

THEORY OF ACTION PHASES IN VIDEO GAMES: EFFECTS OF
DELIBERATIVE AND IMPLEMENTAL MINDSET DIFFERENCES IN VIDEO
GAME DESIGN

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**THEORY OF ACTION PHASES IN VIDEO GAMES: EFFECTS OF
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GAME DESIGN**

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ABSTRACT

THEORY OF ACTION PHASES IN VIDEO GAMES: EFFECTS OF DELIBERATIVE AND IMPLEMENTAL MINDSET DIFFERENCES IN VIDEO GAME DESIGN

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With the proliferation of the technologies that enable and drive video gaming domain, the effects of and motivation for gaming has gained much attention from the research point of view. In this thesis, “Mindset Theory of Action Phases” is transferred to the video gaming domain and was tested to observe if mindsets are affecting player’s performances, enjoyment or their predictions about their performances. According to the theory, people tend to be in a certain cognitive orientation that also affects them behaviorally depending on whether they are deliberating on a personal problem where they are indecisive (deliberative mindset) or they have passed the deliberation stage, made up their minds and are planning a roadmap (implemental mindset). In an experimental study, the mindsets are induced by pen-and-paper methods and then participants played a non-commercial twitch style video game. Results showed that there is a statistically significant difference between the deliberative and implemental mindset groups in terms of their performance and prediction of their scores. Implemental mindset group scored significantly better than the deliberative mindset group. Deliberative mindset group was more realistic and implemental mindset group was more optimistic on their predictions. No difference was found in terms of perceived competence, flow, intrinsic motivation or engagement between the mindsets. The results might be significantly beneficial for game designers since they will be able to harness the power of mindsets if they can find creative ways for in-game mindset manipulations that can be tied to the game mechanics naturally.

Keywords: Psychology in Game Design, Player Mindsets, Gaming Motivation

ÖZ

BİLGİSAYAR OYUNLARINDA AKSİYON FAZLARI TEORİSİ: OYUN TASARIMINDA “KARAR VERMİŞ, UYGULAMAYI PLANLAYAN” VE “KARAR VERMEMİŞ, HALEN DÜŞÜNEN” ZİHNİYETLER ARASINDAKİ FARKLAR

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Bilgisayar oyunlarının gelişmesinde büyük katkısı olan teknolojinin gelişmesiyle beraber, oyunların etkileri ve oynama motivasyonları akademi tarafından ilgi görmeye başlamıştır. Bu tezde, “Mindset Theory of Action Phases” bilgisayar oyunları alanına aktarılmış ve bu teoride bahsedilen zihniyetlerin oyuncuların oyun performansı üzerinde, eğlence, pozitif deneyim seviyeleri üzerinde ve kendi performanslarını değerlendirmeleri üzerinde etkileri olup olmadığı araştırılmıştır. Bu teoriye göre insanlar kararsız bir şekilde belirli bir problemleri üzerinde düşünme aşamasında olmasına (karar vermemiş, hala düşünen) veya kararını vermiş ve onu uygulama noktasında olmasına (karar vermiş, uygulamayı planlayan) göre belirli bazı bilişsel yönelimlerde olmaktadır. Bu deneysel çalışmada, bahsi geçen zihniyetler kalem-kağıt yollarıyla başlatılmış ve bunun ardından katılımcılar ticari amaçlı olmayan ve hızlı mekanikleri olan bir oyun oynamışlardır. Sonuçlarda iki zihniyet arasında oyun performansı açısından önemli farklar gözlenmiştir. Kararını vermiş, uygulama aşamasında olan zihniyetteki grup, karar vermemiş ve hala düşünen gruba göre daha iyi performans göstermiştir. Karar vermemiş, hala düşünen grup performansları konusunda daha gerçekçi tahminlerde bulunurken, karar vermiş, yapmayı planlayan grup daha optimistik tahminlerde bulunmuşlardır. Bu sonuçlar, yaratıcı şekillerde oyun içi manipulasyonlar bulacak olan ve bunları oyun mekaniklerine doğal olarak yedirebilen oyun tasarımcıları için önemli ve faydalı olacaktır ve bu oyun tasarımcıları zihniyet gücünden yararlanabileceklerdir.

Anahtar Sözcükler: Oyun Tasarımında Psikoloji, Oyuncu Zihniyeti, Oyun Motivasyonu

To the researchers who will benefit from this study

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CHAPTER 1

INTRODUCTION

In this age, digital games are being played, developed and consumed more than ever in the entire human history and there is also an increasing trend in the industry in terms of revenue (Sinclair, 2015). As being both the requirer and the thruster of technology, game technologies bring loads of technological advancements which also create brand new research opportunities. Computer science domain benefits from the research on games with the studies being carried out in computer graphics, artificial intelligence or others. Human-computer interaction domain is also being leveraged as the positive user experience that is being sensed by users gains much importance especially in the gaming domain. The results of those studies can also be used in other ways such as to increase enjoyment while using production software tools. If we get a little “closer to the human-side”, we will be residing at the intersection between the psychology domain and the game technologies domain which is the main subject of this thesis in a very broad sense.

Once unrelated, the theories in psychology domain started to be applied specifically to the gaming domain to better understand the inner working mechanisms of humans while playing video games. What makes a player spend so much time with these artifacts (i.e. motivational studies)? What are the short-term or long-term consequences of playing video games (i.e. video game addiction studies)? Are they mostly negative (i.e. video game aggression studies)? Can they be used for positive outcomes (i.e. game-based learning studies)? These are all important questions that researchers strive to find answers to however the main umbrella question of this study is that: How can the video game design be informed better by pertinent theories from psychology domain? In other words, can we supply game designers with another tool from the psychology domain while they develop video games?

To be more specific, for the purpose of this study, “Theory of Action Phases” (Gollwitzer P. , 2012), which mentions two mindsets: deliberative and implemental, has been selected as the main theory to be applied in the gaming domain. I tested the theory to see whether it can be utilized by game designers as a tool in video game design or not.

To understand what the theory is about and the meanings of those mindsets we need to see how the theory was developed in the first place. According to Heckhausen and Gollwitzer (1987), while defining goals and pursuing them, there are four consecutive phases that people go through which forms the Rubicon model of action phases: Pre-decision Phase, Pre-action Phase, Action Phase and Post-action Phase. Pre-decision is the phase where people deliberate and assess the possible outcomes of the options they have in an impartial way. In the second phase, Pre-action Phase, the decision is almost made and goal-directed behaviors come into the picture. In the Action Phase, the planning of how, when and where to act are carried out step by step. Finally, in the last phase, the individual evaluates the results of her/his actions and sees if the goal has been met or not. In the same study, they have identified that there are different cognitive procedures that facilitate different mind-sets in pre-decisional phase and pre-action phase. They called these mindsets as the “deliberative mindset” and the “implemental mindset”, respectively. Deliberative mindset is denoted by impartial analysis of desirability-related information and accurate analysis of feasibility-related information whereas implemental mindset is characterized as excessively positive analysis of feasibility-related information and partial analysis of desirability-related information. In other words, people in deliberative mindset tend to more accurately assess their desires and the feasibility of their options, whereas people in implemental mindset tend to have bias about their desires and see their selected option as feasible even if it actually is not.

Therefore, “Theory of Action Phases” describes a dual process that consists of implemental mindset and deliberative mindset. These mindsets cause humans to adopt distinct cognitive orientations and have different properties. To put in perspective, deliberative mindset is adopted when a person is in a situation where s/he has two or more options to choose from (the decision of doing something or not also counts) that s/he has not decided on yet and still deliberating on. On the other hand, implemental mindset is a mindset that is adopted by a person who made her/his decision on a serious issue and planning the details of the implementation of the selected path. These mindsets are mutually exclusive which means that they cannot exist at the same time, conversely they preclude each other and they are adopted without noticing. The mindsets are distinct and independent from each other in terms of the cognitive orientation they create (Gollwitzer & Bayer, 1999; Gollwitzer P. , 2012). They have distinct properties that affect people’s behavior which will be discussed shortly. Although the mentioned mindsets are occurring naturally whenever people are deliberating or planning an implementation, they can be activated artificially with a manipulation method that is called “priming” in social psychology domain (Srull & Robert, 1979). Priming is the activation of desired mindsets, possibly with a pre-designed activity that the participants should perform before the actual experiment (undisclosed to the participants that it is a mindset activation). In this method, there is so-called a carry-over effect where the participants’ mindsets are preserved and transferred to the subsequent activities (Bargh, Gollwitzer, Lee-Chai, & Barndollar, 2001). After the discovery of “Theory of Action Phases”, the distinct properties of the mindsets were started to be investigated and several constructs related to the mindsets were found.

1.1. Performance

One of the property that has been identified as distinct between mindsets is performance which can be defined as the measure of required positive outcomes (i.e. accuracy, completeness, speed) of an activity that a human carries out. In an unpublished manuscript (1998), Gollwitzer, Bayer and Wasel, asked their participants to watch a series of slides and asked them to memorize the story depicted at the center of the slides. However, irrelevant words are also placed at the edges of the slides. In the end, a recognition test was carried out and it has been found that deliberating participants recognized the irrelevant words significantly more than the planning (implemental) participants. In the second and third study, they have used an adapted version of Müller-Lyer figure (Figure 1) and asked participants to determine if the critical distance was shorter or longer than the comparison distance¹. As a result, it has been found that participants in implemental mindset significantly determined critical distance shorter than participants in deliberative mindset implying that they have mostly focused on the center and the deliberating participants explored the whole figure.

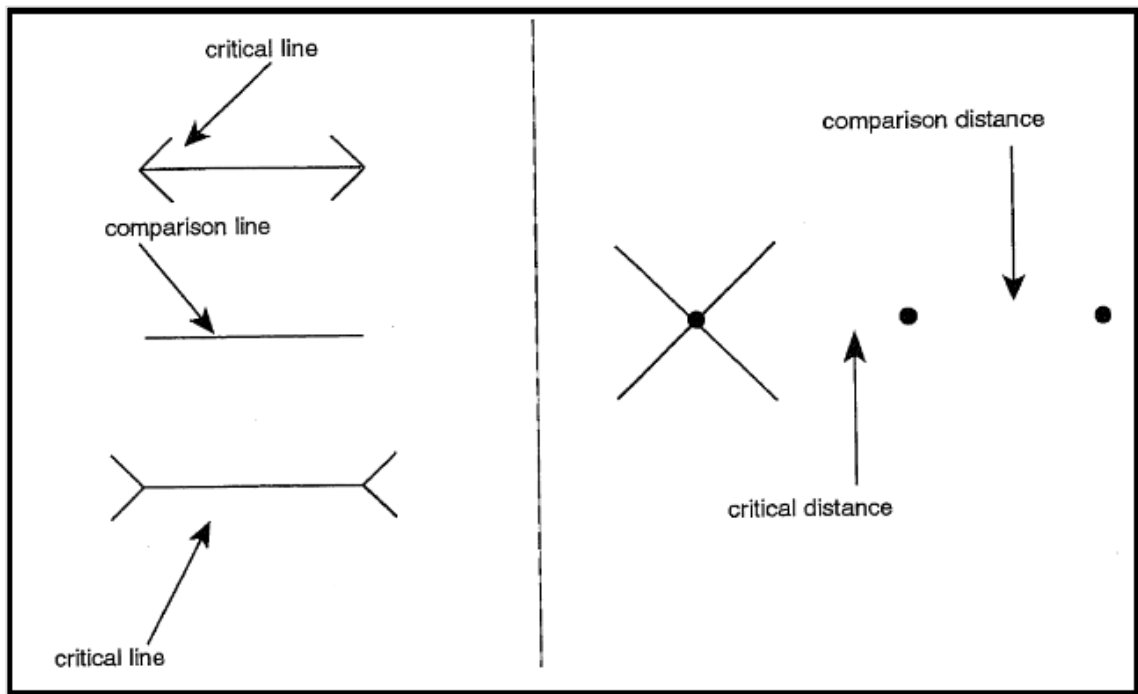


Figure 1: Original (left) and Adapted (right) version of Müller-Lyer Figures (Gollwitzer, Bayer, & Wasel, 1998)

¹ Müller-Lyer illusion is found by Franz Müller-Lyer (1889) which consists of arrow-like figures. It is famous in the sense that the lengths of the figures are hard to be compared with naked eye.

Büttner et al. (2014) also have taken the mindset study from a visual attention point of view which is the main inspiration for this game study. In Büttner et al.'s first two studies, effects of mindsets on visual attention are investigated. As a result of these studies it has been found that implemental mindset participants showed a narrower breadth of attention than the deliberative mindset participants. In the third study, which was an eye-tracking study, participants of the study were either manipulated to be in implemental mindset or in deliberative mindset and then they were shown some pictures with foreground and background images. In results, they have found that while examining a static image, implemental mindset participants mostly focused on the foreground objects which are centered on the screen whereas deliberative mindset participants focused more evenly throughout the screen implying that mindsets affect visual attention and eye behavior. Setting off from these findings, a similar approach is adopted but with a very distinguishing aspect in this thesis study: **Static images were replaced by dynamic scenes and interactivity is added. Best to my knowledge, motion on the screen is a new territory for the theory.** The theory was tested in the gaming context and the first hypothesis was:

[H1] Deliberative mindset group will perform better than the implemental mindset group, since the focus of deliberative mindset group is expected to be distributed evenly throughout the screen instead of partially which is required to be successful in the game.

Since the game requires breadth of attention and awareness of the surroundings of the screen, the hypothesis [H1] is also divided into two where one of them is related to the overall score and the other related to the edges of the screen:

[H1A] The total game-end score of deliberative mindset group will be better than the total game-end score of implemental mindset group.

[H1B] Scores that are contributing to total score from the far ends of the screen of deliberative mindset group will be better than the far-end scores of implemental mindset group.

1.2. Illusion of Good Performance (Optimistic and Realistic Predictions)

A line of studies investigated if mindsets have an effect on the predictions that people make and illusions of control that they experience². One of the most influential one is the Gollwitzer and Kinney's (1989) study. They have studied the effects of the mindsets on

² The summary of how and why illusion of control has been started to be studied in mindset domain was explained by Gollwitzer (2003). He explains the story of the theory beginning from late 1970s, from how the Rubicon model of action phases formed, to how the deliberative and implemental mindsets were defined and to how he and his colleague, Ron Kinney, came up with the conclusion that the action phases actually influence the illusion of control.

the illusion of control. Two experiments were carried out and the following was found to be of significance: Participants in deliberative mindset develop more accurate predictions with respect to participants in the implemental mindset. Participants in the implemental mindset tend to develop an illusionary optimism about their control on the events.

Gollwitzer, Heckhausen and Steller (1990) carried out two studies to see if there is any difference between deliberative and implemental mindsets in terms of recalling information. Thinking and recalling of implementation-related information was found to be higher in people with implemental mindset with respect to people with deliberative mindset. In a similar manner, thinking and recalling of deliberation-related information was found to be higher in people with deliberative mindset with respect to people with implemental mindset. Therefore, this may imply that the participants in deliberative mindset may predict their scores better (more realistically) than the participants in implemental mindset. Moreover, Taylor and Gollwitzer (1995) reported in their second study that people in deliberative mindset do not have positive illusions as much as the people in implemental mindset do. Also people in deliberative mindset had lower perception of their skills which is a result of their pessimism. Another study on predictions was reported in an article that was about accuracy of predictions about the future of close long-term relationships (Gagne & Lydon, 2001). The study showed that predictions made in deliberative mindset were more accurate than predictions made in implemental mindset. Participants in deliberative mindset were more realistic whereas participants in the implemental mindset were more optimistic, as expected. Also, Armor and Taylor's (2003) study showed that participants who have been induced to be in deliberative mindset reported more pessimistic expectations than the ones that were in implemental mindset. Since deliberative mindset implies a more realistic approach in predictions and expectations, Puca (2001) theorized that people in deliberative mindset would choose less difficult tasks than people in implemental mindset, since they tend not to overestimate their probability of success. Indeed, the findings showed that participants in the deliberative mindset had chosen less difficult tasks. Taken together, these studies inform us that the people in deliberative mindset tend to be better and more realistic (or pessimistic in some cases) in their predictions than the people in implemental mindset. I also hypothesized that it should be similar in the gaming domain and therefore, the hypothesis is stated as:

[H2] Implemental mindset group will be experiencing "illusion of good performance" more than the deliberative mindset group which means that the implemental mindset group will be more optimistic about their overall score and the deliberative mindset group will be more realistic about their predictions.

1.3. Enjoyment

Without having a direct rationale on linking mindsets and player experience, I still find it relevant to measure the constructs that constitutes enjoyment in an exploratory manner

since the domain is video gaming and mindsets that affect player performance might play a role in enjoyment.

Taylor and Gollwitzer (1995) claim that the mood of the people in implemental mindset is generally higher than the people in deliberative mindset. In another study, it was found that mood was positively correlated with enjoyment (Robbins, Pis, Pender, & Kazanis, 2004)³. In line with these studies, I hypothesize that, positive mood of the participants in implemental mindset will foster their own enjoyment. Therefore, the main hypothesis on enjoyment becomes:

[H3] Implemental mindset group will enjoy the game better than the deliberative mindset group.

Enjoyment in the gaming domain is actually an elusive term and describes the overall positive experience of the player while playing the game. There are several constructs that add to the enjoyment of the player if satisfied. For the sake of this study, I have taken three constructs from the literature as the enablers of enjoyment: Flow, Intrinsic Motivation and Engagement.

Flow is the optimal life experiences as described by Csikszentmihalyi (1990) and applied to gaming domain by Sweetser and Wyeth (2005). It is articulated that flow is an important factor in game enjoyment therefore the first sub-hypothesis is:

[H3A] Implemental mindset group will report that they were more immersed and experienced more flow in the game than the deliberative mindset group.

Intrinsic motivation is a long-studied phenomenon and explained as doing an activity for its own sake rather than a separate outcome (Ryan & Deci, Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being, 2000) (Ryan & Deci, Intrinsic and extrinsic motivations: Classic definitions and new directions, 2000). It is characterized by efficiency, effectiveness and satisfaction meaning that an intrinsically motivated individual is more efficient, effective and feels more satisfied for the given activity. Ryan et al. (2006) states that if a player is more intrinsically motivated to play a video game, s/he will enjoy the game more:

[H3B] Implemental mindset group will report more intrinsic motivation than the deliberative mindset group.

Engagement is also a contributor to the enjoyment of a player (Chen, Duh, Phuah, & Lam, 2006). Intrinsic motivation answers why players play a game whereas, engagement

³ Although the study was on physical activities, it was assumed that the results also translate to video gaming domain.

describes what happens to players during the play (as flow). Engagement takes place in my research framework as a constituent construct of enjoyment:

[H3C] Implemental mindset group will report more engagement to the video game than the deliberative mindset group.

There are quite a few numbers of dependent variables to be tested regarding the theory of action phases, however visual attention (breadth of attention) was selected as the main variable in this study which was hypothesized as an important parameter for success in twitch style video games⁴.

To sum up, main hypotheses of the study are (Figure 2):

- H1: Deliberative mindset group will perform better than the implemental mindset group, since the focus of deliberative mindset group is expected to be distributed evenly throughout the screen instead of partially which is required to be successful in the game.
 - H1A: The total game-end score of deliberative mindset group will be better than the total game-end score of implemental mindset group.
 - H1B: Scores that are contributing to total score from the far ends of the screen of deliberative mindset group will be better than the far-end scores of implemental mindset group.
- H2: Implemental mindset group will be experiencing “illusion of good performance” more than the deliberative mindset group which means that the implemental mindset group will be more optimistic about their overall score and the deliberative mindset group will be more realistic about their predictions.
- H3: Implemental mindset group will enjoy the game better than the deliberative mindset group.
 - H3A: Implemental mindset group will report that they were more immersed and experienced more flow in the game than the deliberative mindset group.
 - H3B: Implemental mindset group will report more intrinsic motivation than the deliberative mindset group.
 - H3B1: Implemental mindset group will report more interest in the game than deliberative mindset group.

⁴ Twitch gameplay tests player’s reaction time with minimum or no strategy elements (Brathwaite & Schreiber, 2009).

- H3B2: Implemental mindset group will report more perceived competence than the deliberative mindset group.
- H3B3: Implemental mindset group will report less pressure/tension than the deliberative mindset group.
- H3B4: Implemental mindset group will report more competence need satisfaction than the deliberative mindset group⁵.
- H3C: Implemental mindset group will report more engagement to the video game than the deliberative mindset group.

Overall, it is hypothesized that mindsets affect objective performance, enjoyment and perceived performance (Figure 2). It is assumed that competence need satisfaction, flow, intrinsic motivation and engagement add to the enjoyment of the player (Sweetser & Wyeth, 2005) (Ryan, Rigby, & Przybylski, 2006) (Chen, Duh, Phuah, & Lam, 2006).

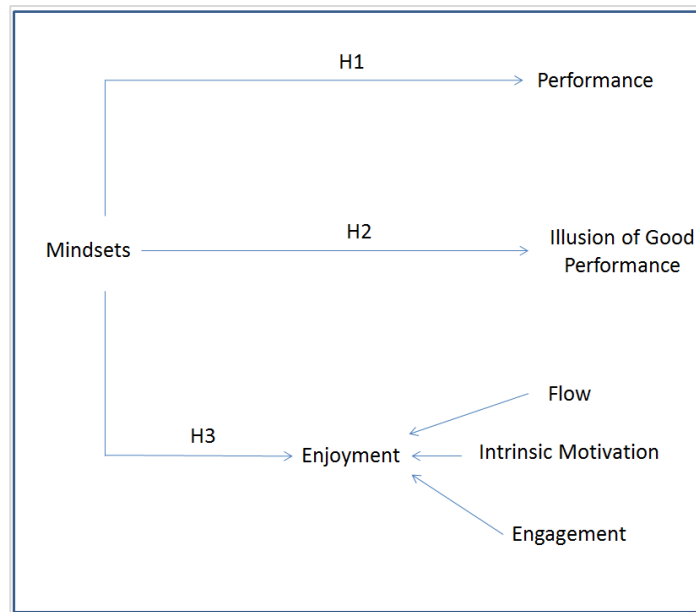


Figure 2: Research Framework

To test the validity of the theory and the aforementioned hypotheses in dynamic and interactive digital environments (video games), a minimal twitch style game has been developed. The game was designed in such a way that the players need to pay attention to the entire screen to succeed therefore the game requires participants to focus equally to the whole screen to perform well. Accordingly, people in deliberative mindset are

⁵ This is different than H3B2 since that one is measured with PENS scale whereas H3B4 is measured by IMI – Perceived Competence (Appendix D).

expected to perform better than people in implemental mindset in these kinds of video games that requires attention throughout the screen at all times.

CHAPTER 2

THE GAME

The game developed for the purpose of this study is a twitch style game that was adapted from a web-based mini-game: Focal Points (Play With Your Mind, 2004). It is a single player game developed by Unity Personal version 5.1.2f1 (64 bit). The game actually simulates an adapted and minimal version of the Guitar Hero (Harmonix, 2005) game where the buttons flow through the screen and the player needs to press the buttons when they are at the right spot.

Fullerton et al. (2004) stated that games can be explained by their formal, dramatic and dynamic elements. Here, I find it convenient to explain the developed game by its formal elements:

Players: Player interaction pattern is selected as “player vs game” which implies a single player game.

Objectives: The objective of the game is to hit as many yellow buttons as possible when they are passing on black boxes while avoiding hitting when they are not on black boxes and also with minimum missing.

Rules: It is fairly a simple game that the rules are evident once the player starts to interact. Players gain points as the boxes are hit at the right places. The core mechanic of the game is to hit the right button at the right time which is when the yellow box is passing over the black boxes. To foster overall feedback mechanism of the game, when a correct hit is made, the yellow box turns into green for a small amount of time and the game makes a sound implying a correct hit whereas if an incorrect hit is made, the yellow box turns into red for a small amount of time and the game makes a sound implying an incorrect hit.

Procedures: There are several yellow boxes (number of yellow boxes change depending on the level) sliding up and down vertically relatively fast and there are numbers written on them (1, 2, 3, 7, 8 and 9) which refer to the buttons on the keyboard. This procedure is repeated until the level ends where each of them lasts 30 seconds. Just the first level is 15 seconds which is an adaptation level. The game consists of 4 levels (Figure 3, Figure 4,

Figure 5 and Figure 6) with an increasing difficulty level since at each level, a new bar is added which means 3 more targets to pay attention. In every level, the colors of the yellow and black boxes that are at the rightmost and leftmost columns were intentionally colored paler to give them a “background object” effect making the centered objects “foreground objects” which makes the scenes similar to Büttner et al.’s study (2014).

Resources: There are no resources in the game that provides the player can utilize.

Boundaries: There are vertically aligned guiding lines where the black boxes reside and the yellow boxes move on. The player cannot move any box regardless of their color and the boxes are bounded by these guidelines.

Conflict: The main conflict of the game is that there are obstacles that players should overcome however there are no penalties if they don’t.

Outcome: At the end of the game, a measurable outcome is not given to the player explicitly unlike most of the games which provide outcomes quantifiably. No score or leaderboard is shown to the player during or at the end of the game in the interface for the purpose of the study but quantitative data is saved in the background to be analyzed later on. The quantitative data includes the correct hits, wrong hits and misses of the player for each level. Correct hit is the successful hit (score point) of the player when s/he hits the correct number on the keyboard when the corresponding box is passing on a black box. Wrong hit is a failure hit of a player if s/he presses the button when the corresponding yellow box is not on a black box. Finally, miss is when a player does not press a button at all when a yellow box passes on a black box (the player “missed that score”).

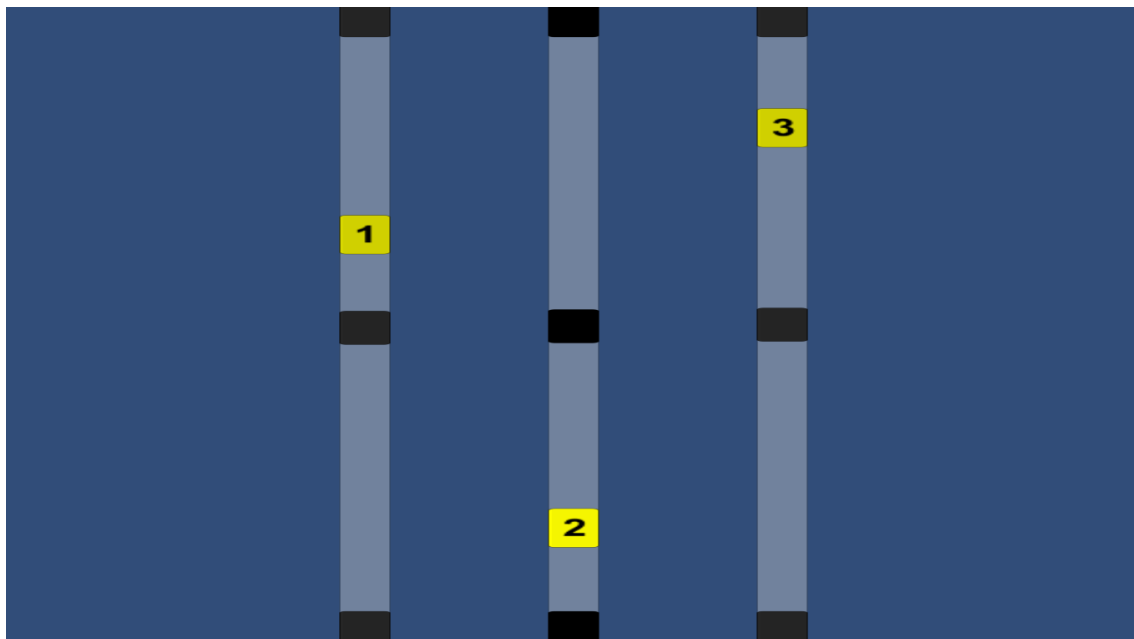


Figure 3: Demo Level of the Game

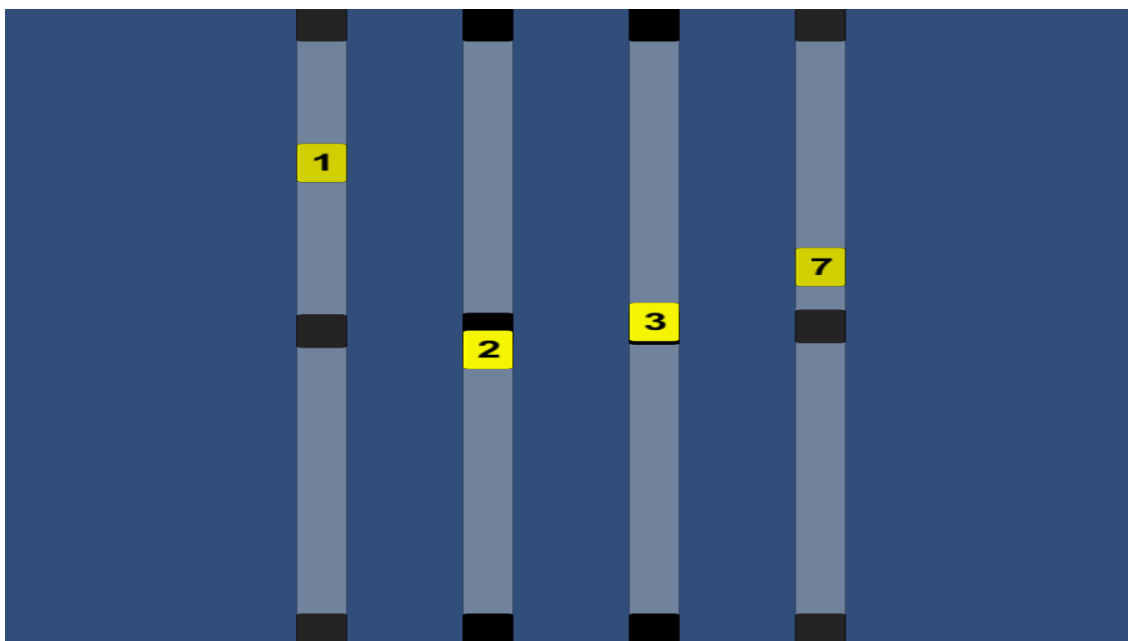


Figure 4: First Level of the Game

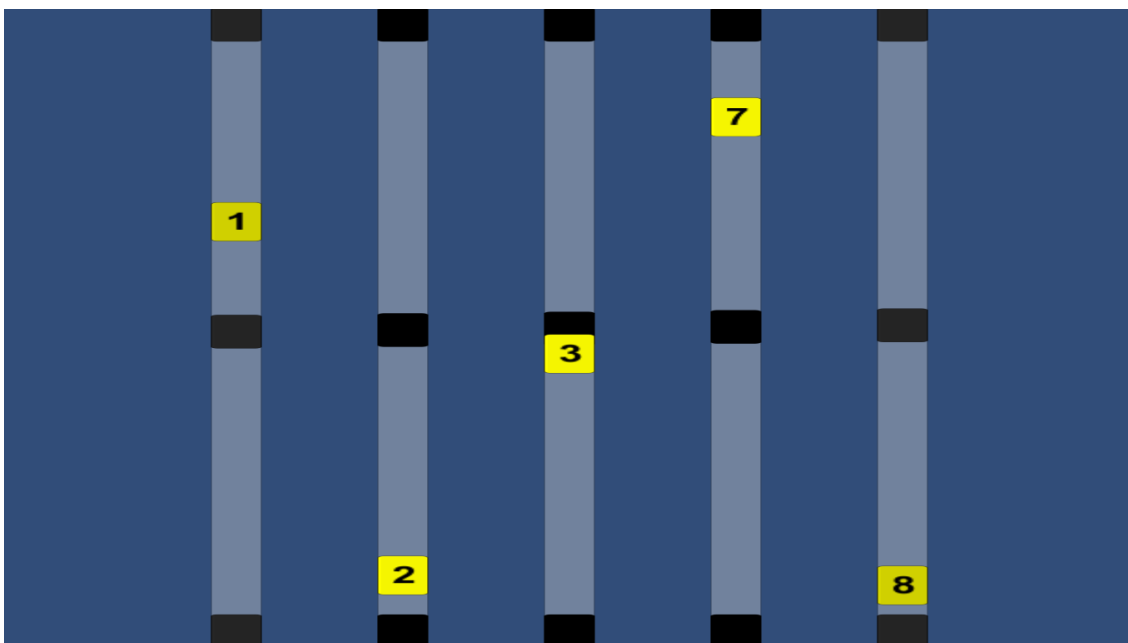


Figure 5: Second Level of the Game

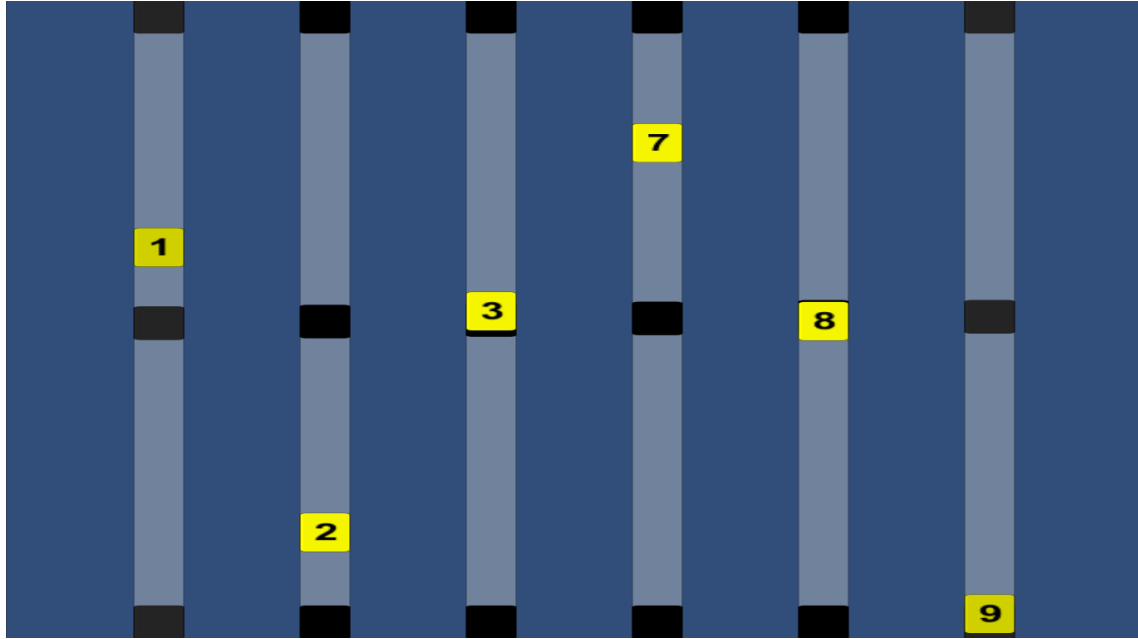


Figure 6: Third Level of the Game

CHAPTER 3

METHOD

As stated above, this research is directed towards an understanding of theory of action phases in the gaming domain and whether it would be useful for game designers or not. In this section, the methodology of the research is presented. The details of the participants, what measures used, the experiment procedure and experimental design is explained.

3.1. Participants

The participants were undergraduate and graduate students from Middle East Technical University with a total of 102 (66 male and 36 female students). Ages of the participants range from 18 to 38 with a mean of 21.83. 90.2% of participants were right-handed, 7.8% were left-handed and 2% reported that they were using their both hands. More than half of the participants were from engineering major (51.5%) and the remaining were from life sciences (18.2%), economics (11.1%), education (8.1%), social sciences (7.1%) and architecture (4.0%). Around a quarter of the total number of participants (27.3%) reported that they were not gamers and the rest reported that they were. Among the gamers, close to half of them (43.2%) reported that they were playing video games less than 1 hour per week. 28.4% have reported that they were playing 1-5 hours per week, 10.8% reported that they were playing 5-10 hours per week, 9.5% reported that they were playing 10-15 hours per week and lastly 8.1% reported playing more than 15 hours per week. Among the gamers again, 59.5% reported that they were playing video games for more than 7 years. 17.6% reported that they were playing for between 5 and 7 years, 8.1% for 3-5 years, 12.2% for 1-3 years and 2.7% for less than 1 year. Participants received bonus credits from Psychology Department for their courses.

3.2. Measures

The primary dependent variable of the study is the visual attention. The visual attention in the game is measured indirectly by the performance of the players⁶ (If the participants are visually more attentive, they will perform better.). Secondary dependent variables were illusion of good performance (optimism/realism) and enjoyment (flow-immersion, intrinsic motivation and engagement)⁷. Other than the eye-tracking data, there are 380 variables in total, 120 items from questionnaires and 260 items from the gameplay data (explained in Appendix I).

Regarding the questionnaires, their item numbers, scale ranges, their sources and their reliability, Table 1 shows a summary:

Table 1: Details of the Scales Used in the Study

	# of Items	Scale Range	Cronbach's alpha (α)*	Citation
PENS: In-Game Competence	3	1-7	0.87	Ryan et al. (2006)
GameFlow - Immersion	5	1-7	0.75	Sweetser and Wyeth (2005)
IMI - Interest	7	1-7	0.88	Ryan (1982)
IMI - Perceived Competence	4	1-7	0.88	Ryan (1982)
IMI- Pressure/Tension	4	1-7	0.89	Ryan (1982)
Engagement	14	1-7	0.77	Brockmyer et al. (2009)

* The alpha scores are calculated from the data that was collected for this study.

Other than the mentioned above, manipulation check, which is a 3 item, 1-7 Likert scale that measures how much the participants are induced into the desired mindset (Appendix G, H), is carried out after the completion of the mindset document to see if the participants were actually manipulated into the desired mindset or not.

The scales, that are measuring the constructs mentioned above, the manipulation and the manipulation check documents were adapted to Turkish.

Although the competence need satisfaction scale was used, the scales of autonomy and relatedness need satisfaction (other two constructs of intrinsic motivation) were not used since neither the game developed for this study fully affords autonomy, relatedness nor they are selected as the dependent variables for this study.

⁶ The visual attention in the game is also measured directly with an eye-tracking device but the data has not been used in the thesis.

⁷ Tertiary dependent variables, self-control and awareness were also measured however are not included in this study since they had different sets of hypotheses and motivation.

3.3. Procedure

Manipulation and manipulation documents for both mindsets (Gollwitzer & Kinney, 1989) were obtained from Peter M. Gollwitzer by e-mail. Also, the procedure carried out in Büttner et al.'s study (2014) -which was the main inspiration for this study- was acquired from Oliver B. Büttner and adapted to this unique study.

Also, prior to the start of the experiment, prospective participants were numbered and assigned to either deliberative or implemental mindset condition using Research Randomizer (Urbaniak & Plous, 1997).

Once the participants entered the lab, they were given the informed consent form (Appendix A) to be signed to be able to start. Then the participants were informed about what they will be doing throughout the session. First, they played the game on a 23-inch regular LG monitor while being eye-tracked after filling up a questionnaire (self-control and mindful attention awareness scales, Appendix B). Then they filled a questionnaire about the game (Appendix D) and they were told that they will be giving a break for around 15 minutes for the sake of the study and then will be playing the game again. Lastly, they filled the questionnaire again (Appendix D) after the second gameplay (same monitor) and the study ended. They were also told that there is allegedly another study that the researchers carry on concurrently and they were asked to fill the related questionnaires (mind-set manipulation document which induce the intended mind-set, Appendix E and F and manipulation check document, Appendix G and H) while in the break. When finished, the participants were asked 3 open-ended questions to elaborate: 1) Have you used your fingers on the keyboard as it was shown to you or did you try different finger placements? (To see if they play the game as shown) 2) What do you think the game study was about? (To see if they relate the study to the questionnaire in the middle) 3) Do you have any feedback about the study? After recording the answers, the participants were thanked and debriefed.

The whole procedure took around 45 minutes per participant mostly depending on the amount of time the participant has spent time in the manipulation task.

CHAPTER 4

RESULTS

Mindsets of the players were expected to be affecting both their performance and constructs such as game experience, enjoyment, engagement, immersion, perceived competence and pressure/tension. Players were manipulated to induce the required mindset and they have played the developed game, afterwards. For the analyses, SPSS version 22.0.0.0 - 64 bit was used.

4.1. Preliminary Analysis

The manipulation documents and the notes that were taken during the experiment were manually inspected before any numerical analysis. The topics were mostly related to moving for deliberative mindset group participants' unresolved problems whereas personal projects of implemental mindset group participants were mostly career related. In the "Other " category, deliberative mindset group participants stated the problems of adopting a different lifestyle, giving up video games, protein powder usage, buying a dog, issues about student society, not being able to study and psychological issues. Implemental mindset group participants on the other hand detailed their personal projects (on "Other" category again) on buying a car or a motorcycle and decorating a room. All the topics written on the manipulation documents by the participants are summarized in Figure 7. The uneven distribution or different selection of the topics are not a threat to the validity of the study since it is known that priming effects are not dependent on the context of the manipulation (Galinsky & Moskowitz, 1999).

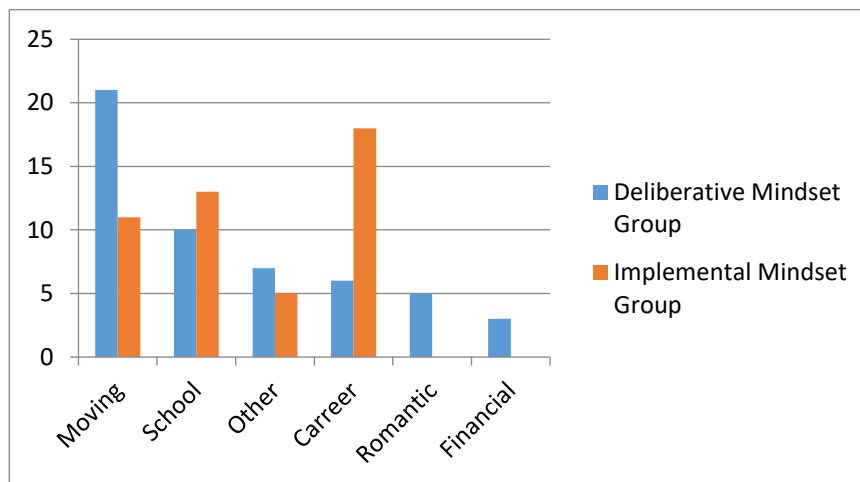


Figure 7: Selected Topics of Deliberative and Implemental Mindset Groups

After the manual inspection, 2 of the participants' data have been discarded. One of them was discarded because of her/his outlier z-scores (total wrong numbers in 1st game being 3.42 and total wrong numbers in 2nd game being 3.54). Also, after the mahalanobis distance was calculated (with dependent variables total correct number, total miss number and total wrong number for both games), it has been seen that the same participant's data stands out as an outlier. The other discarded data belonged to a participant with an inconvenient project description in manipulation document with repeated numbers in her/his questionnaire scales. S/he was also an outlier in terms of the game performance (to many wrong scores which indicates spamming of keyboard inputs). After the discards, there were left 100 participants with 49 participants in implemental group and 51 participants in deliberative group. Other than these, it has been considered to discard another participant's data who has reported that s/he was expecting an "invisible gorilla effect" (Drew, Vö, & Wolfe, 2013) which may have hindered her/his performance. However s/he was decided not to be excluded from the analysis since s/he was not an outlier in the z-score tests.

The answers to the 3 open-ended questions posed to the participants at the end of the experiment did not result in discards. Only two of the participants reported that they have tried a different combination of finger placement on the keyboard. They both stated it was in the demo level and also claimed that they have switched back to the shown finger placement shortly after the game started. Since their z-scores were in acceptable limits, I have not discarded them. There were no participant who related the study with the manipulation document and who thought that the manipulation was about theory of action phases.

Once the discards are decided and omitted, the manipulation check scores were compared to see if there is a difference between the mindset groups. As can be seen from Table 2, participants in the implemental mindset group had higher scores than the participants in

the deliberative mindset which implies that the manipulation has worked for the sample as expected.

Table 2: T-Test Result for Manipulation Check

	Deliberative Mindset Group (n=51)	Implemental Mindset Group (n=49)	
	M(SD)		t(100)
Manipulation Check	11.88(4.45)	15.55(3.45)	4.62***

***p < 0.001

Some more preliminary analyses have been carried out not necessarily being related to mindsets: The performance, correct hit, difference between the 1st game and 2nd game was significant regardless of the mindset, as expected, meaning that the performance increased significantly ($t(100) = 14.07$ with $p < 0.001$). Also, total correct scores were correlated with “In Game Competence” (0.42) and with “Perceived Competence” (0.35) and these correlations were significant at the 0.01 level. No other correlations were significant between total scores and the constructs measured with the questionnaires (enjoyment, engagement etc.).

Also, gender differences in terms of correct hit scores, miss scores, wrong hit scores, predictions and enjoyment were inspected considering the first game data. It has been observed that males ($M = 81.44$, $SD = 19.41$) performed better than females ($M = 58.44$, $SD = 13.19$); $F = 5.45$, $p = 0.02$ and females ($M = 132.25$, $SD = 12.55$) missed more than males ($M = 110.05$, $SD = 19.18$); $F = 6.23$, $p = 0.01$. There were no difference in terms of their wrong hits. Also, there were no differences in terms of score predictions. As for the enjoyment constructs, males ($M = 11.19$, $SD = 4.18$) reported much more in-game competence than females ($M = 9.22$, $SD = 2.73$); $F = 7.47$, $p < 0.01$. Other than gender, gamer vs non-gamer data was examined in terms of the same dependent variables. It has been observed that gamers ($M = 75.89$, $SD = 21.53$) scored better than non-gamers ($M = 65.78$, $SD = 15.95$); $F = 4.08$, $p < 0.05$ and non-gamers ($M = 125.04$, $SD = 15.48$) missed more than gamers ($M = 115.45$, $SD = 21.09$); $F = 4.21$, $p < 0.05$. Non-gamers' ($M = 19.41$, $SD = 9.48$) wrong hits were also more than the gamers' ($M = 16.62$, $SD = 6.43$); $F = 5.37$, $p = 0.02$. Since participants who categorize themselves as gamers have more experience in the gaming domain, these results are not surprising. There were no significant differences between gamers and non-gamers in terms of their enjoyment levels and predictions. Although there were some significant differences between gender groups and between gamers and non-gamers, since the collected data was repeated, each data has its baseline and since hypotheses were irrelevant to gamer vs non-gamer or gender groups, no further action was carried out.

4.2. Primary Analysis

The experiment was a two factor mixed design with two levels for each factor (two mindsets and two repeated measures). Therefore 2x2 mixed ANOVA was carried out to see if there is a significant difference between mindset groups according to different dependent variables.

The first hypothesis (H1) was divided into two where the first one (H1A) stated that the total game-end score of deliberative mindset group will be better than the total game-end score of implemental mindset group. Game-end scores comprise of correct hits, wrong hits and misses which were defined and explained above. To test the first sub-hypothesis, total correct hits in all levels are compared and contrary to what has been hypothesized, it has been found that the implemental mindset group ($M = 90.14$, $SD = 20.65$) scored significantly better than the deliberative mindset group ($M = 85.67$, $SD = 21.60$); $F = 3.99$, $p = 0.05$. When the total miss numbers were analyzed (total misses in all levels), deliberative mindset group ($M = 105.61$, $SD = 21.32$) missed slightly more than the implemental mindset group ($M = 101.22$, $SD = 20.61$); $F = 3.44$, $p = 0.07$. As for the wrong numbers (total wrong number hits in all levels), there was no difference at all between them. Although the test produced significant results, the findings showed that the first sub-hypothesis (H1A) was not supported.

As an extra step, since the third level was subjectively harder than the previous levels, same analysis was carried out for total correct hits excluding the third level. It has been observed that there were no significant differences between deliberative ($M = 62.98$, $SD = 16.82$) and implemental ($M = 66.67$, $SD = 16.33$) mindsets; $F = 2.61$, $p = 0.11$. This finding also shows that the first sub-hypothesis was not supported.

The second sub-hypothesis (H1B) of the first hypothesis was that the scores that are contributing to total score from the far ends of the screen of deliberative mindset group will be better than the contributing scores of implemental mindset group. Since this hypothesis is related to the outer areas of the screen, 1st and 6st columns are analyzed in particular for 3rd level. It has been determined that there is no significant difference between the mindsets ($F = 0.08$, $p = 0.77$) for the 1st column. However, when the total correct number on the 6th column was compared, it was found that the implemental mindset group ($M = 2.94$, $SD = 2.04$) performed significantly better than the deliberative mindset group ($M = 2.75$, $SD = 1.67$); $F = 5.00$, $p = 0.03$. Like the first sub-hypothesis (H1A), although the test produced significant results, it has been found that the second sub-hypothesis (H1B) was not supported. Overall, the findings did not provide support for the hypothesis which stated that participants in deliberative mindset score better than the participant in the implemental mindset. In contrast, it was seen that participants in implemental mindset scored significantly better than the participants in deliberative mindset.

Other than these, an exploratory analysis was carried out. This time, rightmost and leftmost columns and the all of the central boxes were omitted and the scores that are

contributing from the vertical far ends of the screen were considered. There were no differences spotted between deliberative ($M = 21.24$, $SD = 11.83$) and implemental mindset ($M = 24.78$, $SD = 8.59$); $F = 2.59$, $p = 0.11$.

The second hypothesis (H2) claimed that implemental mindset group will be experiencing “illusion of good performance” more than the deliberative mindset group which means that the implemental mindset group will be more optimistic about their overall score and the deliberative mindset group will be more realistic about their predictions. To see if either of the mindset groups have been able to predict their performances, the correlations between total correct, miss, wrong scores and questionnaire answers to self-evaluation questions were analyzed. The “illusion of good performance” was operationalized by these self-evaluation questions. The questions asked participants to guess how many times they did a wrong hit, how much they think they scored out of 100, their relative performance with respect to other players and what their overall performance is on a 1-9 Likert scale (Questions 38, 39, 40 and 41 in Appendix D, respectively). The last question that was asking the participant’s overall performance revealed considerable results (Table 3 and Table 4) (Figure 8, Figure 9 and Figure 10): It was observed that while deliberative mindset group’s wrong scores were correlated with their prediction of overall self-performances (-0.31), implemental mindset group’s correct and miss scores were correlated by their overall self-performances (0.30 and -0.31, respectively). To understand the relations further, moderated regressions are carried out to see the moderation effect of mindsets on predicting the performances. To be more precise, actual performance was the independent variable, prediction of performance was the dependent variable and the mindset was the moderated variable. After the analyses, for Question # 38, it has been observed that deliberative mindset group marginally better predicted their wrong hit scores ($b = -0.16$, $t(94) = -1.77$, $p = 0.08$). For Question # 39 there was no significant difference. For Question # 40, it has been seen that deliberative mindset group better predicted their comparative performances ($b = -0.28$, $t(94) = -2.07$, $p = 0.04$). Lastly, for Question # 41, implemental mindset group marginally predicted their performances better ($b = 0.02$, $t(94) = 1.90$, $p = 0.06$). After all, it can be stated that the second hypothesis was marginally supported.

Table 3: Correlation Table of Predictions (Deliberative Mindset Group)

	Question #38	Question #39	Question #40	Question #41
Total Correct	-0.24	-0.06	-0.28	0.11
Total Miss	0.24	0.06	0.27	-0.11
Total Wrong	0.11	-0.31*	0.12	-0.31*

*Correlation is significant at the 0.05 level

Table 4: Correlation Table of Predictions (Implemental Mindset Group)

	Question #38	Question #39	Question #40	Question #41
Total Correct	-0.11	-0.02	-0.01	0.30*
Total Miss	0.11	0.02	0.01	-0.31*
Total Wrong	0.27	0.26	0.17	-0.04

*Correlation is significant at the 0.05 level

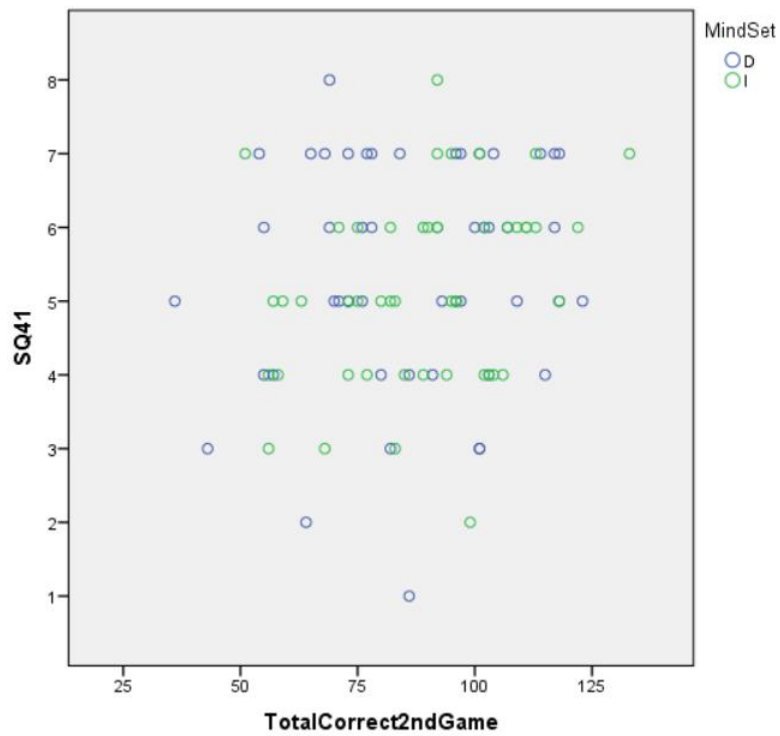


Figure 8: Correlation Graph for Total Correct Hits

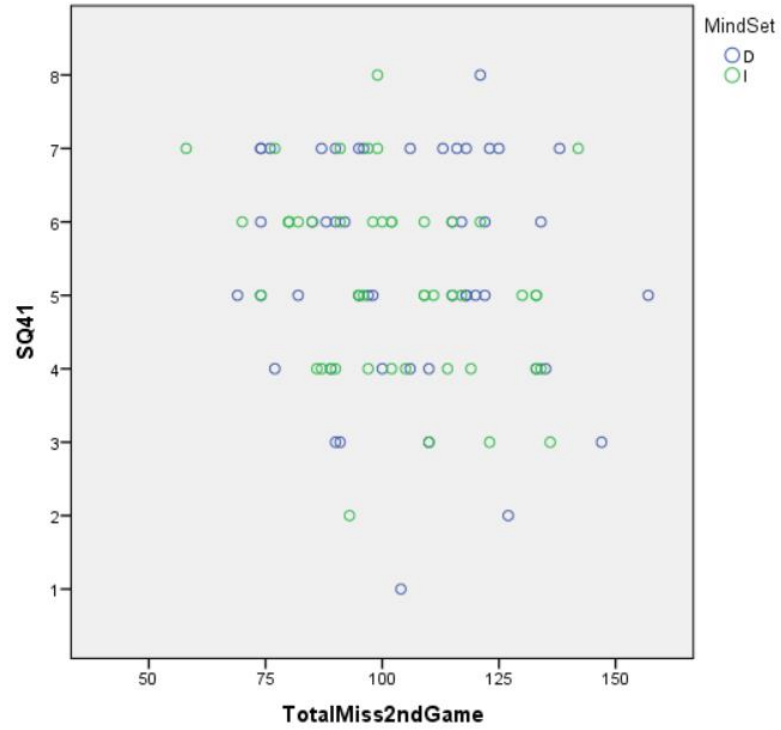


Figure 9: Correlation Graph for Total Misses

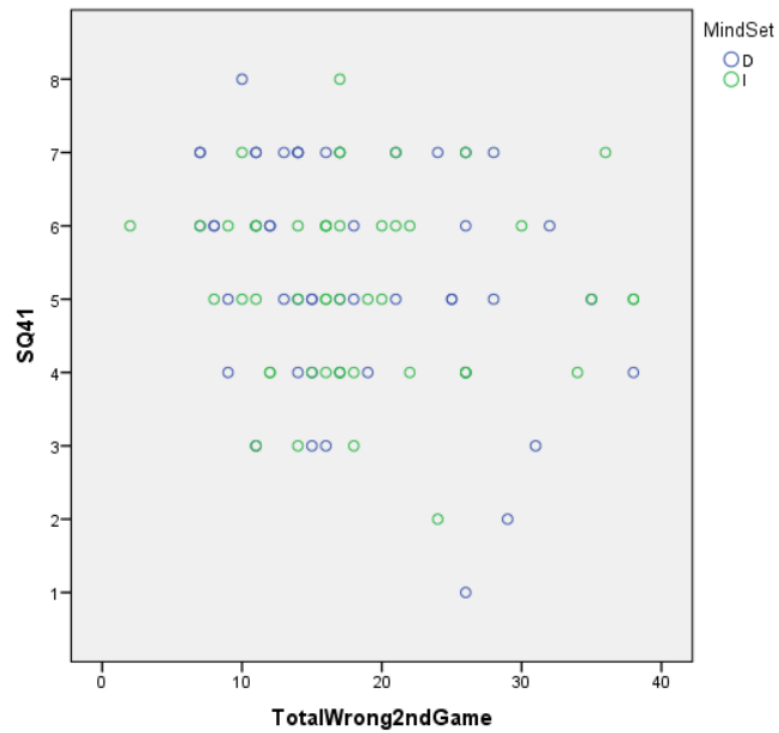


Figure 10: Correlation Graph for Total Wrong Hits

The third hypothesis (H3) stated that the implemental mindset group will enjoy the game better (more immersed, more intrinsically motivated and more engaged) than the deliberative mindset group in general since the former will have a better mood. The scores of the dependent variables; in-game competence, immersion, interest/enjoyment, perceived competence, pressure/tension and engagement were not found to be significantly different between mindset groups (Table 5 and Table 6). As a result, it can be safely asserted that the third hypothesis was not supported.

Table 5: 2x2 Mixed ANOVA Results for Enjoyment

	F	Sig.
In Game Competence	0.54	0.47
Game Flow Immersion	0.22	0.64
IMI Interest Enjoyment	0.47	0.49
IMI Perceived Competence	0.12	0.73
IMI Pressure Tension	1.50	0.22
Engagement	0.08	0.78

Table 6: Group Means and Standard Deviations for Each Test on Enjoyment

		After First Play		After Second Play	
		Mean	SD	Mean	SD
In Game Competence	D	10.82	3.45	13.12	3.60
	I	10.12	4.19	12.98	3.05
Game Flow Immersion	D	24.76	5.32	22.71	5.74
	I	25.49	4.90	23.90	6.02
IMI Interest Enjoyment	D	27.25	4.28	27.59	4.46
	I	28.16	4.38	29.06	4.99
IMI Perceived Competence	D	11.94	4.66	14.84	4.73
	I	11.20	4.72	14.43	4.00
IMI Pressure Tension	D	13.63	3.29	13.18	3.08
	I	13.71	3.57	12.51	3.04
Engagement	D	51.96	10.94	51.33	12.56
	I	55.16	10.59	55.06	12.92

4.3. Discussion

In this study, the main finding is that implemental mindset group scored significantly better than deliberate mindset group both in terms of overall scores and in terms of the scores gathered from the far ends of the screen. Although this result contradicts with the first hypothesis -[H1A] and [H1B]-, it is in line with Armor and Taylor's (2003) study which states that implemental mindset facilitates better task performance on a scavenger hunt compared to deliberative mindset. Therefore the result of the study might be generalized as the people in implemental mindset performs better than the people in deliberate mindset. This result may have several reasons.

First, the participants in the deliberative mindset may have shown a heightened receptiveness to newly available information (the symbolic meanings of the game) which overwhelmed them and prevented them from adequate cognitive processing whereas implemental group just focused on what they can process and got more correct hit scores. Another explanation might be that, mood tends to be lower for people in deliberative mindset (Taylor & Gollwitzer, 1995). According to Totterdell (1999), professional sports players' performances are affected by their mood (feeling less tense resulting in better performance for instance) which may be a reason why the participants in deliberative mindset have performed worse.

Also, according to Puca's (2001) study, deliberative mindset is characterized by a longer response time. Since the developed game requires both breadth of attention and a short response time, the suffering of participants in deliberative mindset from a longer response time may have hindered their performances. To address this issue and eliminate the possible unwanted effects, future studies may avoid utilizing time dependent games that are based heavily on reaction times.

Taylor and Gollwitzer (1995) reported that participants who are manipulated to be in deliberative mindset see themselves more vulnerable to controllable and uncontrollable risks. Being vulnerable to risks might make a person uneasy and restless. Participants who feel under the pressure or nervous may have naturally performed worse. More relaxed and time independent (non-twitch) games that require less dexterity may prevent these effects.

Also, Brandstatter and Frank (2002) carried out three studies and found out that people in implemental mindset shows higher persistence while solving a puzzle or playing a computer game. Higher persistency for implemental mindset may have resulted in better performances. In addition, individuals who are in the implemental mindset tend to have stronger attitudes (Henderson, De Liver, & Gollwitzer, 2008) which may have pushed them further to perform better.

Lastly, although people in deliberative mindset tend to expand their focus throughout a static screen impartially (Büttner, et al., 2014), when they are involved in an interactive activity such as playing a video game, their cognitive load/orientation might be undermining their performance. Also, although people in implemental mindset tend to

focus more on the foreground objects that are on the middle and center in a static screen, they may tend to focus on an interactive activity more than people in deliberative mindset which boosts their performance.

Finding no significant results in total wrong hit scores between mindsets is not surprising since the main significance was expected from the correct score. Also, mapping of the buttons might have affected the wrong numbers since some of the participants have claimed that they have mixed the keys they pressed sometimes (pressing 8 while intending to press 9).

An extra analysis was carried out excluding the last level with the idea that it may have disturbed the data with its extreme difficulty, as mentioned above. It was seen that there were no differences between mindsets without the last level and there were significant mindset differences when the last level was included in the analysis. This might inform us that mindset effects tend to rise to the surface more as the difficulty of the game increases.

The second hypothesis [H2] was that the implemental mindset group would be more optimistic about their performances and the deliberative mindset group would be more realistic about their predictions. This hypothesis was moderately satisfied. The non-optimistic nature of deliberation explains why deliberative mindset group's overall self-performance evaluations were correlated with their wrong scores instead of correct scores. Also, better predicting their comparative performances shows the realistic nature of the deliberation. The interesting result about this hypothesis is that implemental mindset group marginally better predicted their total correct scores. Their self-performance evaluations were correlated with their actual correct and miss scores. This might be simply because of the reason that the performance itself is effecting the participants' prediction in the gaming domain. This is different than the Gollwitzer and Kinney's study (1989) where the performance outcome is fixed (whatever the participants do, the outcome does not change) to measure the illusion of control. Games are systems that the outcome of it changes inherently according to the players' actions where illusion of control becomes less relevant to measure. This is why this hypothesis is about illusion of good performance rather than illusion of control.

As for the last hypothesis [H3], there was no significance between mindsets in terms of flow, intrinsic motivation (interest, perceived competence and pressure/tension) or engagement. The only inference from this is that the mindsets did not affect the overall enjoyment of the players of a twitch style game for this particular study. As argued by Klimmt et. al (2009), familiarity with a game can strongly affect enjoyment levels and a new game should incorporate high success levels. This kind of mechanism was not supported with the developed game which in turn may have resulted in lower enjoyment levels that was not enough for mindset differences in terms of enjoyment to arise.

The main limitation of the study is that the developed game is unique and obviously does not represent all kinds of game genres which brings external validity considerations. The findings of the study may not be generalized to all game genres and should be tested on

non-digital games also to possibly negate the digital medium effect. Also the game consists of 4 levels which divide the experience, therefore another game with a single, non-obstructive leveled game may reveal the mindset effect better.

A threat to internal validity might be that different participants may have reacted differently to the manipulations. Some may have developed a relatively shorter mindset span which may not have been carried to the subsequent task (playing the game). This might be a shortcoming of the study which has no trivial solution to be overcome. Experimenting with participants in different days and different times of the days might also constitute threats to the internal validity of the study.

Another threat to internal validity might be the self-performance questions and their presentation. The questions were asking participants to guess how many times they did a wrong hit, how much they think they scored out of 100, their relative performance with respect to other players and what their overall performance. Asking similar questions back-to-back might have resulted in unreal answers. Selecting one or two questions as independent variables that measures the predictions of the participants might have been sufficient.

A problem which was faced during the study is that some of the participants stated that they were pressing the buttons which they did not intend to (intend to press 8 but pressed 9, for instance). This is probably due to the mapping problem. A solution is to develop the game for playable with one hand only or come up with a better interaction design.

Another limitation of the game was that although the game has a clear goal, it did not provide a feedback mechanism about the progression of the player. The scores (correct, miss or wrong) of the players were not shown on the game interface not to distract players in this fast-paced game for the sake of this study. Another game with a more visible goal and progression can elicit more of the mindset effects.

Mood might have been measured after the manipulations to see its interactions with other constructs since it was shown that it is related to mindsets (Taylor & Gollwitzer, 1995).

Lastly, because of the nature of the study, participants encountered with the game first time in the lab. They did not have any prior experience or what the game would be like before the experiment. A study that involves a game which is being by the participants for a while or for a long time can bring up new results.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1. Implications for Game Design

The main implication of this study for game design is the knowledge of relative performances of players depending on their mindsets. Game designers may have access to the performance of a player whether the player is in an implemental or deliberative mindset. This might inform game design decisions that they have to make. Game design may incorporate elements to better leverage the experiences. For example, inducing players to the implemental mindset in the beginning of the game might raise the mood and increase the performance of the players in general. Other than that, changing the player's mindset in-game according to the story for instance can add to the dramatic effect.

A prominent contribution to the gaming domain would be a study that actually incorporates the mindset manipulation into the game itself rather than pen and paper manipulation before the game. Finding a new manipulation technique that can be incorporated into the game mechanics would be remarkably beneficial to game designers. This way, game designers may use those techniques in their game design to come up with new and innovative ways of playing. An inspiring example is given in Zhao et al's study (2012) where the authors have developed a new technique to induce people into implemental mindset. They have shown that task-irrelevant cues (such as carpets or queue areas in waiting lines) in the environment may manipulate people to go into the implemental mindset which makes them persistent on the actual task. This study differs from other studies in the way that, this study accepts the existence of mindsets and develops methods for implemental mindset manipulation. Authors define "in-system" and "out-system" virtual boundaries and posit that in-system individual show more tendency to adopt implemental mindset. Similar methods can be used, in turn-based games for instance, to keep the players "in the game" when players have down-time in the game.

Another implication for game design is to use the findings of this study as a dynamic difficulty adjustment. The game can use the in-game manipulations to change the player's mindset to increase (or decrease) their performances. This way the difficulty adjustment

is transferred from the software to the player's minds which needs serious testing to understand if it might work or not.

5.2. Future Studies

Although the performances were significantly affected by mindsets; enjoyment, engagement, flow or intrinsic motivation of the players were not, which needs further testing. The reason for relating the mindsets to the enjoyment is that it is known that the mindsets affect mood and since video games are created for entertainment, there might be an interaction between mindsets, mood and player enjoyment. In short, the question is: Do people in implemental mindset who have an elevated mood enjoy a video game better than the people in deliberative mindset or not? This might be tested under different settings which I believe it to brighten the mindset effect on enjoyment. The significance that might be found from that study means a lot to the game development community since enjoyment is the main selling point of (most) video games.

In this study, there are also some findings on illusion of good performance, optimism and realism which needs more robust results and conclusions. The results are somewhat satisfying however, further research is needed to see if there is really a significance. One way to test that is to design an experiment with more of a luck-based game unlike the game in this study and see if the results strengthen these findings.

The results obtained from this particular study are only the outcome of a test which used a simple but unique twitch style game which cannot be generalized to the whole video game domain. However, the findings are promising and more studies can be conducted on different genres of games and possibly adding different ideas and research questions inspired by this study. One high level example can be to research how these findings can be used in e-sports domain.

5.3. Conclusion

In this experimental study, effects of action phase mindsets on video game performance, enjoyment and illusion of performance are researched and found some significant results which may ultimately benefit video game designers and also may generate new questions to be answered for researchers. The results are somewhat both surprising and expected at the same time when the literature on mindsets is concerned. There is an obvious difference between mindsets which are shown that they are also applicable in the video game domain. It is shown –one more time- that the mindset manipulation works and the mindsets are carried to the immediate subsequent activities. Another important result is that the cognitive orientations adopted because of the mindsets are shown to affect player behavior that can be pursued further for new hypotheses.

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APPENDICES

APPENDIX A

INFORMED CONSENT FORM

Genel Bilgiler

Bu çalışma ODTÜ Enformatik Enstitüsü Oyun Teknolojileri Yüksek Lisans Programı öğrencilerinden Mehmet Kösa tarafından yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Bu çalışmanın amacı, oyun oynarken oyuncunun oyuna harcadığı dikkatin oyun performansı üzerine etkisini incelemektir. Geliştirilen mini-oyunun oynanması, 15 dakika civarında ara verildikten sonra aynı oyunun tekrar oynanması şeklindedir. Verilen arada ise, eş zamanlı yürütülen ve insanlarda karar verme ve planlama ile ilgili başka bir çalışmanın anketi doldurulacaktır. Bunlar bittikten sonra ise, oyunla ilgili anketler doldurularak seans sonlandırılacaktır. Çalışmanın tamamı 30 dakika civarında sürmektedir. Oyun çalışması sırasında göz hareketleriniz kayıt altına alınacaktır.

Araştırmada yaklaşık 100 katılımcı hedeflenmektedir. 18 yaş üstü üniversite öğrencileri katılımcı olarak davet edilecek, çalışmaya katılanlar bu duyurunun yapıldığı ders için bonus puan alacaklardır. Alınacak puan dersin öğretim üyesi tarafından belirlenecektir.

Riskler ve Faydalar

Araştırma katılımcı için herhangi bir risk ya da fayda içermemektedir.

Gönüllülük Esası

Bu çalışmaya katılmak tamamen gönüllülük esasına dayalıdır. Çalışmayı istediğiniz zaman bırakabilirsiniz.

Gizlilik Esası

Çalışmaya katılanlardan toplanan veriler tamamen gizli tutulacak, veriler ve kimlik bilgileri herhangi bir şekilde eşleştirilmeyecektir. Katılımcıların isimleri bağımsız bir listede toplanacaktır. Ayrıca toplanan verilere sadece araştırmacılar ulaşabilecektir. Bu araştırmanın sonuçları bilimsel ve profesyonel yayınlarda veya eğitim amaçlı kullanılabilir, fakat katılımcıların kimliği gizli tutulacaktır.

İrtibat

Çalışmayla ilgili soru ve yorumlarınızı araştırmacıya mehmet.kosa@metu.edu.tr adresinden iletebilirsiniz veya 555 310 6004 numaralı telefonda Mehmet Kösa'ya ulaşabilirsiniz.

Katılımcı Onayı

Yukarıdaki bilgileri okudum ve bu araştırmaya gönüllü olarak katılmayı kabul ediyorum.

Ad-Soyad:**E-mail:****İmza:**

APPENDIX B

SELF-CONTROL SCALE (1-13) AND MINDFUL ATTENTION AWARENESS SCALE (14-28)

Aşağıdaki her bir ifadenin yanına sizin düşüncenize göre ne kadar doğru olduğunu, ölçek skalasını kullanarak belirtiniz.

1	2	3	4	5	6	7
Kesinlikle			Ne katılıyorum			Kesinlikle
Katılmıyorum			Ne katılmıyorum			Katılıyorum

- ___ 1. Cezbedici şeylere direnmekte iyiyimdir.
- ___ 2. Kötü alışkanlıklarımı kırmakta zorlanırım.
- ___ 3. Tembelim.
- ___ 4. Yersiz şeyler söylerim.
- ___ 5. Eğer eğlenceliyse, benim için kötü olan bazı şeyleri yaparım.
- ___ 6. Benim için kötü olan şeyleri reddederim.
- ___ 7. Daha iradeli olmak isterdim.
- ___ 8. Başkaları güçlü bir iradem olduğunu söyler.
- ___ 9. Zevk ve eğlence beni bazen işlerimi yapmaktan alıkoyar.
- ___ 10. Konsantrasyonumu sağlamakta sorun yaşarım.
- ___ 11. Uzun vadeli hedeflerim doğrultusunda etkin bir şekilde çalışabilirim.
- ___ 12. Birşeyin yanlış olduğunu bilsem bile, bazen o şeyi yapmaktan kendimi alıkoyamam.
- ___ 13. Sıklıkla tüm seçeneklerimi dikkate almadan hareket ederim.
- ___ 14. Belli bir süre farkında olmadan bazı duyguları yaşayabilirim.
- ___ 15. Eşyaları özensizlik, dikkat etmeme veya başka bir şeyleri düşündüğüm için kırarım veya dökerim.
- ___ 16. Şu anda olana odaklanmakta zorlanırım.
- ___ 17. Gideceğim yere, yolda olup bitenlere dikkat etmeksizin hızlıca yürüyerek gitmeyi tercih ederim.
- ___ 18. Fiziksel gerginlik ya da rahatsızlık içeren duyguları, gerçekten dikkatimi çekene kadar fark etmeme eğilimim vardır.
- ___ 19. Bir kişinin ismini, bana söylendikten hemen sonra unuturum.
- ___ 20. Yaptığım şeyin farkında olmaksızın otomatikçe bağlanmış gibi yapıyorum.
- ___ 21. Aktiviteleri gerçekte ne olduklarına dikkat etmeden acele ile yerine getiririm.

- ___22. Başarmak istediğim hedeflere öyle çok odaklanırım ki o hedeflere ulaşmak için şu an ne yapıyor olduğumun farkında olmam.
- ___23. İşleri veya görevleri ne yaptığımın farkında olmaksızın otomatik olarak yaparım.
- ___24. Kendimi bir kulağımla birini dinlerken aynı zamanda başka bir şeyi de yaparken bulurum.
- ___25. Gideceğim yerlere farkında olmadan gidiyor, sonra da oraya neden gittiğime şaşırıyorum.
- ___26. Kendimi gelecek veya geçmişle meşgul bulurum.
- ___27. Kendimi yaptığım işlere dikkatimi vermemiş bulurum.
- ___28. Ne yediğimin farkında olmaksızın atıştırıyorum.

APPENDIX C

DEMOGRAPHICS QUESTIONNAIRE

1. Yaşınız? _____
2. Sağlak mısınız, Solak mısınız?
 - ☐ Sağlak
 - ☐ Solak
3. Cinsiyetiniz?
 - ☐ Kadın
 - ☐ Erkek
4. Lisans Anadalı Fakülteniz?
 - ☐ Mühendislik
 - ☐ Fen Bilimleri
 - ☐ Mimarlık
 - ☐ Eğitim
 - ☐ Sosyal Bilimler
 - ☐ İktisadi ve İdari Bilimler
 - ☐ Diğer (Lütfen Belirtiniz)
5. Video oyunları oynar mısınız?
 - ☐ Evet
 - ☐ Hayır
6. *Haftada kaç saat video oyunları oynarsınız?
 - ☐ 1 saatten az
 - ☐ 1-5
 - ☐ 5-10
 - ☐ 10-15
 - ☐ 15'den fazla

7. *Kaç senedir video oyunları oynuyorsunuz?

- ☐ 1'den az
- ☐ 1-3
- ☐ 3-5
- ☐ 5-7
- ☐ 7'den fazla

APPENDIX D

PENS: IN-GAME COMPETENCE (1-3), GAMEFLOW – IMMERSION (4-8), INTRINSIC MOTIVATION INVENTORY – INTEREST/ENJOYMENT (9-15), INTRINSIC MOTIVATION INVENTORY –PERCEIVED COMPETENCE (16- 19), INTRINSIC MOTIVATION INVENTORY – PRESSURE/TENSION (20-23), ENGAGEMENT (24-37) AND CONTROL (38-41) SCALES

Aşağıdaki her bir ifadenin yanına sizin düşüncenize göre ne kadar doğru olduğunu, ölçek skalasını kullanarak belirtiniz.

1	2	3	4	5	6	7
Kesinlikle			Ne katılıyorum			Kesinlikle
Katılmıyorum			Ne katılmıyorum			Katılıyorum

- ___1. Oyunda kendimi yeterli hissettim.
- ___2. Oynarken kendimi becerikli ve etkili hissettim.
- ___3. Oynama yeteneğim ile oyundaki mücadele çok dengeli bir şekilde örtüşüyordu.
- ___4. Oynarken etrafımdakilerin daha az farkındaydım.
- ___5. Oynarken daha az farkındalık sahibiydim ve günlük yaşam hakkında daha az kaygılıydım.
- ___6. Oynarken değiştirilmiş bir zaman deneyimi yaşadım.
- ___7. Kendimi duygusal olarak oyunun içindeymişim gibi hissettim.
- ___8. Tüm duyularım ile kendimi oyunun içindeymişim gibi hissettim.
- ___9. Oyunu oynarken keyif aldım.
- ___10. Oyunu oynamak eğlenceliydi.
- ___11. Oyunun sıkıcı olduğunu düşünüyorum.
- ___12. Oyun dikkatimi toplayamadı.

- ___13. Oyunu oynamayı çok ilginç buldum.
- ___14. Oyunu oynamanın oldukça keyifli olduğunu düşünüyorum.
- ___15. Oyunu oynarken, oyundan ne kadar keyif aldığımı düşünüyordum.
- ___16. Bu oyunda gerçekten iyi olduğumu düşünüyorum.
- ___17. Diğer katılımcılara göre daha iyi yapmışımdır.
- ___18. Bir süre oynadıktan sonra kendimi oyunun ustası gibi hissettim.
- ___19. Oyndaki performansımdan memnunum.
- ___20. Oynarken kendimi çok gergin hissettim.
- ___21. Oynarken çok rahattım.
- ___22. Oynarken kendimi endişeli hissettim.
- ___23. Oynarken üzerimde baskı hissettim.
- ___24. Zamanın nasıl geçtiğini farketmedim.
- ___25. Değişik hissettim.
- ___26. Birisi benimle konuşsaydı, farketmezdim.
- ___27. Gergin hissettim.
- ___28. Zaman durmuş gibiydi.
- ___29. Kendimden geçmiş gibiydim.
- ___30. Birisi benimle konuşsaydı cevap veremezdim.
- ___31. Uzun süre oynasam yorulduğumun farkına varmazdım.
- ___32. Oynamak otomatik gibiydi.
- ___33. Düşüncelerim hızlıca aktı.
- ___34. Oynarken nerede olduğumun farkında değildim.
- ___35. Nasıl oynayacağımı düşünmeden oynadım.
- ___36. Oynamak beni sakın hissettirdi.

___37. Oyunun içine gerçekten girdim.

38, 39 ve 40 numaralı soruların sonundaki boşluğa düşüncenize göre 0 ile 100 arasında bir rakam yazınız.

38. Sarı kutular toplamda 100 kere siyah kutuların üzerinden geçtiyse, kaç kere yanlış basmışsınızdır (sarı kutu kırmızıya dönüp başarısız manasına gelen sesi çıkarmıştır)?

39. Sarı kutular toplamda 100 kere siyah kutuların üzerinden geçtiyse, kaçına doğru basmışsınızdır (sarı kutu yeşile dönüp başarılı manasına gelen sesi çıkarmıştır)?

40. Diğer katılımcıları da göz önünde bulundurursanız, sizce yüzde kaçın içerisine girmişsinizdir? _____

41. Genel performansınızı aşağıdaki ölçekte değerlendiriniz ve işaretleyiniz.

1	2	3	4	5	6	7	8	9
Çok Kötüydüm				Ne Çok Kötüydüm Ne Çok İyi dim				Çok İyi dim

APPENDIX E

DELIBERATIVE MIND-SET MANIPULATION DOCUMENT

Lütfen bu dokümanın tamamını okuyup, ardından size ayrılan yerleri doldurmaya başlayınız.

Lütfen halihazırda aklınızda olan ve henüz çözülememiş bir probleminizi düşünün. Çözülememiş problemden kastedilen problemler genel olarak üzerine etraflıca düşündüğümüz ancak henüz herhangi somut bir adım atmadığınız problemlerdir. Bu tarz problemlerde, insanlar genelde kararsız hissederler ve sürekli bir şeyleri değiştirip, değiştirmeme konusunda tereddüt yaşarlar. Yani, çözülememiş bir problemde, henüz bir şey yapmaya karar vermemişsinizdir ancak tersi bir duruma da karar vermemişsinizdir. Çözülmemiş problemlerin sorusu şudur: “... yı yapmalı mıyım? Yoksa yapmamalı mıyım?”

Burada ilgilendiğimiz problemler kolayca çözülebilen kişisel problemler değiller. Örneğin, öğlen yemeğinde kola içip içmeme kararınız burda bahsedilen kapsama girmez. Onun yerine, ciddi manada üzerine düşünülmesi gereken ve görece daha komplike problemler burda bahsedilen kapsama girer. Örnek vermek gerekirse, başka bir yere taşınma veya taşınmama kararı, okunan bölümü değiştirip, değiştirmeme kararı, yeni bir ev alıp, almama kararı uygun problemler olabilir.

Probleminizi seçerken şunlara dikkat etmelisiniz:

- 1) Kararı zaten verilmiş bir problem seçmeyiniz.
- 2) Çözmesi zor olan bir problem seçiniz.
- 3) Bir süredir aklınızı kurcalayan ve sizin için önemli olan bir problem seçiniz.

Lütfen bu görev için yeni bir problem düşünmeyiniz.

İkinci adım olarak, hayatınızda bu değışiklięi yaptığınız zaman oluşacak pozitif ve negatif sonuçları veya yapmadığınız zamanki pozitif ve negatif sonuçları belirtmenizi istiyoruz. Bunun için, size yardımcı olacak bazı sorular hazırladık.

Göreceğiniz gibi bu anket 2'ye ayrılmış durumda:

A kısmı size, eğer değışiklik yaparsanız oluşacak pozitif ve negatif sonuçları soruyor.

B kısmı ise size, eğer değışiklik yapmazsanız oluşacak pozitif ve negatif sonuçları soruyor.

Nasıl bir problem seçeceğinizi ve bu dokümanı nasıl dolduracağınızı anladıktan sonra size ayrılan yerleri eksiksiz doldurunuz. Bu dokümanın devamında çözülmemiş olan kişisel probleminizle ilgili pozitif ve negatif sonuçları soran sorular vardır.

Henüz çözülmemiş problemim (lütfeñ ayrılan yeri kullanınız):

Bugünün tarihi:

A. Hayatınızda deęişiklik yaptığınız takdirde doğacak sonuçlar

1. Akabinde (hemen ardından) doğacak sonuçlar

Çözülmemiş probleminiz için bir karara vardığınızı ve hayatınızda deęişiklik yaptığınızı hayal edin:

Sizce bu kararınızın hemen ardından (yakın tarihte) ne gibi pozitif ve negatif sonuçlar doğacaktır? Bu sonuçların olacağından ne kadar eminsiniz?

	Akabinde (hemen ardından) doğacak <u>pozitif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

	Akabinde (hemen ardından) doğacak <u>negatif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

2. Uzun vadede doğacak sonuçlar

Sizce yakın tarihte beklediğiniz sonuçların ardından, uzun vadede hangi pozitif ve negatif sonuçlar doğacaktır?

	Uzun vadede doğacak <u>pozitif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

	Uzun vadede doğacak <u>negatif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

B. Hayatınızda deęişiklik yapmadığınız takdirde doęacak sonuçlar – herşeyi olduğu gibi bıraktığınız durumdaki sonuçlar

1. Akabinde (hemen ardından) doęacak sonuçlar

Eđer bir deęişiklik yapmazsanız ve deęişiklik fikrini uygulamazsanız: Hemen ardından ne gibi pozitif ve negatif sonuçları olacaktır? Bu sonuçların olasılıkları sizce kaçtır?

	Akabinde (hemen ardından) doęacak <u>pozitif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

	Akabinde (hemen ardından) doęacak <u>negatif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

2. Uzun vadede doğacak sonuçlar

Bir değişiklik yapmamanın sonucunda ne gibi uzun vadeli pozitif ve negatif sonuçlar doğacaktır? Bu uzun vadeli sonuçlardan ne kadar eminsiniz?

	Uzun vadede doğacak <u>pozitif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

	Uzun vadede doğacak <u>negatif</u> sonuçlar	Olma Olasılığı (%)
1		
2		
3		

APPENDIX F

IMPLEMENTAL MIND-SET MANIPULATION DOCUMENT

Lütfen bu dokümanın tamamını okuyup, ardından size ayrılan yerleri doldurmaya başlayınız.

Lütfen halihazırda aklınızda olan planladığınız bir projeyi düşünün. Planlanan projeden kastedilen projeler, insanların tamamlamaya çalıştığı projelerdir ve bu projeler insanların adımlarını planlayarak attığı projelerdir. Planlanan bir proje için onu uygulamaya çoktan karar vermişsinizdir. Planlanan bir projenin ifadesi şudur: “... yı planlıyorum.”

Burada ilgilendiğimiz planlar kolayca uygulanabilen kişisel planlar değiller. Örneğin, bir gazeteye üye olmak konusundaki planlar burda bahsedilen kapsamda değildirler. Onun yerine, ciddi manada üzerine düşünülmesi gereken, görece daha komplike ve birkaç adımdan oluşan planlar burda bahsedilen kapsama girer. Örnek vermek gerekirse, başka bir yere taşınma kararı, okunan bölümü değiştirme kararı, yeni bir ev alma kararı uygun planlar olabilir.

Planladığınız projenizi seçerken şunlara dikkat etmelisiniz:

1. Uygulanması kolay olan bir proje seçmeyiniz.
2. Seçtiğiniz proje görece komplike olmalıdır.
3. Bir süredir aklınızı kurcalayan ve sizin için önemli olan bir projeyi seçiniz.

Lütfen bu görev için yeni bir problem düşünmeyiniz.

İkinici adım olarak, planladığınız bu projeyi uygulamanız için gereken en önemli 5 adımı belirtmenizi istiyoruz. Bunun için, size yardımcı olacak bazı sorular hazırladık.

Göreceğiniz gibi bu anket 2'ye ayrılmış durumda:

A kısmı size, projenizi uygulamak için gereken beş önemli adımı soruyor.

B kısmı ise size, bu her bir adımı nasıl planladığınızı soruyor.

Nasıl bir proje seçeceğinizi ve bu dokümanı nasıl dolduracağınızı anladıktan sonra size ayrılan yerleri eksiksiz doldurunuz. Bu dokümanın devamında projenizin en önemli beş adımını soran ve herbirinin ne zaman, nerede ve nasıl uygulanacağını soran sorular vardır.

Planladığım projem (lütfen ayrılan yeri kullanınız):

Bugünün tarihi:

A. Gerekli adımların listesi

Lütfen aşağıda ayrılan yerlere projenizi uygulamak için gereken beş önemli adımı listeleyiniz.

1. Adım: _____

2. Adım: _____

3. Adım: _____

4. Adım: _____

5. Adım: _____

B. Proje nasıl ilerleyecek?

Lütfen bu adımları düşünerek ne zaman, nerede ve ne şekilde uygulanacaklarını belirtiniz.

1. Adım: _____

a) Ne zaman uygulamayı düşünüyorsunuz?

b) Nerede uygulamayı düşünüyorsunuz?

c) Nasıl uygulamayı düşünüyorsunuz?

2. Adım: _____

a) Ne zaman uygulamayı düşünüyorsunuz?

b) Nerede uygulamayı düşünüyorsunuz?

c) Nasıl uygulamayı düşünüyorsunuz?

3. Adım: _____

a) Ne zaman uygulamayı düşünüyorsunuz?

b) Nerede uygulamayı düşünüyorsunuz?

c) Nasıl uygulamayı düşünüyorsunuz?

4. Adım: _____

a) Ne zaman uygulamayı düşünüyorsunuz?

b) Nerede uygulamayı düşünüyorsunuz?

c) Nasıl uygulamayı düşünüyorsunuz?

5. Adım: _____

a) Ne zaman uygulamayı düşünüyorsunuz?

b) Nerede uygulamayı düşünüyorsunuz?

c) Nasıl uygulamayı düşünüyorsunuz?

APPENDIX G

DELIBERATIVE MIND-SET MANIPULATION CHECK DOCUMENT

Lütfen aşağıdaki sorulara az önceki çözülmemiş kişisel probleminizi ve doldurduklarınızı düşünerek işaretleme yapınız.

1. Kararınızı belirlemek için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

2. Bir yol haritasına (eylem planına) bağlı olmak için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

3. Kararınızı uygulamak için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

APPENDIX H

IMPLEMENTAL MIND-SET MANIPULATION CHECK DOCUMENT

Lütfen aşağıdaki sorulara az önceki planladığınız projenizi ve doldurduklarınızı düşünerek işaretleme yapınız.

1. Kararınızı belirlemek için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

2. Bir yol haritasına (eylem planına) bağlı olmak için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

3. Kararınızı uygulamak için ne kadar hazır hissediyorsunuz?

Hiç Hazır Hissetmiyorum	☐	☐	☐	☐	☐	☐	☐	Çok Hazır Hissediyorum
	1	2	3	4	5	6	7	

APPENDIX I

GAMEPLAY DATA

The following game play data is collected for each participant twice (before manipulation and after manipulation)⁸:

- a. FirstColumn
 - i. FirstColumnCorrect
 - 1. FirstColumnFirstCellCorrect#
 - 2. FirstColumnSecondCellCorrect#
 - 3. FirstColumnThirdCellCorrect#
 - ii. FirstColumnMiss
 - 1. FirstColumnFirstCellMiss#
 - 2. FirstColumnSecondCellMiss#
 - 3. FirstColumnThirdCellMiss#
 - iii. FirstColumnWrong#
- b. SecondColumn
 - i. SecondColumnCorrect
 - 1. SecondColumnFirstCellCorrect#
 - 2. SecondColumnSecondCellCorrect#
 - 3. SecondColumnThirdCellCorrect#
 - ii. SecondColumnMiss
 - 1. SecondColumnFirstCellMiss#
 - 2. SecondColumnSecondCellMiss#
 - 3. SecondColumnThirdCellMiss#
 - iii. SecondColumnWrong#
- c. ThirdColumn
 - i. ThirdColumnCorrect
 - 1. ThirdColumnFirstCellCorrect#
 - 2. ThirdColumnSecondCellCorrect#
 - 3. ThirdColumnThirdCellCorrect#
 - ii. ThirdColumnMiss
 - 1. ThirdColumnFirstCellMiss#
 - 2. ThirdColumnSecondCellMiss#

⁸ First, second and third column are applicable for Demo Level. First, second, third and fourth columns are applicable for First Level. First, second, third, fourth and fifth columns are applicable for Second Level. All of the columns are applicable for Third Level.

- 3. ThirdColumnThirdCellMiss#
 - iii. ThirdColumnWrong#
- d. FourthColumn
 - i. FourthColumnCorrect
 - 1. FourthColumnFirstCellCorrect#
 - 2. FourthColumnSecondCellCorrect#
 - 3. FourthColumnThirdCellCorrect#
 - ii. FourthColumnMiss
 - 1. FourthColumnFirstCellMiss#
 - 2. FourthColumnSecondCellMiss#
 - 3. FourthColumnThirdCellMiss#
 - iii. FourthColumnWrong#
- e. FifthColumn
 - i. FifthColumnCorrect
 - 1. FifthColumnFirstCellCorrect#
 - 2. FifthColumnSecondCellCorrect#
 - 3. FifthColumnThirdCellCorrect#
 - ii. FifthColumnMiss
 - 1. FifthColumnFirstCellMiss#
 - 2. FifthColumnSecondCellMiss#
 - 3. FifthColumnThirdCellMiss#
 - iii. FifthColumnWrong#
- f. SixthColumn
 - i. SixthColumnCorrect
 - 1. SixthColumnFirstCellCorrect#
 - 2. SixthColumnSecondCellCorrect#
 - 3. SixthColumnThirdCellCorrect#
 - ii. SixthColumnMiss
 - 1. SixthColumnFirstCellMiss#
 - 2. SixthColumnSecondCellMiss#
 - 3. SixthColumnThirdCellMiss#
 - iii. SixthColumnWrong#