TETRIS Actics: Evaluating Audio vs Video Disruptions

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INTRODUCTION

Background: Gaming interruptions impact gameplay; their effects on Tetris are vital in gaming psychology.

Significance: Comparing visual vs. audio interruptions in Tetris aids in understanding distraction effects on gaming and cognitive skills.

Hypothesis(H1): There is a significant difference in Tetris performance between visual and audio interruptions.

METHODOLOGY

Participants: 64 participants engaged in a between-participants design, randomly assigned to either visual or audio interruption conditions. Participants had regular Tetris play habits and normal or corrected hearing and vision.

Interruptions: Visual interruptions displayed a changing banner; audio interruptions involved spoken ads and a siren every three minutes for 20 seconds.

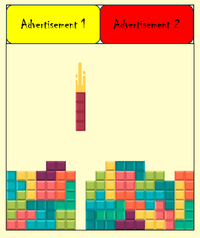

Fig.1: Visual Disruptions

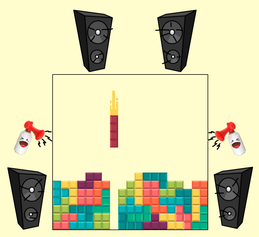

Fig.2: Auditory Disruptions

Gameplay Scoring: Tetris gameplay performance was scored automatically on a scale from 0 to 100.

Data Cleaning: Scores were confirmed within the 0 to 100 range. Subsets were created for auditory (32 participants) and visual (32 participants) distraction conditions with no outliers found in box plots.

RESULTS

Table 1: Descriptive statistics

Condition (Interruptions)	*Min.*	1st Qu.	*Mdn*	*M*	3rd Qu.	*Max.*	*SD*
Auditory	44.00	60.00	69.00	67.94	76.00	87.00	11.05
Visual	29.00	37.75	46.00	46.62	52.50	74.00	11.80

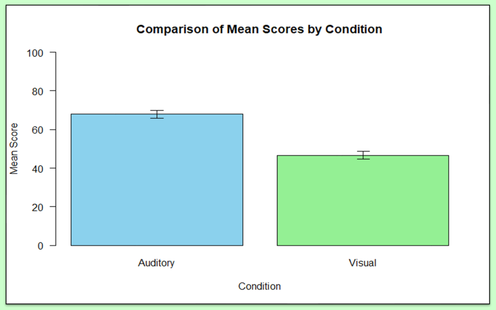

Fig.3: Graph of condition means

Observations:

- Both 'auditory' (Shapiro-Wilk test, $W = 0.95$, $p = 0.17$) and 'visual' ($W = 0.96$, $p = 0.35$) subsets demonstrated no significant departure from normality. Levene's test revealed no significant difference in variances between 'auditory' and 'visual' groups ($F(1, 62) = 0.37$, $p = 0.54$). These findings support assumptions for conducting an independent t-test
- Welch's two-sample *t*-test revealed a statistically significant difference in Tetris scores between the auditory ($M = 67.94$, $SD = 11.05$) and visual ($M = 46.62$, $SD = 11.80$) interruption conditions, $t(61.73) = 7.456$, $p < .001$. The mean score in the auditory condition was 67.94, and in the visual condition was 46.62. The 95% confidence interval for the difference in means ranged from 15.60 to 27.03.
- The graph illustrates a significant difference in Tetris scores between auditory ($M = 67.94$) and visual ($M = 46.62$) interruption conditions. Auditory interruptions show lower distraction with higher scores compared to visual interruptions, indicating a lesser disruptive impact on task performance with auditory interruptions.
- The narrow error bars around the means suggest less variability, reinforcing differences seen in the mean scores.

Sensitivity Analysis: Analyzing interruption frequency and duration will improve our understanding of how auditory and visual interruptions impact Tetris scores.

Discussion

- Similar to **Wickens et al.(2005)** study on interruptions during vehicle control tasks, our research highlights the varying scores between auditory and visual distraction conditions in Tetris gameplay. This provides insight into the unique effects that different types of interruptions exert on performance.
- According to **Warnock et al. (2011)**, interruptions always create disruption, regardless of how notifications are sent. Our findings, however, show that although interruptions affect work performance, auditory notifications seem less distracting than visual cues.

- **Edwards et al. (2021)** emphasize nuanced interruption design for speech agents, focusing on word choice and tone modulation. In line with their insights, our study highlights significantly higher Tetris scores in auditory interruptions compared to visual interruptions. Unexpected audio cues can distract individuals when they aren't directed to focus on them.
- we can infer a correlation between interruptions and task performance, aligning with our study's observation. The noticeable fact is that the interruptions affect cognitive tasks more significantly than skill tasks. **(Lee & Duffy, 2015).** Experienced Tetris players might handle audio interruptions better since they're used to focusing visually on the game without being easily distracted.
- A recent study by **Nees and Sampsell (2021)** suggests that auditory interruptions cause less distraction than visual alerts in visual tasks, aligning with our findings that auditory cues may be less distracting than visual cues. Perhaps auditory cues enable individuals to stay focused on their current visual tasks.
- Similar disruption was observed across modalities on the primary task, yet auditory interruptions proved more disruptive to the interruption task. Intra-modal interruptions were found more effective for visual tasks **(Jing et al., 2022).**
- **Radović et al. (2022)** found that higher interruption frequency accelerates task completion but can raise error rates or reduce performance upon task resumption. This insight could be integrated into our future research.
- Highlighting the importance of task-switching mechanisms, **Brazzolotto and Michael (2020)** offer insights pivotal for shaping our future research direction.

Limitations:

- The small sample size limited broader insights.
- Limited exploration of interruption frequencies.
- Narrow game choice restricted task variation.
- Brief gameplay duration impacted in-depth analysis.

CONCLUSION

Our study provides pivotal insights into the effects of interruption modalities on gaming performance, demonstrating a notable divergence between auditory and visual interruptions in Tetris gameplay. These findings underscore the importance of customized interruption strategies in professional settings and enhance our comprehension of cognitive reactions to interruptions in psychology. Conducting a sensitivity analysis on interruption frequency and duration will further enhance our findings on the scores.

FUTURE RESEARCH DIRECTIONS

- Assess prolonged exposure effects of interruptions.
- Investigate combined auditory and visual interruptions.
- Explore interruptions across varying task complexities.
- Study how user experience in Tetris alters interruption effects.
- Determine optimal interruption frequencies for minimal disruption.

References

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