

# Stress Relief Effectiveness of Visual Elements Presented Through Videos

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## ABSTRACT

Stress can negatively impact both the academic aspect and the social aspect of high school students' life [1]. Although many schools recognize this problem and have employed counselors to help students deal with stress, students seldom contact the counselors because students prefer to deal with the problem alone [2], which rarely yields results. This study aims to test the effectiveness of visual elements such as general movement, rhythm, and texture of the object presented through videos when it comes to stress relief in high school students and tries to explore the therapeutic value of stress relief videos. A 1-minute video showing a device simulating a balloon being repeatedly inflated and deflated while timed to a 4/4 beat was created using 3DS Max and later distributed to participants via WeChat along with a PSS [3] translated by the researcher and a questionnaire with open-ended questions that ask for feedback on the video. The difference in PSS results and the response to the questionnaire suggest that the visual cue of movement affected the perception of stress the most and 70.00% of participants feel relaxed after watching the video.

**Keywords:** Perceived stress, PSS, stress reduction, visual elements, video

## 1. INTRODUCTION

This study explores the possibility of using videos as a method of stress relief among high school students in their junior year. Past studies have researched receptive music therapy and the musical elements that make the most contributions to the decreasing stress [2] but the possible therapeutic value of relaxing videos and what visual elements are the most effective in decreasing stress did not receive as much attention. In the study, the researcher designed the following experiment: an invitation was sent to 106 11th grade students and 30 gave their consent to participate in the study. The experiment group in this study consists of 15 female students from 11th grade, and 15 male students from 11th grade, such an experiment group ensures that gender is not a distracting variable in this study. Instructions for the experiment, a translated version of the original PSS, a follow-up questionnaire, and a 1-minute long video were then sent to the 30 participants in a separate message via WeChat. The participants are instructed to first fill out the PSS twice, once before watching the video and once again after watching the video. In the video, the animation of a device simulating a balloon being inflated and deflated was shown (picture 1). The perspective of the audience rotates around the device throughout the duration of the video, no soundtrack of any kind was present in the video to ensure that visual elements are the only independent value in the experiment. In the video, the movement (being inflated and deflated) of the object is timed to "music for trio" [2], a piece of relaxation music that has a 4/4 beat. The researcher is

aware of the fact that the original PSS is used to calculate perceived stress over the course of one month, so to better suit the conditions of this study, indications of time in the original questions of the PSS are deleted for this study. The open-ended questions ask about the overall viewing experience of the video and try to categorize the reaction to watching the video, which visual element did they find most influential for reducing stress, and what do they think is missing from the current video that would have made the video more effective at reducing stress.

## 2. THE PSS AND ITS RESULTS

One sample of the original PSS question would be "In the last month, how often have you been upset because of something that happened unexpectedly?" The questions used a 4-point scale, 0 being never and 4 being very often. The researcher adopted the questions used in the original PSS except with indications of time deleted. The original scoring table was also adopted as well: 0-13 for low stress, 14-26 for Moderate stress, and 27-40 for high perceived stress [3]. (Table 1)

Table 1. PSS scoring rubric

	PSS score
High perceived stress	27-40
Moderate stress	14-26
Low stress	0-13

The PSS score from the participants before they watched the video had an average of 16.7 out of 40, with 23.33% of participants (n=2) being categorized as low stress, 70.00% (n=21) being moderate stress and 6.67% of participants (n=7) being high perceived stress.

After watching the video, the participants scored an average of 14.53 out of 40, with 30.00% (n=9) being low stress, 70.00% (n=21) being moderate stress, and 0% (n=0) being categorized as high stress. (Figure 2 & 3)



Figure 1. What the animation looks like

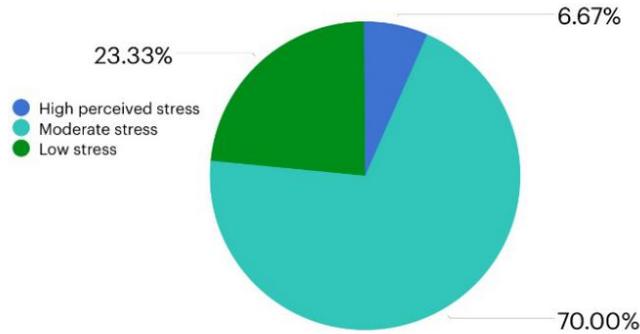


Figure 2. Stress level before video

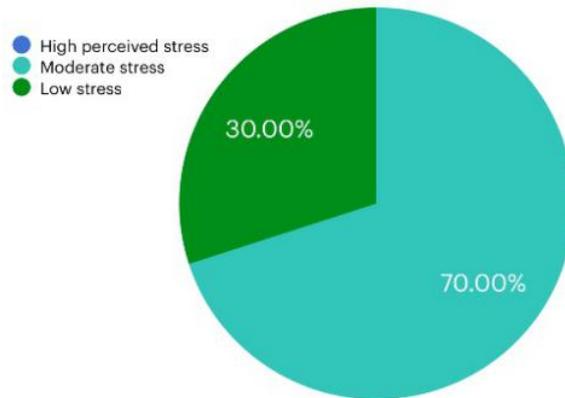


Figure 3. Stress level after video

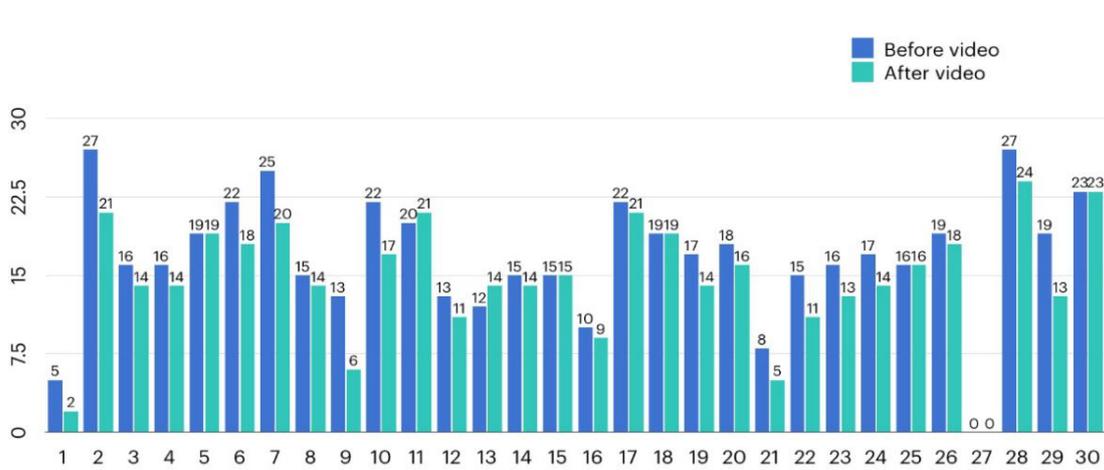


Figure 4. PSS results

6.67% of participants (n=2) had an increase in PSS scores after watching the video, 20.00% experienced no change in their PSS score and 73.33% of participants experienced a decrease in their PSS score, which resulted in an average difference of -2.17, suggesting that there is an overall decreasing trend in PSS after watching the video. (Figure 5 & 6)

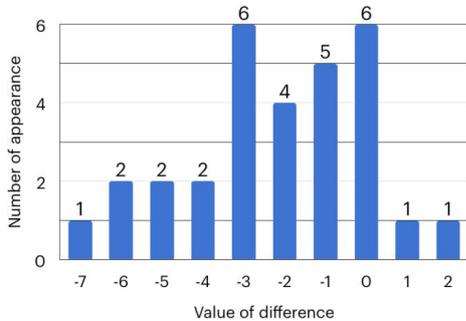


Figure 5. Value of changes in PSS scores

● Decrease ● No change ● Increase

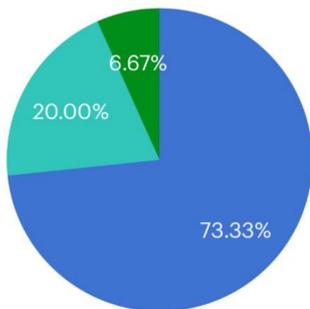


Figure 6. Percent change of changes in PSS scores

Interestingly, the number of male and female participants who experienced either decreased, unchanged, or increased PSS scores are the same (11 decreases, 3 unchanged, and 1 increase in PSS for female students, 11 decreases, 3 unchanged, and 1 increase in PSS for male students). (Figure 7)

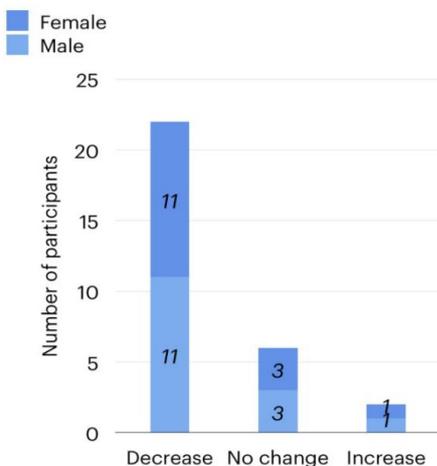


Figure 7. Change in PSS scores categorized by gender

### 3. RUBRIC OF OPEN-ENDED QUESTIONS AND ITS RESULTS

The open-ended questions are designed so that the researcher could acquire both feedback and suggestions from the participants regarding the video. The questions used in the questionnaire are as follow:

1. How did the video affect you?
2. What was the most influential element for reducing stress in the video for you (rhythm, texture, movement, etc.)
3. Do you think the video would be more effective if the video was longer (2-3 minutes instead of 1) and combined with some sort of soundtrack?

To better quantify the responses, any response for question 1 that mentions the word relaxed or states that they felt a reduction in stress will be categorized as "relaxed". If the response indicates that the participant felt it was comforting to watch the video, that response is categorized as "satisfying". If the response clearly states that the participant didn't feel anything, that response is categorized as "no effect". If there are responses that do not fall into any of the mentioned categories, they are made into a new category to ensure the integrity of the collected data. 5 categories are created for question 2. Any response that mentions how the device is moving or the shape of the device is categorized as "movement", the responses that discuss the aesthetic of the device or the feel of the device is categorized as "texture", responses that specifically mention the color of the device is categorized as "color", and finally any factors that couldn't fit into the 4 previous categories are put into the 5th category called "others". One response can be put into multiple categories e.g. movement, texture, rhythm. For question 3, the responses could be categorized into "need music, need time"; "need music, no time"; "no music, need time"; and "no music, no time".

For question 1, 70.00% of participants' response (n=21) is categorized as "relaxed", 13.33% of responses (n=4) are categorized as "no effect", 10.00% of responses are categorized as satisfying, and finally, 1 participant (3.33%) reported that the video was "hypnotizing", and another participant (3.33%) reported the video to be "refreshing". (Figure 8)

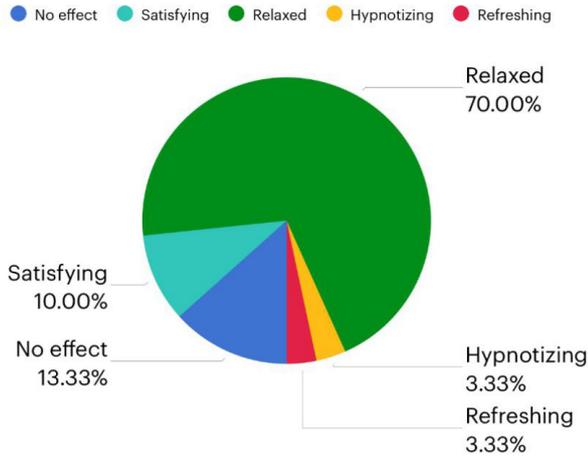


Figure 8. Figureical representation for responses to question 1

Among the responses to question 2, the two most influential single visual elements of the video consisted of movement (n=18, 36.00%) and rhythm (n=15, 30.00%). The two most common combinations of visual elements that are influential in the video are movement/color (n=5, 16.67%) and movement/rhythm (n=4, 13.33%). Interestingly, all the responses that were categorized as “others” all said that the movement of the perspective of the audience was an influential element. (Figure 9)

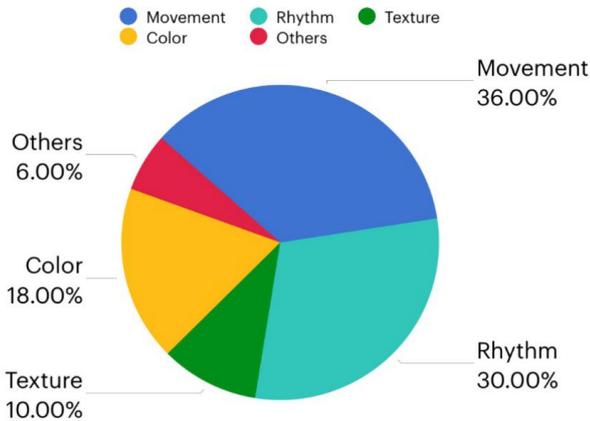


Figure 9. Figureical representation for responses to question 2

For question 3, 63.33% of all participants' responses (n=19) fall under the category of "needs music, no time", suggesting that the current video has appropriate length and the only improvement that can be made to it would be to give it a soundtrack. 23.33% (n=7) of responses are categorized as "needs music, needs time", suggesting that the participants feel the current video lack both sufficient length and soundtrack. 10.00% of responses (n=3) are categorized as "no music, no time", suggesting that the participants feel either the video is fine the way it is now or they feel that these improvements will not be able to improve the video's effectiveness at reducing stress. And 3.33% (n=1) falls into the category of "no music, needs

time", suggesting that although music is unnecessary, increasing the length of the video could make the video more effective at reducing stress. (Figure 10)

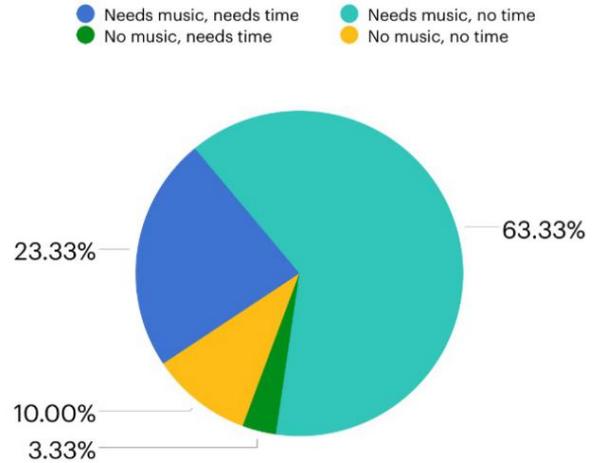


Figure 10. Figureical representation for responses to question 3

#### 4. DISCUSSION

This study also proves to an extent that gender may not be a decisive factor when it comes to reducing stress for high school students, but it may be somewhat influential when perceiving stress. The number of male and female student that experiencing decreased PSS (11 female students, 11 male students), unchanged PSS (3 female students, 3 male students), or increased PSS (1 female student, 1 male student) are all the same; at the same time there are 10 male students categorized as moderate stress and 4 categorized as low stress while 11 female students are categorized as moderate stress and 3 as low stress before watching the video. After watching the video, there are 11 male students categorized as moderate stress and 4 categorized as low stress while 13 female students are categorized as moderate stress and 2 as low stress. (Figure 11 & 12)

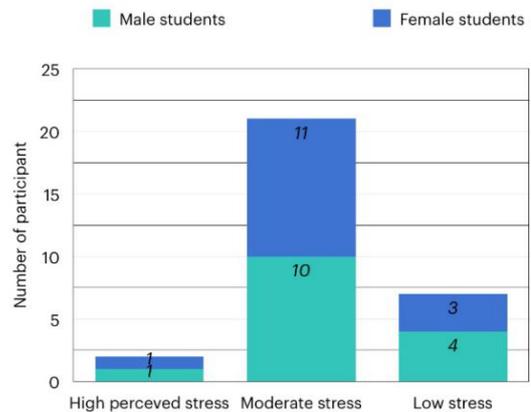
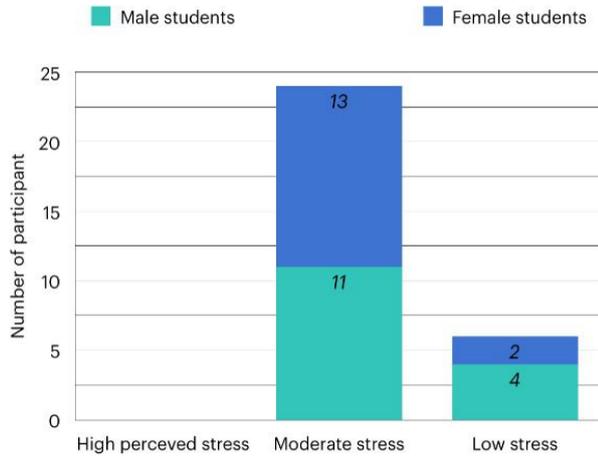


Figure 11. Perceived level of stress before video categorized by gender



**Figure 12.** Perceived level of stress after video categorized by gender

Although it is not the main point of this study, the researcher hypothesized before conducting the experiment that rhythm would be the most influential visual element, which turned out instead to be movement. The researcher believes that because rhythm itself is not a visually stimulating element but an auditorily stimulating element, and in the current study where there is no auditory stimulus, the effect of rhythm is weakened. The reason why movement is such an influential factor in reducing stress and what are the specific quantifying factors is unknown to the researcher and warrant further research in this area. The advice given by participants in their response to question 3 on the questionnaire included adding a soundtrack to the video, changing the color of the moving object, finding a different texture other than wood for the base of the device (3 participants reported that the wooden texture made them feel more stressed) and improving the frame rate of the video, have all been taken into consideration for future research and improvements.

## 5. LIMITATIONS

The sample group used in this study is very small and only consists of 11th-grade Chinese students, which indicates that the results of this study are somewhat limited. The usage of PSS in this study might produce inaccurate results because the original PSS was designed to measure perceived stress over the course of 1 month whereas, in this study, that timeframe is 1 minute. The responses to the questionnaire are categorized by the researcher himself so there is the possible existence of human error, and finally, question 2 on the questionnaire shows signs of guidance, which might produce inaccurate results.

## 6. CONCLUSION

Based on the fact that 73.33% of participants experienced a decrease in their PSS score and 70.00% of participants

states that they feel relaxed to an extent after watching the video, the conclusion of videos can be a method of stress relief for high school students can be reached. The movement and rhythm of the device in the video were perceived as the two most influential visual elements (36.00% and 30.00%), the physiological cause to this result requires further research and study. Also, as shown by the data above, a musical or auditory element may be a more influential factor in reducing stress as 73.33% of participants feel that the addition of a soundtrack will make the video more effective at reducing stress.

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