

The “Science of Social Justice”: An Interdisciplinary Theoretical Framework Grounded in Neuroscience, Education, and Anthropology towards Healing Intergenerational Trauma

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The Science of Social Justice (SSJ) is a theoretical framework for healing intergenerational trauma which stems from the impact of the historical and lived embodied experience of systemic oppression. It explores the theoretical assertion that social justice and well-being are one and the same thing. This paper explores neuroeducational and anthropological research on the relationship between empathy, emotions, and awareness to analyze how embodied and contemplative practices such as yoga and meditation are examples of awareness-based interventions that can serve as the means of promoting embodied social justice. In this paper the Systems-Based Awareness Map (SBAM) is introduced as a visual representation of the SSJ which has been largely influenced by the field of interpersonal neurobiology—a theoretical map and model of the relationship between internal states of awareness, interoceptive awareness, exteroceptive awareness, and external states of awareness. The SBAM is a means of demonstrating how the relationships between qualitative and quantitative measures of awareness and embodied experience, and their potential correlations might be “mapped” visually to show how these domains are potentially interrelated. This process may also to help researchers, scientists, educators, and policy makers determine how it is that trauma, pain, or various forms of violence have a negative, “contracting” impact upon individual and collective experiences of awareness, thus assisting with the development of interventions, policies, or educational programs which might help to ameliorate this impact.

Social Justice and Well-Being: One and the Same Thing?

The Science of Social Justice, hereafter referred to as SSJ, is an interdisciplinary theoretical framework that uses the biopsychosocial model of health (Wade & Halligan, 2017), or an understanding of the combined and interrelated biological (physiological), psychological (mental), and relational (relationship-based) dynamics which impact health and health behaviors, as well as interpersonal neurobiology to explore and study the impact of the intergenerational trauma. Intergenerational trauma has been defined by Isobel et al. (2018) as

a discrete process and form of psychological trauma transmitted within families and communities. Intergenerational trauma can be transmitted through attachment relationships where the parent has experienced relational trauma and have significant impacts upon individuals across the lifespan, including predisposition to further trauma. (p. 1100)

The transmission of intergenerational trauma often occurs during childhood in the form of interpersonal violence, abuse, and neglect, leading to biological changes in the central and autonomic nervous system, cognitive and psychological changes in mood, affect, and memory, and shifts in behavior that adversely impact the social matrix, health, and well-being of the person(s) impacted (Van der Kolk, 1988; Van der Kolk et al., 2005). Systemic oppression and marginalization can play a role in both how trauma is experienced in a person's lifetime, in that certain traumas can be very identity-specific, such as racialized trauma (Menakem, 2021).

This paper will firstly explore in further detail how marginalization and systemic oppression have been defined, and what their relationship is to trauma. Next, I will explore the conceptual framework that undergirds the SSJ to redefine what I mean by the words "social" and "justice" for the purpose of grounding these terms in a new way of understanding the meaning of well-being. This conceptualization of the relationship between social justice, awareness, and well-being will then be linked to a discussion of the studies which have explored intergenerational trauma transmission. Lastly, I will introduce the theoret-

ical framework for the SSJ through the lens of how it relates to learning and interpersonal neurobiology. I will also introduce the Systems-Based Awareness Map (SBAM) as a means of framing how the SSJ could be operationalized for data visualization and biopsychosocial well-being intervention development.

The central proposition of the SSJ is that social justice and well-being are one and the same thing. It explores the idea that these phenomena are so inextricably linked as pathways to one another, that they are virtually indistinguishable on the individual and collective levels of the experience of being aware. I propose that we can better understand how people can comprise communities who reflect emotional health into the world by thinking about collectives of people as *collective nervous systems*—two or more humans who, in theory, through their relationality, can share an intention to heal from internalized oppression, and thus emanate a sense of well-being into the world in a manner that influences how energy and information flows through the collective consciousness. The Systems-Based Awareness Map is one means of visualizing what a “collective nervous system” might look like as it encounters healing and trauma within a journey to holistic health. Again, part of the purpose of this paper is that I would like to give readers the opportunity to understand how it is that I came to conceptualize the SBAM as an extension of the Science of Social Justice—but I would like to also encourage the reader to challenge the concepts found herein, and to see how and whether this description aligns with their own lived experience and/or data.

The SSJ is also meant to aid in the development of recommendations on how researchers, educators, healing practitioners, and medical professionals could create educational spaces and well-being interventions to explore and study the impact of intergenerational trauma that has resulted from centuries systemic oppression to promote healing.¹ Lindauer (2021) gives a very helpful definition of systemic oppression as the following:

¹ The (SSJ) most certainly may also have implications for global marginalized peoples as well. It is this author’s hope that this framework will inspire the study of a transnational and global conceptualization of the SSJ in order to better understand how the impact of marginalization, movements for social justice, and intergenerational trauma vary according to geographic location, culture, environment, and historical context, among many other factors.

Systemic oppression (SO) is about the permanent subordination, humiliation, and domination of certain social groups due to their socially constructed lower position in society on account of the socially constructed higher position of the oppressing groups. It often happens covertly, invisible, and without any bad intention, which indicates the ordinariness of steady oppression and points to the fact that it is systemically ingrained: If nobody is able to see oppression, how deeply are we concerned by it?... (SO) is based on the (socially constructed) belief that some groups in society are less valuable than other groups because of their attachment to certain categories, like gender, sexual orientation, race, ethnicity, religion, and age. (p. 1)

Marginalization is defined in this paper as “the process whereby various groups are excluded from access to and participation in the dominant culture” (Tucker, 1990). Systemic oppression is a phenomenon which exists in the relational domain of how we are with one another, and thus, it requires the cultivation of awareness in order to “see” or perceive it in action, in order to pierce the veil of invisibility that Lindauer (2021) references above. Systemic oppression can thusly be viewed as a *byproduct* of marginalization, which includes the institutionalized processes that codify systemic oppression into policies, laws, ideologies, and other actions which sustain the hierarchy between dominant and subordinate groups of people. In the context of the United States, Black, Latino/x, and Indigenous, women, AAPI, and LGBTQIA+ populations would be examples of marginalized groups. However, I am also aware that my use of the word marginalized is a broad generalization which does not address the vast inter- and intraindividual differences and complexities of privilege and subordination which exist among the marginalized, and that not everyone who is technically classified as belonging to a marginalized group may feel that this aligns with their experience of identity.

“Marginalized” remains a helpful term to emphasize the historical reality that these groups have faced centuries of historical discrimination, structural and physical violence, and erasure due to the existence

of white supremacy, patriarchy, hetero-normativity and ableism—the existence of which has established persons who identify as white-bodied, men, persons in cis-gendered heterosexual relationships, and the able-bodied as “the norm” by which others have been considered less than. This socially constructed phenomenon of creating privilege, access, safety, and power for certain groups over others has been reproduced over the course of many generations, and continues, regardless of whether people wish to be the active participants in a harmful social hierarchy. Emotional and psychological distress and pain can exist for those who wish to be in solidarity with each other’s healing regardless of their social position, a situation which we might endeavor to cultivate compassion for. The aforementioned issues, and many which I have not been able to call attention to, form the context for which many have historically called for social justice.

Jost and Kay (2010) have defined social justice as

a state of affairs (either actual or ideal) in which (a) benefits and burdens in society are dispersed in accordance with some allocation principle (or set of principles); (b) procedures, norms, and rules that govern political and other forms of decision making preserve the basic rights, liberties, and entitlements of individuals and groups; and (c) human beings (and perhaps other species) are treated with dignity and respect not only by authorities but also by other relevant social actors, including fellow citizens. (p. 1122)

This definition is particularly helpful to establish a vision of what practices need to be put into place on a broad, external, societal level in order to bring about the systems and relationships that support social justice. However, this paper focuses more on the internal, embodied conditions of the human experience that might give rise to social justice. I hope to add in a generative manner to the conversation about what social justice might “feel” like (in the somatic sense) when practiced individually and collectively, as an expression of what it means to heal ourselves from the physical and emotional pain and trauma of

systemic oppression, which results in intergenerational trauma. If we center our emergent understanding of the meaning of the term social justice around the way science understands what human awareness, emotions, and well-being are from scientific fields such as psychology, neuroscience, and medicine, then a shift in how we expand our understanding of what social justice is about might be possible.

It is also important to mention that the theoretical exploration of the SSJ also seeks to reframe the word “justice” as “*loving-awareness-in-action*” in order to experimentally ground the concept of justice within our experience of both embodiment and what it means to act from the intentional space of love—which will be explored further in the section of this paper titled *Loving Awareness and the Healing of Intergenerational Trauma*. We have bodies, we have a sense of self, and thus, we are aware. Alain Morin states that “self-awareness represents the capacity of becoming the object of one’s own attention. In this state one actively identifies, processes, and stores information about the self” (2011, p. 807). This definition of self-awareness allows us to infer that we could develop somatic practices which deliberately apply our attention towards the identification of processes and information which contribute towards the healing of the trauma which is specific to the experience of harm related to our intersectional identities. This idea might be foundational to how we conceptualize embodied social justice and will be explored further in the section entitled *Towards Visualizing and Operationalizing the Science of Social Justice: The Systems-Based Awareness Map*.

We also know from the literature of psychology and neuroscience which explores emotion regulation, or the capacity to control one’s emotional responses (Thompson, 1994), that humans have the capacity to engage in the active reappraisal and suppression of reactive and automatic behaviors in response to pain, fear, and impulsivity, to being and becoming self-aware, mindful, and oriented around a desire to center compassion for self and others in their thoughts and actions (Koechlin et al., 2018; Olatunji et al., 2017; Hinshaw, 2003). This can have a healing impact on self and relationships by increasing empathy and prosociality (Creswell & Lindsay, 2014). Within the literature which

explores the science of mindfulness, defined as the ability to attune our awareness to the present moment, we know that the relationship between our ability to engage our attention and direct our awareness towards where reactivity is arising in the mind and body with acceptance (Lindsay et al., 2018) is often referred to as a crucial aspect of shifting our capacity to regulate our emotions and modulate our neurobiological stress response (Weinstein et al., 2009). This particular skill can provide a potential buffering effect (Creswell & Lindsay, 2014) which can lessen the severity of the subjective experience of stress. However, though the benefit of stress reduction is a crucial aspect of how we can heal through contemplative practices, the possibility that new ways of understanding the complexity of the experience of “self” can emerge from the process of attuning the mind with sustained focus and the re-orientation of awareness, is equally exciting to consider in terms of the benefits of contemplative practice.

Hollis-Walker and Colosimo (2011) state that

Because mindfulness means continual contact with experience, there is an opportunity for insight. Maintaining clear and open awareness over time allows first-hand experience of how the mind functions. Like shining a flashlight inwards, subtle mindful processes are revealed, such as how strong are reactions and how rapid-fire is the change of thoughts and emotions. (p. 222)

Mindfulness may, in fact, represent an example of a contemplative practice with extraordinary potential to support the kinds of internal processing and healing needed to mend the traumas that are specific to oppression. However, as will be explored in this paper, there is a real need for contemplative practices to language themselves in the tradition of social justice for them to be safe, trauma-informed spaces for this specific kind of healing work to occur. One excellent example of a social justice-based approach to awareness is the R.E.S.T. practice, developed by Rashid Hughes (2021), that has been deliberately cultivated to bring presence to our capacity to heal ourselves, with close attention paid to how systems of oppression constrain our capacity to embody

individual and collective liberation. This practice represents a departure from awareness-based practices which do not treat the experience of identity as though it matters, the unintentional result of which can inadvertently encourage “aggression-masquerading-as-compassion” (Hughes, 2020) by focusing too much on controlling and/or policing our internal responses to how we access the experience of being aware, as well our power and positionality in the world.

The SSJ is meant to offer up an awareness-based, embodied counter-narrative to the ways in which acts of justice have been defined and enacted by some individuals and groups as punitive, restrictive, and violent in nature. If, as Reverend angel Kyodo williams (2022) has stated, “justice lives nowhere else other than the body,” and our ability to be aware, and thus direct our awareness with intention and attention is an embodied capacity of the human experience, then loving-awareness, when enacted, might become a means by which to know and embody what justice is, or is not.

Conceptual Framework

The SSJ is a framework grounded in neuroscience because it places the scientific understanding, identification, and healing of trauma at the core of our individual and collective capacity to know how the transmission of trauma through our actions in the present, as well as through the generations, can deeply impact our way of being with one another. In order to lovingly-disrupt cycles of unmediated social and emotional pain and violence that stem from institutionalized racism, discrimination, and othering of all forms, there is a lot we can learn from science about what it means to develop a different relationship with pain and the trauma which is stored in our bodies—a relationship which allows us the tools and the safe spaces we need to feel seen, heard, and to cultivate a sense of belonging.

Research projects that wish to be grounded in the SSJ and well-being interventions might start with the central question: “How can we put the science of well-being to the service of social justice?” If justice in the context of this paper is being defined as “loving-awareness-in-action,” then it is important to also mention that the word “social” is defined

here as the “relational sphere of our shared interbeing.” Social justice, in this specific framing, then becomes redefined as *those actions and relationships which are the embodiment of loving-awareness-in-action*. It might be stipulated that actions with the intention of cultivating compassion, loving-kindness, gratitude, altruism, empathy, and prosociality, which are emotional and relational effects which have been associated with engaging in contemplative practices, may be crucial to the development of loving-awareness-in-action. Perhaps, actions which merge the internal intention to place our conscious attention and awareness on what it means to love ourselves (which involves necessarily those actions which support the health and well-being of the body) can then be extended through the power of relationship to try to heal the places and spaces which still radiate with the pain of unresolved, unintegrated personal and intergenerational trauma.

Here, it might be advantageous to name that this paper does not seek to define awareness, or even loving-awareness-in-action exhaustively, but to state some parameters by which these terms might continue to be explored in the context of reifying the relationship between social justice and well-being. Within this biopsychosocial framing of well-being, we can be in the practice of coming to understand the complexities of how our internal reality is inseparable from our external reality, and so the health and well-being of our individual body actively becomes the health and well-being of the world.

Loving-Awareness and the Healing of Intergenerational Trauma

The question remains what awareness and attention have to do with our capacity to heal trauma? Awareness is an energy of attention and intention that we are applying to our internal reality in order to impact our external reality. David Bohm and F. David Peat, in their book “Science, Order, and Creativity,” confirm this presupposition when they state that

Any discussion of awareness must...bring in the question of attention, which is closely related. Indeed, the two words are to some extent interchangeable, insofar as awareness can mean heedfulness, which also signi-

fies attentiveness. Nevertheless, there is an important difference of connotation between these two words. Thus, the word attention means literally “stretching the mind towards something. ...This implies an inner activity that is needed to grasp the object of interest... (1987/2000, pp. 214-215)

Bohm and Peat affirm the relationship between our internal capacity to be agentic and turn towards felt experiences and mental conceptualizations which in turn give rise to external realities. Perhaps when we have the intention to apply our attention and loving-awareness towards healing ourselves and one another, we may also then be aware that we are creating the conditions for a world which will begin to reflect the same thing back to us.

We can also look to the way in which Dr. Martin Luther King Jr. defined the relationship between the internal cultivation and manifestation of love and non-violence as a means for moving towards justice, and agape, a term which further situates a nuanced understanding of loving-awareness. Dr. King once stated in his pivotal essay *The Power of Non-Violence* (1958), that

nonviolent resistance is...an internal matter. It not only avoids external violence or external physical violence but also internal violence of spirit. And so at the center of our movement stood the philosophy of love. The attitude that the only way to ultimately change humanity and make for the society that we all long for is to keep love at the center of our lives...love in its highest sense is not a sentimental sort of thing, not even an affectionate sort of thing. ...when we talk of loving those who oppose you and those who seek to defeat you we are not talking about eros or philia. The Greek language comes out with another word and it is agape. Agape is understanding, creative, redemptive good will for all men.

Agape is such an impactful way to understand the meaning of justice as loving-awareness-in-action because it names the existence of *internal* (meaning psychological, emotional and spiritual) conditions as well as external violence as being in opposition to the cultivation of true justice. Agape demands the heart-level work of extending justice to anyone, regardless of their body or social location. It is similar to the statement, “if you have a body, then you deserve well-being,” which undergirds the ethos of the SSJ. In this way, those who occupy bodies which are associated with “the oppressor” and the “oppressed” are mutually bound in this quest to discover what justice looks and feels like in practice and embodiment. This means that regardless of whether we have benefited from systemic oppression or not, none of us can truly experience well-being until all of us do.

Oppression is a reality of internalized violence which lives in the body and is a great loss for humanity no matter the way in which we personally identify. Racialization, discrimination, othering, and all permutations of imagined separateness perpetuate the seemingly intractable violence that arises in any system of social hierarchy that places intrinsic value on the health and well-being of some bodies, and none on others. In the previously stated ways, the SSJ is intended to be an intentionally inclusive model for approaching the healing of intergenerational trauma. The science of understanding the influence and prevalence of intergenerational trauma has interestingly been studied most extensively in the literature of biopsychology. Many of these studies have surveyed Aboriginal or Indigenous populations around the world who have deeply suffered post-traumatic impacts from the effects of the violence of colonization, the results of which I will elaborate on below (Pember, 2016; Menzies, 2008). Yehuda and Lehrner have created an important body of work surveying the literature of epigenetics, to look at the influence of post-natal care, as well as in-utero exposure to intergenerational trauma transmission which is reflected in maternal stress during pregnancy. Though they were not able to attribute intergenerational effects in humans to any one set of biological or psychological determinants, they were able to confirm that cultural and societal experiences have a lasting impact upon our biology (Yehuda & Lehrner, 2018). Previous

analyses by Yehuda et al. (2014) examined the adult offspring of Holocaust survivors to look at both glucocorticoid receptor sensitivity as well as vulnerability to psychiatric disorders, such as parental posttraumatic stress disorder (PTSD). They found strong associations associated with negative alterations in hypothalamic-pituitary-adrenal (HPA) axis function, or, the neurobiological stress response in those persons who developed PTSD post the experience of the Holocaust, as opposed to who went through the same experience without developing PTSD. The results of the study were interestingly very similar to studies conducted with the offspring of survivors of the 9/11 attacks on the World Trade Center, in which internal beliefs about the self impacted the resilience of survivors (Yehuda et al., 2014). Indeed, how they attended to their trauma response made all of the difference between their capacity to make meaning of their experience and heal.

The state of the fields which study intergenerational trauma transmission are still in their infancy, therefore there are issues with the generalizability of outcomes. Much work remains to be done to determine more exact neurobiological mechanisms of transmission. However, all of all of these studies have identified intergenerational trauma as being deeply related to the collective experiences of trauma, the collective memories of long-term chronic stress, and the resultant biological shifts in maladaptive stress responses in the body. The production of dysregulated cortisol levels and the epigenetic inheritance of lower DNA methylation that causes the alteration of the functional expression of genes that are responsible for modulating the stress response in a healthy manner are examples of this stress response. Additionally, the studies mentioned earlier in this section with Indigenous populations around the world have linked the transmission of intergenerational trauma to a greater prevalence of mental health disorders such as anxiety, depression, and PTSD, as well as adverse health behaviors such as drug addiction and substance abuse (Bombay et al., 2009).

Another approach to the study of the transmission of intergenerational trauma can be found in the fairly recent survey of the impact of the trans-Atlantic slave trade on present day African-American populations in the U.S., whose analysis is situated in an examination of how the ex-

treme violence of slavery, as it existed across the span of over four centuries, might have effected the attachment style of some parents in the African-American community, such that the cycles of psychological and physical violence which occurred on the slave plantation in the dynamics of master and slave, can be seen in some of the adverse childhood experiences, or trauma, of African-American youth (Graff, 2014). However, these studies are relatively few in number, and in order to avoid a deficit-framing of the African-American community, as well as other marginalized communities, we must consider that these studies might not always speak to the full complexity of the adaptation, community cultural wealth, resilience, ingenuity, and loving-kindness which has also persisted in spite of such harsh historical conditions.

Though this article does not intend to systematically review or summarize the entire corpus of scientific knowledge about the transmission of intergenerational trauma, it is important to mention that in general, the impact of intergenerational trauma is biopsychosocial in nature, and thus, we also know that our approach to creating interventions that are designed to support healing from intergenerational trauma must have a biopsychosocial approach in their implementation and intended impact. It is also important that we be aware of the harmful idea that the responsibility for healing from the trauma of oppression lands upon the individual to heal using contemplative practices—social, community, economic, and policy level support is necessary to create a holistic container for this work. Perhaps at no other point in time in our recent human history have we seen the profoundly destructive institutional logic of the placement of the responsibility for well-being upon the bodies and communities of the most vulnerable, than during COVID-19.

As a global community, we have watched as communities of color in the U.S., and communities impacted by rampant poverty around the world have found that their access to the resources which support their health and well-being, or not, have made a life and death difference in their ability to survive the pandemic of COVID-19 (Seedat, 2021). By teaching or educating those who suffer from the impact of marginalization, as well as those who hold positions of authority, to create pro-

grams and interventions which support the power of creating the internal conditions for transformational healing, we can attempt to re-center well-being and the healing of intergenerational trauma as both a medical and educational imperative that can be provided to everyone on the basis of a desire to live in a healthy global society.

Positionality and Subjectivity of the Author

This paper is hoped to be the beginning of a conversation about the place of social justice in the science of the study of well-being, such that scientists, educators, health professionals, and people from all walks of life who are interested in exploring the connection between healing the self and healing society will have a jumping point from which to explore their own unique contribution to this emergent field of study. The SSJ arose from the first educational empirical investigation of mindfulness and yoga interventions being taught to low socioeconomic status (SES) youth of color in the U.S., *A Case Study of a Yoga and Meditation Intervention in an Urban School: A Complex Web of Resilience and Relationships in the Search for Student Well-Being* (King, 2017). I chose a yoga and meditation intervention inside of a public school as an appropriate case study of the biopsychosocial impact of mind-body interventions on well-being. The youth in the context of this study were identified as a population that was particularly vulnerable to systemic oppression due to their age, class status, and racial/ethnic identity (age = 12; low-SES; self-identified first generation immigrant; self-identified youth of color). They were some of the very first youth in the U.S., historically speaking, to begin to receive a yoga and meditation intervention in their school with the stated purpose of the intervention being to help them heal from trauma.

I want to encourage the reader to think of words like “education” and “learning” as extensions of the way we think about what it means to grow in our understanding of what it means to live a life of purpose and meaning, thereby extending our idea about education as a metaphor for the evolution of the self and society. I personally embody the identities of being a neuroscientist, a medical anthropologist, an educator, a mother, and Black woman. My awareness of my experience of

intersectionality (Crenshaw, 2017) and my lived experience of the harms of oppression have informed my engagement with the study of the relationship between individual and collective healing. Critically yet lovingly interrogating and *interocepting* or applying our interoceptive awareness to the body as a meaningful site of learning and emancipation has been central to the Black Liberation experience in the U.S. for centuries. As a scientist, I hope to decolonize the practice of how some scientists communicate with the public as though they are purely “objective,” and the subjectivity of their lived experience does not motivate any aspect about their research in order to intentionally shift the power dynamic. I am also hoping to re-define intergenerational trauma from the perspective that we, as humans, in our deep biological, psychological, and relational interconnectedness might see the utility in envisioning ourselves as *intergenerational beings* who are in relationship with both our ancestors and our descendants at any given moment in time, which means that we have the chance to shift our relationship with the past and the future in ways that can be generative and healing.

Theoretical Framework: Emotions, Integration, and Learning to Tap into a Collective Nervous System

Learning scientists know now that emotions are central to the process of learning. Research in social and affective neuroscience conducted by Immordino-Yang and Faeth (2010) has indicated that “emotional thought is the platform for learning, memory, decision making, and creativity, both in social and nonsocial contexts” (p. 72) and that “If [students] feel no connection to the knowledge they learn in school, then the academic content will seem emotionally meaningless to them. Even if they manage to regurgitate factual information, it will not influence their decisions and behavior” (p. 76).

By extension, I argue that if contemplative practitioners from marginalized communities feel disconnected from the healing modalities they are learning because they do not address their lived experiences, then these practices will ultimately not serve the purpose of promoting social justice. The stresses which they encounter in life and will need to cope with are specific to their intersectional identity. By coping, I am

referring to those strategies that people use to protect themselves from the psychological harm associated with different social experiences, by eliminating, controlling, or distancing themselves from a problematic situation (Pearlin & Schooler, 1978). Coping is the primary means by which we can still function cognitively when we are presented with challenges whose emotional context might make us too reactive to respond without excessive rumination (Leen-Feldner et al., 2004) or a potential diminishing of creativity (Hoffmann & Russ, 2012), skills that are important in finding innovative means of dealing with difficult life situations. Therefore, contemplative practices for the marginalized are not just about stress reduction for the sake of increasing performance and productivity but are for the purpose of learning how to heal ourselves and our communities.

The ability to adapt to stressful situations and utilize a variety of coping mechanisms to get through times of stress are skills that are not distributed equally; age, socioeconomic status, and cultural background all factor into the levels of stress experienced and the types of coping mechanism employed (Oláh, 1995; Williams & McGillicuddy-De Lisi, 1999). Identifying as a person of color, combined with the experience of racism or race-related stress, decreases subjective well-being and increases the experience of stress above and beyond that of everyday stressors not linked to racism. This assessment of race-related stress is particularly advanced for those who identify as African-American but also remains salient for the experience of Asian-Americans and Latinos (Sellers et al., 2003). Chronic stress is a deeply emotional experience which is linked with the neurobiology of trauma and has ramifications for the awareness we bring the context of our relationships.

Immordino-Yang (2016) has stated that “Emotions, and the more biologically primitive drives that undergird them, such as hunger and sex, are action programs that have evolved as extensions of survival mechanisms. Put simply, emotions have evolved to keep us alive” (p. 18). This description helps to illustrate the embodied nature of how we feel what we feel and how this extends into the ways we behave. This includes ways of being which are deeply motivated by the need to survive—including the ways in which we can “other” and enact violence

on those who we perceive as being different from us. One could say that in fact, the ability to regulate one's emotions is an essential aspect of the ability to produce an experience of self that is integrated, in that all the parts of the whole self are expressive of a state of well-being. The capacity to integrate challenging emotions in the moment they are being experienced is a tool of healing that is vital for the progress of social justice-as-well-being.

Dan Siegel (2020), the neurobiologist who pioneered the field of interpersonal neurobiology, has recently defined emotion in terms of its relationship to the concept of integration. He states,

The linguistic term we use for the linkage of differentiated parts into a functional whole is the word integration... What I am suggesting isn't even that emotion leads to integration. What I am suggesting is that emotion *is* integration. In this way, for example, an emotional experience is one that shifts our state of integration. Emotional development promotes integration. Emotional well-being reveals an integrated individual. We can increase integration in cases of emotionally meaningful events and when we feel emotionally well. Similarly, we can decrease integration when we are emotionally distraught or emotionally unwell. (pp. 149-50)

Why would the idea of integration be important to create healing for individuals and communities seeking social justice? Integration as emotion reflects a state of overall health and homeostasis on all levels of an individual and their community. Having access to the full range of our emotions and the ability to regulate them represents minds and bodies that have built the capacity to harness their available skills and strategies to successfully and creatively navigate a very complex, ever-changing world filled with an astonishing variety of others, all of whom have something to be learned from. The ability to maintain emotional homeostasis is fundamental to the make-up of a person who can learn from past experiences, relationships, and environments, whether adverse or pleasant, and bring elements of these lessons into the

present moment, to forge a future in which the fullness of their potentiality as a human being has the possibility of arriving. Contemplative practices can help us open to the possibility of healing from intergenerational trauma because we cannot heal from that which has been concealed from our own awareness.

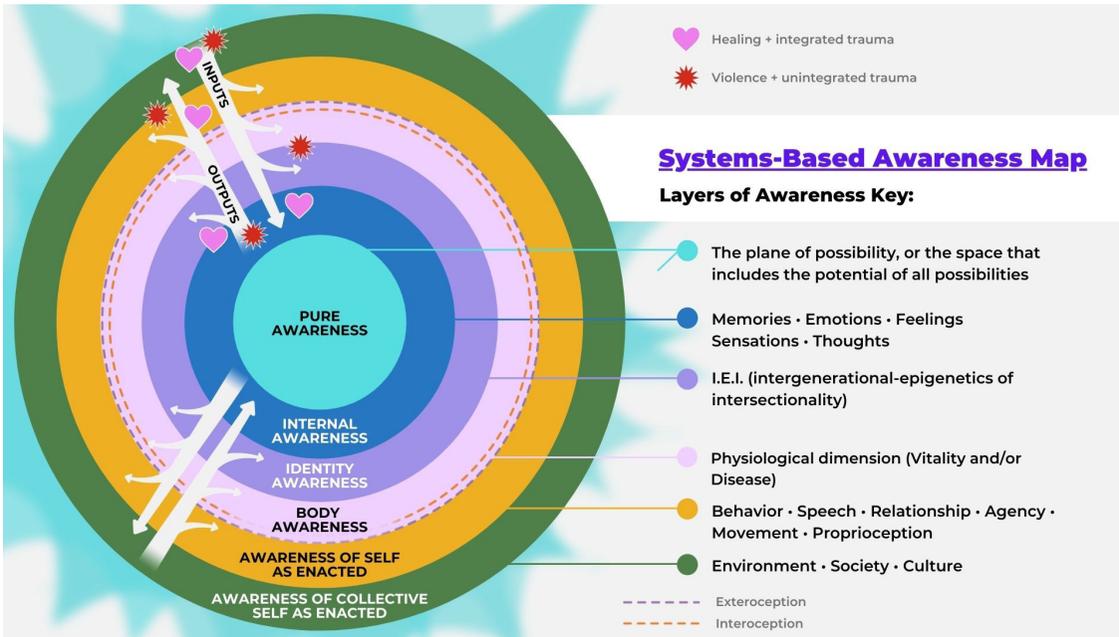
Towards Visualizing and Operationalizing the Science of Social Justice: The Systems-Based Awareness Map

The Systems-Based Awareness Map (SBAM) is a theoretical model of the relationship between our experience of internal awareness, which includes interoceptive awareness, and our external awareness, which includes exteroceptive awareness, and how these might be impacted by the pain of intergenerational trauma, or healing. Garfinkel et al. (2015) have developed a 3-part model that makes the important distinction between interoception, which is the sensing of internal bodily changes and is deeply linked to emotion and cognition; interoceptive accuracy, or how people perform on objective tests of interoception; and interoceptive awareness, which is the meta-cognitive awareness of interoceptive accuracy. Exteroceptive awareness is a key component of how we map the experience of external stimuli onto our internal experience of self; together, interoceptive awareness, exteroceptive awareness, and emotional awareness provide the key functions for how we experience body awareness, such as how we feel our body in relation to space, and our capacity to express agency (Salvato et al., 2020).

The SBAM, which is a visualization of what *might* be the relationship between how we experience different yet interconnected layers/domains of awareness, is meant to aid in the development of an understanding of how our internal experience of self and our external experience of the world “map” onto one another, and thus, are always informing how the other takes shape. This concept has been discussed in some detail throughout this paper, and has deep disciplinary roots in the field of interpersonal neurobiology. The SBAM, as it stands right now, is not a complete representation or form of data visualization, but I hope that it will develop over time with collective input to become a theoretical model that has utility in helping to describe what collective

trauma and/or healing looks like, to help us understand how to visualize how the collective nervous system functions when in optimum health, or not.

Figure 1
The Systems-Based Awareness Map (SBAM)



Note. The Systems-Based Awareness Map (SBAM) containing the 6 layers of awareness: “pure awareness”; “internal awareness”; “identity awareness”; “body awareness”; “interoceptive awareness”; “exteroceptive awareness”; “awareness-of-self-as-enacted”; “awareness-of-collective-self-as-enacted.” Interoceptive awareness has been placed just inside of body awareness to infer its function in meta-cognitive awareness of internal functions (how we feel inside) and exteroceptive awareness has been placed just at the boundary between body awareness and awareness-of-self-as-enacted to infer the boundary between our skin, and our sense of having a body within the world. The theoretical movement of “healing” is indicated by the pink hearts. The theoretical movement of unintegrated trauma is indicated by the red stars. Neither healing nor trauma are being defined within this construct, but are nonetheless meant to be explored for their relation to the various layers of the map.

The SBAM (see Figures 1 and 2) is also meant to help guide in the visualization of how, in theory, the experience of pain or trauma, or the healing and integration of trauma, impacts each of the layers of awareness concomitantly by imagining how each layer, in a three-dimensional model, would “expand” or “contract” according to where trauma or healing processes locate themselves and move in different regions of the map. In this way, one could imagine that the expansion of awareness in one area of the map, since each of the layers is deeply inter-related, might catalyze an expansion of awareness in some other area of the map—the same which could be said if, for instance, a particular layer of awareness was underdeveloped for different biopsychosocial reasons—then perhaps that might have ramifications for contractions in other areas of the map. The layers within this two-dimensional model, and the arrows which signify the movement of energy and information, seem as though they are impermeable when in fact all of the data that can be housed within can move to any region of the map where relationships or correlations are found via data analysis. The map is also an emergent concept, and so, it remains yet to be seen how every human’s experience of self can be interpreted through it.

From here, it might be helpful to ground the SBAM in an understanding of how it has been informed by prior disciplinary work. Inasmuch as the SBAM is a tool for exploring and visualizing our experience of awareness, is it also an exploration of the nature of the mind-body relationship. Siegel’s (1999) creation and exploration of the field of interpersonal neurobiology (IPNB) and his definition of the three facets of the mind were extraordinarily pivotal in the development of the SBAM. Siegel (2020) defines the possible three facets of the mind as the following:

One is *subjective experience*. Even if mind were completely dependent on the brain, and the brain in the head alone, placing our first-person experience, our inner subjective felt texture of life only in the head does not make subjective experience *the same* as brain activity. Subjective experience is one unique aspect of what we mean when we use the term, mind. Even if

we say, “What is on your mind right now?” this inquiry naturally would involve the brain’s activity, but it might also include the sense of the body, the feeling in relationships with others ...

A second facet of mind that also cannot be reduced merely to brain activity is the way we *know* we are having a subjective experience. This knowing emerges with being *aware*, one component of what is meant by the term, *consciousness*. Being conscious usually involves both the subjective experience of knowing, and that which is known ... Again, even if this experience of being aware were to be completely dependent upon neural activity in the head, this knowing of being aware is not the same as neural firing ...

A third facet of mind that might include the common descriptions of thought, memory and even emotion is *information processing*. This way of symbolizing something with meaning in what are sometimes called representations can occur within the body and its actions, what is sometimes called embodied and enacted cognition. Such information flow can also happen in your computer, and we call that extended; it can also surround you in cultural patterns of communication and we call this embedded cognition. Information processing—whether embodied, enacted, extended, or embedded—does not need consciousness to occur, and in fact, much of information processing may be happening without our awareness. (p. 3)

The SBAM is meant in part to be a tool for visualizing the complex relationship between the three facets of mind as Siegel has described them above. It is hopefully experienced as an intuitive extension of what it feels like to be conscious of your own subjective experience, and how this might shift, for instance, when practicing with connecting to differ-

ent types of awareness in the context of contemplative practices. It is meant to help us ask: What does it mean for us to become aware of the energy and information flow from within the experience of having a “self” that is embodied, enacted, extended, and embedded within this world—and how do we make sense of that in the context of understanding what it means to heal and integrate trauma? Perhaps part of how we accomplish this is by deliberately including the qualitative with the quantitative; the unmeasurable with the measurable and experimenting with how we form language and imagery around that. For instance, provocatively, the innermost layer of the SBAM (see Figures 1 and 2—the central blue circle) starts with what I have titled “pure awareness,” or a representation of the quantum field from which quantum physicists have determined that all energy and information in the universe arises from within spacetime (Doplicher et al., 1995). Siegel (1999, 2020) refers to this realm as the “plane of possibility,” meaning, the space from which any potential experience of self or the world can emerge. One could imagine this as the space from which dreams, imagination, or other complex and unquantifiable phenomena emerge into human consciousness.

The reality of your subjective internal world, inside of your skin, is a reality which no one else can directly know but you. It is filled with the constant processing of memories, emotions, feelings, sensations, and thoughts. All of these are happening automatically for you thanks to the workings of your central, autonomic, and peripheral nervous system, in concert with the rest of your body. You do not need to ask the body to “perform” these actions for you, which makes for a seamless experience of “you” at all hours when you are awake. These actions can happen without you paying very much attention to them, and thus you remain “unaware” of how or why they are happening. On the other hand, you can apply the power of your attention to this process of the emergence of experience from the internal world to the external world as they are happening, and thus become “aware” of their happening. When you apply your attention deliberately to your internal states of being, this is called “internal awareness” (see Figure 1—the dark blue circle). Perhaps, by becoming conscious of our formerly unconscious internal process-

es, we can bring a whole new feeling of agency and empowerment to everything that we do.

The next layer of the SBAM is called “identity awareness” (see Figure 1—the purple circle). Identity is a lens through which we are socialized to view the world. We are not born with an identity; it is applied to our inner life by what we learn from others around us, within our external reality. You could say that it is transposed onto our consciousness. This means that there are aspects of our identity that are applied to us without our agency. Everyone has an identity, but how we perceive our identity changes and shifts over time as we receive energy and information from our experience of all the other layers of awareness, our relationships with others, and the socio-cultural cues we receive from the world. Additionally, we cannot be aware of how our identity is being interpreted in the eyes of someone else, which has some bearing on how we will be treated within the world—particularly, whether we will experience ourselves being discriminated against, or not. In theory, whether the function and perception of our identity is being consciously apprehended by the mind and incorporated into a person’s awareness, it still has the power to affect change on that person’s life, as others continue to perceive us through the lens of their own identity awareness. This dynamic will also have some impact on the shaping of our internal awareness because of the thoughts, memories, emotions, sensations, and feelings that arise in relationship with how we are treated in the world.

The way we perceive the identities of others may also unconsciously trigger us to behave in certain ways that are more welcoming, playful, compassionate, and inclusive, or more unfriendly, hostile, or even violent towards those we perceive as being different from us. Identity is like a pair of glasses that is constantly coloring our reality. We are wearing these glasses all the time, but until we actively pay attention to who and what is informing the shape of these glasses, we cannot fully understand why we perceive the world and our relationship to it in the way that we do. We might, in some ways, remain outside of the locus of our own agency regarding identity because we have allowed it to be applied to us, rather than us defining its contents through the power of our own awareness. We all have “identity awareness” (see Figure 1—the

purple circle) but we might remain ignorant of its true impact on our sense of self and the world.

We may have a sense of identity that relates to the experience of “self” as singular, or we may have a sense of identity that relates to being a part of a larger whole, such as our family, culture, organization, or nation. This experience of awareness could be an integral part of the experience of “collective self”—it is an expanded sense of self that goes beyond the “I,” to “We”—that can be embodied, enacted, extended, or embedded into the world. In this way we might begin to see how internal, identity, and collective awareness-as-enacted are deeply inter-related. Because identity awareness within the theoretical framing of the SBAM is deeply informed by our internal awareness, as well as our awareness of our body in general, the less aware we are of the complexities of our identity, the less able we will be to perceive and understand how and to what extent our internal reality impacts our external environment and vice versa. Our identity is always, whether we realize it or not, a matter of the “intergenerational-epigenetics-of-intersectionality (I.E.I.)—meaning, our identity is informed by the generations of ancestors who came before us (intergenerational), and the relationship between where they lived (the environment) and what genes were passed on to us (epigenetics). It is also an intersectional experience, in that the way we perceive the interconnected facets of our race, culture, gender, etc., always intertwines and “colors” the way we see the world and are treated within it.

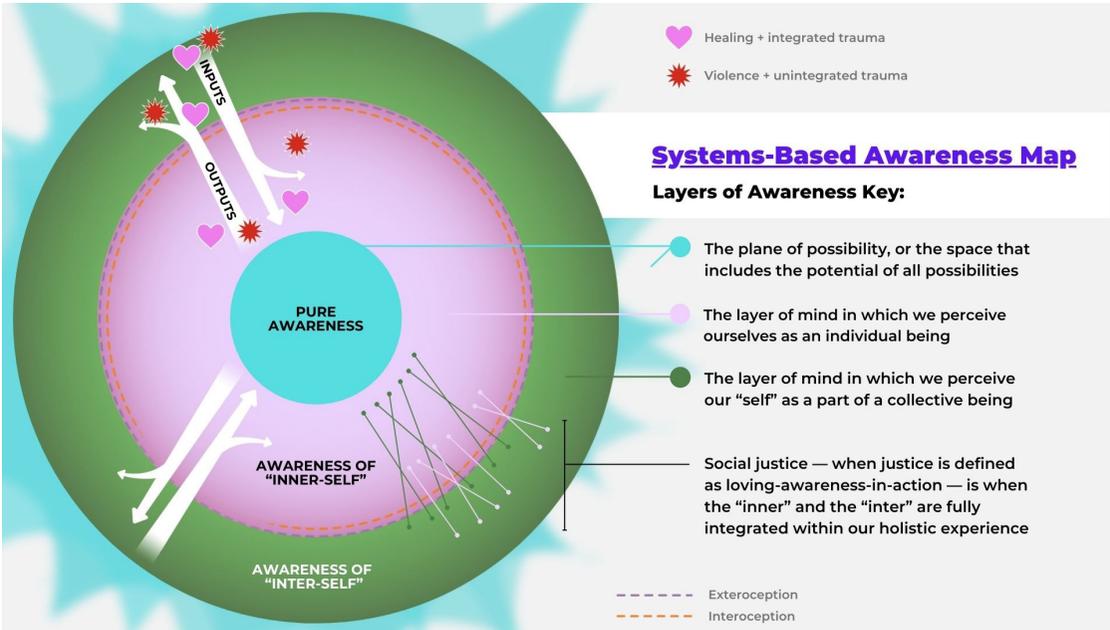
Our system of internal awareness is always in conversation with our identity awareness. Information from our internal awareness and our identity awareness is always informing the experience of our “body awareness.” Our experience of the history and current status of our health and vitality, or of our experience with disease and pathology, are included within our body awareness (see Figure 1—the pink circle), and deeply related to our behavior, speech, agency, movement and proprioceptive awareness (awareness-of-self-as-enacted), sharing a great deal of information and thereby defining a huge part of what we consider to be our overall well-being.

However, as a thought experiment, take a moment to consider what it is like to be all alone by yourself, doing nothing. Just sitting there, observing the world around you, you are not necessarily acting upon the world and therefore your subjective experience has not necessarily become externalized into the world. The minute that you move your body in the direction of another body—that you speak, or behave, or express any manner of agency in relationship with another being—your sense of “self” becomes enacted in the world (see Figure 1—the golden yellow circle). When you pay attention to who you are, in the sense of your combined internal, identity, and body awareness, then you also become aware of how your internal reality gets projected into the world and impacts other people’s reality. This creates a “shared reality” or a “collective nervous system” that you can be aware of in your proprioceptive awareness (how you know where your body is in space) as you cultivate awareness of yourself as enacted, embedded, and embodied within the world.

From there, one might in theory extend a growing connection with inner, identity, and body awareness, to become aware of a sense of self that feels it belongs within this shared collective reality. Everything that occurs in the environment, society, or cultural spheres becomes integrated into a sense of self which has multiplicity and is a “collective self.” Cultivating an awareness of how this collective self then gets enacted onto the world and literally becomes the world around us is awareness of the collective-self-as-enacted (see Figure 1—the dark green circle). What this means is that the extent to which each one of us cultivates the ability to pay attention to the systems that are arising inside of us at any given moment and notice the relationship between our internal and external worlds as they co-create one another, is also the extent to which we can develop “systems-based awareness” for ourselves. Perhaps how we individually experience healing and the integration of trauma through developing a unique relationship to what is within and between the layers of awareness—all nested within the experience of the mind-body connection—might be key to revealing how we as a society understand the impact of trauma and/or well-being. When the flow of energy and information from the well-being of the self-as-individual-be-

ing reflects the well-being of the self-as-collective-being, perhaps this is what we mean by the term “social justice” (see Figure 2).

Figure 2
Systems-Based Awareness Map: Layers of Awareness



Note. The SBAM where the three inner layers of awareness (internal, identity, and body awareness) are nested within the pink circle “awareness of inner-self” and the two outer layers of awareness (awareness-of-self-as-enacted and awareness-of-collective-as-enacted) are nested within the green circle “awareness of inter-self.” The pink lines represent energy and information flow from inner-self to inter-self. The green lines represent energy and information flow from inter-self to inner-self.

The question remains, how might researchers go about using the SBAM as a tool for interdisciplinary data visualization and analysis? Im-mordino-Yang (2013), in her paper exploring how ethnographic and neuroscientific research methods can be complementary to one another, suggests,

cultural neuroscience, with its roots in anthropology and cultural psychology and its branches gathering biological evidence, is in a perfect position to develop this interdisciplinary method. This approach could enrich the interpretation of purely biological or behavioral evidence by helping to uncover relationships between reasoning, feelings, and meaning making, on the one hand, and neurobiological mechanisms, on the other. (p. 42)

Perhaps, then, it could be said that the SBAM might find its greatest interdisciplinary anchoring within interpersonal neurobiology, anthropology, and cultural neuroscience. Importantly, though the version of the SBAM in this paper is two-dimensional, in future iterations, it is meant to “come alive” in a three-dimensional sense. With the addition and interaction of both qualitative and quantitative data sets, particularly those which have been informed and structured by interdisciplinary work that allows for information from lived-experience and story-telling to be sorted (into emergent patterns, coded and analyzed), and other neuroscientific psychophysiological research methodologies such as fMRI or measurements of heart-rate variability (HRV), this kind of data visualization is entirely possible—and will be the pursuit of future projects who find a “home” for themselves within the study of the Science of Social Justice.

By layering the aforementioned information within the map, this data visualization methodology would in theory allow research scientists to examine, for instance, the neurobiological correlates of automatic emotional responding and how these relate to differences in behavior, identity, and self-reported thought processes (attributed to meaning-making), which could be gathered through ecological momentary assessment in order to develop a more nuanced understanding of how these relate to the occurrence of biomarkers of health (such as within neuroendocrine and immune systems) and health pathologies on a moment-by-moment basis. This might allow us to establish a deeper understanding of what the relationship is between how people experience the layers of being aware, the mind-body connection, and

the ebb and flow of their experience of trauma, health, and well-being. The capacity of the SBAM to factor in the experience of identity, including what it means to be aware of ourselves as intergenerational beings, whose epigenetics and experience of intersectionality matter in terms of how we understand our capacity to be aware of the function of the inner, to the inter aspects of being, personally gives me great hope. Perhaps, with continued work on this topic—including critical interrogation of the accuracy of the ways that each layer of awareness has been defined in this paper, researchers will refine the SBAM and co-create a tool that gives us the ability to see how the science of well-being might truly be put to the service of social justice, for the betterment and actualization of planetary health for us all.

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