

The Maximum Power Principle: a new step in bringing psychoanalysis closer to modern holistic sciences

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Abstract

Classical psychoanalysis stems from and is still fundamentally rooted in early-20th century scientific thought, and typically seeks the cause of present behaviour in past experiences, thereby underlining the importance of ‘genetic’ processes over that of ‘epigenetic’ ones. Yet, a series of clinical cases, mostly dealing with drug addictions and traumatic experiences, are to date unsatisfactorily dealt with by conventional approaches. Recent theoretical developments in the fields of ecology and energetics, and specifically the Lotka-Odum Maximum Power Principle (MPP), may provide a valuable cross-disciplinary interpretational key to these cases, while bringing psychoanalysis itself one step forward in its long overdue path of catching up with modern philosophical developments in holistic sciences.

Background

Reductionist science and classical psychoanalysis

Classical psychoanalysis assumed that the unconscious functioning and structures of the human mind, albeit invisible, could nonetheless be studied *a posteriori* (a theory known as metapsychology). All psychic acts (dreams, thoughts, deeds) would be looked at from a pre-defined number of ‘observation points’, and this analytical process was deemed essential for the understanding of the psychopathology at hand, and for its cure. Classical metapsychology

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defines five such ‘observation points’ (Rapaport & Gill [1959]). Among these, we shall focus our attention here on the ‘genetic’ one, which is not to be intended in a molecular biological sense, but stands for ‘tracing back each psychical structure to another which preceded it in time and out of which it developed’ (Freud [1913]).

Striving to objectively ‘observe’ an inherently invisible phenomenon (or, rather, one which could only be seen through its effects) might appear paradoxical, but was actually perceived as necessary by Freud and his followers, in order to set their new ‘science’ firmly in place among the existing natural/empirical sciences.

Psychoanalysis thus started out by trying to borrow both rigour and methods from contemporary natural sciences. Specifically, the rapid development of classical physics and mechanics naturally led to the adoption of a mechanistic model for physiology, and to assuming all psychic life to be linearly related to the activity of the nervous system (Ellenberger [1970]). This was undoubtedly useful at first; however, the mechanistic and reductionist nature of early-20th century science soon began to be a hindrance to the further development of psychoanalysis and its ability to grasp the full complexity of the human psyche. Today some aspects of metapsychology may be considered obsolete. However, despite being officially discarded, many of its underlying axioms implicitly linger even in those psychoanalytic approaches that ostensibly declare themselves as far removed from orthodox psychoanalysis. Only in the last decades have the first isolated efforts to incorporate elements of complex theories into psychoanalysis been made (Levenson [1994]; Seligman [2005]; Piers [2005]).

Modern holistic science and the Maximum Power Principle

During the twenty pre-psychoanalytic years of his medical career, Freud had followed a personal development path that spanned microscopic anatomy to anatomo-clinical neurology. That goes a long way towards explaining how natural it was for him to adopt a philosophical approach to the budding discipline of psychoanalysis which was essentially grounded in his long experience at the microscope.

It is interesting to note, on the other hand, how the eminent ecologist H.T. Odum felt the need to coin the opposite term ‘macroscope’ (Brown, Hall and Jørgensen [2004]). Such expression synthesizes a philosophical view of science that clearly advocates the necessity to always view and interpret a complex system as having a role in the next larger system into which it is embedded, and not as a mere collection of parts to be mechanistically dissected.

A clear example of the transition of scientific thought from reductionism to holism is provided by the evolution of the Maximum Power Principle (MPP), which was born out of early 20th century reflections on energetic control over natural systems (Lotka [1922a]), and was later refined in the light of modern systems theory (Bertalanffy [1950]), as well as early ecology (Odum [1953]). It had long been recognized that a large energetic output per unit of time (thus, power) in the form of growth, reproduction, and self-maintenance is most important to the survival of an organism. By extrapolating and generalizing this observation, it was then postulated that, under the appropriate conditions, maximum power output may in fact be the ultimate underlying criterion for the long-term survival of all systems, both living and non-living (Odum & Pinkerton [1955]). It was subsequently further observed that systems may operate according to alternating phases of ‘selfish’ (or micro-scale) vs. ‘holistic’ (or macro-scale) maximization of power. As pointed out by Odum in his rebuttal to what he perceived to be a common misinterpretation of the MPP, ‘selection for maximum power does not mean a selfish maximizing of power by components’ (Odum [1983]). Again, the accent is put on the necessity to always consider the next larger scale, i.e. the whole system in its entirety. In fact, it was found that the short-sighted overexploitation of readily-available (natural) resources by a single system component may well lead to a high power throughput for that particular component in the short term, but it will typically fail to be sustainable in the long run, when reserves become depleted, and the side-effects of such behaviour become apparent, eventually drastically dragging down the power of the entire system. This lucid intuition, although difficult and perhaps ultimately impossible to effectively prove in the full scientific meaning of the term, has since garnered widespread respect and given rise to a number of notable theoretical and empirical studies (Patten [1993]; Giannantoni [2002]; Hall [2004]; Cai *et al.* [2006]; Salthe [2010]).

Figure 1 illustrates a generalized model for a multi-component system in which a complex web of interactions take place, including many feedback loops. *Overall* system power is thus maximized (according to the MPP), in spite of comparatively limited component-specific power throughput. Such complex structures are well known to be typical of healthy natural ecosystems.

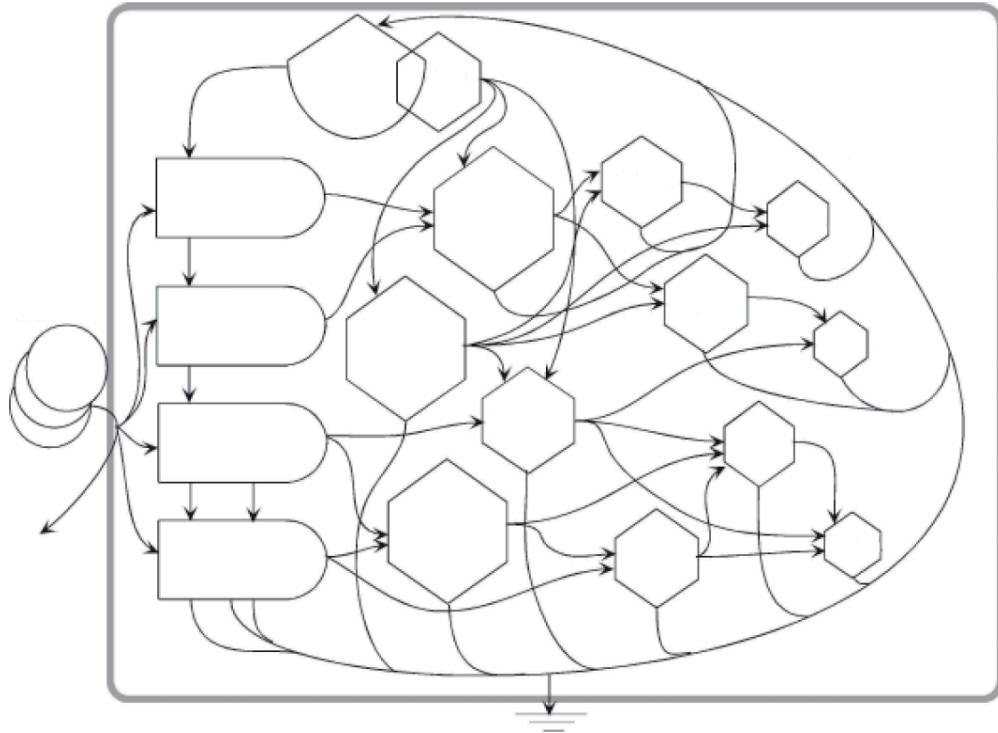


Figure 1: Diagram of a system entertaining a complex web of interactions, including multiple feedback loops (e.g. a healthy natural ecosystem). Source: adapted from Brown et al. (2006)

Figure 2, on the other hand, illustrates a simpler system in which power is only maximized ‘selfishly’ within one prevailing autocatalytic loop⁶ (4), to the short-term benefit of a single system component (C), while feedback is only provided in terms of low-quality ‘waste’ (W) that contributes little to the underlying production system (P), and requires extensive external support (S) to be recycled.

Figure 2 may be used for the streamlined description of a typical modern industrial society, which maximizes the power of human capital (C) in the short-to-medium term largely by relying on an ever-increasing supply of slowly-renewable (R1) and non-renewable (R2) resources, without providing valuable feedback loops that stabilize the natural supporting system (P).

⁶ An autocatalytic loop is defined as a level of organization whereby two (or more) system units are connected in a cyclic manner, resulting in the exponential growth of one of the units for as long as there is sufficient remaining stock of the other(s).

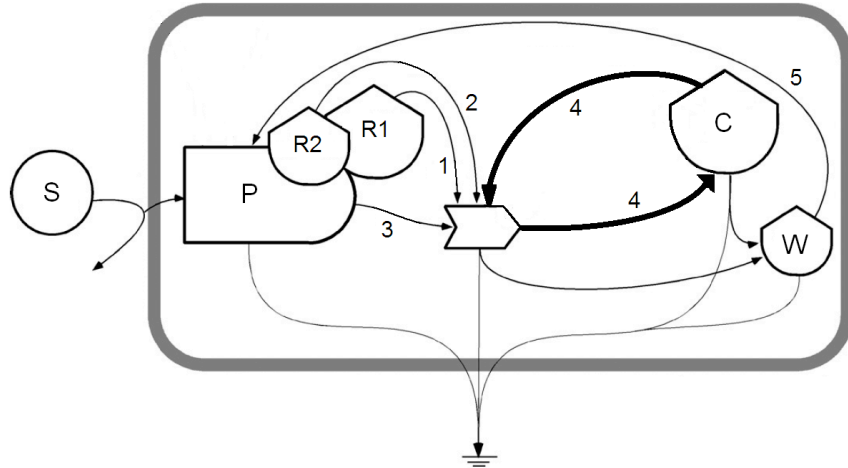


Figure 2: Diagram of a simpler system (e.g. a modern industrial society), locked in a single prevailing autocatalytic loop (4). Source: adapted from Brown & Ulgiati (2011)

Bridging the gap from ecology to psychoanalysis

Observed limits of the ‘genetic’ point of view in psychoanalysis

Generally speaking, psychoanalysis, from the beginning of its history, has almost always sought the cause of present behaviour in past experiences, underlining the importance of ‘genetic’ processes (seen largely as invariants) over that of ‘epigenetic’ ones (which, instead, result in a continuous remoulding of the mind). In our opinion, this is one of the fundamental causes of the hitherto limited success in the psychoanalytic treatment of drug addictions and traumas, in which the ‘epigenetic’ element in fact often has a leading role. While necessary, the metapsychological assumption that all psychological phenomena have a psychological origin and development is clearly not sufficient to explain clinical pathological conditions like those emerging from drug abuse and traumatic experiences. In fact, the classically assumed preponderance of ‘genetic’ processes is greatly reduced in the light of a new emphasis on the self-organization processes that take place inside the human mind. The behaviour of some types of drug addicts (Wurmser [1974], [1985], [1987]; Director [2002]; Burton [2005]) and traumatized people (Ferenczi [1932]; Smith [1999]; Bonomi [2004]) may exhibit commonalities that have little to do with their individual backgrounds. For instance, in the case of substance abuse, what is often central in determining the addict’s behaviour is the polarizing effect that the drugs themselves (and the dissociative processes induced by them) have on his/her psychopathological mental ‘loops’.

In psychoanalysis, a typical example of the establishment of a similar mental 'loop' may be found in Ferenczi's 'Orpha' concept (Ferenczi [1932]; Beni and Santoni [2014]). With

this term, Ferenczi refers to a set of psycho-physical reactions that, according to him, occur during and after an inescapable trauma, and which collectively allow the traumatized subject to get past the traumatic experience itself, and provide a short-term survival strategy, at the expense of inducing a deep dissociation of the personality. It is important to underline that, although this reaction is borne out of the traumatic experience per se, it actually has much farther reaching consequences. Once established, this mental process goes on to become a fundamental part of the subject's personality, to the point where the latter ends up being completely rearranged around it.

The role of the MPP as a new cross-disciplinary interpretational key

We hereby propose that the MPP may be identified as the guiding principle in the self-organization processes of the human mind, in a similar fashion as it applies to biophysical systems.

A diagram such as the one depicted in Figure 1 may be used as a conceptual model for a healthy human mind, where the well-being of the individual ultimately depends not on a single 'closed' loop but on a large number of physical (food, shelter, healthcare) and social (parental care, friendship, employment) interactions. The latter demand a sustained effort for their joint support (i.e. many feedback loops), and thus prevent the out-of-control single-minded maximization of the power of any particular interaction at the expenses of the others. Instead, the generalized diagram illustrated in Figure 2 may for instance apply to a drug addict's mind, whose (excessive and delusional) self-confidence is driven by the polarizing autocatalytic loop (4) established by the interaction with the drugs themselves (represented as R1 and R2).

First evidence of the applicability of the MPP to psychoanalysis

Over ten years of professional activity in the field of trauma and drug addictions have led one of the authors to come in touch with several patients for whom substance abuse gave rise to mental mechanisms that were very destructive for the subject's psycho-physical equilibrium. However, a seemingly paradoxical effect could sometimes be noticed: the profound dissociation of the personality induced by the addictive experience seemed to allow some subjects to find new ways to survive the damage done by it. The subjects developed 'super-personalities' which were adaptively powerful ('progressive') in the short term, at the expense of causing a number of serious long-term psychophysical pathological conditions

which often had ultimately catastrophic effects (Beni [2009]). In particular, one clinical case study appears to be especially suitable to illustrate the thesis being presented here⁷.

Eliza was born in a family where those elements of tenderness that are generally required for the psycho-physical survival of a healthy human being were severely lacking. On one hand, this led to Eliza's invalidating emotional fragility; on the other hand, it contributed to her strong inner thrust towards early independence. This first trauma may be seen as a first 'epigenetic' process in that it already induced a first dissociation in Eliza's mind (Beni [2013]). However, its relative importance is reduced in the light of the later events (drug addiction), which then had a much larger role in moulding Eliza's mind. In fact, heavy drugs (heroin and cocaine) entered early and massively into her life, during her adolescence. Contrary to what might be expected, they did not, at first, have a destructive effect on her, but a transformative, even constructive one. She abandoned her former self as a sad and traumatized child, and at once became a young adult, powerful in her capacity to prevail upon her peers, detached from her past, no longer in need of affection, and at the same time no longer harmed by the destructive dynamics taking place within her family. All this may be interpreted as an eminently 'epigenetic' process. In other words, the 'drug – addict' autocatalytic loop (labelled as 4 in Figure 2) strongly contributed to establishing what she came to consider as her own personal success, i.e. her self-esteem as an 'almighty' and self-sufficient woman (C in Figure 2).

After a while, though, the polarizing effect of such autocatalytic loop led to a progressive neglect of (i.e. lack of reinforcing feedback loops to) other fundamental aspects of her life (P in Figure 2). In particular, the continued depletion of her economic, physical and affective/interpersonal resources irremediably affected her ability to keep working, and thus also to finance her drug addiction. As a result, Eliza started collaborating with drug pushers and even stealing from her own home. This eventually led to her final break-down: she lost her job, lost her credibility at home, and collapsed from a self-assured leader who needed no-one beside herself to a weak and exposed loser who could barely make it to the next day. On a biophysical level, the accumulated toxins and drug catabolites within her body (W in Figure 2) had ended up impairing her basic cognitive structures and mental functions (P in Figure 2); at the same time, on an interpersonal level, the negative social and relational effects of her drug-induced behaviour (W) had also contributed to the extreme weakening of her most fundamental social skills (P).

⁷ The technico-clinical aspects of the case report are beyond the scope of this paper; the interested reader may find these in Beni [2013].

The final result of this break-down was the sudden cut-off of the drug inputs (1 and 2) and the disruption of the auto-catalytic loop itself (4), which resulted in a dire identity crisis (C), since the latter could now only rely on a stunted supply of basic interpersonal skills and social relations (3), both of which had been severely neglected ever since her childhood. Key to Eliza's eventual recovery from her break-down was her surrendering her delusional concept of herself as an 'almighty' self-sufficient being who could sustain herself indefinitely and independently of anyone else, only based on her auto-catalytic loop (4), which was ultimately driven by the drugs (R1 and R2). She had to be helped to slowly 're-learn' to rely on a whole range of resources (P), which were in fact necessary all along, irrespective of her delusional perception otherwise. However, these relatively lower-power inputs (3) would never have been able to propel her to the exalted status that she had reached in the early and central stages of her drug-addict life, and even less so now that their abundance had been seriously undermined through prolonged neglect and lack of reinforcing feedback.

Discussion

On the central role of the crisis as the necessary precursor to the cure in the clinical treatment of trauma, Smith (1999) stated that 'some failure of Orphic functioning must occur for analytic work to begin'.

Observing the human mind (the 'system') in the light of the MPP, it may now be argued that as long as the localized 'selfish' maximization of power by a single auto-catalytic loop is in full swing and is sufficient to also maximize the power of the entire system (seen as the simple sum of its parts), such a deeply engrained functional pattern remains virtually impossible to alter. Only at the notice of an impending crisis in the prevailing autocatalytic loop does the first possibility of change also arise. The system may then be led to recover in some way, and to the extent that is still possible, whatever remains of the complex web of interactions that forms its underlying support structure (now looking at the system from a holistic perspective, and no longer only as the mechanistic sum of its parts). Similar observations were reportedly often made by Odum about the co-development of modern industrialized societies (Hall [2004]): 'In HT [Odum]'s eyes the end of this "frenzy of consumption" we are in now would come only with the exhaustion of the high quality fuels, and until then it was maximum power at a relatively high rate'.

Going back to the case study illustrated in section 2.3, Eliza too could only be led to a cure at a time of major existential break-down. In her case, the psychoanalytical process strongly clashed with her chronic lack of trust in all primary reference figures, and awoke in

her a never-before fulfilled need for affection which had long been made dormant ('dissociated' in clinical terms) by the overpowering drug-induced autocatalytic loop. Similarly, in the case of trauma victims, besides the original trauma experience and its often recurrent re-enactments, the eventual catastrophic failure of the 'Orphic' autocatalytic loop must also be considered as a further probable, and in fact therapeutically desirable, traumatic event.

However, a further important observation must be made. The study of biophysical systems has shown that if the fundamental equilibria underpinning a healthy ecosystem are subject to prolonged damage and neglect, it may ultimately become impossible to restore their functioning (Millennium Ecosystem Assessment Board [2005]).

Likewise, a person's recovery is only possible if the failure of the autocatalytic loop occurs before the complete and utter depletion of his/her other primary resources (e.g. in Eliza's case, she could still rely on some sort of family ties, her relatively young age and not terminally impaired physical health, etc.).

Conclusions

A growing body of experimental evidence seems to indicate that the MPP does indeed provide a fitting theoretical framework for the interpretation of the psychopathology of trauma and selected types of addictions, as well as of the functioning of biophysical thermodynamic systems (its usual field of application). In this way, psychoanalysis itself is brought one step forward in its long overdue path of catching up with modern philosophical developments in holistic sciences.

More specifically, traumatic experiences and severe addictions are found to often lead to the formation of strong autocatalytic mental loops which tend to polarize the subject's personality and, ultimately, life (i.e. the whole 'system'). The exclusive nature of such loops, together with their exponentially growing intensity, then invariably concurs to determine the foreseeable failure of the entire system. Clinical experience has proven that the psychoanalyst may help the patient to 'learn' to conceive and accept an alternative way of being, outside of the overpowering autocatalytic loop which previously structured his/her very life, and thus steer him/her clear of certain death. However, the ultimate success of the therapeutic process appears to strongly depend on two fundamental conditions: firstly, the sheer proximity of the crisis of the autocatalytic loop mechanism, and secondly, its timing with respect to the extent of the remaining resources on which to draw in order to construct the new way forward.

These conclusions resonate strongly with similar considerations which have been made in the fields of environmental science and policy. It has been argued that well-guided policy advice, based on sound environmental analyses, may help avert an ominous crash for modern societies, by pointing the way to a comparatively smoother descent towards a lower-power and more sustainable future (as advocated, among others, by Meadows et al. [1972], Georgescu-Roegen [1979], Odum and Odum [2001] and Lovelock [2006]). In this case, of course, the situation is made even more complex by the fact that not one, but many parallel (and partly interconnected) autocatalytic loops have been established in different parts of the world, each being at a different stage in its ultimately doomed trajectory of ever-increasing strength and exclusiveness. However, the fundamental rule still seems to be that, in order for far-sighted policy advice to stand a chance of being heeded, it may first be necessary for the world as a whole to have further dangerously inched its way towards the very brink of environmental disaster - it only remains to be hoped that in that case, the 'therapy' will not be too little, too late.

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