

Addiction and Trauma Re-examined through the lens of Complexity Theory



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Abstract

Upon reviewing the scientific research in the fields of pathological addiction and trauma, we find that there is a broad overlap between the neurophysiological substrate of memory and learning mechanisms in subjects suffering from these two ailments. We observe how these patients may develop an extraordinary ability to use their addiction, or their post-traumatic personality, in a generative way, by polarizing their functioning more and more intensely and pervasively around the substance or the post-traumatic transformation, which ends up functioning as an attractor, as defined in Complexity Theory. Such a process then sometimes also brings these patients to a 'titanic' type of functioning, which - again according to Complexity Theory - may be described as a *hypercycle*. We further observe that such dissociation from every other part of the personality is like the phenomenon described by *Ferenczi* [1] with the concept of *Orpha*, which takes place after a trauma allowing the traumatized person to go on living while experiencing a deep dissociative process.

Keywords: Complexity Theory; Hypercycle; Attractor; Substance-Induced Dissociation; Drug Addiction; Trauma

Introduction

In our practice as psychotherapists we have worked with a great number of cases of pathological addiction and trauma, in both private and public¹ healthcare environments. Since 2004 we have met with almost a thousand patients a year who suffered from some form of addiction and/or trauma, providing them with initial consulting sessions and personality assessments, as well as continuing sessions and treatment based on psychotherapy and often psychoanalysis as well.

In previous works [2,3], we defined substance-induced dissociation as referring to a dissociative phenomenon boosted - though not generated - by the use and abuse of psychotropic substances and the addictive behaviours linked to them. In the same way, certain abnormal post-traumatic personalities are also boosted by dissociative phenomena that lead traumatized people to have both adaptive and pathological abilities, even years after the traumatic event.

In this paper, we start by reviewing the literature on the neurophysiology of these two fields of severe psychopathology and highlight the inherent similarities. We then re-examine the fields of

pathological addiction and trauma through the lens of two key concepts of Complexity Theory, highlighting the dissociative process present in both, and point out how the application of the concepts of attractor and hypercycle [4,5] provides a coherent interpretative framework as well as a useful clinical tool.

Neurophysiological Observations in Cases of Trauma and Addiction

Many literature studies have shown how the effects of trauma [6,7] and severe drug-addiction [8,12] can capture the mind of the affected individual making it gravitate entirely around the traumatic memory and the substance abuse, respectively to the complete detriment of any other memory or everyday activity. For this reason, any external stimulus not directly connected to trauma or addiction has minimum impact on these individuals, with drastic consequences on their learning and mnemonic processes. The ability and motivation to learn new functional strategies, as well as new life skills, is impaired, as is the capacity to control oneself and not give-in to impulsive behaviors [13,14].

¹In Italy there are dedicated public health departments for addiction, in which the authors have worked together.

It is also widely known that severely traumatized individuals have distorted access to their memories, in that these subjects' minds are over-conditioned to go directly to the memory of the trauma. In fact, it has been observed that the recollection of the traumatic memory produces an increase in physiological activity [15]. The subject's mind remembers the trauma on top of everything else, in a constant sort of hypermnesia, but side by side with a form of amnesia, which completely deletes all other non-traumatic memories and, as Janet noted for the first time [16], this clearly interferes with common everyday life activities. Essentially, the memory of the traumatic experience becomes the top priority in the mind of the traumatized individual conditioning his/her behaviour accordingly.

Besides the distortion of the mnemonic process, alterations in the learning process are also characteristic in trauma victims. Exposure to "inescapable" traumatic events has long-term effects on the individual, such as incapacity to avoid new traumatic situations [17] and lack of motivation to learn new strategies of avoidance [18]. Paradoxically, each traumatic experience increases the risk of traumatic relapses.

It is interesting to note how many of the characteristics of trauma victims are shared by drug addicts as well:

- i. Chronic drug abuse increases Protein-Kinase-A (PKA)² activity, in the dopamine regulatory function, in the cortico-limbic-striatal circuit [19], which, in turn, activates the CREB³ [20]. Alterations of PKA and CREB levels in the amygdala or in the nucleus accumbens can heighten the ability to exercise the conditioned reinforcement of the stimuli linked to substance abuse, until these stimuli take complete control, entirely redirecting and reprogramming the person's behaviour [20]. In other words, whatever the individual associates to the use of a substance becomes the sole priority in his/her mind, conditioning his/her behaviour dramatically.
- ii. Apart from the single mechanism of action of each drug, all psychotropic substances also cause an increase in the dopamine levels released in the striatum [21,22] and the stronger and longer lasting learning signals associated to the abuse, increase the likelihood of that individual using the substance again. This effect reinforces itself and grows with each successive use of the substance, meaning that every new dose taken increases the probability of further use.

iii. Altogether, the above-mentioned data show how the alterations in memory and learning processes of subjects afflicted by trauma and by severe substance addiction are very similar.

Trauma and drug-induced dissociation in the light of Complexity Theory

The attractor

Within Complexity Theory, of special relevance here is first and foremost the concept of the Attractor, which allows us to see how the patient's life functioning as a whole is compromised when drugs or trauma become part of it. It is very well known how both psychoactive substances and trauma can disrupt a person's existence, but our aim here is to point out how the substance - or rather the behaviour connected to the substance's use - and the trauma, can become an "Attractor" of this person's functioning, in the sense suggested by Complexity Theory.

It is also important to keep in mind that this disruption has more aspects to it:

- i. It goes far beyond the actual psychotropic effect of the drug(s); in fact, simply quitting the substance does not eliminate the psychological effects of long-term abuse, as the latter are not limited to the use of the substance *per se*. Recovery from addiction and a life of sobriety do not guarantee, therefore, the full obliteration of the psychological experience connected to substance abuse.
- ii. We can say the same thing for trauma, where the end of the traumatic event does not automatically delete the damage done to the personality. It can be so powerful as to completely transform an individual [14,23].
- iii. It is never entirely or simply a direct consequence of the subject's pre-morbid personality [24,25], or of any family and social variables in the individual's history.
- iv. In a short amount of time a person becomes someone other than himself, just like Dr. Jekyll becomes Mr. Hyde⁴.

In other words, a gap opens between the past and present of the individual, especially in severe cases of abuse and trauma, and the addiction and the post-traumatic personality become the entire life of the individual and anything else becomes futile and dissociated. More

²Protein Kinase A (PKA) is a family of enzymes whose activity is dependent on cellular levels of cyclic AMP (cAMP). It acts to phosphorylate many enzymes important in metabolism and helps transfer the dopamine signal into cells. In the nucleus accumbens, which mediates reward, motivation, and task salience. The vast majority of reward perception involves neuronal activation in the nucleus accumbens, some examples of which include sex, recreational drugs, and food.

³CREB (cAMP response element-binding protein) is a cellular transcription factor. It binds to certain DNA sequences called cAMP *response elements* (CRE), thereby increasing or decreasing the transcription of the downstream genes. CREB has a well-documented role in neuronal plasticity and long-term memory formation in the brain.

⁴When Robert Louis Stevenson wrote his novel "The strange case of Dr. Jekyll and Mr. Hyde", he was probably thinking about some severe form of alcoholism. It is also interesting to note that he chose the term Juggernaut, to underline how Hyde was unstoppable: a century later, the same word was used for Marvel Comics's unstoppable monster, a man who, during his childhood, had been badly traumatized.

specifically, the person's mind is affected by a kind of dissociation, which we regard as a clinical version of the Attractor [26].

The Hypercycle and its Relation to the Historical Concept of Orpha

We noticed that some of our patients, with severe cases of addiction or trauma, managed to develop the ability to "utilize" their own addiction or post-traumatic personality in a productive way; individuals with extraordinary skills and great adaptive capacity, who paradoxically maintained a certain psycho-physical stability for considerable lengths of time [27].

To better understand how this "sub-group" of patient's function, we shall now refer to a particular type of attractor, which is the hypercycle. A hypercyclic system generally functions by exponentially incrementing the speed at which it consumes and dissipates the resources necessary for its own growth – such as, for example, happens in the stage of exponential growth of a society largely reliant and dependent on petroleum oil as its energy supply. In the following pages, we shall explain how, in our view, within the field of psychoanalysis, psychoanalyst Sandor Ferenczi's concept of Orpha (1932) described the onset of a hypercyclic process in the mind of a traumatized subject.

Orpha is defined as a part of the individual's personality that rears its head when there is an *inescapable* trauma, much like a "guardian angel" or a primordial lifesaving force, allowing for the victim's psyche to run away from pain, to overcome fear and to somehow cope with the shock. What we are particularly interested in is the fact that once Orpha is awakened, it does not simply go away; in fact, it becomes the wisest and strongest part of the individual's personality. This fragment of personality, which Ferenczi names "orphanic" (1932), may take up a huge role in the subject's psyche.

More specifically, and in the light of Complexity Theory, we could say that the orphanic fragment of post-traumatic personality becomes the centre of a hyper-cyclic process so powerful that the individual's entire mind and life comes to revolve around it. That is why we maintain that the concept of Orpha, identified as the core of the hypercycle, can become a useful theoretical and clinical instrument in the treatment of severe forms of trauma and addiction [28].

As happens in some severe cases of addiction, once the hypercyclic process has been activated, the personality system is totally revolutionized, as the "Chemical Orpha" triggers a disproportionate growth of certain fragments of the personality, while all other areas become extremely dissociated, even at the expense of the most basic human needs such as affection, caring and intimacy.

The extent of the substance-induced dissociation is often such that the subject loses all trace of these aspects of the human condition and therefore no longer realises that he/she is lacking them. Such individual's personality is then characterized by profound voids, alongside remarkably "titanic" aspects, in an absolutely disharmonious juxtaposition [29,30].

Conclusion

Through a review of the scientific research in these sectors, we found a broad overlap between the neurophysiological substrates of memory and learning mechanisms in subjects suffering from pathological dependencies and from severe trauma. Based on these data, and also supported by our own clinical practice observations, we suggest that the concepts of attractor and hypercycle, originating in Complexity Theory, provide a much-needed overarching interpretational framework for both substance-induced addiction and trauma, and represent very useful tools in making sense of and managing these two difficult clinical fields.

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