

Psychophysical Responses after Watching 6 Games from Squid Game; Analysis of Heart Rate and Blood Pressure

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Squid Game was shown on Netflix in 2017. Participants were shown a short movie clip from Squid Game with violence.

Abstract:- In 2021, the Netflix show, Squid Game, was released and has since claimed the position of the most-watched show in Netflix history. Due to this widespread popularity, we conducted a study to examine the effects of horror films on a person's heart rate and psychopathy. Student researchers studied the reactions and effects of horror films on blood pressure with 25 participants. The study was conducted over several months to collect raw and accurate data on the participants' reactions. A short movie clip was shown to the participants to provide a control group and their information was collected before, during, and two minutes after watching the clip. Squid Game, a South Korean survival drama series, produced for Netflix by Korean director, Hwang Dong-hyuk, was the show that all of the respondents watched. If there is a discrepancy in the participants' mood assessments after watching Squid Game (Ojing-eo Game in Korean, it may provide additional information on the motivations behind violent behavior. This study investigates the association between physiological markers and psychopathy, as well as how the presentation of violence affects the participants' reactions. We measured and looked for variations in the heart rate and blood pressure. To gauge any changes in the participants' perspectives on the violent situation, a self-report mood scale was used. The impact on heart rate and blood pressure—diastolic and systolic—is thought to increase with the number of psychopathic traits. Participants with higher levels of psychopathic tendencies will experience lower heart rates and blood pressure compared to participants with lower levels of psychopathic tendencies. Before and after watching the movie clip, participants were required to complete the Profile of Mood Scale (POMS), which evaluates the emotions of the respondents. In this study, data from the Psychopathic Personality Inventory (Criminal Justice IRE, 2023) and the personality questionnaire were combined with biographical (age and gender) data. Participants completed two measures of the Levenson Self-Report Psychopathy Scale online at <https://openpsychometrics.org/tests/LSRP.php>. The first scale is principal psychopathy, which is concerned with the emotional traits of psychopathy, such as a lack of empathy and tolerance for antisocial behavior. The other scale is known as secondary psychopathy, and it refers to the antisocial characteristics of psychopathy such as rule-breaking and a lack of effort toward socially acceptable behavior. A blood pressure monitor was used

to assess the individual's heart rate and blood pressure, divided into two components: systolic pressure and diastolic pressure. The volunteers were required to wear blood pressure monitors on their upper arms.

I. INTRODUCTION

➤ 6 Games in Squid Game

In the show *Squid Game*, 456 players are chosen to participate in 6 deadly South Korean children's games to get a shot at the \$4.56 billion KRW cash prize, which is approximately \$38.6 million in USD. Motivated by the large reward that could ease their financial burdens, all the players decide to participate. However, they are unaware that the games that they will participate in will result in deaths. *Squid Game* quickly amassed popularity and its actors and actresses received numerous awards for their outstanding performances. The masked individuals also play an important role in the show because they help facilitate the games, which are held for the entertainment of wealthy men, or VIPs. Throughout the games, players develop meaningful relationships and engage in teamwork while also dealing with betrayal and competition. In the end, the protagonist Seong Gi-hun succeeds in the competition for the cash prize. He realizes the reality of the sacrifices made by the friends he made along his journey (Hwang et al., 2021).

• Marble Games

The participants were paired up and given a bag of marbles, with instructions to play any game they wished. If a player lost all their marbles, they were eliminated from the game, which unfortunately meant death. Sang-woo was paired with Ali, Kang Sae-byeok with Ga-yeong, and Gi-hun engaged in a betting game with Player 001. Although Player 001 was aware he was being played, he still gave Gi-hun his final marble. Sae-byeok and Ga-yeong played a simple betting game, with Ga-yeong conceding defeat based on principle. Sang-woo, on the other hand, deceitfully replaced Ali's marbles with rocks to win the game. Deok-Su and his opponent played a game where the objective was to collect the most marbles near or in a dug-out hole. Unfortunately, Deok-Su's opponent caused his marble to fall into the hole, along with Deok-Su's, resulting in the opponent's victory.

• Honeycomb Shape Cutting Games

In this game, players are asked to make a choice between four shapes: a circle, a star, a triangle, and an

umbrella. They were unaware that the choice they made would affect how easily they could accomplish the task given to them. The players were asked to use a needle to pick at the shape on the honeycomb candy within a certain amount of time after they chose their shape. The shape that is hardest to pick at is the umbrella shape. In comparison, the triangle-shaped candy is much easier to take apart because it is simple. If the shape is broken, then the player

who broke it is shot by the workers in pink with a black mask. When the game nears its end, Gi-hun’s sweat drops onto his umbrella-shaped honeycomb candy. He then realizes that the candy becomes more translucent when liquid is applied to it, so he licks his candy until it becomes easier to chip at. Soon after, the other players follow his example and survive the game.



Fig 1 <Honeycomb Shape Cutting Games. Image Source from “Squid Game,” Directed by Hwang Dong-hyuk, performance by Lee Jung-Jae, Netflix, 2021. Netflix, Ep.03, 38:54, Ep.03, 37:23>

• *Squid Game*

The Squid Game was a popular children's game in South Korea during the 1970s and 1980s. In the show, Gi-hun and Sang-woo are the only remaining players and they determine their roles through a coin toss. The game begins as a traditional hopscotch-like game but quickly devolves into a violent knife fight. Gi-hun eventually wins and eats the squid's head, but he has a change of heart and suggests that he and Sang-woo leave the game. Sang-woo, however, stabs himself in the neck and asks Gi-hun to use the prize money to help his mother.

• *Red Light, Green Light*

As Squid Game’s first game, it establishes a sense of fear in the participants because it includes graphic blood. The objective of the game is to go past the finish line before the time limit. If the players fail to accomplish this goal, they are shot by the doll shaped as a little girl that turns and detects movement. Players can only move freely when the doll faces the tree and the robot’s chant ends. When the players move while the robot doll is positioned towards them, they are shot on sight.



Fig 2 <Red Lights, Green Lights Game. Image Source from “Squid Game,” Directed by Hwang Dong-hyuk, performance by Lee Jung-Jae, Netflix, 2021. Netflix, Ep.01, 46:49, 3:05>

• *Tug of War*

This game is straightforward—it is a game of tug of war, with a deadly twist. To survive the game, players need to avoid falling off their team’s platform while actively trying to pull towards the back so that the opposing team falls to their death.



Fig 3 <Tug of War Game. Image Source from “Squid Game,” Directed by Hwang Dong-hyuk, performance by Lee Jung-Jae, Netflix, 2021. Netflix, Ep.04, 43:05, Ep.04, 44:02>

• *Glass Bridge Game*

In this final game, players are expected to sacrifice each other to determine which glass panels are safe for the players to traverse across. Along the way, many participants choose the wrong tile and meet their death when the panel

shatters underneath them. Other participants are pushed to their deaths by others so that the game can continue. When the time limit nears zero, the players make it out of the game, with some players affected by the glass panels that explode after the time limit.

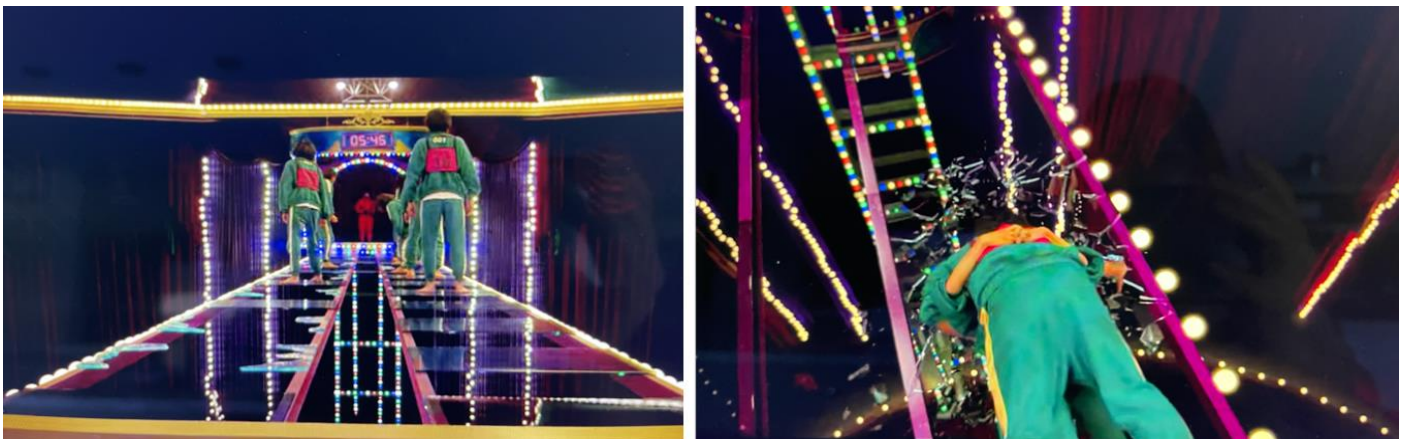


Fig 4 <Glass Bridge Game. Image Source from “Squid Game,” Directed by Hwang Dong-hyuk, performance by Lee Jung-Jae, Netflix, 2021. Netflix, Ep7. 39:20>

II. METHOD

➤ *Procedure*

25 respondents participated in this research. A short movie clip was shown to the participants, and their blood pressure and pulse rate were assessed before, during, and two minutes after they finished watching it.

➤ *Participants*

Of the 25 participants, 13 were men (52%) and 12 were women (48 %); the age ranged from 14 to 55, all of Korean ethnicity.

➤ *Measures*

A questionnaire created by the researchers was used to collect the biographical information. It includes questions about the participant's gender and age. (Raw Data: https://docs.google.com/spreadsheets/d/1152T217iFUS5doSmTkdmk9uB06Nc_0kgkZDvxuHJiIM/edit?pli=1#gid=761438691)

Name of the Game	Timeframe from Netflix
Marble Games	Ep.06 (25:00 - 52:00)
Honeycomb Shape Cutting	Ep.03 (28:15 - 49:30)
Squid Game	Ep.09 (00:01 - 14:19)
Red Light, Green Light	Ep.01 (44:53 - 55:06)
Tug of War	Ep.04 (33:00 - 50:30)
Glass Bridge	Ep.07 (24:00 - 52:00)

Fig 5 <Participants watched the same timeframe of the movie clip from Netflix>

• *Biographical Data*

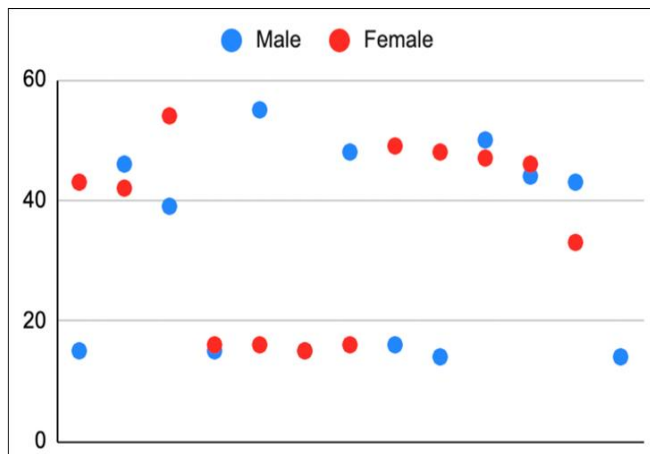


Fig 6 <Biographical Data>

• *Profile of Mood Scale (POMS; McNair Et Al., 1971)*

The Profile of Mood States (POMS) is a standardized questionnaire used to measure a person's current mood state. It consists of 65 adjectives that describe different moods, and the participant rates the extent to which they have experienced each mood in the past few days (Grove). The POMS results are used to calculate six mood state scores, each of which reflects a specific mood dimension. The

POMS is commonly used in sports medicine and clinical psychology to assess the effects of physical or mental stress, exercise, or interventions on mood. The POMS is available in a variety of versions, including the POMS 2, which comes in two versions for adults and teenagers, ages 13 to 17, and adults and older.

Multi-Health Systems Inc. (MHS), which also owns the copyright rights, publishes and owns the POMS, and has changed it to a 20-question format. The study used a shortened version of POMS-2 with 20 questions. Negative factors were tension, anger, fatigue, depression, nervousness, moodiness, confusion, embarrassment, and fatigue. Positive factors were proud, energetic, cheerful, competent, alert, confident, satisfied, full of energy, and vibrant. The sum of the sub scores is a measure of the overall emotional state.

All participants watched the same time slot of his NETFLIX series to ensure they were in the same state. To score each participant's POMS, we used the following formula:

$$\text{Total Mood Disorder} = \Sigma \text{ of Positive Factors} - \Sigma \text{ of Negative Factors}$$

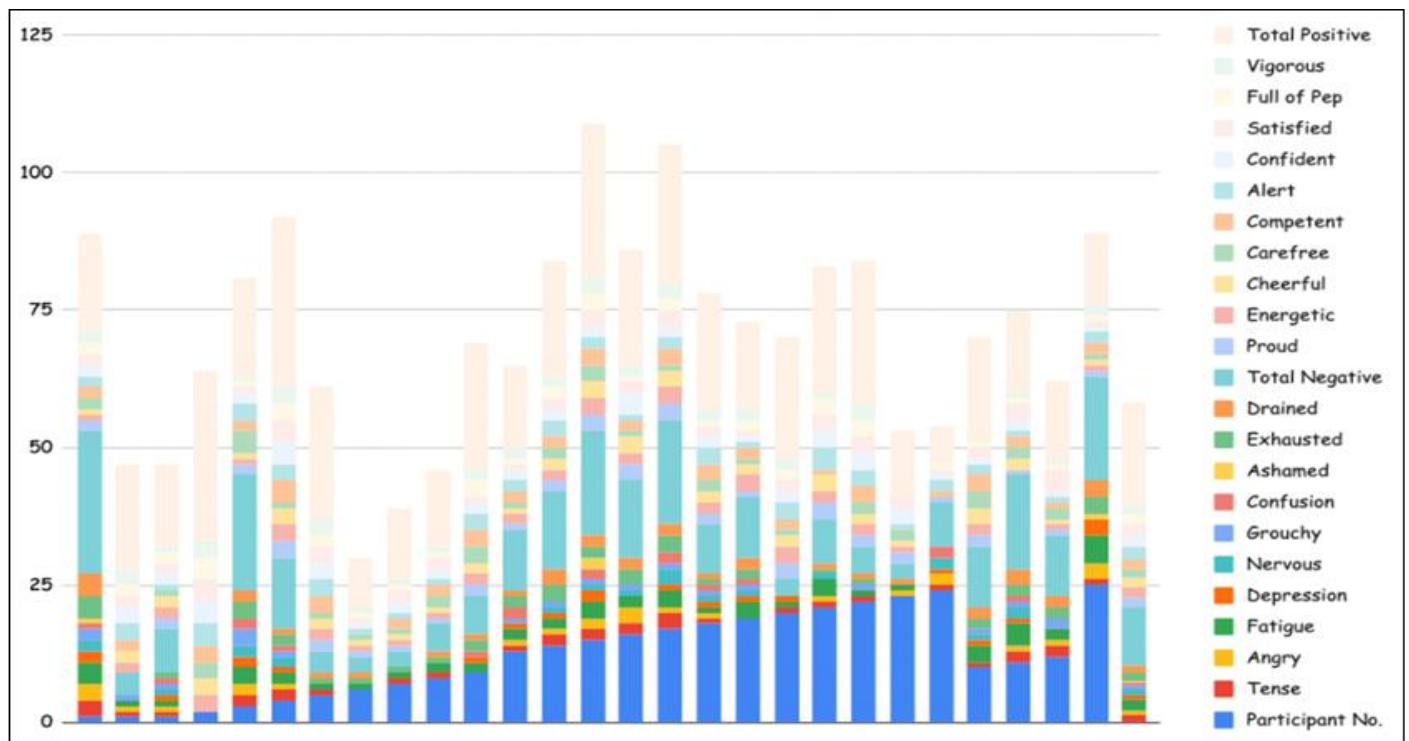


Fig 7 <Profile of Mood State Trial 1>. 7b. <Profile of Mood State Trial 2>

• *Blood Pressure and Heart Rate*

To confirm that the little movie clip they watched had no impact on them, their blood pressure and pulse rate were measured. The OMRON BP786N, CareTouch #PSW01, OMRON BP742N, and QGUGU #B22 Blood Pressure Monitors were utilized to obtain readings during the experiment. Baseline measurements were established and

participants were allowed to get comfortable with the equipment by recording their heart rate and blood pressure during the questionnaires. The cuff was placed on the participant's non-dominant arm with the center of the inflatable bladder directly over the brachial artery using an inflatable bladder.

- *Statistical Analyses*

To assess changes in mood after viewing the brief movie clip, the POMS was reviewed before analyzing differences in heart rate and blood pressure. The relationship

between the **Psychopathic Personality Inventory (PPI)** score, bpm, and heart rate were examined using an EXCEL graph to determine if psychopathy acts as a mediator of their effect.

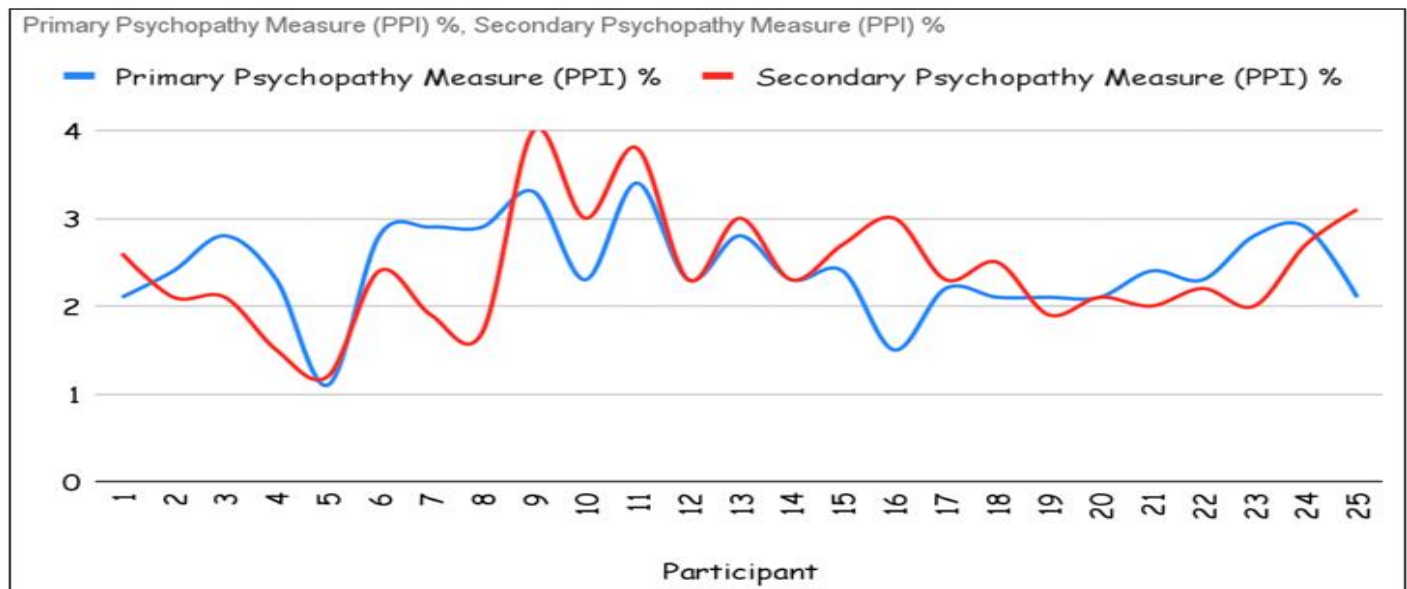


Fig 8 <Primary & Secondary PPI Measures>

III. RESULTS

On the subscales of the POMS Negative Factors, individuals in the first condition (T1) reported feeling less tense (1.259), angry (0.963), fatigue (1.963), depression (0.852), nervous (0.852), grouchy (0.815), confusion (0.704), ashamed (0.185), exhausted (1.556), drained (1.333) than in the second condition (T2). Following the viewing of the violent game clip, participants in the second condition (T2) reported feeling more tense (2.429), angry (1.500), fatigue (2.143), depression (1.429), nervous (1.643), grouchy (1.143), confusion (1.143), ashamed (0.500), exhausted (1.929), drained (1.857) than they did before.

On the subscales of the POMS Positive Factors, individuals in the first condition (T1) reported feeling prouder (1.704), energetic (1.778), cheerful (1.815), carefree (1.556), competent (2.000), alert (2.148), confident (2.148), satisfied (2.111), full of pep (1.704), vigorous (1.667) than in the second condition (T2). Following the viewing of the violent game clip, participants in the second condition (T2) reported feeling less proud (1.214), energetic (1.071), cheerful (0.857), carefree (1.357), competent (1.786), alert (2.429), confident (1.571), satisfied (1.571), full of pep (1.214), vigorous (1.071) than they did before. Participants' diastolic pressure increases after viewing the violent movie clip.

IV. DISCUSSION

The study found that participants reported mood changes did not match their physiological responses after being induced with anger. They reported feeling a range of emotions after watching a movie clip, and the impact of

watching a violent movie clip on their emotions depended on the individual. The study suggests that violent content and knowledge of a serious storyline can trigger outrage. The PPI score did not affect the interaction between heart rate, diastolic pressure, systolic pressure, and the situation. However, the study's participants had a low mean PPI score compared to previous studies with non-criminal populations. One of the study's limitations is that the participants were not diagnosed as psychopaths and were the researchers' friends and family.

This raises the possibility that a higher PPI score had a mediating effect, which could be observed in a clinically identified psychopath sample.

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