The Maximum (Em)Power Principle as a Cross-Disciplinary Interpretational Key: From Ecology to Psychology

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ABSTRACT

We argue that the Lotka-Odum Maximum (Em)Power Principle (MPP) may provide a valuable novel interpretational key to classic Freudian metapsychology, and to all those contemporary psychoanalytic approaches which, admittedly or otherwise, still continue to adopt most of its assumptions as their basic premises. Generally speaking, psychoanalysis, from the beginning of its history, has sought the cause of present behaviour in past experiences and traumas, 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). The MPP helps shed new light on this and provides an alternative, more holistic approach. A practical clinical case study is illustrated and discussed, and a conceptual parallel is drawn with the simplified analysis of the functioning of an industrial society.

INTRODUCTION

This paper stems from the experimental observation of a series of clinical cases, mostly dealing with drug addictions and traumatic experiences, which are to date unsatisfactorily dealt with by conventional psychoanalysis. We believe that this lack of success may be largely due to the fact that psychoanalysis has mostly remained, admittedly or otherwise, tied to a view of the world that characterized the natural sciences in the early 20th century. 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].

In our opinion, the more recent developments of scientific thought in the fields of ecology and energetics, and specifically the Lotka-Odum Maximum (Em)Power Principle (MPP) [Lotka, 1922a; b; Odum and Pinkerton, 1955], may provide a valuable cross-disciplinary interpretational key to unravel the hidden functioning of both biophysical thermodynamic systems (its usual field of application) and the human mind (as seems to be confirmed by preliminary evidence in cases of drug addiction). We illustrate here this double application of the MPP by means of a conceptual parallel between a biophysical system and a clinical case study.

HISTORICAL BACKGROUND

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 defines five such ‘observation points’ [Rapaport and Gill, 1959]. Among these, we will focus our attention 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, such as physics and biology. Psychoanalysis thus started out by trying to borrow both rigour and methods from contemporary natural sciences. 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.

In this paper, we focus on discussing how the ‘genetic’ point of view may lie at the basis of metapsychology’s failure to explain many unforeseeable and creative aspects of human behaviour, among which those deriving from drug dependence and trauma experiences. Generally speaking, psychoanalysis, from the beginning of its history, has invariably 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.

THE WORKING HYPOTHESIS

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 [Ferenzni, 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’.

It is argued here 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.

OVERALL VS. ‘SELFISH’ MAXIMIZATION OF POWER

It has been observed that systems may operate according to alternating phases of ‘selfish’ vs. ‘holistic’ maximization of power. As pointed out by Odum in his famous rebuttal to numerous misinterpretations of the MPP, “selection for maximum power does not mean a selfish maximizing of power by components” [Odum, 1983]. In fact, the short-sighted overexploitation of readily-available (natural) resources by a single system component may well lead to high (em)power in the short term, but it will invariably 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.

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. We argue here that the
same type of diagram 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.

Figure 1. Systems diagram of a natural ecosystem / healthy mind entertaining a complex web of interactions, including feedback loops. (Source: adapted from Brown et al., 2006).

Figure 2. Systems diagram of an industrial society / drug addict’s mind, locked in a single prevailing hyper-cycle (4). (Source: adapted from Brown and Ulgiati, 2011)
Figure 2, on the other hand, illustrates a simpler system in which power is only maximized ‘selfishly’ within one prevailing hyper-cycle (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.

We argue here that the same generalized diagram illustrated in Figure 2 may apply to:

(A) 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 high-energy non-renewable resources (R2), without providing valuable feedback loops that stabilize the natural supporting system (P);
(B) a drug addict’s mind, whose (excessive and delusional) self-confidence is driven by the polarizing hypercycle (4) established by the interaction with the drug itself (R2).

A more detailed description of the individual system components depicted in Figure 2, in the light of the two interpretations given above (A and B) is given in Table 1.

CASE STUDY

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. 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. 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).

After a while, though, the polarizing effect of such hypercycle (4) led to a progressive neglect of (i.e. lack of reinforcing feedback loops to) other fundamental aspects of her life (P and R1). In particular, the continued depletion of her economic and physical 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, we can say that the accumulated toxins and drug catabolites within her body (W) had ended up impairing her basic cognitive structures and mental functions (P); 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).

The final result of this break-down was the sudden cut-off of the drug input (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 (3) and social relations (1), both of which had been severely neglected ever since her childhood.
Table 1. Description of system components in Figure 2.

<table>
<thead>
<tr>
<th>System component</th>
<th>Industrial society</th>
<th>Drug addict’s mind</th>
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<tbody>
<tr>
<td>S</td>
<td>Renewable resource flows (sunlight, deep earth heat and tidal exergy)</td>
<td>Fundamental physical inputs for survival (sunlight, food, water, …)</td>
</tr>
<tr>
<td>P</td>
<td>Natural production system</td>
<td>Basic cognitive structures and functions of the human mind; fundamental social skills</td>
</tr>
<tr>
<td>R1</td>
<td>Slowly renewable resource funds (fertile soil, old-growth forests, …)</td>
<td>Parental and social relations, social status, economic independence, friendship, affection, …</td>
</tr>
<tr>
<td>R2</td>
<td>High-emergy non-renewable resource stocks (fossil fuels, minerals, …)</td>
<td>Drugs (cocaine, heroine, …)</td>
</tr>
<tr>
<td>C</td>
<td>Human ‘capital’ (assets, services, culture, arts)</td>
<td>Identity (eventually leading to delusional perception of one’s self as ‘almighty’ and self-sufficient)</td>
</tr>
<tr>
<td>W</td>
<td>Wastes and emissions</td>
<td>Toxins and drug catabolites; negative social and relational effects of drug-induced behaviour</td>
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THE WAY FORWARD

First and foremost, Eliza had to undergo a long and painful process in which she was slowly led to recover a primordial conception of tenderness, without which she would not have been able to respond to any kind of therapy (the technical elements of the latter fall outside the scope of the present paper and are not discussed here).

In the end, 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 (R2). She had to be helped to slowly ‘re-learn’ to rely on a whole range of resources (P and R1), which were in fact necessary all along, irrespective of her delusional perception otherwise. However, these relatively lower-(em)power inputs (1 and 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.

Going back to our conceptual parallel between the drug addict’s mind (B) and the modern industrialized society (A), we may say that, likewise, the level of affluence (C) which has so far been afforded by the hypercyclic (4) exploitation of high-emergy non-renewable resources (R2) is unlikely to be sustained when, in the not so distant future, society is eventually forced to only rely on renewables (P) and, to a lesser extent, slow-renewables (R1). Just like Eliza, human society will then inevitably experience some sort of break-down, sooner or later.

However, clinical experience has proven that the psychoanalyst may help the addict to ‘learn’ to conceive and accept an alternative way of being, outside the prevailing hypercycle (drug addiction) which by and large structured his/her very life, and thus steer him/her clear of certain death. Likewise, well-guided policy advice, based on sound environmental analyses, may help avert an ominous crash for society, and instead point the way to a comparatively smoother descent (as advocated by Odum in his “Prosperous Way Down” [Odum and Odum, 2001]).
REFERENCES