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The Modern Meditation: The Effect of Video Games and Yoga on Mindfulness Scores

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THE MODERN MEDITATION

The Effect of Video Games and Yoga on Mindfulness Scores

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The Modern Meditation: The Effect of Video Games and Yoga on Mindfulness Scores

This thesis has been reviewed by the faculty of the NEIU Honors Program and is found to be in good order in content, style, and mechanical accuracy. It is accepted in partial fulfillment of the requirements of the NEIU Honors Program and graduation with honors.

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ABSTRACT

This study was designed to explore the positive effects of casual video games, by comparing the mindfulness and mood scores among a) active yoga participants, b) passive yoga watchers, c) active video game players, and d) passive video game watchers. Participants were all undergraduate students recruited through Northeastern Illinois University's participant pool. Participants began the study by being assigned to one of the four conditions. Following their interaction, participants answered an adapted mood inventory questionnaire, a Player Experience Inventory (PXI), and an Engagement Questionnaire (EQ). Demographics were also collected. It was hypothesized that the active video game condition will have equal, or greater, scores in mindfulness and mood as the active yoga condition. Also, the active conditions will have higher mood scores and engagement scores than the passive conditions. Results showed that video game participants had significantly higher mindfulness of the mind scores while yoga participants had significantly higher mindfulness of the body scores. Further, there were significant differences in all three portions of the Mood and Symptom Checklist (MSC). Finally, both the PXI and EQ had a significant main effect of engagement type (i.e., active versus passive). Theories on these outcomes are discussed later in the paper.

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Life is full of stressors. Finding ways to manage mood and reduce stress is vital to living a well-balanced and happy life. With the growing reliance on the internet for daily tasks and the speed at which those tasks can be completed, instant gratification has become the new norm. Despite the numerous consequences of internet adoption, both positive and negative, there was hardly a stigma surrounding this global shift. Not all technologies have been so lucky to avoid these stigmas. Video games are often linked to violent behavior or aggression (Ferguson, 2007), or addiction (Gentile, 2009). However, the narrative has begun to shift as there are many studies that show the positive effects of video games. Pallavicini et al., (2018) concluded that both commercial and non-commercial video games provided evidence of improvements in cognitive and emotional skills.

The vastness of video game types and the broadness of the audience cannot be understated, and the different outcomes provided by each should be studied individually. Despite the belief that video games are primarily played by teenage males, the average age of players is 31 years of age, and 45 percent of players identify as female (Entertainment Software Association, 2021). Regarding video game type or genre, first-person shooter (FPS) games such as Call of Duty, or Counter-Strike have been shown to improve decision making and reaction time (Metcalf & Pammer, 2014). While role-playing games (RPG) such as World of Warcraft have shown improvements in decision making as well as prosocial behaviors (Granic et al., 2014). Casual video games (CVG) (e.g., Tetris, Pac-Man, Candy Crush) are games in which not a lot of mental or

physical energy is needed to engage. CVGs are normally shorter in the length of playtime and generally considered easier to play than other game types. CVGs have been shown to significantly improve reaction time in the elderly (Clark et al., 1987), improve mood, and decrease stress across age groups (Russoniello et al., 2009). A later study also found that playing casual videogames significantly reduced the symptoms of participants diagnosed with clinical depression (Russoniello et al., 2013). This flexibility in effectiveness across ages, ease of access, and ease of gameplay make CVGs a perfect candidate to perform further research.

Yoga is already well regarded for its ability to relieve stress and improve physical and mental wellbeing (Chong et al., 2011). There is growing clinical and experimental research to confirm the benefits of yoga. Riley and Park (2014) concluded from their systematic review of five studies that the psychological (positive affect, mindfulness, and self-compassion) mechanisms were the key to yoga's relationship with stress. Bartos et al. (2022) determined that even remote yoga through the CRAFT program had a positive effect on emotional intelligence, physical well-being, and mindfulness. While video games have been studied against controls, none have been compared against other stress-reduction techniques such as yoga. The breadth of research on yoga, and matching ease of entry to CVGs makes for a great pairing in this study. The measures are also a good fit for both yoga and CVG play.

Mindfulness and Mood

Research involving mindfulness has become an important staple within psychology. The literature involving improved mindfulness is linked to the general quality of life and mental health improvements due to a perceived reduction in stress

(Valikhani et al., 2020), as well as negatively correlated to anxiety, stress, and depression across adult age groups (Sharma & Kumra, 2022). Mindfulness is a term that is thrown around but is defined as an open undivided understanding of what is occurring internally and externally rather than a specific stimulus (Brown & Ryan, 2003). To meet the criteria of this definition, both physical and mental mindfulness must be measured. The State Mindfulness Scale for Physical Activity (SMS-PA) is an adapted version of the State Mindfulness Scale (SMS) which has been shortened to be more quickly administered to better capture state mindfulness ratings (Cox et al., 2013). Further, the validity testing showed equal effectiveness to the original SMS (Cox et al., 2013).

Research involving both yoga and video games has shown improvements in mood scores. Mood is defined as a disposition to respond emotionally in a particular way that may last for hours, days, or even weeks, perhaps at a low level and without the person knowing what prompted the state (APA Dictionary). Measuring mood consistently in research applies to many fields including sport, clinical, and cognition. A clinician's ability to understand and measure moods can help differentiate diagnoses of anxiety and depression (Teachman et al., 2007). Botterill and Brown (2002) determined that mood awareness directly impacts sports performance. To refine how one measures mood Gregg and Shepherd (2008) expanded and validated the Four Dimension Mood Scale. Their tests demonstrated that the four-factor measurement of mood was superior to the two-factor model (Gregg & Shepherd, 2008).

Engaging Through Watching

With the popularity of the internet being used for shows, shopping, and life in general, a new kind of entertainment has boomed, live streaming. For example, Twitch, a

streaming and video service similar to YouTube, had 5.7 billion hours watched across channels in quarter three of 2021 (Clement, 2022). Early studies indicate an emotional connection to outcomes and streamers (Wulf et al., 2018) and a cognitive response via fMRI measurements to vicarious gameplay results (Kätsyri et al., 2013). Sjöblom, and Hamari (2017) concluded that there is a relationship between the number of hours an individual watches streams, the number of different streamers they watch, and different types of gratification including cognitive, affective, social, tension release, and personal integrative. This newer form of entertainment has distinct differences from past research on television due to several factors including live audience interaction, celebrity availability, and the ability to participate in the same games as the entertainer. For this reason, further research is needed to determine the effect this new entertainment medium has on the general population. To measure the differences in engagement the EQ will be administered. This measure is able to determine differences in participant's perceived level of engagement (Hannum et al., 2021).

Aims and Hypotheses

The aim of this study was to explore the positive effects of casual video games, specifically the mindfulness and mood scores compared to yoga. Previous research has shown improvements in state mindfulness in both casual video gameplay (Russoniello, et al., 2009) and yoga (Riley, & Park, 2015). Therefore, this study will compare the scores between active yoga participants, passive yoga watchers, active video game players, and passive video game watchers. The passive viewing of video games has grown into a hobby, with websites such as YouTube and Twitch.tv being amongst the most popular

places to watch. The passive condition will provide additional context for how engagement affects participants' mood scores.

Based on the theoretical assumptions and the empirical findings described I have come to the following hypotheses:

Hypothesis 1: The active video game conditions will have (a) equal or higher mindfulness scores, and (b) equal or higher mood scores as the active yoga condition.

Hypothesis 2: Active participants will have (a) higher engagement scores, and (b) higher experience scores than passive participants

Hypothesis 3: Active participants will have (a) higher mood scores than passive participants, and (b) higher mindfulness scores than passive participants.

METHOD

Participants

Participants were 116 undergraduate students attending Northeastern Illinois University. The 27 active yoga participants consisted of 5 males and 22 females. The 29 passive yoga participants consisted of 2 males, 25 females, and 2 non-binary/third gender. The 29 active video game participants consisted of 5 males, 22 females, 1 non-binary/third gender, and 1 unreported. The 31 passive video game participants consisted of 7 males, 23 females, and 1 non-binary/third gender. Participants were randomly assigned to conditions at the beginning of the study. They ranged in age from 18 to 72 years, with a mean age of 24.8 (SD = 7.59). Two (2) participants did not report their age. Of the 116 participants, the highest reported ethnicity was Hispanic/Latin/x at

46.6% (n = 54) of the total. The next two most reported were White at 28.4% (n = 33) and Black at 13.8% (n = 16). All participants were recruited through Northeastern Illinois University's SONA system, which students use to receive class credit or extra credit.

Materials

Overview

The survey was made up of an adapted mood inventory and an adapted experience and exposure measure. Demographic information was also collected, including participants' age, gender, and ethnicity. Within the demographic section, participants were also asked about their experience with yoga and video games before participating (discussed later).

Adapted Mood Inventory

The adapted mood inventory contained portions from the State Mindfulness Scale for physical activity (SMS-PA), the Four-Dimensional Mood Scale (FDMS), and the Mood and Symptom Checklist (MSC). The SMS-PA (Cox et al., 2015) consisted of thirteen statements to better measure state-dependent mindfulness levels on both physical and psychological dimensions. Seven regarding the participant's state of mind (e.g, "I was aware of different emotions that arose in me" or "I noticed pleasant and unpleasant thoughts") and six regarding the participant's body state, (e.g., "I felt present in my body" or "I was in tune with how hard my muscles were working"). This portion was scored on participants' agreement with each statement on a five-point Likert-type scale ranging from 1 (not at all) to 5 (very much). Items 1-7 were scored to determine the state mindfulness levels of the mind, while items 8-13 were scored to determine the state mindfulness level of the body. Higher scores indicate higher levels of state mindfulness.

The FDMS (Huelsman et al., 1998) measured the dispositional mood of participants through four dimensions, made up of five adjectives each totaling 20 items. The four dimensions are high positive affect (for example active or alert), low positive affect (bored, or tired), high negative affect (anxious, or tense), and low negative affect (calm, or pleased). Participants were scored on how accurately the adjectives describe their average mood on a five-point Likert scale, from 1 (not at all) to 5 (extremely). The MSC (Gonder-Frederick et al., 1989) rated current mood and physical symptoms. Three categories make up the eleven items: physical symptoms (sweaty and pounding heart), negative moods (angry or frustrated), and positive moods (alert, or cheerful). The physical symptoms make up two of the items, negative mood makes up four, and positive mood makes up the remaining five. Scoring was based on how participants were currently feeling on a seven-point Likert scale from 1 (not at all) to 7 (extremely). Scores of each component will be analyzed separately. See Appendix A for the full scales of this measure.

Adapted Experience and Exposure Measure

The Adapted Experience and Exposure Measure is made up of the Player Experience Inventory (PXI) and the Engagement Questionnaire (EQ). The PXI (Abeele et al., 2020) was used to measure eight dimensions of a participant's interaction with a game. This was adapted by changing the wording in the chosen fifteen statements to make sense with each of the four conditions, (e.g., "The game felt relevant to me." was changed to "The activity felt relevant to me."). The eight dimensions include meaning, mastery, immersion, ease of control, challenge, progress feedback, audiovisual appeal, and goals and rules. The PXI was developed to address the gap of player experiences in

games and succeeds in measuring the functional consequences (i.e., the immediate experiences of the game, such as ease-of control) and the level of psychosocial consequences (i.e., the emotional experiences, such as immersion or master). The PXI was scored on a seven-point Likert scale from 1 (not at all) to 7 (extremely). Higher scores indicated a more positive experience while lower scores indicated a more negative experience. The EQ (Hannum & Simons, 2020) measured participants' engagement in their assigned activity. The questionnaire was made up of ten items about the feelings participants had during their task (e.g., "I felt myself zoning out during the task", or "During the task I was enjoying myself"). The EQ was scored on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicated higher levels of engagement. Scores of each component were analyzed separately. See Appendix B for full scales of this measure.

Demographics

The participant's demographic information (i.e., age, ethnicity, and gender) was gathered, as well as a self-report measure of the participant's experience with yoga and video games (e.g., "I play video games in my free time." and "I consider yoga to be one of my hobbies"). The self-report measure was scored on a five-point Likert scale from 1 (not at all) to 5 (extremely). This self-report was made up of six questions, three about video games, and three about yoga. Every participant was given all six questions for consistency.

Procedure

Participants signed up for this study through the Northeastern Illinois University SONA system's website. After signing up for the study participants were redirected to the

survey via hyperlink. After consenting to be part of the study each participant was randomly assigned to one of four conditions: active yoga, passive yoga, active video game, or passive video game. Those who were assigned to the active yoga are prompted to follow along to a prerecorded introductory yoga lesson to the best of their ability. Passive yoga participants were instructed to watch (and not follow along) the same prerecorded yoga lesson. The yoga instructor video had been edited to include a separate female assistant completing the yoga video in a small window at the top right corner. Participants assigned to the active video game condition were directed to follow a link in the survey to an online version of the game Tetris and play for as long as they could until they lost the game. Further instructions on how to play the game were provided on the website. Passive video game participants were redirected to a prerecorded video of a female assistant playing Tetris until she lost the game. After participants completed the task associated with their condition, they were presented with the Adapted Mood Inventory. The SMS-PA, then the FDMS were presented. Finally, they answered questions from the MSC to measure any physical symptoms related to their task. Participants then moved on to the Adapted Exposure and Experience Inventory, which included the PXI and EQ. After completing the fifteen questions from the PXI and nine questions from the EQ their demographic information was gathered. This information included their age, gender, and ethnicity, as well as a six-question self-reported questionnaire about their prior experience and expertise with yoga and video games. At the conclusion of the survey participants were redirected to a Google Form that gathered their names and student email address. This information was kept separately from their survey answers and used only to give the students their SONA points.

RESULTS

Statistical Procedures

A 2 (engagement type: passive versus active) x 2 (activity type: video game versus yoga) between-participants multivariate ANOVA was run to test for main effects and interactions across all the conditions. Each portion of the Adapted Mood Inventory and Adapted Experience and Exposure Measure were scored individually and in the same method as each measure was tested.

State-Mindfulness Scale for Physical Activity

Scores for the Mind

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity type on mindfulness scores. There was not a statistically significant interaction between the effects of engagement type and activity type ($F(1, 1) = 0.21$, $p = 0.65$). The main effects analysis showed that engagement type did not have a statistically significant effect on mindfulness scores of the mind ($F(1, 1) = 0.33$, $p = 0.57$). Finally, there was a significant main effect of activity type on mindfulness scores of the mind ($F(1, 1) = 4.04$, $p = 0.05$). Participants in the video game conditions scored significantly higher ($M = 25.1$, $SE = 0.81$) than those in the yoga conditions ($M = 22.8$, $SE = 0.83$). Mean differences in scores are shown in Figure 1.

Scores for the Body

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on mindfulness scores. There was not a statistically significant interaction between the effects of engagement type and activity type ($F(1, 1) = 0.01$, $p = 0.92$). The main effects analysis showed that engagement type did not have a statistically

significant effect on mindfulness scores of the body ($F(1, 1) = 2.12$, $p = 0.15$). Finally, there was a significant main effect of activity type on mindfulness scores of the body ($F(1, 1) = 23.67$, $p < 0.001$). Participants in the yoga conditions scored significantly higher ($M = 22.5$, $SE = 0.82$) than those in the video game conditions ($M = 17.0$, $SE = 0.78$). Mean differences in scores are shown in Figure 2.

Four-Dimensional Mood Scale

High Positive Affect

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity type on mood scores. There was not a statistically significant interaction between the effects of engagement type and activity type ($F(1, 1) = 1.18$, $p = 0.28$). The main effects analysis showed that there was no significant difference in engagement type on High Positive Affect scores ($F(1, 1) = 0.46$, $p = 0.84$). Finally, there was a marginally significant main effect of activity type on High Positive Affect scores ($F(1, 1) = 2.95$, $p = 0.09$). Participants in the yoga conditions scored higher ($M = 17.6$, $SE = 0.46$) than those in the video game conditions ($M = 16.5$, $SE = 0.44$) such that those in the yoga condition reported more positive affect.

Low Positive Affect

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on mood scores. There was not a statistically significant interaction between the effects of engagement type and activity ($F(1, 1) = 0.51$, $p = 0.48$). The main effects analysis showed that engagement type did not have a statistically significant effect on Low Positive Affect scores ($F(1, 1) = 0.80$, $p = 0.37$). Finally, there was no significant main effect of activity type on Low Positive Affect scores ($F(1, 1) = 0.57$, $p = 0.45$).

High Negative Affect

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on mood scores. There was not a statistically significant interaction between the effects of engagement type and activity type ($F(1, 1) = 0.25$, $p = 0.62$). The main effects analysis showed that there was no significant difference between engagement type on High Negative Affect scores ($F(1, 1) = 0.12$, $p = 0.73$). Finally, there was no significant main effect of activity type on High Negative Affect scores ($F(1, 1) = 2.18$, $p = 0.14$).

Low Negative Affect

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on mood scores. There was not a statistically significant interaction between the effects of engagement type and activity ($F(1, 1) = 0.02$, $p = 0.90$). The main effects analysis showed that engagement type did not have a statistically significant effect on Low Negative Affect scores ($F(1, 1) = 1.25$, $p = 0.27$). Finally, there was no significant main effect of activity type on Low Negative Affect scores ($F(1, 1) = 0.07$, $p = 0.79$).

Mood and Symptom Checklist

Physical Symptoms

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on symptom scores. There was a statistically significant interaction between the effects of engagement type and activity ($F(1, 1) = 4.54$, $p = 0.04$). Participants in the active conditions scored similarly with active yoga participants scoring slightly higher ($M = 6.26$, $SE = 0.56$) than active video game participants ($M = 6.17$, $SE =$

0.54). However, passive video game scores were significantly lower (M = 4.61, SE = 0.52) than passive yoga (M = 7.00, SE = 0.54). The main effects analysis showed that engagement type did not have a statistically significant effect on physical symptom scores (F(1, 1) = 0.58, p = 0.45). Finally, there was a significant main effect of activity type on physical symptom scores (F(1, 1) = 5.25, p = 0.02). Participants in the yoga conditions scored significantly higher (M = 6.63, SE = 0.39) than those in the video game conditions (M = 5.39, SE = 0.38).

Negative Moods

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on symptom scores. There was a statistically significant interaction between the effects of engagement type and activity (F(1, 1) = 5.62, p = 0.02). Participants in the passive conditions scored similarly with passive yoga participants scoring slightly lower (M = 9.34, SE = 0.87) than passive video game participants (M = 10.10, SE = 0.85). However, active video game scores were significantly higher (M = 11.38, SE = 0.87) than active yoga (M = 6.48, SE = 0.91). Interaction results are presented in figure 3. The main effects analysis showed that engagement type did not have a statistically significant effect on negative mood scores (F(1, 1) = 0.82, p = 0.37). Finally, there was a significant main effect of activity type on negative mood scores (F(1, 1) = 10.44, p = 0.002). Participants in the video game conditions scored significantly higher (M = 10.74, SE = 0.61) than those in the yoga conditions (M = 7.91, SE = 0.63).

Positive Moods

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on symptom scores. There was not a statistically significant interaction

between the effects of engagement type and activity ($F(1, 1) = 0.52$, $p = 0.47$). The main effects analysis showed that engagement type did not have a statistically significant effect on positive mood scores ($F(1, 1) = 0.64$, $p = 0.43$). Finally, there was a significant main effect of activity type on positive mood scores ($F(1, 1) = 4.89$, $p = 0.03$). Participants in the yoga conditions scored significantly higher ($M = 21.2$, $SE = 0.83$) than those in the video game conditions ($M = 18.7$, $SE = 0.80$).

Player Experience Inventory

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on player experience scores. There was a marginally significant interaction between the effects of engagement type and activity ($F(1, 1) = 2.84$, $p = 0.09$). Participants in the active conditions scored similarly with active video games scoring slightly higher ($M = 71.3$, $SE = 2.73$) than active yoga ($M = 70.2$, $SE = 2.83$). However, passive video game scores were significantly lower ($M = 60.8$, $SE = 2.64$) than passive yoga ($M = 69$, $SE = 2.78$). Interaction results are presented in figure 4. The main effects analysis showed that engagement type did have a statistically significant effect on player experience scores ($F(1, 1) = 4.60$, $p = 0.03$). Participants in the active conditions scored significantly higher ($M = 70.8$, $SE = 1.96$) than those in the passive conditions ($M = 64.9$, $SE = 1.92$). Finally, there was no significant main effect of activity type on player experience scores ($F(1, 1) = 1.63$, $p = 0.21$).

Engagement Questionnaire

A 2x2 multivariate ANOVA was performed to analyze the effect of engagement type and activity on engagement scores. There was not a statistically significant interaction between the effects of engagement type and activity ($F(1, 1) = 0.18$, $p = 0.67$).

The main effects analysis showed that engagement type did have a statistically significant effect on engagement scores ($F(1, 1) = 7.30$, $p = 0.008$). Participants in the active conditions scored significantly higher ($M = 43.7$, $SE = 1.29$) than those in the passive conditions ($M = 38.9$, $SE = 1.25$). Finally, there was no significant main effect of activity type on engagement scores ($F(1, 1) = 2.40$, $p = 0.12$). Participants in the yoga conditions scored marginally higher ($M = 42.7$, $SE = 1.29$) than those in the video game conditions ($M = 39.9$, $SE = 1.25$).

DISCUSSION

The present experiment is one of very few that explores the effects of CVGs (Clark et al., 1987) and contrasts them with yoga (Chong et al., 2011; Riley & Park, 2014). The added layer of active engagement versus passive watching (Wulf et al., 2018) further contextualizes the benefits of actively participating. I found that active participation showed higher scores in engagement and player experience compared to passive watchers. Further, neither of these scores were significantly different across activity types. These results show that despite passive watching showing cognitive responses (Kätsyri et al., 2013) and gratification (Sjöblom & Hamari, 2016), active participation is still more rewarding. Further, these results confirmed my hypothesis that active participants would have higher engagement and higher experience scores than passive participants. However, there were no significant differences in mindfulness scores of both the body and the mind between active and passive participants. Furthermore, engagement type did not have any significant differences across the two mood measurements (i.e., FDMS and MSC).

The mindfulness and mood measures showed some interesting results. Within the FDMS the only section that showed marginally significant differences was the High Positive Affect (e.g., Active, Alert, Inspired, etc) where yoga participants reported higher scores. Within the MSC yoga participants reported significantly higher scores on positive moods (e.g., Confident, Relaxed, etc), while video game participants reported significantly higher scores on negative moods (e.g., Angry, Frustrated, etc). While this acts counter to my initial hypothesis that video game participants would have equal or higher rated mood scores as yoga participants, further testing should be completed to determine the level of differences in mood. Most important were the scores on state-dependent mindfulness. These results revealed that yoga induced higher levels of mindfulness within the body, while video games induced higher levels of mindfulness within the mind. These results open new questions regarding the different aspects of mindfulness, and how each part can be affected based on activity. With research confirming the positive effects of mindfulness on mental and physical health, it is vital to explore new potential techniques to increase state mindfulness.

Limitations

While this experiment was intentionally designed for remote participation, there is no doubt that environmental factors may have played a role in the results. Due to the inability to perform this study in person, the experimenter lost the ability to control the environmental conditions such as setting, time of day, external distractions, and ability to monitor participants. Should this study be completed again, it should be done so with the environment under moderator control.

With 116 participants, the sample size met expectations. However, the gender distribution was highly skewed in favor of female participants with 92 of the 116 reporting as female. While it is not possible to tell whether gender affected the outcome of this study, it is important to note this disparity. Future replications of this study could include comparisons of gender to further research gender stereotypes and stigmas surrounding both yoga and video games.

Finally, while all of the measures were validity tested, many have not been applied to this exact type of study. Certain measures also had their wording adapted to better fit all possible conditions (e.g., "The game gave clear feedback…" to "The activity gave clear feedback…"). These changes may have affected the validity of these measures due to stretching their application outside of the intended purpose. Additionally, there was no true control group to contrast the activities against. Replicating this study as it was conducted could shed light on whether this was the case, potentially with the addition of a true control group.

Conclusion

The world is constantly changing, and with instant access to information and a heightened desire for instant gratification, methods to slow our thinking down and improve our mental health are at a premium. This study hoped to reveal some insight into potential methods of increasing state-mindfulness scores through two different mediums. The results indicated that both yoga and CVG were capable of doing so in different ways. People who played video games had higher scores of mindfulness of the mind, while those who partook in a yoga lesson showed higher scores of mindfulness of the body.

These results not only inform future experiments but also reveal a larger picture of what affects state-mindfulness and alternative ways to improve upon it.

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Appendix A

Adapted Mood Inventory

Includes Items from State Mindfulness Scale for Physical Activity (SMS-PA), Four Dimensional Mood Scale (FDMS), and Mood/Symptom Checklist (MSC).

SMS-PA -

Scoring: State Mindfulness of the Mind - Items 1-6, State Mindfulness of the Body - Items 7-12

1. I was aware of different emotions that arose in me.
2. I noticed pleasant and unpleasant emotions.
3. I noticed emotions come and go.
4. I was aware of different thoughts that arose in me.
5. I noticed pleasant and unpleasant thoughts.
6. I noticed thoughts come and go.
7. It was interesting to see the patterns of my thinking.
8. I focused on the movement of my body.
9. I felt present in my body.
10. I listened to what my body was telling me.
11. I was aware of how my body felt.
12. I noticed the sensations in my body.
13. I was in tune with how hard my muscles were working.

Participants make their ratings on a 5-point Likert-type scale ranging from 1 (Not at all) to 5 (Very Much).

FDMS -

For each item on the scales, participants are asked to indicate to what extent the adjective reflects the way they generally feel, that is, "how do you feel on the average?"

High Positive Affect -

1. Active
2. Alert
3. Attentive
4. Inspired
5. Interested

Low Positive Affect -

1. Bored
2. Fatigued
3. Dull
4. Tired
5. Worn Out

High Negative Affect -

1. Anxious
2. Nervous
3. Upset
4. Tense
5. Distressed

Low Negative Affect -

1. Calm
2. Pleased
3. Relaxed
4. Untroubled
5. Contented

The participants make their ratings on a 5-point Likert-type scale ranging from 1 (very slightly or not at all) to 5 (extremely).

MSC -

The checklist is composed of 2 physical symptoms and 10 mood states which are further divided into 5 positively valenced mood states and 5 negatively valenced mood states.

Physical Symptoms

1. Sweaty
2. Pounding Heart

Negative Moods

3. Angry
4. Sad
5. Frustrated
6. Nervous

Positive Moods

7. Energetic
8. Alert
9. Confident
10. Cheerful
11. Relaxed

Participants rate the extent to which they are currently experiencing each item on a 7-point unipolar scale ranging from not at all (1) to extremely (7).

Appendix B

Adapted Experience and Exposure Measure

Includes items from the Player Experience Inventory (PXI) and the Engagement Questionnaire (EQ).

PXI -

Items are rated on a 7-point Likert scale. The checklist has been adapted to include 15 statements regarding the participant's interaction with their condition. Wording of the checklist items were edited to fit the active and passive video game conditions and the active and passive yoga conditions.

Meaning -

1. The activity felt relevant to me.
2. This activity was valuable to me.

Mastery -

1. I felt capable while engaging in this activity.
2. I felt I was good at this activity.
3. I felt a sense of master engaging in this activity.

Immersion -

1. I was no longer aware of my surroundings while engaged in this activity.
2. I was immersed in my activity.
3. I was fully focused on my activity.

Ease of Control -

1. I thought the activity was easy.
2. The actions involved in this activity were clear to me.

Challenge -

1. This activity was challenging but not too challenging.

Progress Feedback -

1. I could easily assess how I was performing in this activity.

Audiovisual Appeal -

1. I appreciated the aesthetics of this activity.

Goals and Rules -

1. The goals of the activity were clear to me.
2. I understood the objectives of the activity.

Engagement Questionnaire

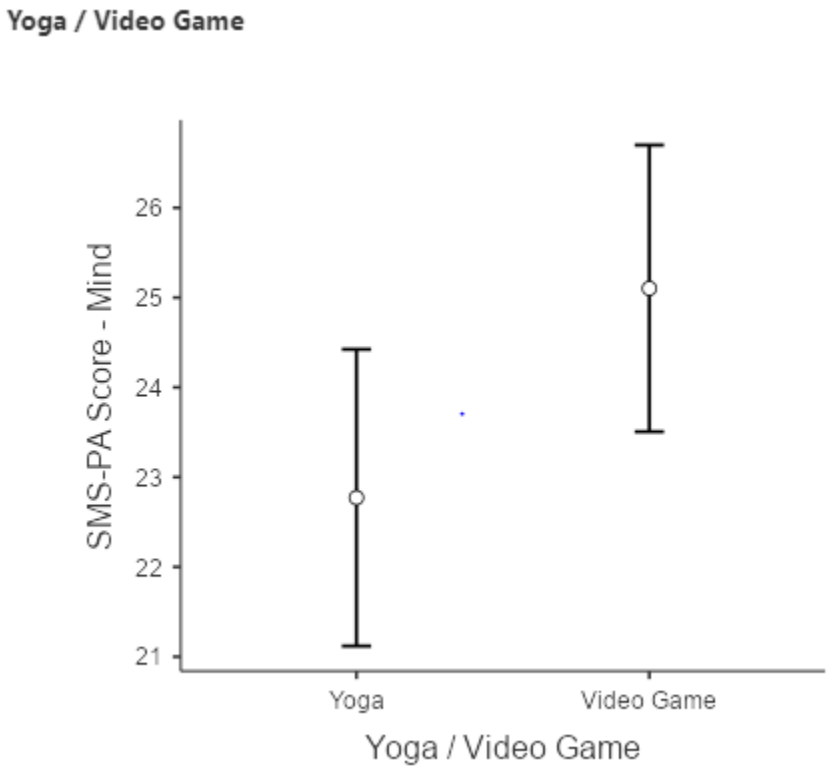
EQ -

Participants rate their level of agreement to items presented as statements. Responses use a 7-point scale, ranging from Strongly Disagree (1) to Strongly Agree (7).

1. I felt myself zoning out during the task.
2. I lost interest in the task.
3. I was distracted.
4. I felt dedicated to finish the task.
5. I wanted to devote my full attention to the task.
6. I found the task meaningful.
7. During the task, I was enjoying myself.
8. I found the task captivating.
9. I was motivated to expend extra effort during the task.

Figure 1

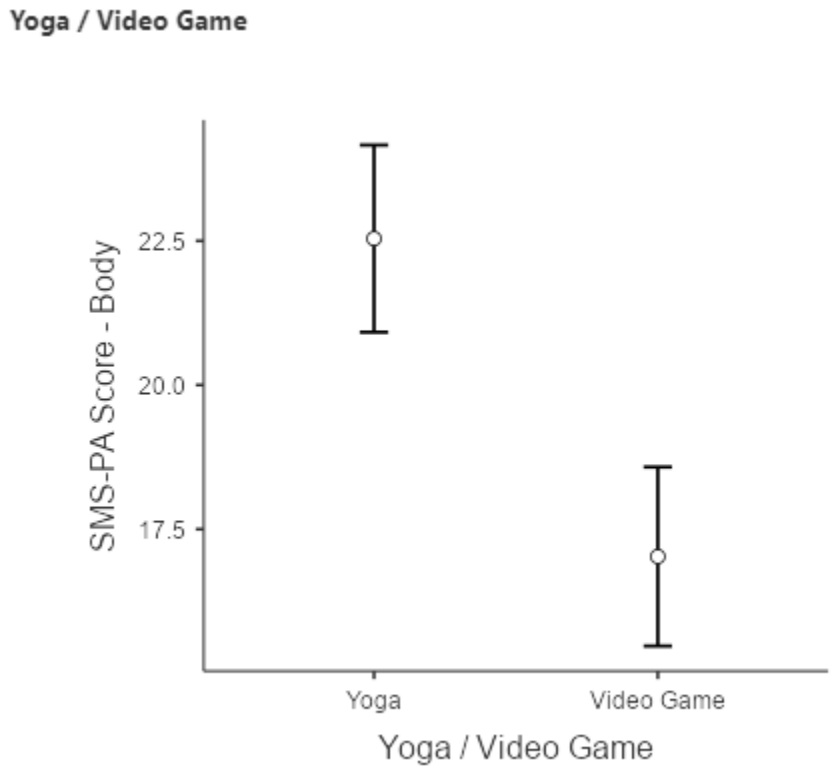
State Mindfulness Scale - Mindfulness Scores of the Mind



Note. Number of yoga = 56, number of video game = 60, total $N = 116$.

Figure 2

State Mindfulness Scale - Mindfulness Scores of the Body



Note. Number of yoga = 56, number of video game = 60, total $N = 116$.

Figure 3

Mood and Symptom Checklist -Negative Moods Interaction

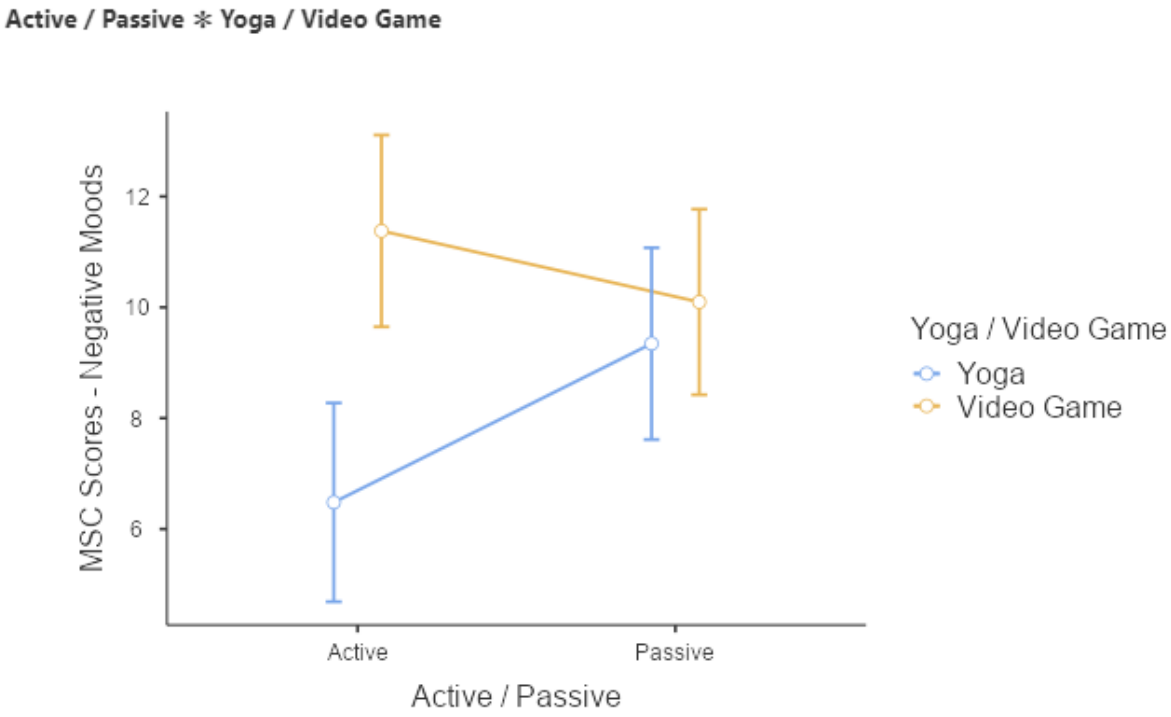


Figure 4

Player Experience Inventory Interaction