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INTERSECTIONS

Walking Wounded:

A living lab & multi-media performance transforming trauma through real-time drawing and sound generated from dancers' nervous system.

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Abstract

Walking Wounded is a living lab & multi-media performance transforming trauma through real-time drawing and sound generated from performers' nervous system and unique gesture vocabulary. It gives expression to unspeakable personal and collective experiences of trauma through movement, sound and imagery, and transforms the unbearable pain and toxic shame lodged in the body through somatic release using bio-adaptive play. The project seeks to restore interpersonal connection non-verbally in a safe environment, foster resilient communities and bring movement into movement building through a four-part co-design process, culminating in a local performance. Working with dancers and non-dancers who have experienced different forms of trauma, we use multi-modal movement workshops to generate the raw material for a non-linear, constantly evolving narrative, along with sonic vibration to realign damaged attunement systems amplified through sub-woofers and set to Solfeggio frequencies.

Keywords

Dance, electronic music, biosensors, generative images, machine learning, database aesthetics, trauma, somatic system, collective narrative, biomedica, networked performance

Introduction

Most rape victims, combat soldiers and children who have been molested become so distressed when they think about the experience they split off or numb the intolerable pain as a survival mechanism to move past the trauma.

Trauma is not stored as a narrative with an orderly beginning, middle, and end, but as flashbacks that contain fragments of experience, isolated images, sounds, and body sensations that initially have no context other than fear and panic. While the mind often lacks a story that can be clearly communicated, trauma is re-enacted and wreaks havoc on the body in one's immune system, muscle and nervous system. Memory cells in the immune system can lead to the auto-immune system being compromised, whereby the

body attacks itself.

Because trauma is a contraction held within the somatic system, we are often "shaped" by terrifying experiences; they inform our worldview and impact our sense of identity, intimate relationships, physiology, emotions, behavior, perceptions, and feeling of belonging. Trauma is both an individual and a community experience.

We are also deeply impacted by systems of oppression, such as racism, misogyny and poverty, which are pervasive and when experienced chronically have a cumulative effect that is similarly life-altering, as well as intergenerational and epigenetic.

Many activists-artists working on social justice issues, like me, are walking wounded. The issues we seek to end often reflect our own unaddressed trauma. Facing the reality of and healing from trauma are essential to building effective movements and systemic transformation.

Walking Wounded gives expression to unspeakable personal and collective experiences of trauma through movement, sound and imagery and attempts to transform the unbearable pain and toxic shame lodged in the body through somatic release using bio-adaptive play. The project seeks to restore interpersonal connection non-verbally in a safe environment, foster resilient communities and bring movement into movement building through a four-part co-design process, culminating in a performance.

Methodology

Erasing awareness and cultivating denial are often essential to survival. Over time, however, these defensive strategies which numb shame often cause those who experience trauma to lose track of who they are, of what they are feeling, and of what and whom they can trust. Through music and imagery generated from the inaudible sounds of both the dancers' inner bodies, their somatic and autonomic

nervous system, the piece seeks to *compose* the fragments and re-animate the life force that lies within each of us, but is often blocked or shattered through painful life experiences. Sonic vibration amplified through an array of carefully placed sub-woofers, and set to Solfeggio frequencies serve to realign attunement with oneself and one another.

Walking Wounded explores the delicate issue of trauma through collaborating with both trained dancers and trauma survivors to generate the piece, as well as with subject matter experts on trauma to design pre and after care models. Initial theoretical research on movement and neuromuscular patterns of emotion is being further examined phenomenologically through the iterative creation process with the choreographer, Pauline Jennings. We develop deeply unconscious physical postures, both neuromuscular and energetic, as children as the limbic system is still forming between the ages of 3-7, which can give rise to embodiments of feelings and chronic mental states. Trauma, too, contributes to these somatic markers. Our unique postural signatures are often an attempt to inhibit feelings that are difficult for us to bear, and yet are entirely outside of our awareness. Like our mental life, much of our physical life, sensations, feelings, gestures, movements, contractions, releases, expansion, operate outside of conscious awareness.

But this deep patterning in the body can often undermine our capacity to lead full and healthy lives. Our physical body interfaces to more subtle interior worlds, and plays a critical role in our transformation of character. Yet, dance and performative gesture, specifically, carry the potential to *rescript* our nervous system, our postural signatures, through breath, realignment and alternate movement habits. In short, language is post-kinetic, as Maxine Sheets-Johnstone forwarded. We, therefore, possess the ability to reproduce culture through the performing body. If motion emerges out of emotion, then the opposite is also true; we can transform emotional states through activating new sensory-motor routines as a result of free, unguided bodily expression.

Working with dancers and non-dancers who have experienced different forms of trauma, this project attempts to re-pattern the nervous system through a four-part co-creation process, which consists of:

1) Workshop Series (sensing) to enhance somatic awareness, create new sensory-motor routines and establish a shared gesture vocabulary through contact improv, embodied games and multi-modal story circles.

2) Open Rehearsals (visioning) to connect personal experiences to collective narrative of trauma to transform embedded scripts, historical patterns and systemic oppression into live drawings and music generated from the survivors' muscles, heartbeat, bloodflow, temperature and motion data.

3) Multi-Media Performances (prototyping) to broaden awareness of the cumulative toll on individuals, communities, and movements and cultivate empathy in audiences through mirror neurons and a post-show dialogue.

4) Open-Source Framework & Tools (scaling) to extend the process to other social contexts and countries, enable communities to self-organize, replicate and reinterpret approach, and inspire a global movement.

To ensure our process does not re-traumatize participants, a critical dimension of *Walking Wounded* revolves around establishing strategic partnerships with leading non-profit and cultural organizations to co-design the workshop series, cross-issue rehearsal process and pre and after care models for performances.

Living Lab

A core aspect of the development process is the living lab—a sensitively designed 2-day multi-modal workshop, which we conduct through partnerships with local organizations working with survivors of sexual assault, refugee resettlement, combat veterans and foster care teens. The workshops consist of movement prompts and story circles, and culminate in a short performance. The purpose of the workshop is to enable participants to connect personal experiences to the collective narrative of trauma by transforming embedded scripts, historical patterns and systemic oppression into live drawings and music generated from the participants' muscles, heartbeat, blood flow, temperature and motion data. Movement prompts seek to enhance somatic awareness, create new sensory-motor routines and establish a shared gesture vocabulary from which to generate choreography. The unique gestures of participants are also mapped to a database of kaleidoscopic images through a machine learning algorithm. Story circles, both verbal and non-linguistic, generate raw material for the database as well as *storied objects*, which consist of custom electronics inside 3D-printed objects that trigger voice-recordings of memories through touch. The 3D scans are objects of significance brought by the participants to give away at the workshop. Through the process, participants contribute to an ongoing palimpsestual experience to transform trauma, expand their own gesture vocabulary through kinesthetic engagement, as well as gain knowledge of open-source software and hardware used to create bi-media for networked performance.



Live Performance

The final multi-media performance will be generated with the [XTH Sense \(XS\)](#), the world's first biocreative instrument and next evolution in sensory expression, which my collaborator Marco Donnarumma and I have been developing for the past 4 years. We created the first wireless prototype for one of my previous works, [\[radical\] signs of life](#) through funds from the Rockefeller Foundation. The XS captures mechanical muscle sounds at the onset of muscular contraction, as well as blood flow, body temperature and spatial information. The XS amplifies these sounds, extracts salient features, then maps them to musical and visual parameters. In this case, they will be interfaced an open-source live drawing application developed by Maria Mishurenko & Gordey Chernyy and Max/MSP custom applications created by the sound designer Kevin Patton to explore the spatial and sculptural aspects of sound, as well as thresholds generated through touch between the dancers.

A combination of contact improvisation and responsive choreography is employed as a means to both maintain the autonomy of the dancers, as well as to emphasize touch, breath and alignment. Contact improvisation is a partnering dance form, which focuses on skills such as rolling, releasing, giving and supporting weight, expanding range of spatial concentration, lifting, catching and falling all help one move with and through gravity, share weight in motion and use momentum and flow in physical contact. It focuses on body awareness: mindfulness, sensing and collecting information. Typically performed without music, and by two or more people, maintaining physical contact while moving freely. Responsive choreography similarly encourages self and other awareness, as well as builds trust in one self and the environment. Those who have been traumatized often lack a feeling of being safely and securely held, and as a

consequence self and other trust and respect.

Each participant-performer wears two XS sensors. The biophysical and motion data stemming from the XS is then be sent over OpenSoundProtocol (OSC) and mapped real-time to both the live drawing application (either directly or through a midi controller) and the musical and spatial parameters in Max supplemented by Ableton. This enables the participants to co-create live drawings real-time through their unique gesture vocabulary in collaboration with the machine learning program, as well as generative musical composition. I see visual, sound and lighting artists as performers in addition to the audience.

In addition, a machine learning application and database will map the movement patterns generated by participants in the workshops (based on Irmgard Bartenieff's Fundamentals) to a library of generative shaders, brushes and images associated with the fragmented narratives that emerge from the story circles. These live drawings will be projection-mapped onto reconfigurable screens on wheels moved by the performers to form a loose narrative. Storied objects holding lyrical fragments of memories shared by workshop participants trigger non-linearly, creating a polyphony of voices, as audience performers and members pick them up during the performance, adding a layer of emergence and fragmentation to the experience.

The set and lighting organically support and balance out the technical infrastructure as well as underscore the inner world of depersonalization, fragmentation and projection. The audiences' internal experience arc mirrors the in medias res interior landscape of trauma, traveling from stimulus response to positive disintegration, eventually arriving at presence of being—a place of absorption where one is not grasping for meaning through pattern recognition, but viscerally embodying the experience—raw energy and matter—beyond the self.

The goal of the performance is to create a communal space of ritual where ghosts are externalized into sound and image—exorcised—and healing takes place.

Technology

XTH Sense is a plug & play, hackable biocreative instrument & next evolution in sensory expression. The XS captures mechanical muscle sounds at the onset of muscular contraction, as well as blood flow, body temperature and spatial information. Through intelligent algorithms, the XS amplifies these sounds, extracts expressive features of your body: movement dynamics, muscular energy and temperature changes and establishes a pathway to interact with connected devices, musical and video software, games and virtual reality in a highly personalized and engaging way.



Anticipated Outcomes

The "night sea journey", a common trope explored by Jung, is the journey into the parts of ourselves that are split off, disavowed, unknown, unwanted, cast out and exiled to the subterranean world of consciousness. The aim of the four-part process and culminating performance is to similarly reunite us with ourselves. Such a homecoming can be as Stephen Copes has noted, "surprisingly painful, even brutal. In order to undertake it, we must first agree to exile nothing."

Walking Wounded seeks to create a safe and experiential environment in which dancers, survivors, and even audience members can work together to integrate split off parts of the self and to heal damaged attunement systems through training in rhythmicity and reciprocity. As Copes has keenly observed, "a self cannot exist as a cohesive structure apart from self-object experiences, without them, we cannot generate an inner experience of well-being. The very foundation of equanimity is the capacity to soothe the self, and this capacity we can only internalize through having been safely and securely held and soothed ourselves...all human beings who have developed the capacity to be an abiding presence can transfer this capacity in a kind of *cellular, visceral way to others who don't have it*" (emphasis mine). Being in synch with one self and others requires the integration of body-based senses—vision, hearing, touch, and balance. Treatment for trauma survivors needs to address not only the imprints of specific traumatic events but also the consequences of not having been mirrored, attuned to, and given consistent care and affection: dissociation and loss of self-regulation. The most devastating long-term effect of this shutdown is not feeling real inside. Biomedia, performative gesture and socio-collaborative play can restore attunement and mirroring. Dance activates mirror neuronal engagement and music fosters a sense of attunement through sonic resonance and communal pleasure. The creation of a safe and supportive space for kinesthetic engagement and interpersonal connection affords one an opportunity to overcome the unbearable sense of separation and transform destructive tendencies into the joyful play of a child.

Gesture also plays a critical part. It can be communicative,

instrumental and/or aesthetic. Adam Kendon defines "performative gesture," specifically, as a "learned shape or sequence that not only indicates, but instantiates, embodies a request, a plea, an offer, an invitation, a refusal." It is, therefore, hypothetically possible to bring new awareness to the body through new routine gestures, disrupting social conventions and dislodging painful embedded memories. In *Agency and Embodiment*, Carrie Noland supports this assertion. She sees the body as "a sensorium extending itself prosthetically through gesture into the world."

For Noland, gesture functions as a "nodal point where culture (the imposition of bodily techniques), neurobiology (the given mechanics of a human sensorimotor apparatus) and embodied experience (the kinesthetic experience specific to an individual body) overlap and inform one another." Specifically, Noland interrogates the interoceptive system, which entails the physiological condition of the body; it is the 'material me' that enables visceral afferent information to surface in awareness and affect our behavior, our moods, emotions and general well-being.

The XTH Sense supports a particular type of performative gesture. Because the XS does not rely upon an external object as an instrument, but instead the performers own muscle fiber, her own body, it moves beyond instrumental gesture, acting only upon the external environment. Instead the performer acts within and responds to her own intimate, bodily milieu. Operating on the level of the body's viscera, the performer's conscious sculpting of muscular tension and heightened articulatory sensitivity creates, in a sense, a direct pathway to the interoceptive system itself. In essence, my intent is to employ the XS to quiet the participant-performers' (and by extension the audiences') sympathetic nervous system through bio-feedback to neutralize stress and to rebalance the ecological assembly process, thereby creating an optimal environment for memory system consolidation, and ultimately psychic re-integration.

Conclusion

Many aspects of *Walking Wounded* have been challenging. The most difficult, however, was building in pre and after-care models with psychologists and other somatic practitioners to ensure that we do not re-traumatize participants during the multi-modal workshops. The piece has also forced me to challenge my own assumptions about and approach to social practice, to find the balance between honoring personal experiences while simultaneously abstracting the individual stories into a collective shared narrative.

Over the past year, we have also been building and interfacing various custom tools (live drawing, machine learning, sound system) that will drive the performance, but also be harnessed in the workshops, as both a means to expand the gesture vocabulary of the participants, and also begin to

build the database of gestures, images, and sounds associated with the stories.

For the next 6-9 months, we will continue to hold multi-modal movement workshops across the country with different affected communities and non-profit partners and begin integrating these tools in the experience design.

I am also currently experimenting with non-linear narrative devices to seamlessly integrate: 1) movement abstractions that signify traumatic events, 2) live drawings, and 3) storied objects with which performers and audience members can interact. As a result, a narrative arc and musical score is slowly surfacing that moves participants from stimulus confusion to positive disintegration, arriving at presence of being. This insight has pivoted me towards exploring ways to establish a process of shared ritual between the performers and audience that ethically instigates what Kazimierz Dabrowski labeled “positive disintegration;” a perceived state of over-excitability that is symptomatic of an expanding consciousness. Disintegration, Dabrowski claims, is the first stage of individuation away from the “illusion” that various forms of authoritative systems (which we internalize as the super ego) instill as a form of social control.

To comprehend this neurophysiological process, I have begun an excruciating phenomenological inquiry into my own trauma. From this, I have gleaned that it is here, beneath the layers of protective social armor, when the numbing mechanism no longer work, our autonomic nervous system shuts down catalyzed by the shame-shudder coupling, and mental dis-ease ensues, that we can restore our capacity to re-become a fully integrated human being.

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Author’s Biography

Heidi Boisvert (PhD) creates groundbreaking games, web/mobile, AR/VR and transmedia storytelling experiences for social change, as well as large-scale networked performances using bio-creative technology. She co-founded XTH, a startup that invents novel modes of expression through technology and the body. She is a Harvestworks Fellow and an MIT research affiliate whose work has been featured in Kotaku, TIME, Wired, Salon, Fast Company, Washington Post, and the Atlantic, and shown at EMPAC, Banff, Queens Museum, Kunsthalle and Waag Society.

Key Collaborators

Pauline Jennings is compelled to solve critical questions through her body and its relationship to others via responsive systems. Her choreography is aimed at providing a visceral journey for both dancers and audience that reflects a rapidly changing society. Pauline has presented work at SFMoMA, Merce Cunningham Studio, Museumsquartier Wien and Eastern Bloc (Montreal). She has lectured at UC Berkeley, Mills College, Institut Intermediaire (Prague), Univ. of Applied Arts (Vienna) and NYU-Shanghai.

Kevin Patton (PhD) is an artist and speculative designer whose primary mode of making is through creating interactive systems. He is active in the fields of multimedia theatre, experimental music, collaborative design, and interactive art. Kevin is also a frequent collaborator in installation, network art & performance art projects. He is an Assistant Professor of Interaction, Washington University.