

# A Non-Directive Positive Reinforcement Framework for Trauma and Addiction Treatment

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## ABSTRACT

People grow and heal through support. This paper argues that mainstream addiction treatment is prone to reinforcing states of negative affect and negative urgency in the client. These states, especially the latter, keep the client's biology stuck in negative reinforcement – in oscillations of negative affect followed by relief of negative affect, which then potentiates the next cycle of negative affect, and so on. This is the addiction dynamic, broadly considered. This paper outlines a protocol, within a shaping paradigm, to create a positive reinforcement framework for addiction and trauma treatment. This Organic Intelligence® (OI) framework establishes natural relational conditions that are guided by a free association conversation. Therapeutic attunement and a specific reinforcement process amplify the client's eventual pleasurable and meaningful reflections in the here-and-now, gradually enabling the client's biology to break free of the dominance of the ubiquitous negativity bias. OI proposes this fundamental clinical shift from negative to positive reinforcement because it aligns with the primary, organic impulse – not to process trauma or the past, but to enhance processing capacity.

**Keywords:** Addiction, trauma, organic intelligence

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*In addiction, reclaiming  
and reassociating pleasure  
pathways is necessary,  
and will require careful  
supervision in supporting a  
lifestyle change to sobriety.*

The cost of addiction to individuals and society is staggering. Not surprisingly, global health, governmental, and commercial responses proliferate, with seeming aims ranging from education/amelioration to profiteering. As the co-occurrence of addiction and trauma has become more recognized, high-profile treatment centers in the U.S. – such as The Meadows, Sierra Tucson, etc. – recruited high-profile trauma professionals to affiliate with their brands. Trauma methods like EMDR® and SE® were soon incorporated at numerous addiction centers. However, questions of efficacy and negative outcomes have emerged, and there is limited incentive to assess negative outcomes of somatic intervention protocols, including in commercial treatment environments.

For somatic treatment, as with psychotherapy generally, the assessment of harmful outcomes is mostly lacking. There is cause for concern regarding unwanted outcomes, since the field of somatic trauma therapy, still in its infancy, mostly lacks research-based guidance for treatment protocols. However, the field of interpersonal neurobiology stands with a unique opportunity at this early stage of its development to reconsider traditional concepts of therapy that are incorporated into somatic treatment. Furthermore, care for risk management is especially important, given the vulnerability of those struggling with addiction. The authors hope to inspire interventions with a greater eye toward harm assessment and reduction. The reconsideration

of treatment frameworks and basic assumptions as they relate to addiction here serves to highlight the most salient considerations for therapeutic success generally, and especially for treatments aiming to be somatically and trauma-informed.

“The problem of adverse effects of psychotherapy has been recognized for decades, yet research on causes and prevention of harm has failed to progress.” Here, Parry, et al. (2016) join a small chorus in the indictment of unwanted effects in therapy. Challenges to merely assessing prevalence are numerous and daunting. While estimates of the prevalence of negative effects are sobering (cf. Strauss et al., 2021), still more concerning is the fact that such assessments themselves likely undercount prevalence. They are confounded by well-known biases in survey methodology. Cognitive dissonance, for instance, would say that paying a price, in this case monetary or emotional, for something lends value to whatever is acquired. Negative reinforcement suggests that cessation of an adverse process actually reinforces that process. And the repeated suggestion in the culture of therapy that pain is a necessary part of growth – rising even to the nadir of a healing crisis – surely skews clients’ perspective post-process.

Trauma therapy arises almost exclusively from within this feel-the-distress framework, as it relies on exposure, anti-repression, and processing models founded in the earliest Freudian and Reichian notions of therapy. It seems to strain credulity: How can we process trauma if we avoid it? However, these basic assumptions are misleading. Therapists and their clients do not process trauma; they experience neurobiological states in the here and now. To work therapeutically with such states, it is necessary to first understand the dimensions most relevant to how they function in the biology, and how they maintain and change – including how states that shift from moment to moment can change to enduring traits.

The most salient characteristics must be understood within a framework of complexity science. Such a framework highlights how our biological systems organize, maintain the status quo, or disorganize. Ahead, we will discuss how positively valenced intensity can catalyze organization in human dynamical systems. The key dimensions for a dynamic systems understanding are:

1. Overall intensity level
2. Valence – positive or negative
3. Acceleration/deceleration as a function of inhibitory and disinhibitory biologic conditions

Every system has a threshold where intensity will fragment or disorder that system. Negative intensity, however, largely keeps the system’s status quo by reiterating negative intensity states through negative reinforcement and the negativity bias. Addiction treatment is largely ensconced in reiterating negative states – thus

maintaining the system’s status quo through that negative reinforcement.

The hazardous role of negative affect in addiction is well known. Measelle et al. (2006) demonstrated that negative affect is a prospective correlate of substance use. However, even more discriminative than negative affect alone is “negative urgency” (see Kaiser et al., 2012) – the habits or impulsive strategies – like substance use, for instance – for lessening negative intensity. We propose to:

- Explicate these dynamics with an alternate framework that relies on the understanding of complex systems, such as allostasis and large-scale brain networks.
- Outline OP’s relationally attuned therapeutic work with clients’ spontaneously occurring (and recurring) states, which can increasingly be shaped within a positive reinforcement paradigm.

This new paradigm notwithstanding, addiction and trauma are serious, even life-threatening conditions that often require multidisciplinary treatment approaches. Thus, there are numerous evidence-based approaches to treating addiction and trauma, including CBT, exposure protocols, introspective and interoceptive excavation of traumas, assignments of self-care practices, and joining community. However, we believe that harm will be reduced when we reexamine what underlies most therapy: the process of creating and maintaining an aversive level of intensity in the client. This uncomfortable intensity is the source of a severely under-recognized form of harm. One reason that it is under-recognized is that most people – including therapists and clients – believe, explicitly or implicitly, that harm is good: “No pain, no gain.” “It may get worse before it gets better.” “To heal and grow, we need to get out of our comfort zone.” Thus, both therapists and clients are liable to interpret suffering in therapy as positive – as signs of healing and growth.

We propose a radically different model: working at a lower and even pleasant level of intensity. This enables the addicted person to gradually move away from top-down efforting, from managing their system, to something much more easeful and beneficial. Our biologies have the capacity to heal and grow on their own, and a comfortable level of intensity is fundamental to enabling this innate process.

A therapeutic program that focuses as much as possible on sustainable comfort and minimizing swings to discomfort operates on a framework of positive reinforcement: a framework that teaches the client’s physiology that it’s possible to feel better *by feeling better*. This contrasts with negative reinforcement, a framework that reinforces in the client’s physiology that feeling better must always in some way be attached to feeling worse, e.g., I felt better *after* that unpleasant session in which I had to feel my uncomfortable feelings, or *after* I did

practice X (e.g., exercise, journaling, socializing), even though it was uncomfortable to do.

A positive reinforcement framework is the essence of Organic Intelligence® (OI), a therapeutic approach that has been taught and used with anecdotal success by hundreds of OI students internationally. While processing negative intensity associated with trauma is the current norm, one of the main discoveries in OI is that humans can increase processing capacity through increasing intensity of positive valence. In this way, the physiology can increase its capacity to handle intensity easefully, automatically, and autonomically. This frees up time and energy for people to pursue meaningful lives – as opposed to spending so much time, energy, and attentional focus on managing their systems.

Positive reinforcement is especially indicated for the treatment of addiction and trauma because these conditions are fundamentally disorders in the biology's processing capacity. In this paper:

- 1) We make a case for understanding addiction and trauma as disorders in biological processing, including information processing.
- 2) We introduce OI theory and its scientific background: OI offers a way to increase the capacity to process intensity autonomically. The key to catalyzing this increase in capacity is a positive reinforcement framework for therapy in a here-and-now context.
- 3) We explain how OI can be used to create a positive reinforcement framework for the treatment of addiction and trauma.

## Addiction and Trauma as Disorders in the Biological Processing of Intensity

Koob and Moal (2000) have argued that addiction is a disorder in the biological processing of intensity, i.e., of the biology's capacity to process intensity automatically and easily, without requiring effortful management by the person. Trauma, we suggest, is a similar disorder. Many are familiar with the ACEs study (Felitti et al., 1989), which demonstrated that trauma had been an under-recognized factor in substance abuse, as well as a host of other disease conditions. The profound and under-appreciated import of this study, bolstered by subsequent confirming research (Centers for Disease Control and Prevention, 2021), is that the effects of trauma land firstly in the biology, the soma, before manifesting visibly in the psyche. Interventions for both addiction and trauma, we therefore suggest, must somehow have a coherent strategy for change at the biological level. In this section, we elaborate on how addiction and trauma are disorders in the biological processing of intensity. This lays the groundwork for the next section, in which we introduce a theory of how change can be catalyzed at the biological level.

Addiction and trauma manifest in the biology through various forms of uncomfortable intensity, or stress, e.g., unpleasant emotions, sensations, images, and thoughts. Some might think that adopting a perspective on addiction and trauma as being forms of stress downplays their seriousness. This thought, however, underestimates the seriousness of stress itself. We would like therefore to elucidate on stress, its seriousness, and its relation to trauma and addiction.

Stress is a biological state, with associated effects on felt experience, in which the demands on one's physiology exceed the physiology's ability to easefully process those demands. In this systems processing definition, stress is known as allostatic overload, which is the total load of demands on the physiology. The demands for processing can arise internally or externally. If there is too much demand, too much intensity from within our physiology and/or from environmental demands, our physiology is stressed, and we may feel stressed.

The four general conditions for stress, or allostatic overload, are "(a) repeated 'hits' from multiple stressors, (b) a lack of adaptation or habituation, (c) prolonged response due to delayed shutdown, and (d) inadequate response that leads to compensatory hyperactivity of other mediators" (McEwen & Gianaros, 2011, p. 3).

Stress has been demonstrated to be so integral to addiction that addiction has been conceptualized not fundamentally as a brain disease, but as a stress disorder (Ruisoto & Contador, 2019). Ruisoto and Contador link brain and stress with brain-change inclusive concepts, including addiction as a learning/social learning disorder, a reward deficit disorder (an anti-reward excess disorder), an executive function disorder, and a brain stress disorder:

...[S]tress exposure and drug abuse result in the progressive up-regulation or excess of the brain stress system (till now referred to as the "anti-reward" brain system), which is the key to understanding the stress-like state of the negative emotion/withdrawal stage, driving drug-seeking and taking through negative reinforcement. This up-regulation results from the increase in the reactivity of the HPA axis and amygdala, also increasing hypersensitivity to stress. It is, therefore, involved in the relief-craving. Furthermore, repeated exposure to drugs and withdrawal from drugs can be considered, in themselves, as stressors, inducing the same brain changes, increasing the risk of relapse, a hallmark of addiction. (p. 64)

Clearly, to understand stress, including traumatic stress and addiction, it is crucial to have frameworks that encompass the physiology from the standpoint of interacting complex systems. Two such inclusive frameworks are (1) allodynamics and (2) large-scale brain networks. Allodynamics refers to the process of organismic resources being allocated to meet demands. We are allodynamic systems: systems that continually deal with physiological demands. An allodynamic under-

standing of addiction sees addiction fundamentally as a dysregulation of the optimal processes of organismic resource allocation. At their optimum, these processes allocate resources in ways that enable the organism to sustain itself organically, i.e., without stress or overload.

Large-scale brain networks implicated by research in stress and addiction include the salience network (SN), the executive control network (ECN), and the default mode network (DMN) – the so-called triple network. A simplified understanding of these networks, with an eye toward their clinical relevance, upon which we will elaborate later in this paper, is as follows. The SN determines what directs our attention – e.g., whether our attention is directed towards threat (real or perceived), the immediate environment, or healthy pleasure. The ECN is active during goal-directed action – e.g., decision making, problem solving, or acting on one's own behalf. The DMN is active during states of rest, autopilot, and freeze. The triple network model of psychopathology posits that aberrant functional organization of, and interaction between, these networks underlie a wide range of psychopathologies (Menon, 2018, p. 236).

The triple network model sheds light on how stress and addiction hijack attention, which is arguably the most important organismic resource. Attention is directed, or filtered, primarily in a hierarchy of neural pathways comprising the brain's salience network, which determines relevance. (Menon, 2015). Menon describes the salience network anchored in the anterior insula, dorsal anterior cingulate cortex, and subcortical structures – including the amygdala, ventral striatum, and the substantia nigra/ventral tegmental area. Collectively, these contribute to complex brain functions including communication, social behavior, and integration of sensory, emotional, and cognitive information.

Lerman et al. (2014) examined the relationships among the triple network using correlational measures that comprise a *resource allocation index* (RAI) using fMRI data. Their conclusions include observations of likely links between triple network dysregulation and psychiatric disorders, as well as the dysregulation that comprises addiction. Of particular clinical relevance to the OI therapeutic protocols related to trauma and addiction (to be elaborated later), it was stated that in a nicotine-deprived stress state, the salience network (SN) seemed to draw attentional resources to the inner experience of craving. Additionally, there was a weakening of the link between the SN and the executive control network (ECN) – with a corresponding, enhanced DMN hyperactivity. These neurological network images describe the potentially ruminative cascade of the attention drawn inward by the negativity bias toward interoceptive states of lesser goal-directed agency and executive control. Stress is disorientation, and interoception of negative states decreases executive control. Importantly, Lerman et al. connect the dots between these dynamics and other patient symptoms, such as depression and dysthymia.

By definition, a system affected by addiction and trauma has learned a host of maladaptive processing tasks and salience habits. These habits include the preference of attention to what's wrong: Threat may be seen where none exists, and threat missed where it actually exists. This priming reiterates signals that reinforce a system in stress, and is a reflection of what has been well documented as the negativity bias, or what OI calls simply, "The What's Wrong Attention" (WWA) (Hoskinson, 2022; Öhman et al., 2001; Soroka et al., 2019; Vaish et al., 2008). These neural habits add extra processing demands, resulting in stress and allostatic overload, where traumatic stress circuits fail to reliably dampen or habituate too soon. In these conditions, attention seeks non-relevant or non-existent stimuli, aided by perceptual and response biases, particularly the negativity bias (Leong et al., 2019). As a reminder, the negativity bias is one of the most powerful forces in human neurobiology, even in infants and children (Vaish et al., 2008), and with therapies focused on addiction, trauma, and their sources, it compounds stress upon stress (Tyborowska et al., 2018). In early development, its remodeling of brain architecture is well known by ACEs, attachment, and a host of other relational, psychological and physical effects (McEwen, 2006). The neural links between the negative reinforcement cycles of stress and addiction are well established, and articulated in a review by Ruisotto and Contador (2019) in the alldynamic framework. In other words, addiction is impossible without negative reinforcement.

Based on this convergence of neural states and their conditions (including ADHD, cf. Cai et al., 2021; Um et al., 2019), it is clear that the increased ability to deal with systemic stress is crucial to addiction recovery and for general human functioning, adaptation, and performance on a global scale. Toward this end, many therapies are increasingly focusing on what they claim would enhance executive function: helping people focus and manage stress; teaching skills to cope with and reduce external stressors, and prescribing drugs that help manage stress. In addition, stress management is of course crucial, especially in early recovery. And, since negative emotion and negative urgency (Kaiser et al., 2012) predict addiction and relapse, it seems that the work of inhibiting such negative affective states would be a primary therapeutic goal. Paradoxically – yet affirming of OI strategies, however – there is evidence that inhibitory management involves the overuse of executive control (Chester, 2016).

There is an alternative and complementary approach, implied by this literature, and – as we will show in the next section – explicitly developed into a comprehensive therapeutic framework in Organic Intelligence. The alternative to the overuse of inhibition is to *increase* the capacity to process intensity natively and effortlessly. Consequently, we will feel more ease, and have less negative urgency (thus requiring less inhibition). The idea that we can increase our capacity to process

intensity organically – to increase our bandwidth – is underrepresented in the scientific literature. While the notion of brain plasticity allows for increased adaptation to a changing variety of stressors (such as the four mentioned earlier in this section), the possibility of qualitative increase in plasticity itself has received little attention. As a result, most therapy remains within the confines of this status quo, and strays from an organic path that would facilitate this increase – instead, focusing on management.

The conditions for understanding dynamical systems and the qualitative increase in processing capacity, however, are gaining interest, but a comprehensive clinical model has been lacking until this point. To glean the current clinically relevant pointers from alldynamics and dynamical systems, and their pathways for a qualitative growth in alldynamic range, we must understand some of the nuance of these systems frameworks.

From Sterling's research (2012), we learn that the framework of allostasis facilitates the understanding of interactions among large-scale brain networks. Both of these systems' (i.e., interactionist) constructs have received increased research attention as the limitations of simpler homeostatic and linear models of management, and mechanical compensation models, have become apparent.

Therapeutically, what is this important difference between the homeostatic and the more organic allostatic lens? The term "allostasis" was coined in 1988; its Greek roots mean, essentially, coherence through variability. This coincides with our more current understanding that the brain increases selective advantage not only by adapting to the current moment, but also by making micro-predictions of needs for adaptation to the future. Allostasis references this predictive process of adjusting the internal milieu to promote survival and reproduction, and contrasts against homeostasis, which is the organismic process of maintaining the same internal milieu (Sterling, 2012, p. 5). The earliest theorists of alldynamics speak eloquently to valence, processing demands, and the role of positively reinforcing experience. Peter Sterling, who, with J. Ayer, coined the term allostasis and defined its construct, describes its difference from homeostasis – vis-à-vis addiction – with a poetic style rare for neuroscience articles, saying allostasis allows

...innumerable activities and experiences to each provide non-adapting anxieties and brief pleasures, their reward values depending partly on the effort expended. But modern life narrows the variety of small pleasures and reduces effort, thereby reducing their reward value and requiring larger portions for equivalent satisfaction – a cycle that generates addictive behaviors.

Homeostasis and allostasis locate pathology at different levels. Homeostasis identifies proximate

causes; for example, it attributes essential hypertension to excess salt water in too small a vascular reservoir. Thus, it directs pharmacotherapy toward reducing salt and water, expanding the reservoir, and blocking feedbacks that would counteract these measures. Allostasis attributes essential hypertension to the brain. Chronically anticipating a need for higher pressure, the brain mobilizes all the low-level mechanisms in concert: kidney to retain salt and water, vascular system to tighten, and salt appetite to rise. Correspondingly, allostasis would direct therapy toward higher levels – to reduce demand and increase sense of control – so that the brain can down-shift its prediction and relax all the low-level mechanisms in concert.

For disorders of addiction homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. Allostasis suggests broader approaches – such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit (Sterling, 2012, p. 5).

As a way to treat addiction, Sterling suggests expanding the range of pleasures and the opportunities to pursue them. Similarly, Menon (2015) identifies the potential for expanding the range of pleasure. He identifies a higher order network that is paralimbic-limbic, and selectively targets for the "spotlight of attention" domains relevant for goal-directed behavior. These include such events as "...deviants embedded in a constant stream, surprising stimuli, and stimuli that are pleasurable and rewarding, self-relevant, or emotionally engaging" (Menon, 2015, p. 597). We shall see how each of these events are emphasized in the OI therapeutic protocol, as OI trains practitioners to see subtle signs of such – mostly unconscious – salience recognition in their clients. Over time and with proper reinforcement, this recognition can find signs of a system quietly advocating for its own auto-organization.

Let us summarize, then, the understanding of addiction we have proposed, and its implications for treatment. The proposal is to understand addiction fundamentally as an allostatic disorder: a disorder in an organism's capacity to natively process load, or intensity. Addiction hijacks the normal functioning of large-scale brain networks. Most clearly implicated in the research on how addiction hijacks our biology are the dopaminergic pathways of the brain's reward system. The effects are system-wide, affecting overall inhibitory structures, salience determination, motivation, and other executive functioning (Volkow et al., 2011). Attention is thus repeatedly directed toward pain and threat – even non-existent threat – rather than toward the environment or healthy pleasure. The compulsive, addictive force is reiterated and reinforced by this process of negative reinforcement, which is the bane of today's approaches to therapy, trauma, and addiction recovery. Negative reinforcement adds stress, which by definition is the com-

promise of vital alldynamic balance, by dysregulating brain network inter-functioning (Raz et al., 2016).

Given the complexity of these conditions, optimal treatment approaches must incorporate large-scale and comprehensive multi-system frameworks to guide unique relational and biologically-based interventions, attuned to and tailored for each person in the moment. In the next section, we introduce such an approach, one that we believe constitutes a paradigm shift in therapy and the treatment of addiction: the addicted person, and any person, has the potential not only to learn coping strategies for stress, but also to increase their capacity to process intensity easefully, naturally, and pleasurably, without requiring the undue demand for management. In other words, a person's biology has the potential not only to learn and practice skills that facilitate pleasant homeostasis, but also to collaborate with their allostatic system. Physiological reorganization and change can develop that strengthen the organism's ability to learn and process information and intensity more efficiently and effectively. While management may be crucial in early recovery, ultimately, the optimal treatment is to grow bandwidth. This idea lies at the heart of Organic Intelligence and its application to treatment, to which we now turn.

## Organic Intelligence Theory

A key feature of existing treatment approaches to addiction and trauma is the importance placed on efforting: active doing, willpower, discipline, achieving goals, commitment, sticking to an action plan, taking the bull by the horns.

While efforting is crucial, especially in early recovery, according to OI, there is another possibility that we ultimately want to help clients realize – a path of ease and comfort, a recovery of pleasure, in which steps that promote wellbeing are more easily, pleasantly, and naturally taken. To take these steps, we need to tap our physiology's capacity to undergo fundamental changes that increase our inherent resilience and capacity to process intensity, and adapt to environments automatically and easefully.

OI refers to this process of the physiology's increased processing capacity, or inherent resilience, as *auto-organization*. To elucidate the notion of auto-organization, it is necessary to consider some of the scientific theories underpinning OI, which is grounded in a clinically-operationalized understanding of dynamical systems, including brain network theory (Bressler, 2010). The field of complexity science studies dynamical or complex systems, which are systems that are capable – when in apt conditions, i.e., initial conditions – of undergoing fundamental changes in their nature that increase their strength, stability, and resilience. In complexity science, this process is called self-organization. OI calls it auto-organization, in order to emphasize

that the change happens automatically in the system; it is not directed by conscious doing.

Human physiologies, according to OI, are complex systems. And, importantly, we are the kind of organic systems that can be self-organizing. Under certain initial conditions, our biological systems are capable of reorganizing in a way that produces stronger, more stable states. In human beings, this state corresponds to an increased capacity to process intensity. The initial conditions that enable human auto-organization in human beings are (1) orientation, which OI defines as connection to the environment through the senses, and (2) orientation to pleasure, which refers to seeking and feeling pleasure that is healthy, not too intense, and non-addictive.

Orientation is a natural impulse of our physiologies, which seek to map the environment as a vital component of allostatic prediction. When oriented, we typically feel safe and comfortable, if the immediate environment is not life-threatening. A state of orientation and of pleasantness – pleasantness within the base of orientation – is the proper, healthy baseline for a human being. When oriented, modulation of intensity is easeful, and typically trends toward pleasant and more sustainable states. These initial conditions of orientation, and orientation to pleasure, constitute the essence of a positive reinforcement framework.

Both conditions are crucial, not just one or the other. There are therapeutic approaches that rightly focus on the second: on pleasure, on the enjoyment of life as important for healing. Such approaches often provide many in-depth practical exercises for pursuing and feeling pleasure. See, for example, Resnick (1997). In OI, however, we're ultimately looking for pleasure that emerges organically within the physiology due to the stabilization of the *trait* of orientation. For auto-organization, there is a world of difference between efforting at pleasure – e.g., using willpower to do something we enjoy – and pleasure that emerges effortlessly within, due to being oriented and in the here-and-now. The former reinforces negative reinforcement; the latter puts us on a positive reinforcement path.

Given how fundamental orientation is to enabling auto-organization, let us elaborate on the science behind its function. Saliency means what matters to the biology, as well as what may subjectively be felt as meaningful for an individual. According to Menon (2021), the saliency network maps salient external stimuli and internal mental events, and facilitates the engagement or disengagement of brain systems for goal-relevant behaviors. In therapeutic work, OI practitioners learn – within relational attunement constraints – to preference clinically observable, biologically, and evolutionarily selected states and behaviors. Orientation is the first of these states, because it forms the bridge between salient internal and external events. It is also a vital part of the process of making cognitive maps:

how we navigate in space, form motor plans, create memory retrieval cues, and locate interesting people. In other words, orientation is vital to what the biology really wants and needs to do. In evolutionary terms, its success would have clear selective value. Behaviors that are especially good at providing selective advantage are often more quickly learned, incorporated, and retained. As expected, learning and looking out for danger are quickly learned. However, salience is also relevant for positively valenced learning of behaviors that bestow outsized selective advantage: how and to what shall we orient that is beneficial.

Orientation and orientation to pleasure bestow such important selective advantages that the physiology is readily prepared to incorporate them. This readiness is known as “prepared learning,” a concept coined and articulated by Martin Seligman (Seligman, 1970; Seligman, 1971; Dunlap & Stephens, 2014). We find that orientation is prepared learning, and can be appropriated into automaticity. With practice and priming, orientation maps us in the environment through our senses, and integrates as a seamless part of the fabric of consciousness. However, it often takes more practice than we might expect, given its readiness as a prepared learning. In the West, there is of course the culture of therapy, and some mindfulness traditions that emphasize internal awareness, self-referencing, and examination of feelings, sensations, thoughts, and images. Thus, there is an emphasis on locating ourselves in our inner cognitive-emotional milieu, or psychological “self.” This cultural predisposition of self-referencing iatrogenically disrupts what would help form a more stable and continuous baseline of affective states.

Biologically, with the discovery of grid cells, place cells, and border cells, we know that self-mapping happens first in relation to the environment, and is primarily located in the hippocampus (Moser, et al., 2015). However, recent research into cognitive mapping has expanded the notion of hippocampal mapping to include more senses than just visual, and with important representations in the somatosensory cortex. This reinforces the fact that autobiographical and body representation (i.e., embodiment) are functionally related to connecting to the environment through the senses (Long and Zhang, 2021) – OI’s orientation, rather than self-referencing. In fact, as we have seen above, it is the negativity bias that often reinforces attention away from the executive control network and towards *internal* experience, internal intensity, and states that are more disorganized, disoriented, disempowering, and that increase the negative effects of DMN dominance.

Indeed, DMN hyperactivity can be quite aversive, to the degree that it is associated with states that arose with the fear of death. This includes the survival response of freeze, or immobility (Porges, 2001). Naturally, the amygdala is implicated in arousal around survival and trauma, and is a key component of the salience network’s assessment of relevance of both external stimuli

and internal mental events (Menon, 2021). Under stress, the link between reduced contribution from the network pairs of salience and executive control, compared to the default mode and executive control, has been affirmed by current research. (Chand et al., 2020). In other words, chronically reiterated states of stress draw attention inward and away from executive control, where integrated, coherent decision-making happens. The issue of physiological coherence is also described by Porges (2007) through its relationship with heart rate variability (HRV), including measures of respiratory sinus arrhythmia (RSA) and vagal tone as indicators of organismic coherence. This is little more than emphasis on the longstanding awareness in the neuroscience of trauma that more stress means less executive control. The clinical importance in OI of RSA as an organizer of physiological resilience can hardly be overstated. Learning to actually see and recognize the subtle behavioral correlates of this modulation takes time and training.

At the opposite clinical pole is the association of DMN with immobility states (cf. Porges’ dorsal vagal network, 2007). This freezy aspect of stress, in which there is the suggested hyperactivity of the DMN, points to the clinical presentation of dissociation that we believe to be an important contributor in dysregulating the efficient relationships among brain networks. Thus, the importance of OI’s notion of orientation is that the salience network, through effortless experience, may recruit states of DMN in their normal function, and thus down-regulate intensity and help rebalance the DMN-SN to ECN-SN relationship. *The normal function of orientation as a salience driven, effortless and automatic state is a re-sourcing aspect of DMN.*

This is, in fact, the most common clinical report of those practicing even 45 seconds of orientation. People typically report feeling state shifts to more relaxation, more settled, and present. Additionally, orientation 1) can naturally be learned and incorporated (cf. “prepared learning” above); 2) quickly becomes an effortless, background aspect of consciousness; and 3) is externally directed attention that circumvents the likelihood of reinforcing the attractor of negative internal intensity states. When orientation is effortless and non-self-conscious, it potentially offers a more integrative non-specific awareness, and an even restful state that can participate in a neutral to positive balanced experience, including with the DMN – and not overtaxing the modulatory abilities of the ECN.

Now to the main point: the OI tenet that orientation, and orientation to pleasure, are initial conditions for auto-organization. When a system attains these initial conditions, the brain network balance supports intensity in the system so that it oscillates toward pleasurable increase and aims toward discrete, *biologically determined*, and clinically perceptible intensity thresholds. In fact, a system is largely organized around, and defined by, the precise amount of arousal that the system (the biology) can process easily. If a system can reach these precise

thresholds and then rest, or de-arouse, afterward, it will auto-organize, thus *increasing that intensity threshold*. When this example of prepared learning occurs, when the system itself picks up the pattern of precise, largely pleasurable intensity, that is auto-organization. The OI clinical result is that a person will have greater capacity to process intensity: to experience pleasurable intensity, to problem solve, to increase resiliency, and to handle complexity.

The concept of increasing biological thresholds is distinctively OI, and has significant implications for the treatment of addiction. Koob and Moal (2000) suggest that addiction involves a compromise of biological thresholds, or “set points.” “[D]rug addiction is hypothesized to involve a change in reward set point and reflects an allostatic . . . adaptation (i.e., outside the normal set point)” (Koob & Moal, 2000, p. 102).

Auto-organization can happen automatically for people whose systems are well-organized, with trait access to orientation, and orientation to pleasure, and an overall positive social environment. For those who have a compromised capacity to process intensity and who don't auto-organize, OI sessions can help. An OI clinician helps a client restore and build access to initial conditions by engaging in free association conversation with the client, tracking myriad aspects of their physiology and conscious experience, and reinforcing any movement in the direction of initial conditions. This process is multifaceted, sometimes looking like a normal conversation between friends, sometimes like a psychotherapy talk session, and sometimes like a somatic session in which one helps the client track sensation. To elucidate further, let us now turn to explain the essentials of OI session work.

OI sessions are free association conversations in a warm relationship of attuned unconditional positive regard (cf. Carl Rogers). The OI clinician invites the client to talk about anything on their mind and to speak as freely as they like, rather than having to be linear or focus on a certain problem, goal, or therapy topic. Free association conversation creates a non-self-conscious, low-demand, and low-stress context in which a client can feel relaxed, comfortable, and safe. This context supports the client's spontaneous, uninhibited conscious experience to emerge. The OI clinician tracks five aspects, or channels, of the client's conscious experience: image, sensation, orientation (sensory connection to the environment), meaning (thought), and affect (emotion). The acronym for these five channels is ISOMA. While attuning to the entirety of the client's experience, OI clinicians selectively reinforce, often subtly, orientation and less negatively valenced ISOMAs. And when the client is stabilized in orientation, rising intensity increasingly manifests through positively valenced ISMA, i.e., neutral to pleasant, comfortable ISMA.

The OI clinician observes the rate of modulation and intensification, as different ISOMA channels have characteristics of inhibition or excitation. Supporting clients' ideal amplitudes of arousal-dearousal levels occurs with in-the-moment exchanges, verbal and nonverbal, in the conversation. OI clinicians learn how to tap the brakes or press the accelerator (or both) so that clients' positive intensities reach their organic threshold peak – that thermostat-like level that catalyzes auto-organization.

There is a learning curve for clients and their biologies to shift from the extant therapy milieu and negative reinforcement to positive. When people's systems move into a mode of auto-organization, therapeutically, intensity is processed in positive valence. However, what is gained is that intensity that was formerly too much – such as a certain level of grief, sadness, irritation or anger – can become sub-threshold as intensity thresholds grow. This is what is meant by growing bandwidth. Remarkably, however, in the OI clinical process, we find that the *states* associated with traumatic memories arise, but they arise contextualized within a positive associative frame. It becomes possible for the client to undergo reconsolidation of their traumatic memory states in ways that are positively valenced, i.e., pleasurable.

The explicit content of such memories has cues, nodes of the “original” event and its accompanying intensity level – but in an alternate, positive valence. In other words, traumatic memory reconsolidation can happen organically where the explicit content is fully – even unconsciously – present and resonant, but positively valenced. The negative or traumatic narrative remains unexpressed, and, if present, is often unconscious. It seems *it is intensity that is most salient in evoking states for reconsolidation, not valence*. In fact, therapeutically, a positively valenced reconsolidation is what seems to be especially empowering, and avoids the precise pitfalls of stressful recall – including the risk of retraumatization. This is inevitable when we understand that explicit memory and its expression are a function of, and never separate from, the biological agenda. So, when a system is organizing around organic thresholds, it presents narrative content with that agenda.

An example of positively valenced reconsolidation can be seen in a recorded OI demonstration session, when a student was talking about an earthquake experience. Some minutes later, the student recalled a different, (similarly) intensely positive memory in the same location, with the same accompanying gestures and other associates of the original experience, including some tears, and the whole house was shaking<sup>1</sup>! There was no conscious connection at the time, nor need there have been, that the spontaneous positive recall was related to the traumatic memory of the earthquake. The student's system was able to reconsolidate the memory without

1. [www.OrganicIntelligence.org](http://www.OrganicIntelligence.org)

focusing on or even being conscious of the trauma, and was instead simply engaged in a pleasant, free association conversation (with a skilled OI clinician who understands how to work with the system to catalyze auto-organization).

In sum, auto-organization is the allostatic process that underlies what we recognize as the deepest healing and growth, including healing from addiction, trauma, and developmentally-originating and relational states. It limits the potential harm inherent in therapies that work without a positive reinforcement framework. With systemic auto-organization comes more comfort, pleasure, ease, interest, curiosity, and interest in the next appropriate level of challenge and increased complexity. Time and energy are freed up for people to pursue what is meaningful in life, rather than continually expending life energy unnecessarily on hypervigilance, hyperactive self-care, or white-knuckled sobriety.

The key to catalyzing auto-organization is a positive reinforcement framework: providing positive reinforcement for attention that spontaneously orients to the environment and to wholesome pleasure – to what is rewarding, meaningful, positively surprising, interesting, and emotionally engaging. We now turn briefly to how to create a positive reinforcement framework for trauma and addiction treatment.

## Creating a Non-Directive Positive Reinforcement Framework for Trauma and Addiction Treatment

A positive reinforcement framework assumes the ultimate goal of auto-organization by promoting the two initial conditions of orientation, and orientation to pleasure, as defined in the prior section. Here, we give brief, practical guidance on creating a positive reinforcement framework for trauma and addiction treatment. We will focus primarily on creating such a framework in a one-on-one session. At the end of this section, we will indicate how the framework can be created for other aspects of a multidisciplinary treatment program.

One might think that OI recommends simply directly telling people to practice orientation and pursue pleasure, as two additional things for a client to do, on top of whatever else they must do as part of their treatment program. In fact, however, in the insistence on attunement and joining, we often do not directly command clients to orient, or orient to pleasure – whether in session or in life. One reason for this is that clients simply may not be able to do so, and in such cases, being directive will just add stress, pressure to follow commands, and guilt, shame, and hopelessness when clients are not able to follow these directives. A second reason that directives are generally contraindicated is that even if clients are able to comply, it is the client's own initiative and self-organizing tendency that are valued, i.e., empowerment. Furthermore, inorganic shifts of state

or attention may create such a different intensity level or valence that it creates a discontinuity of states. OI's clinical process and auto-organization are integrative, meaning that states are comfortably and increasingly connected and interconnected. If someone is in a certain state, whatever it is – e.g., sadness, anger, happiness, neutrality, fight, flight, freeze, talking about topic X or Y, trying to problem solve, etc. – being suddenly told to look around the room, or talk about something pleasant, or hunt for and feel pleasant sensations in the body, can be jarring, misattuned, and come at the opportunity cost of working *within the weave* of the client's state continuity.

Instead, the bulk of creating a positive reinforcement framework consists in setting conditions that make spontaneous orientation, and orientation to pleasure, increasingly more likely, and in subtly – often very subtly – reinforcing orientation, and orientation to pleasure, when they do emerge.

Four practices that increase the chances of orientation, and orientation to pleasure, are:

1. Facilitating a free association conversation
2. Deep, empathic attunement to the client
3. Support and engagement becoming more interesting to the client than the intensity of their pain
4. Priming and amplifying certain ISMA channels

First, the free association conversation often looks like a casual, everyday human conversation. Even for analysts, it may be challenging for a clinician to get used to the strategic reinforcement process in the OI free association conversation. Such conversations may feel unproductive, because they are not consciously and linearly connected to any specific, concrete, measurable progress marker, such as, for example, filling in one's gratitude journal five days this week, or confronting a specific painful trauma in therapy. However, the structured, interpersonal free association conversation, and the accompanying easing of intensity and pressure to set and meet specific goals, are exactly the point. The more interactions that feel like casual, every day, low-pressure conversations, the more likely orientation and pleasure will emerge for supportive interaction.

This interaction is founded fundamentally within a Rogerian attunement context, our second practice. This includes training in being with the client exactly where they are in the moment, and tracking and joining with the client's state, as opposed to trying to change it. If the client is in fight or flight, we often find what is acceptable, even pleasurable intensity. If the client is in freeze, likewise, we support the client's own perception in lack of affect, in immobility, and in cognition at a pace and intensity that helps them feel accompanied. If the client is talking about what's positive and going well, we join there. If the client is talking about deep trauma and pain, we join there.

Turning to the third practice – where engagement becomes more interesting to the client than the intensity of their pain – a therapist might engage in storytelling, and, in general, speaking about any topic that is in some way related to the client’s states. The purpose here is to preserve state continuity in a way that makes little demand on the client’s attention. Speaking extemporaneously and without asking the client any big questions that require attentional effort on the client’s part is a potent way to prime orientation and to draw the client’s attention to the environment. The therapist counts as part of the environment; thus, if a client finds what the therapist is saying interesting, their attention will reside more in the environment than in their interior painful intensity. This is orientation.

The fourth practice, that of priming and amplifying certain ISMA channels, is more advanced and requires more formal training in OI. Let us offer a general explanation of the practice. Over-threshold intensity will generally manifest in particular channels, and different people will be prone to becoming over threshold (i.e., over the organic threshold for catalyzing auto-organization) in different channels. For some people, intensity in affect tends to become over threshold very easily; they are easily overwhelmed by intense emotion. For others, it’s intensity in thought; they are stuck in constant mental intensity; thought after thought without reprieve. To lower intensity, and thus make spontaneous orientation and pleasure more likely, a therapist can prime and amplify a less intense channel. For clients who tend to become over-threshold in affect, priming and amplifying the meaning channel will help lower intensity. For clients who tend to become over threshold in thought, priming and amplifying the affect channel may lower intensity. Furthermore, the reality is that clients generally are cycling between under- and over-threshold experience. There is an art to the process of reinforcing the client’s auto-organizational trend because it involves sometimes simultaneous amplification of inhibitory and disinhibitory ISOMA states.

It is beyond the scope of this paper to go into technical detail about the fourth practice, but one important feature deserves emphasis. Trying to prime and amplify ISMA channels must be done within the context of attunement and state continuity. If a person is dominated by uncomfortable emotion, we fully join them, and may prime another channel, e.g., thinking or orientation (say, by becoming more interesting). We do not simply tell a person who is uncomfortably emotional to think about something else, or to orient.

These four practices, again, make spontaneous orientation and pleasure more likely to occur. When they do occur, it can be subtle and very brief, requiring the therapist to be very *oriented* to the client. A client may orient for a split second, e.g., glance out the window. A client may feel relief of pain or a pleasant affect or thought for a split second. If the therapist can spot these moments, they can subtly reinforce these initial conditions by a

micromovement, such as nodding the head or smiling, or brief verbal confirmations, e.g., “yes,” “mmhmm.” Reinforcing too intensely can be counterproductive, as it may drive the client’s intensity over threshold, and knock them out of the very initial condition that the therapist is trying to reinforce (orientation and pleasure). Pouncing on a client’s mention of something positive and asking them to elaborate on it may be jarring, especially if the positivity emerged briefly and delicately within a wider context of mostly negative and painful content. If the client reacts negatively to our reinforcement efforts, we recalibrate from that feedback about the clinician’s misattunement. We re-establish attunement, which is always prerequisite, before attempting to reinforce initial conditions.

The above four practices are intended primarily for one-on-one therapy sessions. It is also desirable to create a positive reinforcement framework outside this context for as many aspects of a multidisciplinary treatment program as possible. We end this section with a few practical suggestions in that direction.

- One suggestion is to make environments as orientation-friendly as possible, e.g., decorating a facility with plants and objects that are likely to receive clients’ attention, including objects that clients can smell and touch, as well as see.
- A second suggestion is to train the various people who will regularly interact with clients – e.g., medical professionals, group facilitators, and any staff, broadly construed – in the value of orientation, free association conversation, attunement, positivity, and promoting comfort and ease as much as possible. The more the overall treatment program can be infused with these values, the better.
- A third suggestion is to allow for as many options as possible for clients to reduce uncomfortable intensity that are programmatically installed in any aspect of the treatment program. Recall that positive reinforcement is defined as what makes a state or behavior more likely to recur, or to increase its intensity or duration. It’s not necessarily what the program or therapeutic model defines as positive. For instance, it is increasingly thought that social engagement is a therapeutic goal. The definition of addiction as a loss of community or as relationship proxy, especially with the now 40-year old “Rat Park” research, has galvanized some in the recovery community to take new steps in examining social and environmental facets of addiction (Alexander et al., 1981; Gage & Sumnall, 2019). However, with regard to treatments that emphasize social engagement on the grounds of understanding addiction as relationship proxy, we must guard against categorical or linear conclusions about the origins or treatment of stress and trauma. State and biological readiness for social engagement must be clinically assessed, lest we risk misattunement and add to allostatic load by prematurely in-

sisting on socially engaged treatment protocols. For addiction, there are notable exceptions and negative findings related to the effects of socially enriched environments. Furthermore, the causes of addiction are complex, and cannot be boiled down to the loss of one thing or another. Many factors influence addiction (and stress). For instance, genotype, strains, age, and other factors all affect and interact with social and environmental conditions (Khoo, 2020).

## Conclusion

OI work is complex because humans and their biologies are complex. The OI clinician must track myriad nuanced aspects of the client's physiology and conscious experience, in order to prime, in every single moment, the optimal intensity level for the client's auto-organization. Taking a step back from the complexity and technical details of OI, we want to close by emphasizing a simple, fundamental idea that we hope will increasingly support outcomes and reduce harm in the field of therapy, and especially in the treatment of addiction and trauma: the idea of not doing too much at once.

Everyone has a sense of the importance of not doing too much at once. We do not want to overload ourselves, creating stress, panic, burnout, etc. This life tip applies as much to therapy as to daily living: we do not want to (allostatically) overload our clients.

The challenge is that what actually counts as too much, according to OI, is far less than what most people – clients and therapists alike – think. The slightest discomfort, even if titrated, is already a sign that negative re-

inforcement is likely. Even working within “the window of tolerance,” what is regarded by the mainstream as “tolerable” arousal may already be over threshold – in part because it is *discomfort* that, explicitly or implicitly, this framework recommends tolerating. By contrast, OI focuses on tolerating *comfort*.

For persons who suffer from addiction and trauma, it is all the more important not to do too much at once. In addiction, reclaiming and reassociating pleasure pathways is necessary, and will require careful supervision in supporting a lifestyle change to sobriety. However, the value of recruiting brain functions, such as executive control functions by using lower stress protocols is profound (Smith et al., 2011). The OI treatment protocol has developed clearly defined milestones where the overall organizational level of the organism is assessed, and clinical interventions are tuned (and attuned) to that level so as to ensure reconsolidation without retraumatization or over-threshold intensity.

We suggest working as much as possible in a “window of enjoyment” – the capacity of the client's system to experience pleasure within positive reinforcement; a capacity that can grow indefinitely through auto-organization. Training in OI enables therapists to precisely recognize and support the optimal amount of intensity that facilitates auto-organization in the client. Whether one trains in OI, we recommend that every helping professional draws on their skills, knowledge, and experience in order to minimize their client's discomfort and to work in positive reinforcement as much as possible. Follow-up assessment on unwanted negative results, and further empirical research are needed for this recommended course correction.



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## REFERENCES

- Alexander, B. K., Beyerstein, B. L., Hadaway, P. F., & Coombs, R. B. (1981). Effect of early and later colony housing on oral ingestion of morphine in rats. *Pharmacology Biochemistry and Behavior*, 15(4), 571–576.
- Bressler, S. L., & Menon, V. (2010). Large-scale brain networks in cognition: emerging methods and principles. *Trends in Cognitive Sciences*, 14(6), 277–290. <https://doi.org/10.1016/j.tics.2010.04.004>
- Cai, W., Warren, S. L., Duberg, K., Pennington, B., Hinshaw, S. P., & Menon, V. (2021). Latent brain state dynamics distinguish behavioral variability, impaired decision-making, and inattention. *Molecular Psychiatry*, 26, 4944–4957.
- Centers for Disease Control and Prevention (2021, April 6). *Adverse Childhood Experience Resources*. <https://www.cdc.gov/violenceprevention/acestudy/resources.html>
- Chand, T., Li, M., Jamalabadi, H., Wagner, G., Lord, A., Alizadeh, S., Danyeli, L. V., Herrmann, L., Walter, M., & Sen, Z. D. (2020). Heart rate variability as an index of differential brain dynamics at rest and after acute stress induction. *Frontiers in Neuroscience*, 14, 1–15.
- Chester, D. S., Lynam, D. R., Milich, R., Powell, D. K., Andersen, A. H., & DeWall, C. N. (2016). How do negative emotions impair self-control? A neural model of negative urgency. *NeuroImage*, 132, 43–50.
- Dunlap, A. S., & Stephens, D. W. (2014). Experimental evolution of prepared learning. *Proceedings of the National Academy of Sciences*, 111(32), 11750–11755.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventative Medicine*, 14(4), 245–258.
- Gage, S. H., & Sumnall, H. R. (2019). Rat Park: How a rat paradise changed the narrative of addiction. *Addiction*, 114(5), 917–922.
- Hoskinson, S. (2022, January 25). “Organic Intelligence: The End of Trauma Course: Trauma Safe.” *Organic Intelligence | Trauma Safe*. <http://www.organicintelligence.org/>
- Hoskinson, S. (2022). *The job is enjoyment: The end of trauma course workbook*. Self-Published, Organic Intelligence (in press).
- Kaiser, A. J., Milich, R., Lynam, D. R., & Charnigo, R. J. (2012). Negative Urgency, Distress Tolerance, and Substance Abuse Among College Students. *Addictive Behavior*, 37(10), 1075–1083.
- Khoo, S. Y. (2020). Have we reproduced Rat Park? Conceptual but not direct replication of the protective effects of social and environmental enrichment in addiction. *Journal for Reproducibility in Neuroscience*, 1, 1–9.
- Koob, G. F., & Moal, M. L. (2000). Drug Addiction, Dysregulation of Reward, and Allostasis. *Neuropsychopharmacology*, 24(2), 97–129.
- Leong, Y. C., Hughes, B. L., Wang, Y., & Zaki, J. (2019). Neurocomputational mechanisms underlying motivated seeing. *Nature Human Behavior*, 3, 962–973. <https://doi.org/10.1038/s41562-019-0637-z>
- Lerman, C., Gu, H., Loughead, J., Ruparel, K., Yang, Y., & Stein, E. A. (2014). Large-scale brain network coupling predicts acute nicotine abstinence effects on craving and cognitive function. *JAMA Psychiatry*, 71(5), 523–530.
- Long, X., & Zhang, S. (2021). A novel somatosensory spatial navigation system outside the hippocampal formation. *Cell Research*, 31, 649–663. <https://doi.org/10.1038/s41422-020-00448-8>
- McEwen, B. S. (2006). Protective and damaging effects of stress mediators: central role of the brain. *Dialogues in Clinical Neuroscience*, 8(4), 367–381. <https://doi.org/10.31887/DCNS.2006.8.4/bmcewen>
- McEwen, B. S., & Gianaros, P. J. (2011). Stress- and Allostasis-Induced Brain Plasticity. *Annual Review of Medicine*, 62, 431–445. <https://doi.org/10.1146/annurev-med-052209-100430>
- Measelle, J. R., Stice, E., & Springer, D. W. (2006). A prospective test of the negative affect model of substance abuse: moderating effects of social support. *Psychology of Addictive Behaviors*, 20(3), 225–233.
- Menon, V. (2015). Salience Network. In A. W. Toga (Ed.), *Brain Mapping: An Encyclopedic Reference* (vol. 2, pp. 597–611). Cambridge, MA: Academic Press: Elsevier.
- Menon, V. (2018). The Triple Network Model, Insight, and Large-Scale Brain Organization in Autism. *Biological Psychiatry*, 84(4), 236–238. <https://doi.org/10.1016/j.biopsych.2018.06.012>

- Menon, V. (2021).** Dissociation by Network Integration. *American Journal of Psychiatry*, 178(2), 110–112. <https://doi.org/10.1176/appi.ajp.2020.20121728>
- Moser, M. B., Rowland, D. C., & Moser, E. I. (2015).** Place Cells, Grid Cells, and Memory. *Cold Spring Harbor Perspectives in Biology*, 7(2).
- Öhman, A., Lundqvist, D., & Esteves, F. (2001).** The face in the crowd revisited: A threat advantage with schematic stimuli. *Journal of Personality and Social Psychology*, 80(3), 381–396. <https://doi.org/10.1037/0022-3514.80.3.381>
- Parry, G. D., Crawford, M. J., & Duggan, C. (2016).** Iatrogenic harm from psychological therapies – time to move on. *The British Journal of Psychiatry*, 208(3), 210–212.
- Porges, S. W. (2001).** The polyvagal theory: phylogenetic substrates of a social nervous system. *International Journal of Psychophysiology*, 42(2), 123–146.
- Porges, S. W. (2007).** The polyvagal perspective. *Biological Psychology*, 74(2), 116–143.
- Raz, G., Touroutoglou, A., Wilson-Mendenhall, C., Gilam, G., Lin, T., Gonen, T., Jacob, Y., Atzil, S., Admon, R., Bleich-Cohen, M., & Maron-Katz, A. (2016).** Functional connectivity dynamics during film viewing reveal common networks for different emotional experiences. *Cognitive, Affective, & Behavioral Neuroscience*, 16(4), 709–723.
- Resnick, S. (1997).** *The Pleasure Zone: Why We Resist Good Feelings & How to Let Go and Be Happy*. Newburyport, MA: Conari Press.
- Ruisoto, P., & Contador, I. (2019).** The role of stress in drug addiction. An integrative review. *Physiology & Behavior*, 202, 62–68. <https://doi.org/10.1016/j.physbeh.2019.01.022>
- Seligman, M. E. (1970).** On the generality of the laws of learning. *Psychological Review*, 77(5), 406–418.
- Seligman, M. E. (1971).** Phobias and preparedness. *Behavior Therapy*, 2(3), 307–320.
- Smith, K. S., Berridge, K. C., & Aldridge, J. W. (2011).** Disentangling pleasure from incentive salience and learning signals in brain reward circuitry. *Proceedings of the National Academy of Sciences*, 108(27), E255–E264.
- Soroka, S., Fournier, P., & Nir, L. (2019).** Cross-national evidence of a negativity bias in psychophysiological reactions to news. *Proceedings of the National Academy of Sciences*, 116(38), 18888–11192. <https://www.pnas.org/content/116/38/18888>
- Sterling, P. (2012).** Allostasis: A model of predictive regulation. *Physiology & Behavior*, 106, 5–15.
- Strauss, B., Gawlytta, R., Schleu, A., & Frenzl, D. (2021).** Negative effects of psychotherapy: estimating the prevalence in a random national sample. *BJPsych Open*, 7(6), E186.
- Tyborowska, A., Volman, I., Niermann, H. C., Pouwels, J. L., Smeekens, S., Cillessen, A. H., Toni, I., & Roelofs, K. (2018).** Early-life and pubertal stress differentially modulate grey matter development in human adolescents. *Scientific Reports*, 8(1), 1–11.
- Um, M., Whitt, Z. T., Revilla, R., Hunton, T., & Cyders, M. A. (2019).** Shared neural correlates underlying addictive disorders and negative urgency. *Brain Sciences*, 9(2), 36.
- Vaish, A., Grossmann, T., & Woodward, A. (2008).** Not all emotions are created equal: The negativity bias in social-emotional development. *Psychological Bulletin*, 134(3), 383–403. <https://doi.org/10.1037/0033-2909.134.3.383>
- Volkow, N. D., Wang, G., Fowler, J. S., Tomasi, D., & Telang, F. (2011).** Addiction: Beyond dopamine reward circuitry. *Proceedings of the National Academy of Sciences of the United States of America*, 108(37), 15037–15042. <https://doi.org/10.1073/pnas.1010654108>