

How Storyline Affects Emotion

Riddhi Padte

MS in Game Science and design

Northeastern University

padte.r@husky.neu.edu

ABSTRACT

Humans and animals both show emotions in their own way which drive a lot of their behaviors. In this experiment, attempt was made to understand how certain plot in a story of a narrative game would affect the emotions of the players. Physiological changes like heart rate and galvanic skin responses were recorded in accordance with facial expression analysis and PANAS worksheet. Though facial expression analysis was not very useful the other three data were complementary to one another and the results could find certain plots in the story which showed a change in the physiological data of the players during the game. The future iteration could be with a longer and strong storyline along with the same method.

Keywords

Heart rate, galvanic skin responses, PANAS worksheet, emotion, story

1. INTRODUCTION

Games are accepted as mediums that enforce a wide variety of emotions like excitement, confusion, happiness etc. The curiosity of exploring a fantasy world or the anticipation in playing first person shooter games are all emotions that the games bring out in their players. Studies in the areas of experience management or drama management systems have attempted to design strategies of interactive narratives to enhance players' experiences when playing games (Mijin and Young, 2017). The paper tries to determine how certain events in the game bring out changes in the player's emotions.

2. PSYCHOLOGICAL CONCEPT

Emotion affect our perception, cognition and behavior (Hodent, 2017). Emotion is a state of physiological arousal, and it can also involve the cognition related to this state of arousal (Schachter and Singer, 1962)—what we commonly call a “feeling.” When it comes to analysing emotion, it become a very arduous tasks as emotions depend on various factors. Emotion clearly influences our mind and guides our behavior (Hodent, 2017). Emotions have played a very important role in the evolution of games. Games that have an indulging storyline give out an immersive experience to the players.

Emotions can have a wide range and can be brought up in the players while playing video games by variety of events in the story. People play games for the chance to compete, to explore a new experience, to feel specific emotions, and to spend time with friends (Lazarro, 2016). Games make players feel a variety of emotions that enhances their experience of the game. When a player feels certain emotions, there are a bunch of physiological changes that takes place in the body. People interpret experiences with different levels of emotional details depending upon context of use, past experiences, preferences and expectations, and this causes the experience-related emotions to be ephemeral or hard to guarantee as a result of the interaction with an artefact (Chen, 2007; Hassenzahl, 2004). The physiological responses that accompany emotions are produced by the Autonomic Nervous System, whose activation indices are based on electrodermal (sweat gland) and cardiovascular (blood circulatory system) responses (Mauss & Robinson, 2009). In this paper, the physiological changes will be used to see what kind of emotions evoke through the story of the game.

3. GAME

The game will be a text-based game build with Twine with a suspense and thriller storyline. The player will play the main character in the story. The story starts with the person stranded on a train stations and finds a suitcase full of money. As the

night progresses some unexpected events occur and things get out of control. A story consists of several episodes. An episode is a sequence of various events, though it does not control the entire narrative. The pilot test is being done on the first episode of this story only.

4. PILOT TEST

4.1 Methods:

Facial Expression Analysis: The Facial expressions refers to the movements of the mimetic musculature of the face. The laptop's video recorder was used to record the whole session. The expressions were later compared to the Facial expression analysis worksheet.

Galvanic Skin Responses and Heart Rate: To see a change in the physiological response of the participant Empatica's E4 wristband was used to record the galvanic skin responses(Electrodermal activity) and Heart Rate (Blood Volume Pulse). The sessions were all recorded and analysed.

Panas Worksheet: The Panas Worksheet was given to the participants after the session to note down what they felt about the session. The PANAS worksheet was used to further support and check the data received from the above methods.

4.2 Participants:

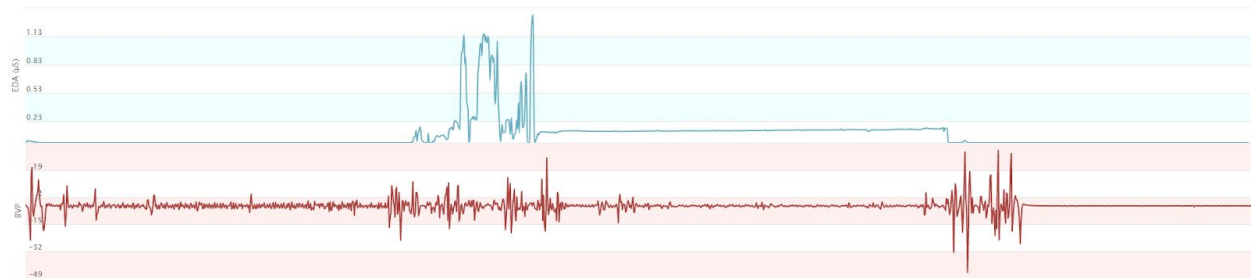
The data is collected from 3 participants who were all briefed before they starting the game. The participants were all told in advance that they would be recorded for the facial expression analysis and that their heart rate and galvanic skin responses will be recorded. The participants were also assured that their data will be kept completely confidential and will be used only for this experiment.

4.2 Results

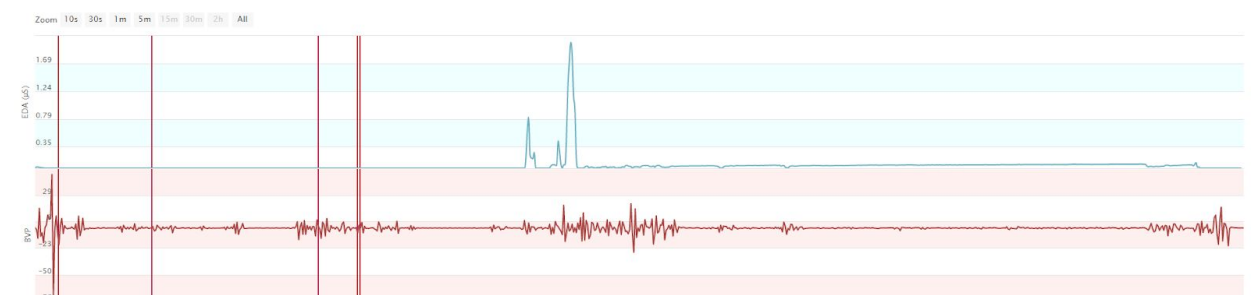
Facial Expression Analysis: The facial expression analysis couldn't give out a lot of results i.e. the participants didn't express their emotions on face during the process except a few.

Galvanic Skin Responses and Heart Rate: The galvanic skin responses and heart rate were all noted and check at which instances there was a significant change.

Participant 1:



Participant 2:



Participant 3:



For participant 3, there was some technical issue with the E4 wristband and it didn't record the electrodermal activity.

Panas Worksheet:

The Panas Worksheet showed rather different results:

Participant 1:

Positive Affect Score: 33

Negative affect Score: 11

Participant 2:

Positive Affect Score: 27

Negative affect Score: 11

Participant 3:
Positive Affect Score: 26
Negative affect Score: 16

4.3 Discussion

The game was deliberately build with no images or sounds for the participants to focus solely on the storyline. The purpose was to make the participants imagine and build the story up in their mind so that they feel more connected to it. It was disappointing to find no solid results in the facial expression analysis. The reason for it could be that the episode was too short or that there were no images to get that kind of a reaction. It might also be possible that the participants were too engrossed to find out what happens in the story.

The heart rate and the skin responses told a different story. All three participants showed a considerable change in the skin responses when in the story the antagonist slapped the character. Even though they just started playing and were not used to it, the “slapping” had some impact on the participants. The changes in the heart rate were at different times, when the character was followed by someone, or there were shots fired. Certain events did affect the player and I feel it would be more clearer in the next iteration of the game.

The Panas worksheet also had complimenting results. Two out of three participants had a score slightly lower than the mean positive affect score. As the story was suspense and a man trying to kill you, I didn’t expect a positive score either. However, two out of three participants had a score slightly lower than the mean negative affect score which says that it wasn’t a negative experience either.

5. EVALUATION

In Phase I, the game had no images or sounds which might have been the reason for the participants to not show any facial expressions. In Phase II, the instrument was improved upon and images and background sound was added to the game. The game was also longer than the previous one. The story was changed. In this phase the story was milder than the previous one. The story starts with the accident of the character while walking on a road looking at the picture of his dead lover. The character wakes up in a hospital with a mistaken identity of a guy who looks just like him. The episode stops when he sees his dead girlfriend.

5.1 Methods

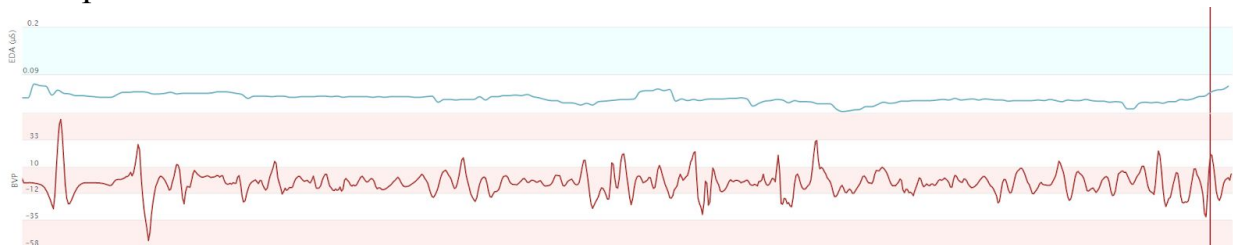
The methods for collecting the data was same as in the Phase I.

Participants: The data is collected from 3 participants who were all briefed before they starting the game. The participants were all told in advance that they would be recorded for the facial expression analysis and that their heart rate and galvanic skin responses will be recorded. The participants were also assured that their data will be kept completely confidential and will be used only for this experiment.

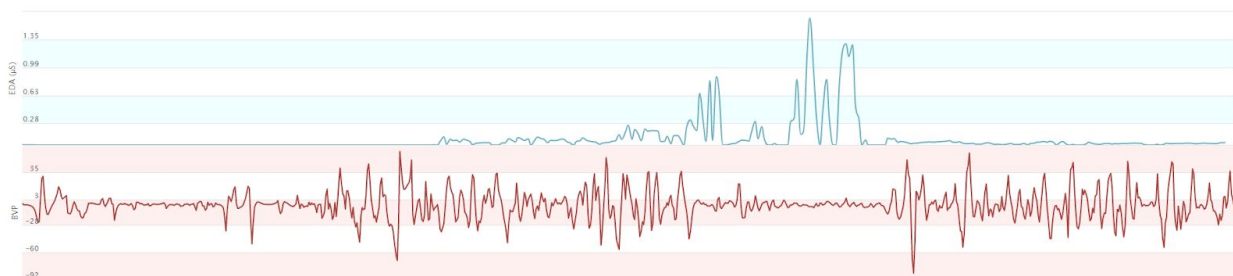
5.2 Results

Galvanic Skin Responses and Heart Rate: The galvanic skin responses and heart rate were all noted and check at which instances there was a significant change.

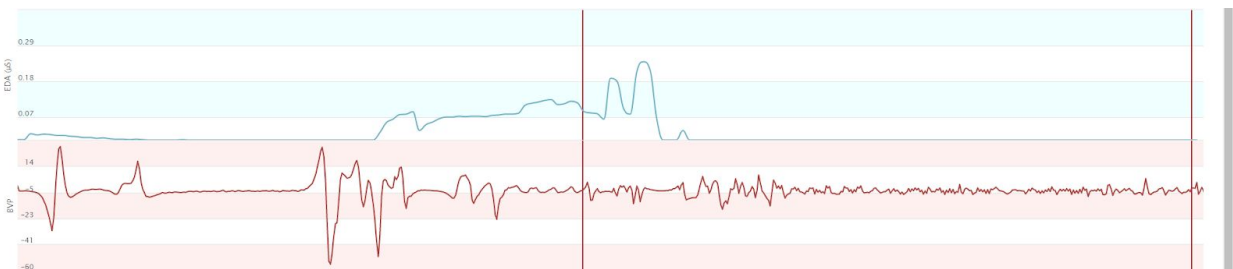
Participant 1:



Participant 2:



Participant 3:



Panas Worksheet:

The Panas Worksheet showed rather different results:

Participant 1:

Positive Affect Score: 34

Negative affect Score: 10

Participant 2:

Positive Affect Score: 35

Negative affect Score: 16

Participant 3:

Positive Affect Score: 33

Negative affect Score: 11

5.3 Discussion

The Facial expression analysis again showed no major results. It could be that the duration should have been longer. It could also be that the participants were immersed in the storyline. The story didn't have strong plots that would surprise the player to a point at which they show some reactions on their face.

The Heart Rate and the Galvanic skin responses showed a variety of changes in the Phase II. The participants had their heart rate increased whenever something confusing happened in the story. The plot had that the character meets with an accident which got the participants excited even if it was just the start of the story. The story also goes further giving rise to some exciting turn of events. The character is mistaken for someone who looks exactly like him. This part of the story also brings in some rise in the heart rate. The skin response of the second participant shows some reaction to this part of the story but the heart rate is relatively calm which is odd.

The results from the PANAS worksheet were also better. All three participants showed clear levels of positive affect. The storyline was milder than the previous one and hence, a positive affect was expected of the participants.

Considerable results can be seen in Phase II of the experiment which also shows that the sounds and the images did help inducing emotions in the story. The results show that story does have an emotional impact and there are certain plots that could induce excitement or anxiety in the players. The second story started with an

accident of the character which gave a very clear response in the results. The instance where the character's dead girlfriend was alive also gave a clear response.

6. CONCLUSION

The game in both the phases was a narrative-based game. In the Phase II, however, there was less liberty of choices. It was more linear in terms of story. The experiment showed significant physiological changes in the participants and the PANAS worksheet also showed complimentary results. The future scope of this experiment could be with a longer storyline. The story could be made more stronger for Facial expression analysis. It could be beneficial to have more data and more number of participants play the game. In conclusion, the experiment gave out results that were expected.

REFERENCES

- Hodent, C. (2017). *The Gamer's Brain: How Neuroscience and UX Can Impact Video Game Design*. CRC Press.
- Mijin K. and Young Y. D. (2017). Computational Modeling of Players' Emotional Response Patterns to the Story Events of Video Games. *IEEE Transactions on Affective Computing*.
- Lazarro N. (2010). The Four fun keys. Retrieved from:
<http://www.nicolelazzaro.com/the4-keys-to-fun/>
- Chen, J. (2007). *Flow in games* (Master thesis). University of Southern California.
- Hassenzahl, M. (2005). The thing and I: Understanding the relationship between user and product. In M. A. Blythe, K. Overbeeke, A. F. Monk, & P. C. Wright (Eds.), *Funology* (pp. 31–42). Norwell: Kluwer Academic Publishers
- Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition & Emotion*, 23(2), 209–237

APPENDIX

Link for the game:

<https://drive.google.com/open?id=1Ckku67pDe1HI-BTBnolIOWDua7J1ORC>

[2](#)