CALM: Mapping yoga practice for gestural control to externalise traumatic experiences

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ABSTRACT

CALM is from a collection of works that explore trauma through trauma-informed therapeutic models, such as bilateral coordination drawing, tapping, and existing movement practices, such as yoga, Pilates, and dance, to control and manipulate sound in performance. This work draws from yoga practice to control the amplitudes and effects on pre-composed audio layers through datagloves.

Yoga is a movement practice often recommended to manage trauma and anxiety symptoms due to the focus on one's body and the generally meditative nature of the practice. However, in cases of sexual trauma, yoga may yield the opposite of the desired results when not used in a trauma-sensitive context [9,12]. This is because the individual tries to focus on the body where they do not feel safe and encounter unresolved trauma. Thus, instead of a grounding effect, the individual hears the mental and physical pain they have endured repeating itself in the present. To reflect this, "stillness" audio material is routed to scream-like and abrasive sounds, while "movement" audio quiets the listener's internal landscape. This contradiction is the impetus of this work.

Author Keywords

Gestural control; Trauma; Musical data mapping; Movement practice

CCS Concepts

• **Applied computing → Sound and music computing**; Performing arts;

1. INTRODUCTION

CALM is a performance work from a collection of works that explore trauma through trauma-informed therapeutic models, such as bi-lateral coordination drawing and tapping, and existing movement practices, such as yoga, Pilates, dance, and conducting, to control and manipulate sound in performance and Max [4].

This work draws from yoga practice to control the amplitudes and audio effects on pre-composed audio layers through datagloves. Yoga is a movement practice often recommended to manage trauma and anxiety symptoms due to the focus on one's body and the generally meditative nature of the practice. However, in cases of sexual trauma, yoga may yield the opposite of the desired results when not used in a trauma-sensitive context [9,12]. This is because the individual tries to focus on the body where they do not feel safe and encounter unresolved trauma. Thus, instead of a grounding effect, the individual hears the mental and physical pain they have endured repeating itself in the present. To reflect this, "stillness" audio material is routed to scream-like and abrasive sounds, while "movement" audio quiets the listener's internal landscape. This contradiction is the impetus of this work.

The precomposed layers were created in two ways. "Stillness" audio was produced by destructively editing live and pre-recorded scream samples through hand gestures (closed fists, pointing, et cetera) and physical movement. This process was repeated (sampling and editing through movement) multiple times. The "movement" audio was created by making a synthesizer from the author's voice and scoring for sections of harmony for three to eight "voices" and arranged to form a pleasant harmonic movement (chord progressions loosely based on Classical choral and medieval music) to contrast the "stillness" audio. Samples were looped and affected with distortion, granular synthesis, and spectral effects.

In the final performance piece, the performer's movement is sent through Max to calculate the movements' amount and force to control the final audio's amplitudes. At the same time, hand gestures and positional data are used to control audio effects on the pre-recorded audio. The impetus behind the piece is the composer's struggles with unresolved trauma and the insistence of laypeople that yoga and meditation will "fix" the trauma when it has had the opposite effect historically. The consonant harmonies are audible through the performer's movement as they move through poses, which usurps commonly held notions of yogic movement practices (meditation and stillness bring peace). Additionally, it serves to externalise the internal feelings and sensations of trauma.

2. METHODOLOGY

This research is performative autoethnography [16], emphasising the embodiment and the embodied experience [13]. I used the MiMu/Glover dataglove system [14], Ableton Live [1], and Max [4]. The subject of this work is a culmination of my experiences and knowledge analysed against trauma-informed therapies and socio-political context. It is an illustration of how the individual's trauma may not benefit from treatments that may aid another trauma or be helpful in a different environment (for example, in a trauma-informed yoga centre run by a sexual assault crisis group in place of a general yoga studio or trauma-informed yoga run for people with Post Traumatic Stress Disorder from a car crash).

As a singer, a large part of my practice involves delving into the self to embody the emotions required for the performance to benefit the work and the audience [18]. Part of this process involves drawing up the feeling to accurately convey through voice timbre and facial expressions (which also shape vocal tone). This work removes those from the performance and leaves them solely aural phenomena.

2.1 Yoga and Trauma

Yoga is a movement practice that commonly has a meditative aspect. A wealth of studies support yoga as an ultimately beneficial management aid for trauma, but most of these studies are not designed around sexual trauma. The aspects that make yoga a helpful tool can be its downfall. For example, the focus on listening to one's body, relaxing into a position and learning to be still, and the general quiet atmosphere of the practice. For sexual trauma, listening to one's body and the quietness means that you hear the internal screaming; the stillness may invoke a

"freeze" (as in fight/flight/freeze) response or remind the person of being forced to stay in a position. Trauma is an embodied experience and often slinks around unbidden in the body [10,11]. The seemingly benign qualities of yoga can tap into the implicit procedural memory (body-based, fixed-action patterns) and trigger an individual's trauma responses when not adequately supervised or applied [9,12].

2.2 Mapping Strategy and Technology

Data is generated by the performer and is captured by *MiMu* datagloves. This is transmitted via a WiFi connection to the proprietary companion software Glover. Controls are assigned outputs as Open Sound Control (OSC) and Musical Instrument Digital Interface (MIDI) and sent to Max and Ableton Live. In Max, the OSC data for yaw (side-to-side movement), pitch (up-down direction relative to the microcontroller in the gloves), and roll are fed through patches to determine whether there is movement and how much movement there is. These are converted to MIDI Control Change (CC) values and set to Ableton to alter the volumes of six audio tracks—changes in amplitude scale with the input value.
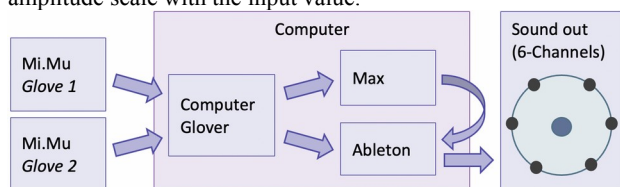

Figure 1. Data routing configuration and audio output.

Hand gestures (Puppet hand, OK sign, Open hand, Fist, 1 finger Point) are used as note on/off controls for effects in Ableton. The MIDI messages were sent through Max. These same gestures alter effect parameters (for example, dry/wet, feedback, et cetera). However, these controls are routed directly from *Glover* to Ableton. The audio effects used were Wanderer (filter delay), Chromatic (Vocoder Reverb), Ring Modulator, and Vibrato Spacial (Chorus). These were primarily controlled in pairs of effects by hand gesture with yaw, pitch, or roll. These effects were chosen to create an unearthly, digitally modulated choir sound to alter the voice synthesizer further away from sounding unquestionably human.

Figure 2. Hand gestures used to route movement to audio effects in *CALM*.

The stillness audio was created through sampling, looping, granular synthesis, and panning around a quadraphonic Surround sound environment. The audio was manipulated using *MiMu*, Glover, and Ableton Live. There were three separate control routings used in each manipulation of the audio. One for controlling the recording of samples, one for manipulating the loop samples with speed and reverse controls, and one for altering the granular controls (Max for Live plugin Granulator II [7]) through grain size, position, and HATEFISH RhyGenerator [8] – a Euclidean rhythm generator. An additional 38 audio tracks were generated by overlapping live manipulation and re-manipulation of audio. These were then parcelled into three tracks for the final work and panned in the Sound panner to separate the sound data. Older audio generated for testing the work was reused and cut up without editing through gestural control.

Movement audio was created by scoring choral music, basing the harmony loosely around medieval harmony progressions, with the density of the harmony increasing over time. I then used Native Instruments' Kontakt sampler to make an instrument of my voice by sampling my voice at every note [15]. The first 21 bars of the score were performed acoustically and blended into the virtual instrument audio. These audio choir layers were then separated into three tracks. Each of these was manipulated by the left and right hand as separate instances but spatialised to the left and right according to the hand/side of the body the audio was on. These were then altered through movement and gesture, as mentioned in this section.

3. DISCUSSION

This piece uses pre-existing movement frameworks, lived experience, and trauma-informed therapies. It sonifies data captured from the performer's movement to externalise lived experience and provide an alternative illustration of remnants of trauma. The piece has links between the works of Nora Turato, Yoko Ono, and Maria Abramovic. In this work, I have attempted to capture some of the essences of sharing of self, unfiltered communication, and aggressive textures performed by a female body. The piece invites the audience into a protected internal space that is not commonly discussed as an impact of trauma. Here, I discuss how the composition process impacted the movements, structure, and sounds used in the work, and finally, the subtext of the final output.

3.1 Composition Process

The piece was refined through practice and iterative development. Through the refinement process, the work became less definitively yoga. Initially, I chose poses and sequences based on a normal yoga flow (session). When reviewing footage of these practices, it was clear that this needed to be more abstracted. A static sitting position was then trialled to condense the viewer's perspective and space used in the performance; instead of traditional yoga with up/down dog and sun salutations, it was seated poses focusing all attention onto the movements of the hands. This was easier to film. However, it needed to link the concepts together convincingly. A blended approach was the third method trialled. Static poses include decorative hand movements to break up the monotony and reduce fatigue from the "stillness" tracks (which can become grating over time). Once this parameter was established, I refined the poses and movement sequences to create a visual progression for a gradual rise from floor to standing positions. This was refined over several months and practised using spoken guide tracks to follow the flow position (like one might have in a mobile yoga application or guided class). This guide track also works as a verbal score for the piece.

Movements used in the live piece were chosen based on providing extramusical benefits without contributing to any adverse effects. For example, Happy Baby/Ananda Balasana was excluded. Malasana (a deep squat pose) was used to put the performer in a less vulnerable position by being on one's feet, but it provides the same benefit. Areas of the body that typically carry tension due to sexual trauma include the hips, chest/diaphragm, and jaw [2]. Muscle tension is a stress reaction and can become chronic as the body wards against danger (physical or psychological). In a chronic state, they need to be loosened gradually and consistently. As a reaction to trauma, physical treatments only provide one aspect of the solution to resolving the trauma and releasing muscle tension. Sexual trauma is common among female, female-identifying, and non-binary persons, and with the #metoo movement, it is also being called out more by men. So, while I chose these movements based on their comfort for my body, they transcend my experience and could be helpful for other performers.

3.2   Subtext, and why yoga?

The piece was designed to usurp yoga as a movement practice due to the contrary effect of conventional general advice. There is a grace in yoga movements and a vision of poise and control versus similar movement practices such as Pilates. In comparison, there is near-constant movement in Pilates and a focus on specific groups of muscles. Yoga's focus is more generalised and has a more prolonged period where the practitioner holds stationary poses. There is also a layer of spiritual baggage associated with yoga, whereas Pilates is clinical and primarily concerned with functional body movement. The decorative arm movements added into the sequences take some aspects of Pilates and allow me to continue to focus on a specific area of my body to guard against unforeseen triggers that might arise.

The yoga poses used were child's pose, puppy dog, half camel and camel, turtle, saddle, mermaid side stretch, seated star, forward fold, malasana, up and down dog, warrior two, peaceful warrior, dancer, mountain, prayer; and crucifix. Some were included because they are well-known yoga poses (such as child's pose, warrior poses, and up/down dog). This intellectual referencing helps to code the movements to yoga practice – though there are obvious similarities between yoga, Pilates, and generic stretches found in any fitness routine.

Figure 3. Mermaid (left) and half-camel (right) poses.

I made modifications along the way and still use modifications to the poses to advance my flexibility, thus providing a direct physical benefit. For example, a full malasana (a deep squat) only became possible after eight months of practising the pose and working through different alterations to assist tight hips. Saddle pose still sometimes requires ungainly movements out of the pose. This, though personally aesthetically unattractive, does reinforce the performer's humanity and plays with expectations of grace and poise in the movement style. It also highlights that some poses might be quite difficult or impossible for every performer or the same performer on different days. It may read somewhat humorously as a struggle increases the movement, and there is a juxtaposition of the visuals of a person struggling to get up from the floor while a choir breaks through a veil of screaming. In those moments, it becomes an acceptance of one's state.

Figure 4. Saddle (left) and malasana (right) poses.

The core impetus behind the composition was trite and generic advice that yoga is a panacea, fixing trauma without proper support or consideration for the individual. I respect yoga as a deep traditional spiritual practice that benefits many people. However, I reject the supermarket of spirituality and commodification of Eastern spiritual traditions. Yoga is more than a movement practice taken in its original context, with thousands of years of history. This piece is not intended to

mock that practice or those that find it useful. It is also not intending to tease people with well-meaning advice (though it is so often uninvited). It is intended to illustrate my internal reactions and troubles with yogic practices and, as an extension, meditation. I hope this fosters some small awareness of the aftereffects of traumatic experiences.

At around 11 minutes (with allowed flexibility of two minutes on either side for performance and movement flow based on a performance-to-performance basis), it is hardly a complete yoga practice – which can go for 30 minutes to two hours in commercial, public classes. I believe that it is an appropriate duration to illustrate the concept without the screams becoming grating. Movement is scored to become more frequent over the duration of the piece, which helps alleviate the screaming tracks' abrasiveness. The audio also changes quality throughout, providing aural interest and easily associated with the performer's movements.

Another subtext that exists but is beyond the scope of this paper to address fully is the silencing of a female-bodied performer, the use of extended voice techniques (for example, screaming and inward phonation) and the wordless nature of the piece. The performer (in my case, a singer) is silent on stage while the screams and the singing are my voice. There is no language to translate emotions directly. The asemantic vocalisation is a key aspect of the "monstrous feminine" [3]. The female voice is expected to be pure, demure, and angelic. When it is used to express anger, especially in Western Art music, it is often wordless, reinforcing the ideas of overly emotional hysterical femininity [17]. This lack of language is used to strip women of power and intelligence. Through extended techniques, women may reclaim the language of the 'monstrous feminine' and access a lexicon beyond the traditional Western discourse. Mapping sound against the female body to create the sound while stripping the performer of their voice is an avenue to be further explored. This is a much larger discussion and is impossible to address in one short paper. I hope to address this in future post-doctoral thesis research.

4. CONCLUSIONS

CALM uses yoga movement practice to externalise an internal soundscape that occurs because of sexual trauma. Datagloves capture the movement data, which affects pre-composed audio through the performer's movement. The rate and amount of movements change amplitudes, while hand gestures and movement add audio effects to the pre-recorded audio. Poses were chosen primarily for physical benefits to relieve hip and chest tension. Yoga has proven benefits for people living with PTSD. However, it may provide the opposite effects for sexual trauma survivors. The audio is mapped to reflect this alternative emotional response caused by a movement practice becoming a physical trigger for a trauma response.

5. FUTURE RESEARCH

This work is part of a more extensive collection for my doctoral thesis, which discusses the use of voice for works about traumatic experience and the effects of trauma through an embodied interface. These works are scheduled for documentation in March 2023. Through this piece and as an extension of alternative movement practices that I have found to be (personally) beneficial, there will be a companion work based on Floor Flow [5] and contemporary dance styles. This piece will be around four minutes in duration and focus on joy through movement, where each movement flows from one to the next. The work uses the yoga positions used in *CALM* in reverse order and explores them through constant motion, which explores the sensuousness of being and feeling connected to one's body. It will use Max to track colours, and two Genki

Wave rings [6] (miniature wearable data controllers) to sonify the performer's movements. It will be algorithmically generated by the performer's position and rate of motion and contrast *CALM* by focusing on an ethereal and rhythmic soundscape.

6. ACKNOWLEDGMENTS

7. ETHICAL STANDARDS

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