Appraisal	.81	7.86	< .001*
Stress	-.04	-.50	.62
Frustration	-.03	-.24	.81
Mood	-.05	-.70	.48

*$p < .05$







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