

Compositional Homology and Creative Thinking

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If the origin of the aesthetic attitude is a complex performance, which involves a multiplicity of interactions in our cognitive, attentional and experiential endowment, as more and more decided aesthetic thinking, philosophy of mind and life sciences lead to point out, and if from these interactions only it's possible to understand the creative nature of human reasoning, which manifests itself in an exemplary way in the artistic activity and aesthetic attention, then the evolutionary morphology is the best candidate for the development of effective tools for the analysis of these aesthetic performance, as well as a rich reservoir of themes and terminology capable of supporting such analysis.

According to the influential paper by Terrence Deacon, «The aesthetic faculty» – I shall limit myself here to make a few examples of a prominent line of research – the aesthetic attitude arises in human cognition via the symbolic exploitation of a variety of juxtapositions, blends and forms of recombination that can induce emergent and novel experiences, with strong emotional connotation.

In the opinion of Deacon and according to a series of studies in evolutionary psychology, among them I remember here those of Paul E. Griffiths, it is here (so to speak) to trace the similarities between the emotional connotation of aesthetic relationship and the complex emotional attitudes that form their antecedents on a phylogenetic level in other living forms, pointing out, however, the peculiarities of the human emotional attitude, which in fact is characterized as tension, attention, continuous processing on the axiological and experiential learning, in short emotional investment on the synthesis and blending of a variety of initial relational schemata and motivational systems.

Deacon, notoriously, suggests that they are not involved here in the aesthetic attitude neuronal structures, modes of behavior and emotional resources entirely new and unprecedented in a phylogenetic sense, but innovative uses and recombinations of characters and capacities somewhat attested in the history of life.

This way we are faced with an analysis developed in the wake of the relationship between phylogenetic continuity, their formal reconstruction within frameworks of activity that determine the onset of the aesthetic attitude and faculty in the same occurrence of innovative linkages between structures and functions. It is in this context that Deacon advances the proposal of a «compositional homology» between the recombination of structures and functions that determines in his perspective the emergence of language, and the one that gives rise to the aesthetic faculty.

Deacon, however, so perhaps not consequential, characterizes the emergence of this tendency to blending and to juxtaposition of motivational systems in form of new experiential qualities as «deletion» of prior functional constraints, leading to an (aesthetic) attitude free from immediate implications for function, but available in many finalistic specific investments.

One may ask, in turn, if a concept of interaction without purposive elements among the structures and motivational systems can be understood as the formal link that precedes the actual implementation of specific cognitive, experiential functions. As we will see, this is the case in the morphological perspective we propose to support. If so, the concept of «compositional homology» can be usefully employed in a different way, not just emphasizing the relationship among different human faculties, but also to investigate the inner conditions for the emergency of such new aesthetic attitude.

Such a descriptive proposal, according to the fundamental review carried out by Fabrizio Desideri, can in fact be re-thought, rather than as the «deletion» of prior functional constraints, as the first opening of a possible orientation toward the world, able to anticipate – just aesthetically – the construction of our unified mental life: in a Kantian fashion we would say, able to anticipate «the sense of the experience».

Evolutionary psychology with its adaptationist program approached such aesthetic attitude as design problem, applying a form of reverse engineering to infer the evolutionary problems this attitude was selected to solve. But only from a systemic view, which considers the emergence of the aesthetic as a response of a complex system to an overall restructuring of its internal and external relations, the anticipatory nature of the aesthetic experience, in its essentially relational and epigenetic nature, can be

understood. Such a systemic view is offered, away from the adaptationist program, by the tradition of the morphology.

The modern synthesis of evolution, focusing on the statistical analysis of the dynamics of population genetics, did not capture the multiplicity of levels of the organismal organization and structure; a multiplicity which requires a qualitative approach to the individuality of the living forms and opens to the question of the origination of the morphological novelty and functional innovation on a multiplicity of hierarchical levels and interactions of the organisms. Only a morphological and systemic investigation can account for such innovations and novelties at higher levels of organization, among which are the aesthetic attitude and creative thinking.

We will try to outline two main problematic fields, focusing in a methodological way on the question of the «function» of the aesthetic relationship and on the nature of the interconnection between innovative and ancestral elements.

These two issues are strongly correlated in the morphological tradition, because both founded in the pivotal concept developed by the classical morphology of the Goethe-Zeit and now usefully rethought in an evolutionary sense; I refer to the concept of homology, and to his nature of a qualitative character, irreducible to the analysis of the quantitatively and statistically conceived states in which the given character can occur.

The great viennese morphologist Rupert Riedl once remarked that «The perception of form is even able to order hierarchically fields of similarity». When Riedl refers to «fields of similarity» it is necessary to distinguish between the *functional* analogy, that is the similarity in function among different traits, and the *morphological* homology, that is the identity of traits, the identity of their *Bedeutung* within the system, although (citing the classic definition given by Richard Owen in 1843) *under every variety of form and function*.

The analogy *establishes* then a similarity of traits based on functional criteria. While homology *sees* (it is no coincidence that Riedl refers to the *perception* of form) the identity of traits as a *structural constraint* much deeper than the «quantitative» variation of adaptive forms and functions. Goethe's morphological perspective was already as such, as we read in the final remarks of the *Metamorphosis of Plants*: «Whether the plant grows vegetatively, or flowers and bears fruit, the same organs fulfill nature's laws throughout, although with different functions and often under different guises».

However, we could not understand, if not in a trivially metaphorical sense, neither Goethe's theory of homology in the structures of plants, nor Riedl's theory of

hierarchical organization of perception, if we were not to emphasize their systematic nature. Precisely under such conditions the concept of homology can allow to overcome the risks of a deterministic interpretation of the relationship between different hierarchical levels, i.e. for instance in genes interactions, developmental processes, morphological structures, behavioural structures. It has been indeed remarked that non-homologous traits on one level can give way to homologous traits on an other level and vice versa. Contemporary analyses on homology have named this phenomenon as *Hierarchical Disconnect*: the same result can be achieved in more than one way, and different results can be achieved starting from the same model.

Functional adaptations and history of the forms appear secondary to the structural maintenance of an identity that still allows to indicate that particular trait as the same trait. In this way, by means of the concept of homology, in terms of methodology we overcome the general reference to categories that refer to the issue of functional adaptation, an issue that is likely to create some kind of particularly dangerous theoretical short circuit in the psychological and behavioral field we are interested. The short circuit lies in the fact that, by identifying certain «functions», you should be looking for links between «traits» that would already be interpreted as specific adaptations, and the same problems assumptions, of which those adaptations would be the evolutionary response.

To a similar risk of procedure or formal defect, the concept of homology is subtracted, in hindsight, because it allows to leave totally undermined both the functional interaction, the morphological trait will be called upon to play in the unfolding of biological act, as the same formal determination of that trait, to keep firmly to the sole identification of that trait considered within its meaning in the build of the structure of living form. This means that this trait can be considered in three aspects, and indeed 1) in its systemic and structural characterization, 2) in its qualitative nature, 3) in its evolutionary significance, understood in a specific sense in relating phylogeny and ontogeny, life history and developmental constraints.

Focusing on the first two points of this short list, the first criterion (Kriterium der Lage, according to the original proposal of Adolf Remane) refers to positionality, to the relative position of an element within a biological system, either on a genetical, developmental, anatomical, behavioral, cognitive, environmental degree. For example, two bones are homologous if their positions in the respective organisms are the same.

The criterion of special quality (according to Remane: Kriterium der speziellen Qualität der Strukturen) concerns the complexity and distinctness of a character.

The organism, considered in the complexity of its interactions, is therefore a system of homologies and non-homologies, and understanding in an evolutionary sense the living form is no more than the understanding of such interactions in which, as showed better than others Gerd Müller (2003: 65), homologous elements become the «attractors», the elements of organization of the evolution possible to be realized, acting «as accretion points for new elements that become part» of the structures in evolution. In this sense homologues and non-homologues make system together, become the constructive elements of a hierarchical interconnection not genetically predetermined, but such as to stabilize and that is determined from time to time both formally and functionally. The innovation possible to be realized (the «generation» of non-homologous) will be channeled and then dynamically «shaped» by the network of homologues that weaves the unity of the organism. We will return to this crucial point.

In the relationship of homology, the similarity between traits (in the case that interests us: the one from which we interpret the evolutionary origin of the aesthetic attitude) is not attributed neither to a meta-empirical model (to an essence), or to a functional analogy, neither is understood as «common descent with modifications». It is rather the systemic significance of the trait in the overall morphological organization trait to appear crucial.

According to the definition proposed by Gerd Müller (2003: 64): «Organizational homology concept».

The determination of what is certainly not due to mere phylogenetic reasons (common descent), nor can be traced to genetic factors or interactions in the development of a species (according to some reading of the current topics of the Evo-Devo), but poses rather a strong emphasis on interconnected causes of multiple levels of organization, and the position that the character acquires into the system, thereby opening up to its function.

If, therefore, the homology is the manifestation of a hierarchical system of interconnections, to be understood as already mentioned in a non-deterministic way, and the relationship between form and function must be understood as systemic organization, it offers the opportunity to think about function no longer in adaptive sense, but as «activity in general» in the system, mode of interconnection, without which you can not think of the shape, of course, but in turn morphologically based on the interconnections of the system.

Alan Love (2007: 700) offers a description that is worth reproduce: «Organization refers to how activities are arranged so as to contribute to causal roles, and therefore is

a kind of natural evidence for activity-function homology». No more adaptive function, again, but function as an activity. In few words (I refer here to Rasskin-Gutman [2005]), function must be understood as a successful interaction among the interconnected elements of a system, so that the whole «works» in the sense of maintaining its own integrity, and promote the emergency of new interactions. (Functionality as capacity to contribute to the self-regulation of some entity of which it is part).

Let us now, in light of what we have seen so far, to report the methodological procedure developed in this way to the question of the nature of the aesthetic attitude. In a morphological perspective and in the light of the concept of homology, then, you will not go in search of the adaptive function that the supposed trait, called faculty or aesthetic attitude, would be called upon to perform (perhaps from assuming an ancestral evolutionary environment [EEA, Environment of Evolutionary Adaptedness]), but rather one would ponder about the systemic meaning of the aesthetic activity as a way of shaping the human mind and be at the same time the result of this reconfiguration, in its anticipation (aesthetically) the actual functional deployment of any further cognitive, ethical, relational / environmental attitude.

Moreover, recognizing the aesthetic as «character» qualitatively understood, conceptually distinct from the multiplicity of connotations where that character can later be deployed, sweeps away all the confusions that are commonly present in an attempt to «go back», so to speak, from the multiplicity of historical forms of the aesthetic and the artistic to the identification of a (single) adaptive function, at the same time, we are faced to a «typological concept», which allows to understand the different manifestations of the aesthetic in the same way in which (on a systemic, morphological, and then cascade also on a formal and functional level) the concept of «tetrapod» – to take a trivial example – allows us to understand both the shape of the horse or the human being, as that of the whale, or the eagle, even as that of the serpent, in which all four limbs are in fact lost.

Saying this is not at all postulated that the aesthetic attitude has some homologue in the organization of the mind of another species. Rather, so to speak the homology is a special case of the morphological configuration as hierarchically organized interconnection. We therefore do not postulate the existence of homologues of the human aesthetic attitude, again, but we understand that, in his characterization of non-homologue made possible by the network of homology which is the morphological organization of the living beings, the aesthetic attitude manifests as an activity in general the organization hierarchically interconnected of the human mind.

In other words, the qualitative characterization which leads to define «aesthetic attitude» the interplay of our cognitive, emotional and expressive relational modalities, showing a character of identity which is maintained under every variety of form and function, but which is recognized as such only because of the systemic (so-called «internal») and relational (so-called «external») interactions which from time to time it characterizes and possibly recognizes and actively proposes in an aesthetic sense.

Just in relation to the latter point it seems methodologically fundamental the distinction between the configuration of the aesthetic attitude (we can say: the aesthetic character) and his way of working, from time to time contextually different. The «overall activity» precedes and anticipates the specific configurations and functions while in turn, so to speak, the same system of interactions can be specified from time to time in ways functionally different depending on the order of priority in which the logical and temporal interconnections are activated (at least partially in this sense: Wimsatt [2002]).

As already said, on the basis of the statements of Rupert Riedl, a really significant aspect of the morphological paradigm here we support is given by the deep relationship between form and perception of form, which here involves first and foremost the relevance of certain configuration criteria for determining systemic field in which it occurs that «new» character called aesthetic attitude.

I conceive of two main candidates for determining such configuration criteria: if, as we have repeatedly proposed, it is ultimately a criterion of positionality to allow the identification of qualitative differential character in his play in the system, it will be the first candidate the symmetry, or at least the balance of the qualitative character in his interactions; precisely the system of hierarchical relationships that it helps to regulate and redefine. From Baumgarten's topic of the beauty of knowledge as immanent «focus perfectionis» of sensitive knowledge (AE, § 26) to the Kantian topic of the judgment of taste as «the feeling [...] of that harmony in the play of the mental powers, so far as it can be felt in sensation» (KU, § 15) we are in an area intensely attended from the classical aesthetics, and not overlooked from the morphological evolutionary thinking from Ernst Haeckel forward.

No less important, usually much neglected, however, is another performance that can easily be traced back to the theoretical framework the homology, specifically inscribed in the emergence of the character of the aesthetic attitude. The homology says the identity of a character under every variety of form and function; recognize the homology is namely strengthening of the identity, and thus also of the differences that

(so to speak) pass through the form and form perception. If the analogy is about the (functional) similarities, the detection of these similarities is insufficient for the purposes the homology, which specifically seeks to identity, thus channeling the paths of identity while deepening the differences. (I am referring to the processes of «entrenchment» and «scaffolding» that says Wimsatt).

Here, if we were to follow the tradition of the «materialistic» morphology in a way that crosses the modern biological thinking from Geoffroy de Saint-Hilaire, to D'Arcy Thompson up to reemerge in Stuart Newman (1995: 220), there we'll be looking to the deep action of the physical constraints of the form, which cause biological forms «turn more and more into themselves». «According to the internalist view, then», says Newman, «the intensification of uniqueness, rather than the open-ended production of overt difference, Thus may be the hallmark of organismal evolution» (at least after the Cambrian explosion).

Even the mechanism of sexual selection, aesthetically founded by Darwin in the choice and sense of beauty (as explained by Professor Menninghaus in his book *Das Versprechen der Schönheit*), sees at work a principle of strengthening identity and differences, a principle that acts on at least two levels, leading to intensify the distinctive characteristics of the species (I refer to Ernst Mayr [1972]), and especially leading to intensify – precisely on the basis of the criterion of aesthetic appreciation of certain favorite characters – the differential connotations of the two sexes.

The recognition of homologues interwoven in the organisms, as we have seen, is at once a prerequisite for the understanding of the functional and morphological innovations possible starting from those networks of homologues. According to Gerd Müller, homologues act as organizers of the phenotype; their position in the organizational hierarchy is the premise for the construction and achievement of new structural orders. Referring now this fundamental assumption to the aesthetic attitude, characterized as hierarchical restructuring and metafunctionality, the formal composition indicated by the aesthetic attitude leads to a new and unprecedented level the organization of the mental performances, and acts as a basis for new functional investments, new forms of creative organization of the human mind.

It has been repeatedly recognized the trouble inherent in an extension of the Darwinian model of natural selection in the domain of culture, and that of cultural creativity in a specific sense: aside as relatively less relevant the question of the «random» character of natural variation, and its difficult to apply to the case of cultural

change, are in fact other salient points that appear to discourage the extension of that model.

As noted by Liane Gabora (2005), «something selection-like may take place during the refinement of an idea, in the sense that some aspects and implications are culled out and developed, while others not. But selection theory predicts change only when there exists a variety of actualized states from which to choose amongst. It does not provide a means of selecting amongst potential future states of a single entity». We find ourselves in front of our initial problem: the modern synthesis, adaptationist, focusing on the statistical variation in the distribution of certain allelic frequencies, does not possess a theory of innovation and novelty, and this theory is viable only by the hypothesis of a systemic-morphological synthesis, as much attentive to the internal interactions between elements of the system that can lead to epigenetically innovative configurations, as to the cooperation in the cognitive and emotional relationship with the surrounding social and cultural environment; the configuration expressed by the aesthetic attitude is not the result of natural selection between pre-existing configurations or «states of mind», although they may in turn lead to functional investments and modules to characterize by a differential success.

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