



## I Feel Your Pain: violence prevention through shared body-state facilitated by the insula

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### Abstract

The aim of the research was to assess the applicability and efficacy of a practice that aligns the instruments and methods used within the mental health community to prevent and treat violence, with those employed by the human body to initiate and inhibit violence. Presenters assayed the applicability and efficacy of this practice through a feasibility study with mental health staff (n=750), and a pilot study with males in residential treatment with primary diagnoses associated with violence (n=10). Pilot data were subjected to Chi-square and ANOVA testing revealing statistically significant impact on violence-related outcome measures with 99% certainty. Capitalizing on homeostatic processes honed over millennia invites the potential to join with biology to prevent violence at its origin and transform treatment. We are on the cusp of a revolution as interdisciplinary research and practitioner experience collide into a vanguard response to the age-old challenge of violence prevention and treatment.

### Introduction

*“One Saturday morning in a secure youth correctional facility, residents on my unit were doing chores. We had just finished a great morning group. Everyone was on task and cooperating. It was a lovely morning. Suddenly my supervisor opened the door to my unit and began to walk across the floor. He was looking for extra linen in the cupboards in the back of our unit. I felt that supervisor’s anger in my torso before I turned to see who it was. So did the residents. When he was halfway across the unit, a fight broke out between two residents who had been getting along well all morning. The two residents*

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*shifted their focus from each other to the supervisor; the source of the aggression. That supervisor called for backup on his radio. Meaning he intended to restrain one, or both, of the residents. I found out later, that supervisor had an argument with the facility director just before walking onto our unit. He carried the sensations his body generated during that argument, from the director's office onto my unit. It was as if he was delivering visceral survival instructions. The youth's bodies picked up those visceral instructions, reciprocated that threat and helped spread those instructions throughout the milieu. Our unit went from peaceful to panic in under a minute. That argument between the director and the supervisor nearly changed the trajectory of those resident's lives. Whether the contagion begins with a client, staff, or visitor, these common events are implicated in aggression, violence, the use of behavior sequence', restraints, isolation, riots, and staff and client injuries. These responses are recorded in the resident's chart and inform their psychotropic medication prescriptions, level of placement, and length of sentencing or stay. Events like this are happening in residential facilities around the world."*

*"This specific event happened decades ago, but I knew in that moment that the language of human survival systems needed to be entrenched in the training and daily conversation of residential treatment. If the biological instruments and methods creating the chaos in that moment had been taught to staff and residents those events could have been prevented. More importantly, they could have been used to create a therapeutic roadmap."*

- Kellie Rhodes, first author

Contemporary neuroscience reveals neurobiological instruments and physiological methodology underlying violence, inviting novel approaches in the prevention, and treatment of violence. From an evolutionary standpoint the goal of an organism is to survive and thrive and pass on our genes. Survival requires continual adjustments toward optimal survival parameters. Homeostasis is the process by which our physiology is maintained within optimal survival parameters.(Damasio & Carvalho, 2013) Emotions and behaviors, including aggression and violence, begin as body-states, driven by homeostasis. Just as wrinkled fingertips indicate prolonged exposure to water, violence indicates prolonged exposure to the unpredictability of a survival resource (food, safety/safe shelter, conspecific/survival partner, well-resourced survival partner, and a survival purpose). There is a dose-response relationship between experiences of perceived resource-specific availability or omission, and aggression and violence. Acute or chronic doses of resource-specific omission can reach a saturation point in the body which presents as

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aggression and violence. The longer a human body goes without homeostatic predictability the more intense the emotion, and the more extreme the behavior. Survival relevant experiences are reflected in the spate of research regarding Adverse Childhood Experiences (ACE)(Ellis, Bianchi, Griskevicius, & Frankenhuis, 2017; Provencal, Booij, & Tremblay, 2015; Simpson, Griskevicius, Kuo, Sung, & Collins, 2012), and mental illness, psychotic experiences, and psychosis.(Bórquez-Infante et al., 2022; Kelleher et al., 2013)

Homeostasis is a system-wide endeavor. Several neurobiological instruments — the nervous including limbic and interoceptive, the immune, and the endocrine including dopaminergic systems — continuously coordinate to achieve homeostasis, keep us alive. The dopaminergic system tracks resource predictability. The predictability of resources is so vital to our survival that features of predictability, including contextual cues and what actions have been successful or unsuccessful in acquiring those resources in that individual's experience, are tracked by the dopaminergic system.(Eagleman & Montague, 2006; Glimcher, 2011; Kishida et al., 2016; Montague, Eagleman, McClure, & Berns, 2006; Niv & Montague, 2008; Schultz, 2016; Tobler, Dickinson, & Schultz, 2003) The limbic system, long recognized as the survival emotion behavior system(P. Morgane, Galler, & Mokler, 2005; P. J. Morgane & Mokler, 2006; Panksepp, 1982; Papez, 1937; Phan, Wager, Taylor, & Liberzon, 2002; Roxo, Franceschini, Zubaran, Kleber, & Sander, 2011), incorporates this information from the dopaminergic system with information from other neural and nonneural systems(Carvalho & Damasio, 2021), assesses body-states and enlists emotions to create behaviors to meet specific missing survival requirements(National Institute of Limbic Health, 2020a). Throughout human evolution, our survival often depended upon the coordinated efforts of others to alert us to threats in our environment and help us fend off predators. A biological instrument that performs this function is the insula. The insula, a component of the limbic system, is a key neural structure facilitating shared body-states through multiple embedded physiological instruments and processes; mirror neurons(Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003; Fabbri-Destro & Rizzolatti, 2008; Iacoboni, 2005; Iacoboni & Mazziotta, 2007), facial expressions(Levenson, 2003; Wicker et al., 2003), affective empathy(Eres, Decety, Louis, & Molenberghs, 2015), and autonomic mimicry(Hatfield, Cacioppo, & Rapson, 1993; Prochazkova & Kret, 2017). Shared body-state is such a common occurrence, like fish in water, we rarely recognize our exposure to it. Yet “we humans catch each other's emotions like we catch a virus”(National Institute of Limbic Health, 2020b), so much so that “people are walking mood inductors continuously influencing the moods and

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then the judgements and behaviors of others”(Barsade, 2002), which can synchronize group behavior(Hatfield et al., 1993) and increase the potential for individual and species survival(Carr et al., 2003; Hatfield et al., 1993). These collective homeostatic processes create experience-dependent neurocircuitry. The “experience-induced sculpting of emotional and cognitive pathways allows a more selective, precise, and efficient neuronal processing of environmental stimuli and thereby forms the lifelong neuronal basis for intellectual and socio-emotional competence... this early synaptic reorganization process may reflect the formation of a principal emotional template”(Braun & Bock, 2011), also known as a limbic template.(Rhodes & Rhodes, 2017) Presenters introduced background and methodology of a non-intrusive, strength-based intervention founded on practitioner experience and rigorous interdisciplinary research that capitalizes on these biological processes and instruments in a literature review, *The Pursuit of Homeostasis: closing the gap between science and practice in the treatment of aggression and violence*, published in Elsevier Journal of Aggression and Violent Behavior.(Rhodes & Rhodes, 2017)

Violence intervention requires awareness and working knowledge of homeostatic processes. Emotions and behaviors are embedded in the homeostatic trajectory. Although homeostasis is an ever-present life-sustaining process, its interoceptive nature impedes our awareness of it.(Damasio & Carvalho, 2013; Khalsa et al., 2018) Intentional exposure to homeostatic processes can heighten practitioner’s awareness of homeostasis.(Ainley, Tajadura-Jiménez, Fotopoulou, & Tsakiris, 2012) Guided practice in how the limbic and dopaminergic systems, and the insula coordinate to optimize individual and group survival, provides the visceral working knowledge required to track, restore, and maintain homeostatic predictability. These skills increase practitioner’s capacity to recognize and track homeostatic fluctuations inviting the potential to intervene prior to homeostatic initiation of violence. The absence of immersive training to increase staff awareness and visceral working knowledge of homeostasis has hindered its application as an intervention.(Rhodes & Rhodes, 2017; Rhodes, Rhodes, Bear, & Brendtro, 2021)

In the present study we hypothesize a homeostatically-informed treatment modality capitalizing on these neurobiological instruments and physiological methods has the potential to reduce aggression and violence and increase the therapeutic quality of residential milieu.

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## Methods

The aim of the pilot study was to assess the efficacy of a homeostatically-informed treatment modality in the prevention and treatment of aggression and violence. Pilot data revealed statistically significant reductions in aggression and violence. Pilot study methods and results are presented in detail at the European Congress on Violence in Clinical Psychiatry, however, are omitted from this article, as they are presented in depth in a forthcoming pilot study article. We present here the methods and results of the feasibility study conducted as a preliminary to the pilot study.

### Feasibility Study

**Objective:** Presenters conducted a feasibility study to determine the applicability and teachability of a homeostatically-informed treatment modality with practitioners working with clients demonstrating and experiencing aggression and violence.

**Procedure:** Participants were introduced to a homeostatically informed treatment modality through two-day workshops hosted by government and private agencies. Post-training, participants completed a Likert scale questionnaire.

**Participants:** Participants were employees spanning the child welfare-criminal legal services continuum (n=750). Participants included; Psychiatrists, Psychologists, Child Youth and Family Treatment Specialists, Residential facility licensing and monitoring directors and specialists, Directors and staff of Residential and community based youth treatment programs, State Division of Human Services research specialists, State Division of Youth Corrections administrators and staff, Director and staff of County Human Services, Director and staff of County foster care, Adult and youth probation, Emergency Medical and Assistance Services eligibility staff, Child Placement Directors and staff, Child protection staff, Temporary assistance for needy families staff, Family and criminal court staff, County Attorneys, supervisors, managers, directors, Healthcare Policy and Financing professionals, and State administrative personnel, as well as felons in community re-entry programs.

**Modality:** The modality assessed employs homeostasis, the limbic system, the dopaminergic system, and shared body-state facilitated by the insula. Participants learn to therapeutically employ the neurobiological instruments

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and physiological methods of the body to (1) track the predictability of homeostatic survival resources, (2) increase their familiarity with their own baseline body-state to prepare them to recognize changes or additions, (3) recognize body-states, emotions and behaviors as mechanisms facilitating homeostasis, (4) identify appropriate event-specific restorative body-states, and (5) utilize personal experience and recall to generate the restorative body-state to foster therapeutic application of shared body-state with clients. Utilizing hand-held representations of neurocircuitry (grooves) and limbic templates during training, invites participants to visually and tactilely experience how they and their coworkers perceive their client's primary body-state. The tools provide a tangible, malleable, perspective through which staff can objectively understand their own and their coworker's experience of their clients.

**Assessment:** Participants completed a 5-point Likert scale questionnaire post-training. The assessment was self-report, with the option of anonymity. Responders specified their level of agreement with a series of statements regarding the modality on a scale from (1) Strongly disagree, to (5) Strongly agree. Scores of 4 or above were coded as positive statements.

## Results

Ninety-three percent of survey respondents indicated the modality was applicable, clear, and valuable. Eighty-four percent indicated the content was relevant to their work, and 80% felt they improved their skills as a result of the training. A majority of respondents selected the highest possible option, a score of 5, for statements indicating the applicability and value of the content. Results demonstrated that the modality is highly applicable and teachable to employees working with clients demonstrating and experiencing aggression and violence.

## Discussion

Our feasibility and pilot studies appear to demonstrate an absence of knowledge within direct-care staff regarding the biological instruments and methods generating emotions and behaviors including aggression and violence, as well as the improvement possible when staff are trained in these processes. While the pilot study of the homeostatically informed treatment modality provides valuable insight into the applicability and efficacy of such training, it is important that additional and more rigorous studies continue to add to the data. Almost two decades ago UCSD Neuroscientist V.S.

Ramachandran presciently stated, “[m]irror neurons will do for psychology what DNA did for biology”. (Ramachandran, 2000) Based upon the results of our feasibility and pilot study we whole heartedly agree.

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