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Exploring Well-Being Through Audiovisual Interaction : Design and User Experience Evaluation of an ASMR-Inspired Interactive System Based on Max/MSP/Jitter

Yi Jiang[1], Hyun-tai Kim[2]*

Abstract

This study presents an audiovisual interactive system based on Max/MSP/Jitter platform, designed to enhance emotional well-being, facilitate creative cognition, and reduce stress in non-clinical settings. In contrast to conventional treatment approaches targeting clinical populations with professional assistance and intricate sensors, this novel system allows intuitive interaction using common input devices (keyboard, mouse) with no prior experience and no special hardware. It has three modules incorporating Autonomous Sensory Meridian Response (ASMR) stimuli and retro video game aesthetics, which enable transportive multisensory experiences for everyday emotional self-regulation and stress relief. Initial user testing shows significant effectiveness in encouraging relaxation, increasing subjectively perceived happiness, and eliciting creative thinking. This research underscores the significance of accessible audiovisual design in digital arts for psychological health, recommending further exploration into participant diversity, longitudinal emotional outcomes, physiological measures, and mobile multi-user system implementations.

Keyword : well-being, audiovisual interaction, Max/MSP/Jitter, ASMR, game therapy

1. Introduction

1.1 Research Background

Current economic development and fast-paced social change raise stress and depressive symptoms. Negative emotional states can lead to serious psychological and physiological disorders over time, including sleep disturbance, coronary heart disease, and clinical depression. To tackle these conditions, interventions such as music therapy, sound therapy, and art therapy are becoming increasingly prevalent. This study marries these interventions by creating a creative audiovisual system to give the overall population practical tools for stress reduction and well-being improvement with both therapeutic and preventative properties.

1 Department of Practical Music, Sejong University, Seoul, Korea [Graduate student]
e-mail: joyyy0712@naver.com
2 Department of Practical Music, Sejong University, Seoul, Korea [Professor]
e-mail: kimht@sejong.ac.kr (Corresponding author)

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Contemporary music experiences have become diversified thanks to developments in information technology and new media art. Forms of art derived from multisensory interaction, including Autonomous Sensory Meridian Response (ASMR) and interactive sound art, are increasingly acknowledged as useful resources in regulating emotions. Previous research has shown that synchronized auditory and visual stimulation significantly relieves anxiety and enhances emotional balance and creative thinking [1].

Traditional approaches to music therapy typically focus on clinical populations (e.g., autism dementia), often requiring professional involvement and either specialized or physiological sensors [2]. This model creates barriers for the general public to experience similar benefits. Moreover, therapeutic programs traditionally emphasize clinical efficacy, paying limited attention to everyday emotional well-being through self-directed interactions.

Thus, exploring a more accessible audiovisual interaction that preserves the positive effects of musical and artistic engagement without specialized skills or external devices is necessary. This approach enables participants from diverse backgrounds to experience immediate relaxation mechanisms, supporting stress reduction, emotional regulation, and enhanced well-being in everyday contexts.

1.2 Research Objectives

This study constructs an accessible audiovisual platform using Max/MSP/Jitter software, enabling users to engage in audiovisual creation and immersive experiences through simple mouse and keyboard interactions, without prior expertise in music, programming, or visual arts. The research integrates gamification and well-being promotion by incorporating ASMR-inspired sounds, retro game aesthetics, and multisensory feedback into three distinct interactive modules.

Aim to explore these modules' potential to induce emotional relaxation and creative stimulation outside the clinic and to carry out an initial user experience study to acquire self-reported measures of emotional shifts, felt stress, and immersion. This offers initial proof of concept for the system to support everyday well-being and creative expression and will pave the way for future work.

2. Theoretical Background

2.1 Well-being

Well-being refers to an individual's positive state across emotional, psychological, physical, and social

dimensions. The World Health Organization defines health as complete physical, mental, and social well-being rather than merely the absence of disease [3]. Well-being thus encompasses emotional stability, psychological satisfaction, social belonging, and meaningful living [4].

In recent years, advancements in digital technologies and multisensory interaction have underscored the potential of sensory stimuli-such as music, sound, and visual elements-for emotional regulation and stress reduction [5]. Research on immersive experiences has further highlighted how audiovisual interaction mechanisms enhance engagement and concentration [6]. Through real-time sound and visual feedback, audiovisual systems foster immersion and positive emotional responses, supporting emotional well-being in non-clinical contexts.

In this study, well-being specifically refers to the emotional relaxation, creative associations, and subjective happiness induced by audiovisual interactions. Through coordinated auditory and visual stimulation, this research aims to provide diverse users with novel, accessible frameworks for daily emotional regulation and creativity enhancement.

2.2 Multisensory Interaction and Sense of Immersion

Multisensory interaction involves the integration of visual, auditory, and sometimes tactile inputs to enhance emotional engagement and environmental perception [7]. Cross-modal mappings—e.g., linking bright colors with excitement or major-key sound with positive emotional state-illustrate the brain's capacity to process sensory input interactively. Of these, audiovisual coordination is especially significant: when sound and video are coordinated, users become more likely to feel immersed; when they are in opposition, immersion is broken.

Previous studies have demonstrated that the synergistic effect of auditory and visual stimulation can significantly enhance users' sense of immersion-a key component of sensory immersion in games and interactive media [8]. Immersion here refers not only to VR or AR settings, but more broadly to a psychological state characterized by deep focus, reduced self-awareness, and unity with the environment [6].

Sound design inspired by ASMR, especially when combined with subtle visual cues, can induce bodily sensations and promote relaxation without the need for complex equipment [9][10]. A 2025 survey by The Guardian reported that over 82% of young adults found ASMR helpful in relieving stress and aiding sleep, framing it as a mainstream self-regulation tool [11]. Moreover, interactive environments with clear feedback and goals are known to support the flow state-a deeply engaging mental condition beneficial to emotional well-being [12].

This study integrates ASMR-inspired sound, particle-based visuals, and intuitive mouse-keyboard interaction to construct a low-barrier system that encourages immersive engagement and creative association, ultimately supporting everyday psychological health.

2.3 Audiovisual Interaction Platforms and System Design

Audiovisual interaction platforms integrate audio and visual aspects together in real-time to generate moving, tangible worlds. In contrast to single-sensory interfaces, these platforms profoundly heighten emotional involvement and immersion, yielding nonintrusive emotional management tools [7][13].

Max/MSP/Jitter, a modular software platform, facilitates real-time sound generation, visual creation, and interactive systems design, with flexibility and intuitive development in mind [14]. As an example, the Sonic Cradle system for meditation utilizes Max/MSP to generate soundscapes responsive to breath, augmenting emotional relaxation [15]. Likewise, Boulanger utilized Max/MSP/Jitter for autism intervention, facilitating cognitive integration via audiovisual interaction [16].

Capitalizing on the above, the current work implements an inclusive audiovisual interface featuring particle-like visuals, sound effects of the ASMR category, and intuitive user control to enable stress release, emotional calm, and creative immersion in common situations.

3. System Design

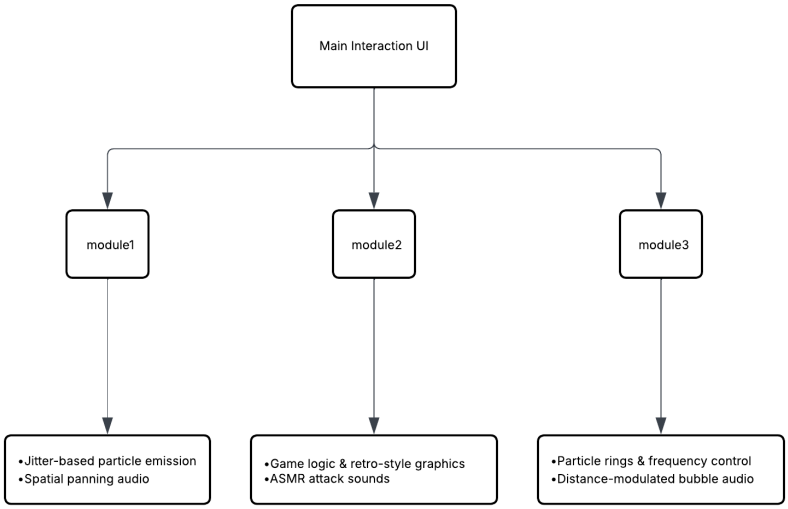
3.1 System Overview

This project built an audiovisual interactive system based on Max/MSP/Jitter to enable emotional relaxation, associative imagination, and immersion through real-time audiovisual response. Based partly on Foderaro's works [17], the system has been independently reorganized with an emphasis on improving well-being.

The system consists of three independent modules, all focused on a different method of emotional or sensory stimulation. Module 1, Particle Flow, offers spatial relaxation through granular ASMR sounds and dynamic particle visuals; Module 2, Softened Space Invaders, introduces playful focus using low-tension audio feedback in a gamified setting; and Module 3, Aureole, emphasizes creative exploration via sound-frequency mapping and visual avoidance logic. All modules are controlled through simple mouse and/or keyboard interactions, enabling freely exploratory and immersive experiences.

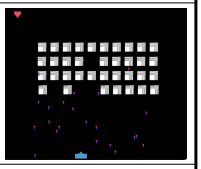
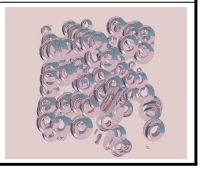
Each module's structure is shown in [Fig. 1], and the key interaction features are summarized in

[Table 1].



[Fig. 1] Modular structure of the audiovisual interaction system

[Table 1] Key features of the audiovisual interaction modules

Module	Visual Elements	Sound Design	Interaction Method	Experiential Goals	Images
Module 1	Monochrome particle visuals	Sand-like granular sounds	Mouse tracking, spatial audio	relaxation, immersion	
Module 2	Retro-style pixel graphics	Gentle attack tones	Keyboard navigation, mouse-triggered actions	Playfulness, attention	
Module 3	low-saturation ring forms	Bubble-texture ASMR tones	avoidance motion, frequency mapping	exploration, creativity	

3.2 Module 1: Particle Flow Module

This module presents a minimalist black-and-white particle environment, with upward-flowing visuals resembling a focused light beam. Mouse position controls particle movement, and horizontal shifts adjust

spatialized audio panning in real time. This tight coupling of motion and sound creates an immersive, responsive audiovisual space.

The sound design features sand-like, ASMR-inspired granular textures, synchronized with visual rhythm. This low-frequency, micro-granular stimulation aims to guide relaxation and attentional focus. The module demonstrates how refined sound elements, paired with fluid visuals, can support emotional regulation through low-cognitive-load interactions.

3.3 Module 2: Softened Space Invaders Game Module

Adapted from the classic arcade game, this module preserves the fundamental mechanics of spaceship movement, shooting, and target elimination, while deliberately softening both auditory and visual elements to mitigate user tension. Rather than punishing failure, a system of three lives provides automatic replenishment to enable relaxed play. All the 8-bit sound effects have been substituted with soothing ASMR-type tones. The firing creates sharp percussive noises, the hits on the targets are added with low-pitched impacts, and taking damage has a short modulated sound. These sound strategies reduce aggression and enhance emotional pacing. The module shows the role sound design can play in remaking the affective tone during non-violent, gamified interaction.

3.4 Module 3: Aureole Module

Modeled after traditional ring-toss toys, the module dispenses with win-loss goals in favor of discovery-oriented interaction. Softer Morandi-hued pixels create ring-shaped particles that react to cursor movement through the principles of avoidance. At the same time, cursor-to-background sound mapping allows users to regulate layered, bubble-like ASMR textures in real time.

The sound design mimics ascending through the water through a frequency gradient: it evokes depth and immersion with low frequencies, drift and stability through mid frequencies, and fragility and transparency through high frequencies. This sound composition enhances spatiality and emotional atmosphere in the absence of textual narration, turning basic stimuli into an experiential experience.

4. Research Methods

4.1 Research Design

The study utilized an explanatory sequential mixed method. It initially measured user experience

quantitatively through a self-created 7-point Likert 18-item questionnaire. This was then supplemented by in-depth structured interviews to collect qualitative comments. The combination of these methods bridged the gap between numerical data and subjective experience, enhancing both analytical depth and practical relevance [18].

4.2 Participants

Eleven participants (5 males and 6 females) ranging in age from 18 to over 41 were recruited. Participants were divided into four age groups: 18-24, 25-30, 31-40, 41+. Six of the participants had a professional or educational background in art or music, and five did not, to bring diversity in terms of past experience. All participants demonstrated basic computer literacy and had no history of psychological disorders.

4.3 Instruments and Procedure

The 18-question survey with a 7-point Likert scale was used as the quantitative tool. Items were divided into positive (Q1-Q5, Q7-Q11, Q13-Q17) and negative (Q6, Q12, Q18) items, the latter being reverse-coded to maintain consistency. Semi-structured interviews were used during the qualitative study to find out the emotional states, cognitive involvement, and memorable moments when interacting with the system. Some of the questions asked were: “How did you feel during the experience?”, “Did it inspire your imagination or creativity?”, and “What module surprised you the most, and why?”.

4.4 Data Analysis

Descriptive statistics were employed to summarize the demographics of the participants. To evaluate the questionnaire's internal consistency, Cronbach's alpha was calculated. Mean scores across Q1-Q18 were utilized to measure overall system impact on stress reduction and subjective well-being.

To compare module performance, items were grouped into Module 1 (Q1-Q6), Module 2 (Q7-Q12), and Module 3 (Q13-Q18). The Mann-Whitney U test was applied to compare differences between participants with and without art/music backgrounds.

Qualitative data were analyzed using Braun and Clarke's six-phase thematic analysis framework [19]. Transcribed interviews were coded, reviewed, and organized into core themes reflecting emotional experience, engagement, and user feedback.

5. Research Results

IBM SPSS Statistics (Version 29.0) was utilized to conduct all statistical analyses in this study.

5.1 Sample Distribution

Demographic information is summarized in [Table 2]. The sample included 11 participants with balanced gender distribution, a wide age range (18-41+), and diverse professional backgrounds. This variety enhanced the explanatory power and generalizability of the study.

[Table 2] Distribution of participants by demographic profile

Categories		N	%
Gender	Male	5	45.5%
	Female	6	54.5%
Age	18s-24s	1	9.1%
	25s-30s	4	36.4%
	31s-40s	5	45.5%
	41s-	1	9.1%
Occupation	Self-employed	1	9.1%
	Student	3	27.3%
	Teacher	1	9.1%
	Government employee	2	18.2%
	Professor	1	9.1%
	Financial professional	1	9.1%
	Freelancer	1	9.1%
	Public safety worker	1	9.1%
Art/Music Background	Yes	6	54.5%
	No	5	45.5%

5.2 Reliability Analysis

The 18-question survey proved to have satisfactory internal consistency with a Cronbach's alpha coefficient of 0.781. Validity testing (e.g., CFA or EFA) was not conducted due to the exploratory nature of this pilot study and the small sample size. The focus remained on internal reliability, which is consistent with best practices in early-stage mixed-methods research.

5.3 Overall Evaluation of the System

As shown in [Table 3], participants rated the system positively across all 18 items, with a mean score of M = 5.99 (SD = 0.44). This suggests that the audiovisual interaction system has strong potential to support emotional relaxation and well-being in non-clinical settings.

[Table 3] Descriptive statistics of the overall system evaluation

N	Minimum	Maximum	Mean	Std. Deviation
11	5.33	6.83	5.99	.44

5.4 Module-Level Evaluation Comparison

[Table 4] presents the descriptive statistics for participants' ratings across the three modules. All modules obtained uniformly positive evaluations, and the overall results were far above the middle of the 7-point Likert scale. Module 2 achieved the best result at 6.14 (SD = 0.60), and Module 3 was close behind at 6.08 (SD = 0.66). Module 1 ranked slightly lower at 5.76 (SD = 0.50) but nonetheless still evincing a positive response. Although minor variations were seen between modules, the overall consistency of the positive user input indicates each interactive design met with success in providing an emotionally engaging and satisfying experience. The results demonstrate that different aesthetic and interaction strategies can all contribute effectively to promoting relaxation and immersion in non-clinical settings.

[Table 4] Descriptive statistics of the overall system evaluation

	N	Minimum	Maximum	Mean	Std. Deviation
mean_mod1	11	5.00	6.83	5.76	.50
mean_mod2	11	4.83	6.83	6.14	.60
mean_mod3	11	4.67	6.83	6.08	.66

5.5 Group Comparison: The Influence of Art/Music Background

A Mann-Whitney U test was carried out to compare participants with and without artistic/musical backgrounds. No statistically significant differences were observed (U = 15.00, Z = 0.00, p = 1.00) as seen in [Table 5] and [Table 6], suggesting that the participants' evaluations were unaffected by prior creative training. This supports the system's accessibility across user groups.

[Table 5] Ranks

Art or music background	N	Mean Rank	Sum of Ranks
No	5	6.00	30.00
Yes	6	6.00	36.00

[Table 6] Test Statistics

Mann-Whitney U	15.00
Wilcoxon W	30.00
Z	.00
Asymp. Sig. (2-tailed)	1.00

5.6 Thematic Analysis of Interviews

Structured interviews with all 11 participants were analyzed using Braun and Clarke's six-phase thematic analysis framework [19]. From the transcripts, five core experiential themes emerged. Many participants reported strong feelings of relaxation and emotional relief while using the system, with particular emphasis on the calming effects of Modules 1 and 3. Several users expressed a sense of immersion and focused engagement, often describing the experience as absorbing, even causing them to lose track of time—an effect especially noted in the gamified environment of Module 2. Others described the interaction as sparking their imagination or creative thinking, citing Module 3 as particularly supportive of open-ended, goal-free discovery. Participants also often mentioned the congruence of sound and images, characterizing the audiovisual feedback as natural and rewarding, though some proposed improving immersion through the incorporation of background noises or the smoothing of the animation in some modules. Moreover, users provided practical recommendations for enhancement, including simplifying controls, sound customization options, and interaction style diversification to maintain engagement over the longer term. These qualitative results find close parallel with the quantitative results in underscoring the system's efficacy in facilitating emotional regulation, creative association, and user satisfaction. To visually represent salient user perceptions, a word cloud derived from interview transcripts [Fig. 2] underscores the most recurrent themes, including relaxation, immersion, soothing, and focus.

[Fig. 2] Word cloud visualization of key terms extracted from user interviews

6. Conclusion

This study explored the emotional impact of an interactive audiovisual participatory system based on the Max/MSP/Jitter platform, intended for deployment outside clinical environments. The system, consisting of three thematically related modules, unites sound design based on ASMR, visual style, and real-time multisensory output. It has the potential to create relaxation, stimulate associative thinking, and enhance immersion through intuitive interaction.

Findings of both the qualitative and the quantitative analyses confirm that users in general felt emotional relief, heightened concentration, and inspiration in all the modules. Participants' background in art or music did not significantly affect their experience, confirming the system's accessibility and low threshold for entry. These findings support the feasibility of applying interactive audiovisual systems to enhance subjective well-being outside clinical or professional settings.

Theoretically, this research expands the scope of well-being technologies by introducing a system that is hardware-independent and open to users without specialized skills. Practically, it demonstrates how Max/MSP/Jitter can be extended beyond experimental music to serve emotional and cognitive wellness through interactive design. The proposed three-stage experiential model, including relaxation, immersion, and creative association, offers a conceptual reference for future audiovisual system design and evaluation. Moreover, the study contributes a replicable mixed-methods framework that integrates Likert-scale surveys with structured interviews, providing empirical support for further research in digital arts, sound-based interaction, and multisensory well-being systems.

However, some limitations must be noted. The limited sample size hinders the transferability of the results, and the brevity of the intervention made it impossible to evaluate the effects on a longer time scale. The system is still in the prototype phase and has no adaptive capabilities or incorporation of physiological input. Future studies should involve more diverse participants, adopt longitudinal designs, and incorporate biometric measures to refine emotional assessment. Broader applications in education, therapy, and creative industry contexts also merit further investigation, especially in developing this system as a scalable, cross-domain platform for emotional engagement and expressive interaction.

In sum, this research provides foundational evidence for linking digital sound technologies with emotional well-being and immersive interaction. It contributes to interdisciplinary dialogue across music technology, interactive design, and psychological health, offering a path forward for inclusive, user-centered media systems in everyday life.

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