The information in the folds of the complex adaptive landscapes of a verbal expression

Bierschenk, Bernhard

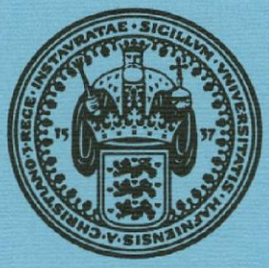
2002

ISSN 0281-9864

The Information in the Folds of the Complex Adaptive Landscapes of a Verbal Expression

Bernhard Bierschenk

2002 No. 82



Copenhagen University
Denmark

Lund University
Sweden

KOGNITIONSVETENSKAPLIG FORSKNING

Cognitive Science Research

ISSN 0281-9864

The Information in the Folds of the Complex Adaptive Landscapes of a Verbal Expression

Bernhard Bierschenk

2002 **No. 82**

Cognitive Science Research
Lund University
University of Copenhagen

Cognitive Science Research

Copenhagen Competence
Research Center
University of Copenhagen
Njalsgade 88
DK-2300 Copenhagen S
Denmark

Adm. editor

Helge Helmersson
Dep. of Business Adm.
Lund University
P.O. Box 7080
S-220 07 Lund
Sweden

Abstract

The present article is advancing the bio-kinematic hypothesis that the Agent-action-Objective (AaO) axiom constitutes the only valid foundation for a behavioural expression of the informational dimensions contained in natural language. Based on the bookkeeping capacity of the discovered AaO-mechanism it is shown that this mechanism can capture emergent [AaO] units and track their growth in complexity. Through individual variations in the growth of the components as well as the variations in nesting, it is demonstrated that structural stability and textual morphogenesis is generating corresponding informational invariants. Furthermore, on the basis of the translation function, it is shown that a sequential translation of an original English text to Swedish and Swedish to Italian is producing the condition for an effective control of the interplay between textual agents (A) and textual objectives (O) within a system of language specific coordinates. Based on coordinated structural invariants, it is shown that convoluted structures are pointing toward the presence of a biologically determined interplay between a produced perspective and stated objectives.

In the context of "angular articulation" during text production synthesising information will be presented as the unique behavioural outcome of a biological system, which has the writing-reading-rewriting capability. All forms of supporting production activities, e.g. the verbal flow dynamics, are examples of complex self-organisation. When the verbal flow dynamics is coupled with particular writing-reading-rewriting activities, then an important ability from the evolutionary point of view becomes manifest in the development of a perspective. But the perspective and the structure of a complete text cannot exist in the brain in latent form. Both must be built up during text production. This implies the coupling of the structure of a text with verbal flow dynamics within the context of a continuous language space of unknown dimensionality (= infiniteness). Figure 1 illustrates the Gestalt-space of the involved evolutionary dynamics.

The sequencing space of string dynamics. String production rests on the realisation of kinetic energy. Most of its production becomes evident through the interaction of two kinds of strings. Individual strings appear as carrier of information either in the form of virtual strings or as material strings. Hence, when the textual surface is altered, produced kinetic energy is forming the sequencing space of the string dynamics.

The production of a concentration space. The formation of patterns of strings is not only the result of self-organising processes but requires the concept of self-reference as information synthesising mechanism. While self-organisation can be observed in the neighbourhood of a thermodynamic equilibrium, the self-reference mechanism is pushing toward equilibrium and thereby producing variable symmetry at the kinematic level. This process of equilibration continues until all parts are in balance from a thermodynamic point of view. The involved phase-transitions are at a distance from the thermodynamic equilibrium dependent on non-linear and dissipative operating processes.

The Functional Clause (FC). The dissipative operating processes of self-reference and self-organisation are confined through the Functional Clause (FC), which is capturing the produced pattern dynamics according to the following Expression:

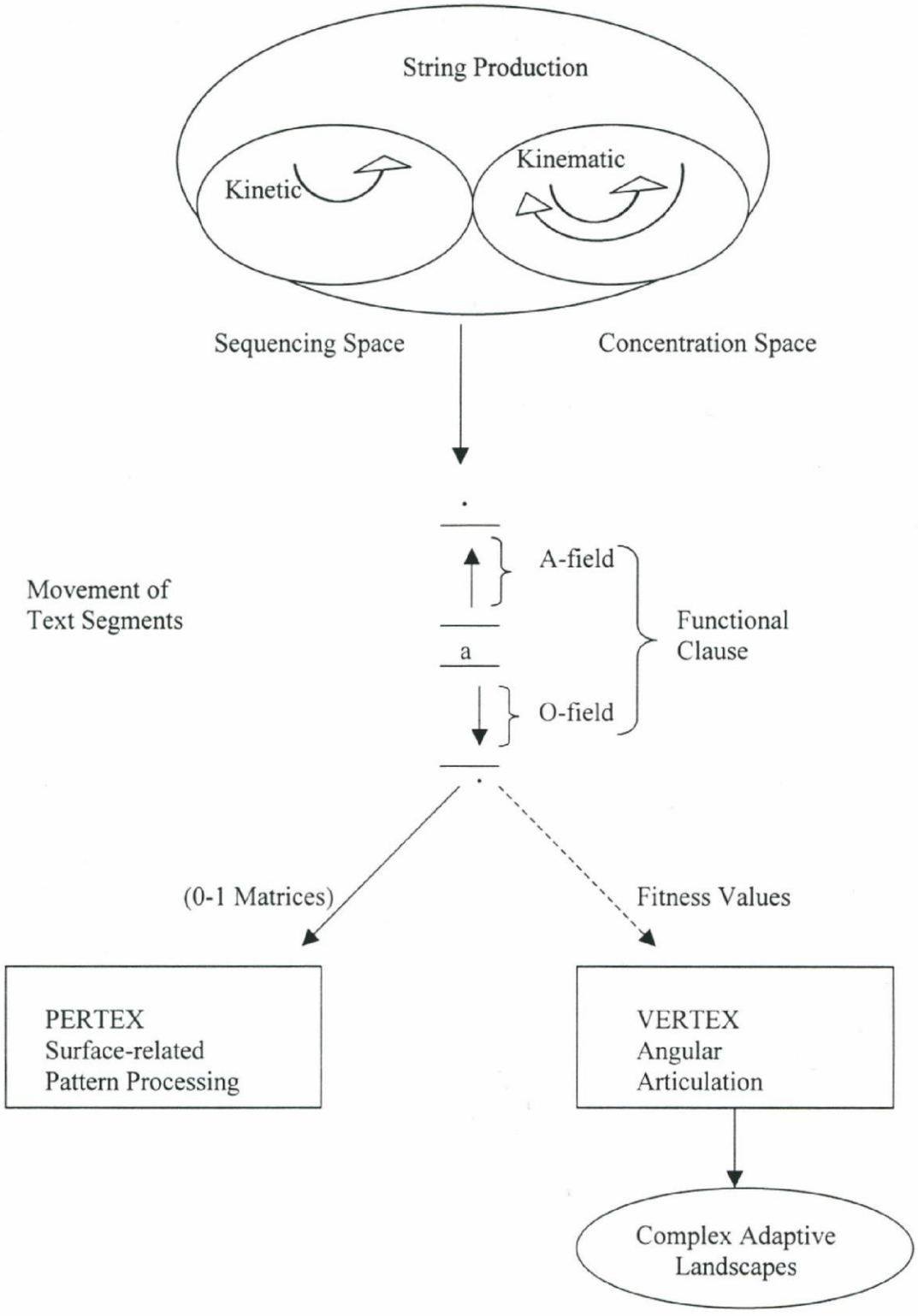
$$\begin{array}{lccccc} & \text{SM} & & \text{verb} & & \text{SM} \\ \text{FC} = & |. & \rightarrow & |v| & \rightarrow & .| \\ & \text{A-field} & & |a| & & \text{O-field} \end{array} \qquad (1)$$

The borders (|) of its A- and O-field embrace a spherical property. In order to be able to observe the movement of a text segment, it is necessary to determine the intersections. In (FC) appears the first component alongside of the border of the A-field. The other is the O-component, which appears at the lower border. The dorsal-ventral and the A/O-intersections appear always in pairs. Both have contrasting functions. But when placeholders (∅) are needed, their substitution is carried out from the top and downward for (A), while substitution of the placeholders for (O) is initiated from down and proceeds upward. Furthermore, it has been made evident that the cyclic processing requires that the operations proceed counter-clockwise.

The Flow-fields. The process of equilibration continues until all A's and O's are dependent on each other. This explains their pair-wise and complementary operation in the establishment of unity. Whenever the language specific equations of text production have been resolved, their evolutionary property is observable as emerging structure.

Figure 1.

Evolutionary Language Dynamics



This means that the process of equilibration has reached a "Fließgleichgewicht", i.e. symmetry. The resolution of a language specific equation is observable through an analysis of the anti-symmetries and symmetries in the produced space. Since dissipative operating processes are open, their dynamics can be captured in the movement of text segments through the flow-fields. Hence the patterns, which become enclosed through the operational closure of (FC), lead to qualitative statements about emerging solutions. The operational closure of FC is determining that part of the perceived or conceived phenomenon, which becomes enclosed in the closure of FC. This process is producing a difference between the AaO's, conceived as systems, and their environments. AaO's conceived of as a configuration of non-equilibrium and equilibrium states, imply that internal driving forces are maintaining their dynamical states. The rest is environment, which provides the conditions (resources) for the maintenance of the non-symmetry condition. Hence, self-organisation is possible only in a structured environment.

0-1-matrices. The generation of the regulatory power of a latticed (i.e. regular patterned) text space refers to the generation of (0-1) matrices. In the set-up of the matrices it has been useful to define a Block-variable as the unit of length for the measuring of distance. This procedure is consistent with the Euclidean properties of physical space. However, the produced thermodynamic movements become frozen at the textual level through the processing of the surface-related pattern. Perspective Text Analysis (PTA) is the method that has been developed for efficient processing of pattern movement. Computer routines in the form of the PERTEX package (Bierschenk, Bierschenk, & Helmersson, 1996) consist of a number of procedures, which are establishing needed trajectories for adding positive charges (= supplementations) to sequences of imperfectly developed AaO's. During original production these sequences are embedded in an evolving text, but in operation extracted from their embeddings and made complete. In principle, the grouping of the A's and O's is an indispensable step in the generation of a thermodynamic trajectory. However, when the co-ordinated A's and O's are sequenced as parallel running A- and O-strands, time is only indirectly related to the measure of distance. On the other hand, traditional routines for the establishment of the corresponding concentration space are resistant to severe shear and strain at their space-time axes.

Fitness values. In contrast, the VERTEX-approach to structural distance and its foliation builds on the discontinuities in angular articulation, which is the only way to achieve perfectly reliable observations. Further, because of the strict dependency in the working of the AaO-mechanism, it has been possible to solve the incompleteness problem in a constructive way. As a result, it can be stated that the only necessary tool for exact and precise reconstruction of structure is an efficient and time-sensitive foliation procedure. Basically, such a procedure concerns the degree of change in the articulation of a variable. At the moment when the textured surface of a particular text satisfies the condition of a latticed space, measured distance can be made the foundation for the operations of grouping of α- and β-variables. To determine the variance-invariance relationship, governing the process of producing "branches" and their arrangement in successions, requires that a change is producing a convolution, which is based on the "groupoid". A groupoid (G) consists of a set of variables that is closed under a binary operation, whose domain is all of (G). Hence (G) will be made the foundation for the manifestation of the kind of order parameters that generate the dynamic aspect of the convolution. Therefore, (G) is replacing the classical frequency group, which has been dominating the taxonomic approaches, and is computed

when regular latticed spaces form the basis of a complex-valued function. In changing from this kind of functions to the operator-valued function of Connes (1994), (G) will play a crucial role in the "foliation" of dynamical states. So, when a natural language expression is treated as system, the thermodynamic limit of its states is determined through the "Connes-fusion".

Morphogenesis. The establishment of the AaO-system through self-organisation and self-reference requires a structured textual context. It follows that only certain conditions, namely those, which provide the texture of the context, are supporting the differentiation of the dynamical states and the morphogenesis of state attractors. Hence, the generation of informational invariants become determined by the structure of the surrounding textual context. Context structures are producing the textual segments, which are mediated through the flow-fields of (FC). Maintenance of its non-equilibrium properties through symmetry-breaking operations in text production allows the system to reflect the structure of the context together with its own internal dynamics. But the self-referential property of the AaO-system is integrating the context into the mechanism and thereby producing a manifold of novel attractor states.

Foliation as Prerequisite for Structural Distance Analysis

In the PERTEX-system the "categorisation" and "classification" or grouping of sets of empirical data, i.e., grapheme patterns, has required that identified patterns are treated as categories, which can be clustered (Anderberg, 1973). In this process, mutually exclusive categories are used directly and their representation is frequently resulting in hierarchically organised trees of clusters (Sokal & Sneath, 1963). But this kind of configuration precludes a test of divergence of a particular cluster-tree from accurate reconstruction. Moreover, conventional cluster techniques, like Ward's (1963) algorithm, assume that the data entries of corresponding matrices consist of dissociated categories. For any clustering procedure, disjoint sets of categories constitute the accepted foundation.

It follows that the distance between any two categories is taken as the proportional measure of "structural" distance. Its behavioural expression, and consequently the expression of all rates of change, is assumed to be the same in all branches of the established tree-configuration. In addition, its theoretical basis is established by means of the axiom of association and consequently the premise of randomness. Furthermore, aggregation is made dependent on the assignment of polarity (0-1) to the data entries. However, especially critical for the classical approach is, according to Raff (1996, p. 106), the absence of criteria for testing the "goodness of fit" of an achieved reconstruction. Trees with large numbers of terminal states may appear as a result of "polynomial incompleteness" in a produced sequence. Raff refers in his discussion to "phylogenetic categories", but his observations are valid in all cases where classical procedures for clustering are applied.

In the comparison and classification of dissociated elements recent developments propose a modelling based partly on non-linear geometric approaches, partly on the measurement of locally linear embeddings. In the latter case, the need to estimate pair-wise distances between widely separated data points is circumvented. But Principal Component Analysis and Multidimensional Scaling as a measure of "non-linear dimensionality reduction" (Tenenbaum, de Silva & Langford, 2000) cannot remove the listed shortcomings. Likewise, the geometric approach for recovering "global non-linear structures from locally linear fits" (Roweis & Saul, 2000) is independent of any time dimension and insensitive to the incompleteness problem.

In the VERTEX-system pairs of values are generated, which means that the speed in the clocking mode of a component becomes enveloped by an operation that is closing all open sets. No matter what the value of the initial variable is, closing is realised by inserting a zero

value in the upper left cell of the fourfold table. In applying this technical operation, certain magnitudes are united. At every moment, the distance (Δ) is half the difference between the effects of a reference value (in the upper left cell), resisting or non-resisting an operator value (in the lower right cell), which is taken as basis for fusion.

It follows that the classical certainty has its validity. At the beginning, all fractions within a particular period must contain closed sets. As a consequence of this requirement, any individual variable value will be wrapped by zero values. Since the contrasting value is always inserted in the lower right cell, all other cells of the resulting connection (C) matrix have to be filled with zeros. In a second fourfold table appear the values, which may or may not follow a clause marker like (,). Thus, a second connection (C) matrix is accounting for the absolute difference between the second and third value.

Hence, the employed ($\Delta/2$) operator consists of the ordinary space-time product, manipulated by a very tiny discrete two-point space (Connes, 1994, p. 176), which is superimposed. As a result, the process of fusing is emphasising the central role of the ($\Delta/2$) operator. However, at the first step of calculation, the procedure may produce a structure that is trivial. Though, it is always instructive to consider a second step, and hence the possibility that the set of fractions may contain a ring and for that reason at least one invariant. The corresponding second-order fourfold table contains the values, which are governing a foliation over borders. A second-order fourfold table refers to a T-matrix, which demonstrates the fact that the concentration space develops on two simple C-matrices.

Foliation appears immediately in the T-matrix [$T = C \otimes C$] as fusion process. The superimposed second-order fourfold table is resulting directly from the interaction of the rearranged reference value with the rearranged operator value. This space corresponds to the discovery of a progressive discontinuation in foliation and branching. As a sequence, textual segments are repeatedly disconnected from the restrictions of the active control parameter, which are the periods and fractions of periods. In overcoming the "borders", constituted by the markers of periods and fractions, the folding is proceeding effectively and apparently resulting in an overall integration effect. Quite concretely, this means that foliation and branching must begin with interval-sensitive operations.

As long as the pairs of values within each interval do not depart beyond the stated criterion value ($0 > \omega_{\Delta/2} < 1$), foliation is reflecting a continuous system. A smooth attractor state is a special case of a space, which is locally continuous (Connes, 1994, p. 11). Although $\alpha\beta$-strands are by definition symmetric, individual rotations and fluctuations in one or the other can exhibit striking differences concerning a component's acceleration in speed and establishment of distance. In addition, it can be concluded that the breaking of evenness must appear with respect to pairs of values both within and between components.

On the other hand, whenever the calculation implies a transition from enveloping Step (1) to enveloping Step (2), the borders of the established intervals are transcended, and new pairs of neighbouring values are formed. When the deviation in a particular pair at the second step exceeds the criterion value, it can be concluded that a system begins to respond in discontinuous manner. As a result, it can be shown that subtle discontinuities in speed of rotational pattern dynamics can be captured by this simple procedure for calculating symmetry-breaking behaviour at the kinematic level. In overcoming the "borders", constituted by the clause markers, the folding process is binding participating variables effectively. Thus, when length no longer is connected arc-wise, a ρ-dimensional space becomes available, which is leaving behind all connections with the Euclidean space.

Topological Representation of Linkage and Bifurcation

The computed quantities that will be used in the illustration of the process of fusion and branching have been presented previously (Bierschenk, 2001, p. 13) The first step in the

folding is to identify the values in any particular interval. As stated previously, if there is only one value in an interval or a period, then this first step is always resulting in a trivial fusion, which must lead to the generation of a corresponding trivial configuration. But this does not tell anything about the possibility that there still might be a specific set of intervals, which encircles a more extensive discontinuity. Therefore, it may be instructive to consider the possibility that the intervals of a period contain a particular singularity, and thus that the entire period posits the property of thermodynamic stability.

A convenient device for visualising a topological configuration is to rule a co-ordinated grid on the source space and to examine its holotopic trajectory. This operation opens a new perspective on the rotation dynamics, which is generating the specificity of the information in the folds. Since the dynamics of flowing information is manifested in continuous and discontinuous branching, both have constraining effects. The latter indicate that an evolving helical curve is winding itself around the corresponding trajectory so that the defining thermodynamic path develops toward the point of destination. Based on the variable configuration, established in Figure 2, it becomes possible to capture the point of destination through the final state attractor and the informational invariant through the name of the attractor.

Variations in a holotopic evolution must have required a novel way of varying. Non-change in a particular segment of an evolving kinematic path is a definite demonstration of existing contextual constraints. It follows that a thermodynamic description of text means an alternative description through its holotopic properties. In focusing on the specification of the locations where the variables of the O-component have been attracted by a holotopic singularity, space and time can be formalised on the basis of unit distance. By localising informational invariants in the latticed space, and simply counting the number of neighbouring nodes, it becomes possible to determine holotopic length. If a counting of nodes is regarded as expression of topological distance, then distance becomes visible as length of the trajectory, which has empirical implications concerning the establishment of a synthesising outcome.

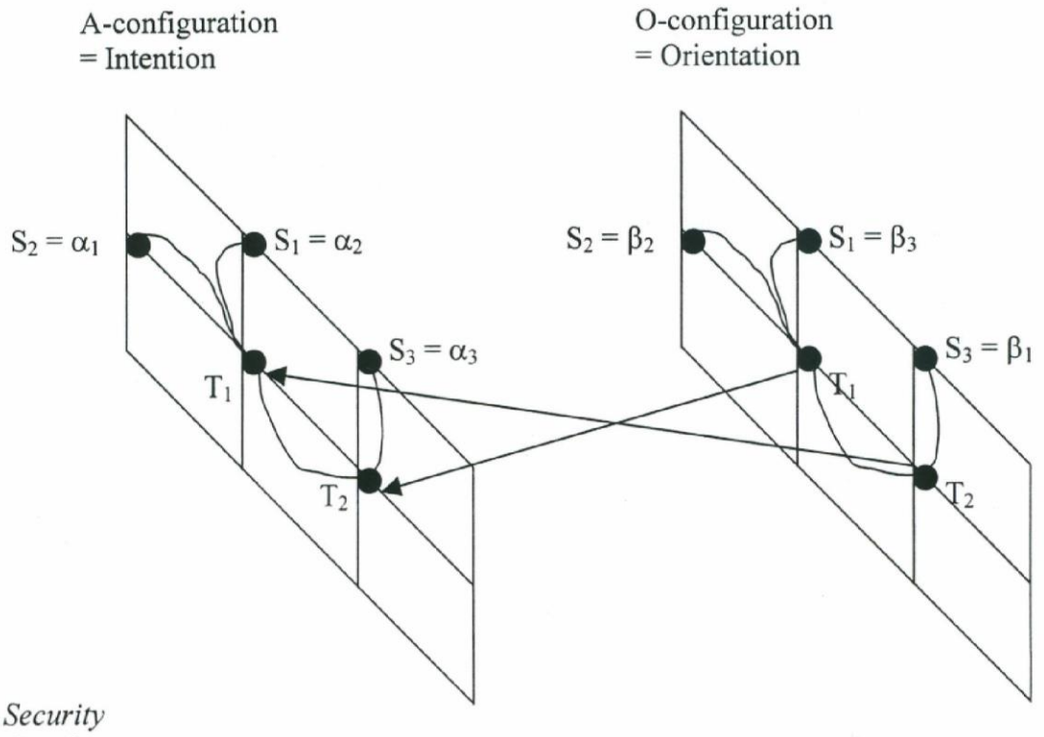
A trajectory can be imagined, which has a length of one-step. The necessary net would then consist of nine nodes. On the other hand, if a path is imagined, which consists of two state attractors, at least 12 nodes must be involved. The structures, discovered and reproduced in Figure 2, are of a most fundamental scientific concern, since the established singularities (O_{T1}, O_{T2}) have made evident that each configuration is characterised by at least one significant discontinuity. A discontinuity suggests a significant change of a previously formed invariant, and is thereby contributing to development and the establishment of the ring-relations, which are carrying the ecologically significant information. Hence the foliation process is producing topological properties, which can be used in the specification and description of an evolving information profile. In studying the structure of a profile from a macroscopic point of view, its convoluted configuration and the significance of its shape as well as its dimensions can be established at the kinematic level.

Coupling of the O- with the A-component

In order to obtain a perspective depth relation, it has been necessary to treat the variables as autonomous units. Thus, one more step has to be taken, if a perspective rotation shall be capable of manifesting corresponding translations. This step consists in the coupling of the trajectories at the kinematic level, so that the coupling can give expression to their coordinative co-operation. Coupling of differently running trajectories means a reworking that generates information of a still higher degree of abstraction. The necessary function concerns the naming of the attractor states of the A-component by means of cyclic swinging operations performed on the O-component.

Figure 2.

Coupling of the O- with the A-configuration
('Most people would like to go home')



T_1 = *Security*
T_2 = *Comfort*

A-configuration

$S_1 = [(\alpha_2) \Leftarrow (\beta_2)]$	(Most people) ⇐ [((Most people)) + (home)]	
	α_2 β_2	$[\alpha_3$ $\beta_3]$
$S_2 = [(\alpha_1) \Leftarrow (\beta_1)]$	Most people ⇐ [(Most people) + [((Most people)) + (home)]]	
	α_1 β_1	$[\alpha_2$ α_3 $\beta_3]$
$S_3 = [(\alpha_3) \Leftarrow (\beta_3)]$	((Most people)) ⇐ home	
	α_3 β_3	

The O-grid

00	0.0000	10	3.7868	20	-8.9238	30	0.0000
01	-1.8157	11	1.9711	21	-6.9527	31	0.0000
02	0.0000	12	0.0000	22	0.0000	32	0.0000

The A-grid

00	0.0000	10	3.7994	20	1.6061	30	0.0000
01	4.1063	11	7.9057	21	9.9118	31	0.0000
02	0.0000	12	0.0000	22	0.0000	32	0.0000

It implies that the relation between the topological state attractors is generating the anticipated perspective rotation. This kind of rotation relates the outcome of folding operations in the way it is shown in the A-configuration of Figure 2. The latter is associated with the emergence of new relations. Hence, by a cyclic and rhythmic extraction of relational information, the swinging operations are producing different developments in the single trajectories. Thereby it will be possible to specify the informational value of the A-component by relating it to its O-component.

The most striking difference in the process of rotation-translation concerns the linkage, which is appearing in the A-component. Just by comparing the obtained result with the folding operations on the displaced O-configuration, Figure 2 gives a visible account of the corresponding rotation demonstrated in the A-configuration. Thus, the rotation-translation through changes in the A-configuration involves linkages between variables of the same kind, but these operate differently in the development of a particular path. Furthermore, in the presence of $[(\alpha_2) \leftarrow (\beta_2)]$ the cycle of extraction starts its work by oscillating through the O-configuration. With $[(\alpha_1) \leftarrow (\beta_1)]$ as point of destination, the swing ends and is thereby extracting (O_{T2}) as the proper highest point initialising the kinematic curve of the A-configuration. The established relation between the A- and O-component reflects a perspective translation of the involved informational invariant. Thus the first attractor state of the A-component is in fact identical with the second singularity of the O-component. In anticipating a second swing, the point of reiteration becomes (O_{T2}) of the O-configuration. The succeeding swing goes backwards and is ending in the terminal state, which is specified by the relationship $[(\alpha_3) \leftarrow (\beta_3)]$. Extracted is now (O_{T1}) and the attached informational invariant becomes the proper specification of the second attractor state in the A-configuration.

This time, the difference in discrimination ($\omega_{\Delta/2} = 1.173375$) is exceeding the range of the criterion value. Thus, the folding operations of the A-component are exhibiting significant differences. Hence a "discontinuous" path is formed, which is reflecting locally continuous as well as globally discontinuous system behaviour. In evaluating the impact of this discontinuity on the A-component, it can be concluded that the translation effects have produced significant changes. Concerning the stability in the process, this effect is indicating that the emerging configuration in fact is generating one non-stable and one stable state attractor. Through the causal relationship between the underlying configurations, informational specificity makes evident that a perspective translation can be determined and used to demonstrate uniqueness in the formation of intention.

The Meaning of the Folding β-strand

In illustrating the basic conditions of the procedures for establishing the meaning of the folded β-strand, the "spherical dependency of the layered composites" of the expression ('Most people would like to go home') will be used. Thus far, the processing of the text segments has been discussed in order to establish meaning as defined by the employed operator function. Hence, meaning can be abstracted from the involved text segments, which simultaneously is suggesting that a name of the resulting virtual state attractor can be generated on the basis of the interacting text segments.

To restate, as long as the difference in a pair of values within a given interval does not deviate from the stated criterion, it is a matter of an unstable thermodynamic path. An unstable path is reflecting a continuous relationship at a local level and may be taken as a pretext that the configuration rests on insignificant changes in the states of the system. On the other hand, whenever the folding operation is producing a value that departs from the criterion, the transition from one terminal state to the next following signals a hysteresis. Thus, a hysteresis is the expression of significant discontinuity.

In the present context, the demonstrated progressive discontinuity is resulting directly from the difference between (β_3) and (β_2). The calculation of the critical value ($\omega_{\Delta/2}$ = -2.80125) implies that the progression is discontinuous. However, since the borders, as established by the intervals, at a second step have become transient, and a novel pair of neighbouring values can be formed, sequential ordering in timing demands that values are ordered as follows:

$S_1 = (\beta_3)$ 'home'
$S_2 = (\beta_2)$ ('Most people + home') } *Security*
$S_3 = (\beta_1)$ ['Most people + (Most people + home')] } *Comfort*

The naming of the idea of the O-configuration and its transformations in the naming process is the result of the rotational distance between the segments of the text example. The fusion of the first two textual segments is bending the initialisation of the course towards the awareness of a locally significant sentiment, namely a place of emotional attachment. This condition is influenced from a distant "point of observation", which relates to the reiterated intention of ('Most people'). Since this operation is manifesting an attitude change through the "shadow" of this point, it is contributing to a changing direction of focus. Relative to some line of reference, this segment is carrying an inclination whose orientation is directed toward a body of persons, sharing a common condition of life, e.g., valuing their place of residence. Thus in the process of concentrating potential information, the text segments of (β_2) are simultaneously carrying both "cause" and "effect" or "intention" and "orientation". Emerging is a concentration, which can be grasped as the development of a virtual state that is dependent on the relationship between proprio- and extero-specific information. Thus, *"Security"* is suggested as the terminus of the first invariant.

A remarkable distance is appearing in the neighbourhood of the formed group ($\beta_3\beta_2$ = 1.9711). Obviously something is happening in the process of forming a new pair when (β_1) is considered for inclusion. In contrasting the established mean value with the value of (β_1), this operation makes evident that the entire folding process continues to be discontinuous, since it becomes clear that the deviation exceeds a second time the criterion value for inclusion. Only sufficiently small perturbations warrant inclusion into an already formed group. It is therefore only natural to say that also variable (β_1) forms its own group. It follows, that the foliation process continuous to change its appearance in a discontinuous manner and the achieved virtual state is transformed by means of a three-fold layered textual segment.

The composite of this variable is the result of a second reiteration of intention, which is giving evidence to the functional relation between changes in attitude and displaced text. Thus, a "time-directed" processing is generating properly incorporated state-paired termini at the kinematic level. In viewing sheltering and protection as responsible for the domestic behaviour of ('Most people'), it is forming the final outcome of the evolving path. Since the virtual property of this "copying" process is related to shading, it is reflecting a specification, which is the result of shared relations.

Ecologically seen, the composite is manifesting an accelerating rotation, which marks a particular attraction. Moreover, (β_1) is denoting intensity in the statement, which means that the variable composite reflects a certain resoluteness or firmness in this kind of behaviour. Thus the three-fold layered variable is manifesting a certain degree of strife. Emerging is a particular stress on the common intention of promoting unconstrained life, which is converging on the state attractor, named *"Comfort"*. The result of naming this invariant signifies the condition of a focus on the significance of the character of the conceived sentiment. Since the ecological meaning of the expression implies a focus on reassurance, the

process of fusing the string into this microstructure has the function of twining together intentionality with an awareness of actuality.

The distinctness of the microstructure follows from the direction of influence, which is building up in a modular fashion. In restating the condition for coming to the "sense" of the established structure, it can be argued that the text producer's "orientation" must have been involved and conceived of as a constituent specification. Hence the final outcome of the trajectory, generated by the established structure, forms a small, but independently folding line. A major advantage of the illustrated processing is its transparency concerning the participating textual elements.

The Meaning of the Folding α-strand

The extraction of the informational invariants of the A-configuration begins with making an important demarcation: To restate, the distinction is made between a "point of observation" and the corresponding "points of view". This peculiarity is effectively contributing to a refinement of the characteristic quality of the configuration in the A-space. Just as a structural expression of a viewpoint is representing a specific orientation so is a point of observation structurally representing the expression of a particular intention. The dependency between both makes full use of the text producer's articulation capacity, which is reflected in the coupling of the pathways between both spaces. Through a cyclic extraction of the names of the informational invariants of configuration in the O-space, it will be demonstrated to what extent the oscillations in the working of the A-component have caused a remoulding of the observer's articulation potential.

The cyclic extraction of the names of the informational invariants of the O-configuration starts at the moment when the process of extraction is advancing through the terminal states:

$$\left.\begin{array}{l} S_1 = (\alpha_2)\ (\text{'Most people'}) \\ S_2 = (\alpha_1)\ \text{'Most people'} \end{array}\right\} \left.\begin{array}{l} T_1 = O_{T2} = \textit{Comfort} \\ S_3 = (\alpha_3)\ ((\text{'Most people'})) \end{array}\right\} T_2 = O_{T1} = \textit{Security}$$

On the basis of the terminal states of the initialising configuration, the cycle of extraction is starting the swing of a pendulum, which is oscillating through the corresponding configuration of the O-space. When the pendulum is reaching the highest point of the resulting oscillation curve, a location is encountered, which contains the specifying name of the singularity (T_1). Thereby, the first cyclic swing through the configuration is extracting *"Comfort"* as the proper name of the invariant of the A-space, which is specifying the meaning of the resulting fusion. Since the identified name is determining the first cycle's proper equilibrium, the reiteration in the first state is uniquely characterised with respect to the involved intention through the transformation of the second state.

With *"Comfort"* as new point of departure, the succeeding swing is ending in the next following terminal state, which is determined by a second reiteration. It follows that the proper name for the first state attractor (T_1) appears in the terminus *"Comfort"*. Its redistributed potential is attributable to a continuous space in which the process is producing relational closeness. Hence, the resulting state attractor is unstable but deep-rooted. Thus far, absence of discontinuity appears to be the distinctive outcome of fusion. With changing appearance in continuous manner, it can be concluded that co-operative interaction appears between text segments in neighbouring locations.

The continuously bending curve, which is characterising the evolving path of intention, gives expression to an ordered sequence of positions that differs to a certain extent from the specification order of the O-configuration. In as much as a configuration is

conceived of as autonomous in its oscillations, it is possible to determine the path of intention in relation to the path of orientation. In what way this response influences the behaviour of the variables involved in the extraction of the second attractor state (T_2), is reflected in the naming. Since the highest point of the resulting curve is reached immediately before the swing ends, the location that contains the name *"Security"*, becomes the final point of destination. Concerning the establishment of the microstructure, it can be concluded that the underlying rotations have partially changed the structural embedding of the attractor names. Hence naming the microstructure of the A-space is only partially invariant when compared to the microstructure of the O-space.

But the act of naming requires some analytical rigour. Naming the relational closeness means naming the centrality of a particular microstructure. In a sense, naming is dependent on how the relation between intention and orientation is synthesised. Very often, naming an attractor state corresponds to finding a single and most typical word for the established idea or motif. In conclusion, liberating the foliation step-by-step from marker restrictions makes the process responding to variations in the determination of phase transitions and the emergence of repeated thematic translations. Short but significant sequences are making up the generation of the pathways to the microstructures of a particular configuration. Processing the involved sequences of textual segments appears in the major trace (T) of the transition matrix, and consists of pairs, which are interacting within (T). Pairs of text segments are important for the establishment of stability and transformation in the establishment of a microstructure. On the other hand, themes and thematic translations appear always in the crossing of two pathways.

Extracting Relational Depth

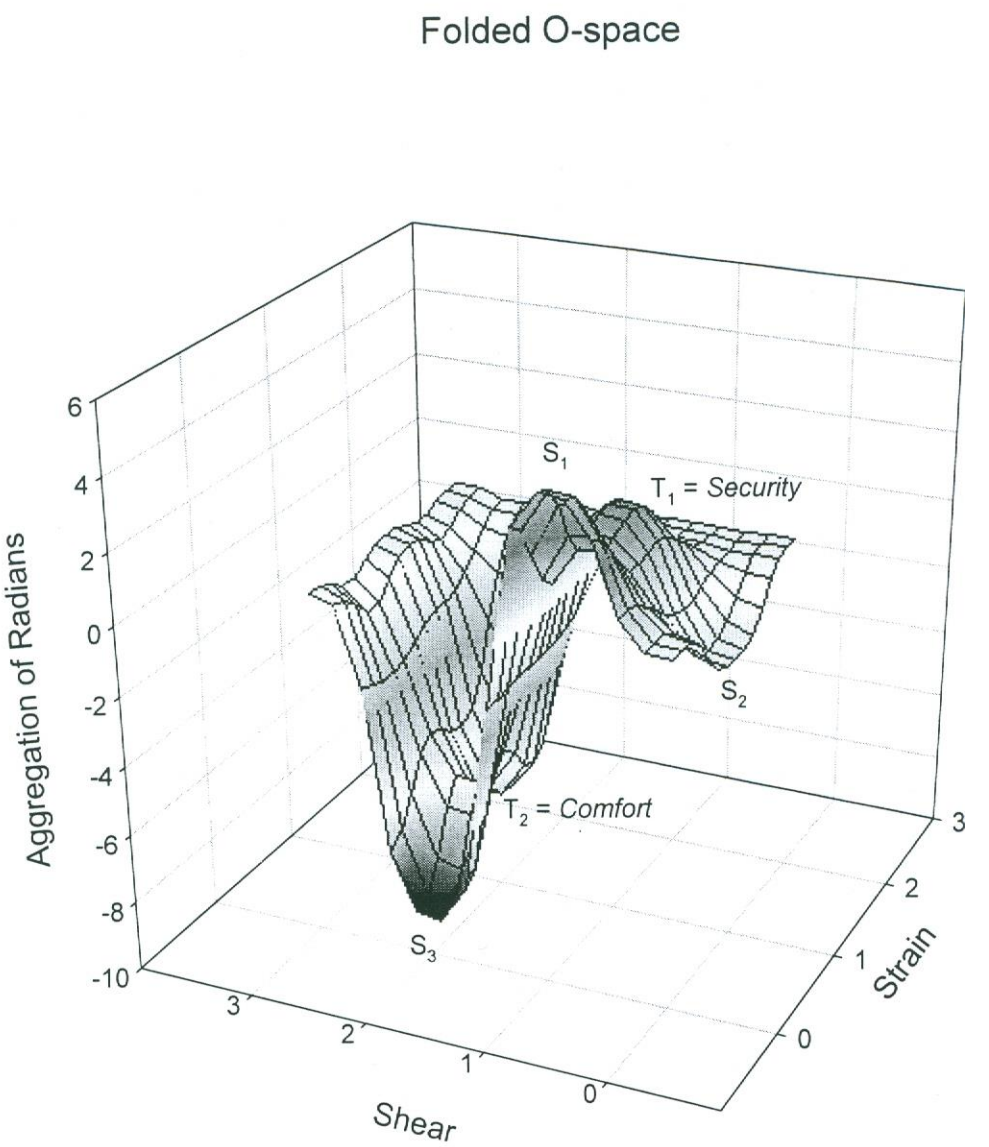
To rule a mesh system on the results of the foliation process is decisive for the quantitative expression of a microstructure and its thematic convolutions. Systems of co-ordinates (or mesh-systems) have the capacity to describe the functional relation between the produced quantities and the development of a profile. An informational account of the continuous convolutions of the underlying ideas and motifs and their translation into evolving themes is generating the kind of configurations shown in the Figures 3 and 4.

A prerequisite for the construction of the presented mesh system has been the fusion principle, underlying the folding in Figure 2. On the basis of a transformed grid, the structure of a particular configuration is regularised and opened for inspection. The X-axis of the grid is representing the straining in progressive thematic translation, while the Y-axis of the grid is depicting the shear in progression from one terminal state to the next. Furthermore, the quantities involved in the fusion process are added as long as the transitions develop on the basis of positive values (+). However, every time the process of fusing is encountering a negative value (-), the corresponding quantity is taken as an indication for a transition that is deflating explicitness in articulation toward implicitness. As a result, the matching quantity is subtracted. Therefore, evolutionary time always prescribes the course of a thematic translation, and thus is maximising the increase in positive or negative values. In this perspective, the steep of a mountain appears as elaboration of a thematic translation toward explicitness. In contrast, a course, which is a function of "implicitness", corresponds operationally with a translation course, developing steeps below sea level. Thus, increasing and decreasing values are defining the gradients of explicitness and implicitness, respectively.

A first measure of the difficulties posed in the text producer's comprehension of perceived ecological properties and explanation is the degree to which a dimensional re-distribution of generated depth-relations has taken place. To restate, the notion "depth" refers to manifested structural distances.

Figure 3

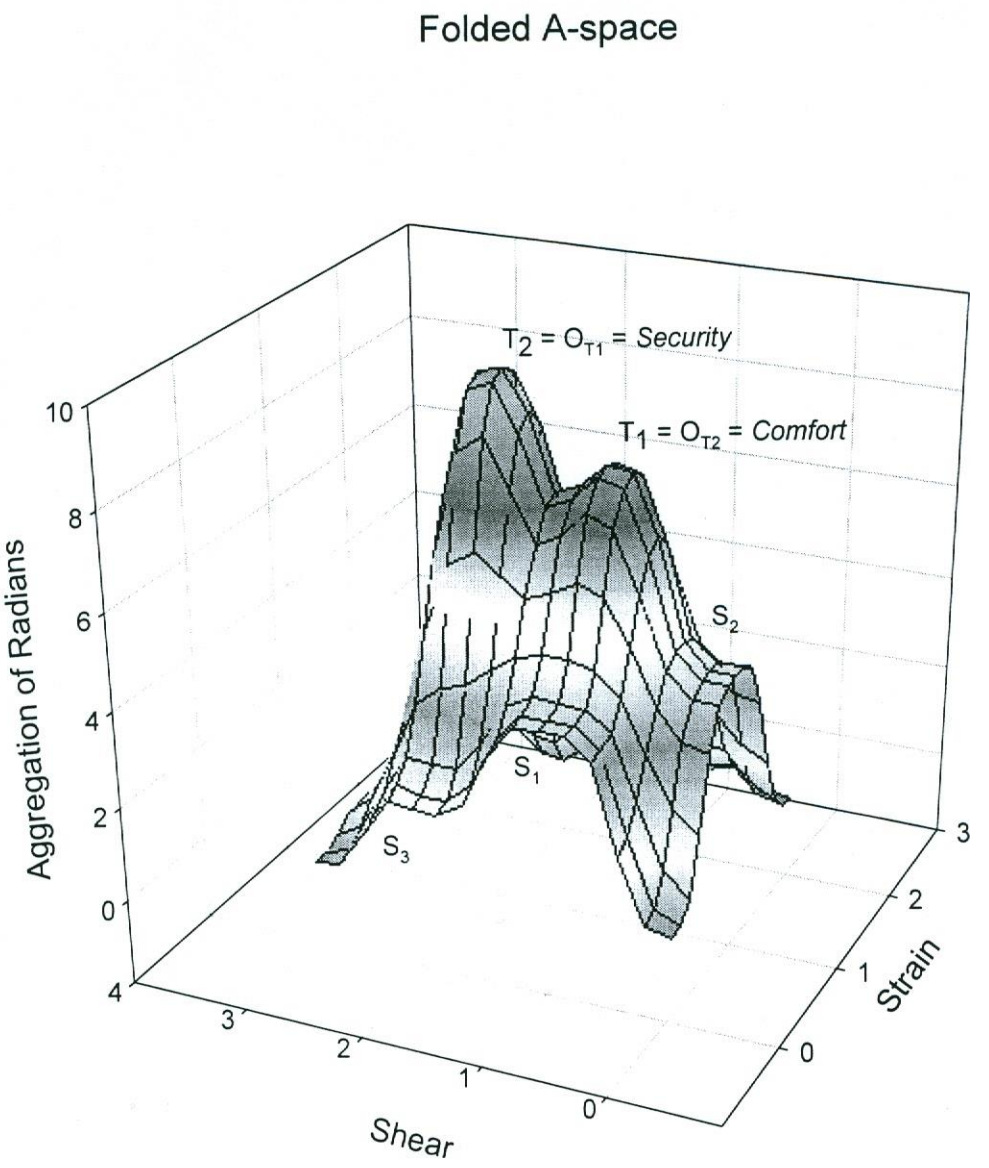
The Convoluted Structure of Textual Objectives
('Most people would like to go home')



S_1 = home
S_2 = (Most people + home)
S_3 = (Most people + (Most people + home))

Figure 4.

Convoluted Structure of Textual Agents
('Most people would like to go home')



S_1 = (Most people)
S_2 = Most people
S_3 = (Most people (Most people))

When the property of distance is taken as criterion for an evaluation of a particular convolution, it turns out that the O-holophor of Figure 3 has a very high degree of implicitness, and hence depth. Moreover, the distinctness and redistribution of the functional relations between the terms of a holophor is a demonstrative expression of perspective transformation of a microstructure as well as the expression of a rotation-translation of an evolving thematic trajectory.

As shown in Figure 3, differences in propagation may have markedly different effects on the development of a depth-relation in the concentration space of a natural language expression. The configuration of the established O-space demonstrates the achieved depth-relation. Seeing the depth in the expression means a changing direction in the focus on a sentiment, which is related to sheltering. Moreover, to see the depth of sheltering means to see the *"Comfort"* provided by a home.

As shown in Figure 4, the A-function concerns the processing of a different number of propagating states, which are resulting in two re-markings. However, processing this kind of shift in the A-function can be completed only if the missing textual agent becomes accessible. Figure 4 demonstrates the effect of marking the distance in a relation. In general, strongly propagating components are an expression for a high degree of rotational dislocation and the production of phase drifting. However, the effects of the concentration spaces are in fact quite similar in that all rotations peak near their information limit (high). The slightly asymmetrical appearing configuration of the A-function is the result of the "ground-state" (S_2), which has a surface-oriented insertion path, and two propagating states (S_1) and (S_3).

As a result, Figure 4 shows that subtle discontinuities in the speed of its rotational pattern dynamics can be captured. But continuity in branching demands also a decision on variable priority in the forming of the first state attractor. Further, breaking of stability at the kinetic level is shown to appear, since a remarkable instability is locally appearing in the neighbourhood of the second interval. The deviation of (S_1) from (S_3) exceeds the critical value for continuity. At this point in time, one isolated phase singularity is arising in the evolving ring structure. Hence, a macroscopic examination of a morphogenesis and a local and global study of its singularities are providing the condition for the establishment of the structure of a particular configuration of informational invariants.

The Morphogenesis of Complex Adaptive Landscapes

From the ecological point of view, it is the biological system that constitutes the frame of reference for text production and the expression of the termini. Considered as "a token" (Kugler & Turvey, 1987, p. 213) of a biological system, it is the individual text producer, who performs the task of producing an information structure. For that reason, the outcome of any textual transformation provides always its own unique physical context. In particular, when its real physical geometry is established as a non-Euclidean geometry of a (ρ) dimensional space, it is possible to demonstrate deeply ingrained commonalties and to articulate the meaning of an information synthesis at the ecological level. Hence, processing "wholeness" also means processing of informational specificity.

The wholeness of a text has been captured in the concept of "holophor". The combining form ('holo-'), meaning "whole" is addressing a sequence of discontinuations, but without any intervening textual dissociation. Since it has been made evident that the rhythmic and clocklike working mode of natural language production generates discontinuities (B. Bierschenk, 2001), it can be concluded that a discontinuity suggests a change in a previous form of expression, "a morphogenesis" (Thom, 1989). At a certain given point in time, at least one isolated phase singularity may arise in evolving text. It follows that the pattern dynamics of natural language production must signify stability as well as change. Hence, a macroscopic

examination of the morphogenesis of text production and a local and global study of its singularities provides the condition of reconstructing the dynamics. Thus, the discovery of a configuration of termini is of a most fundamental scientific concern, especially when related to a successful establishment of the structural configuration of B. F. Skinner's Watson-quote:

Give me a dozen well-shaped, healthy children and I guarantee that I can take each one randomly and train it, to become just any specialist you like, doctor, lawyer, artist, yes even master thief, totally irrespective of the child's ability, interest, race, or ancestors.

Further, text is conceivable of as information carrying system. This property is preserved in the suffix ('-phore'), meaning that part of a physical system that carries or bears the information. Thus, a holophor is generated whenever the angular articulation of one textual variable, i.e. a point attractor, is intersecting a second, carrying the value that leads to the forming of a state attractor. This operation opens a new perspective on the dynamics of the flows, which generate the information. Typical of the dynamics in the information flow is that it manifests both textual continuity in the form of an intrinsic system of coordinates, which has constraining space effects, and discontinuity, which is related to deformation and strand-rotation. The latter indicates that the evolving helix is winding the β-strand around the (O) component so that its defining thermodynamic path toward the global state attractor can be differentiated repeated times. Substitution through reappearing sequences of dummies (∅) is achieved through discrete propagating cell states. Based on the textual segments, associated with point attractors, as context variables, it becomes possible to capture the invariant condition of a coordinate-free A-O-kinematics and to name the evolving thermodynamic trajectories. Families of state attractors consist of patterns of (+) and (-) articulations that can be made visible. In disciplining the convolution procedure, as was shown in the Figures 3 and 4, a three-dimensional landscape comes into existence.

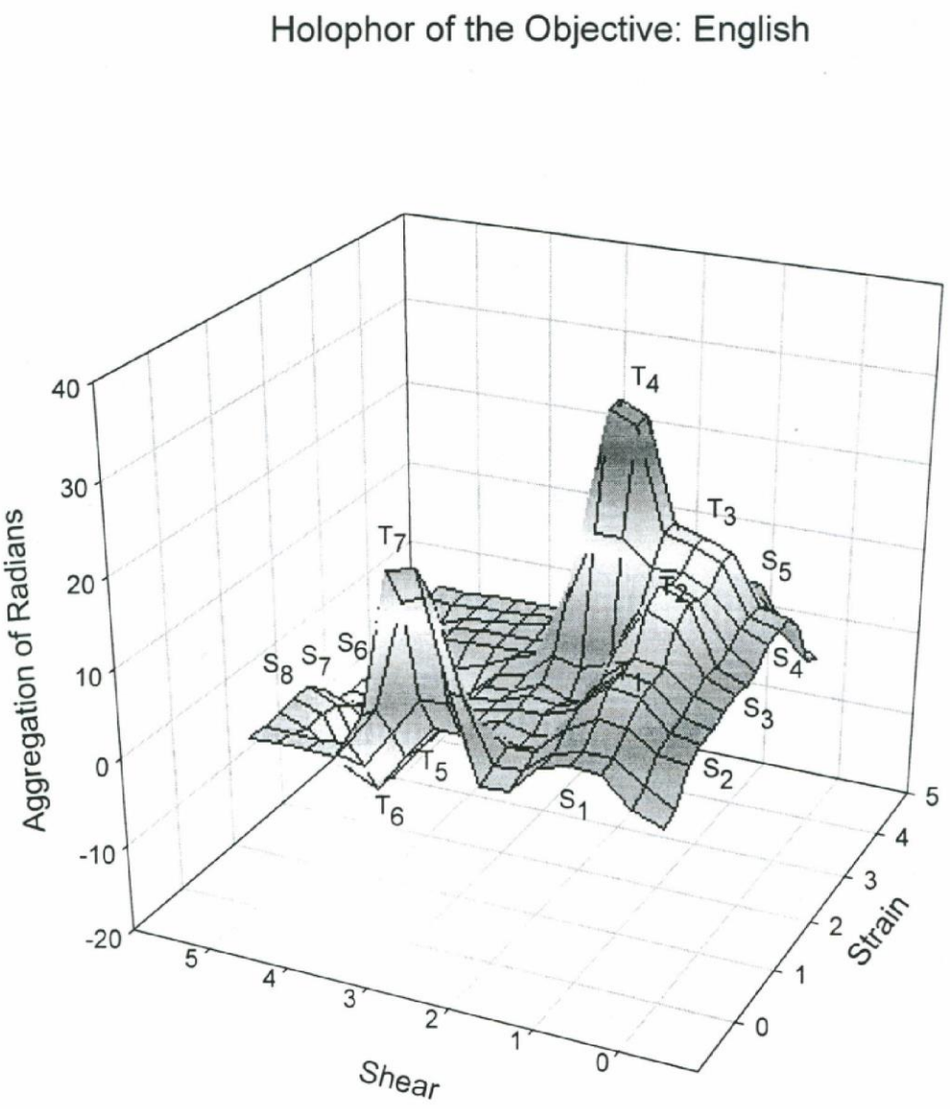
As a rule, it is always possible to associate a descriptor with fused textual segments. In this sense, a descriptor communicates the state that a system has been attracted to in the realisation of a particular action. The closeness of a particular descriptor-name to some other descriptor-names in space and time makes their fusion possible and transforms the entrenched point attractors into a structured configuration of termini. Once a new terminus has come into existence, its transformation through successive states imposes rigour on the process of naming and generates the mentioned informational specificity. Shared termini may emerge, but become specified through their "new" structural relations. Through the causal relationship between termini and the underlying structure, individual specificity makes evident that the particular text producer is contributing uniqueness in his way of grasping the centrality of a particular phenomenon.

For example, concerning the phenomenon of "behaviourism", B. F. Skinner (1972, p. 18) is clearly positioning himself when he is writing: "The stimulus-response model was never very convincing, however, and it did not solve the basic problem, because something like an inner man had to be invented to convert a stimulus into a response". Thus, to have a directed orientation implies, with reference to Skinner, an awareness of a different process, called "operant conditioning". According to Skinner (1972, p. 18): "Behaviour is shaped and maintained by its consequences". Once this idea had been recognised, Skinner could relate his set of ideas to J. B. Watson's formulation of the interaction between organism and environment.

Concerning Watson's natural language expression, Figure 5 presents the emerging landscape of the O-component, while Figure 6 shows the corresponding outcome of the A-component.

Figure 5.

The Convoluted Space of the Ideas of Behaviourism

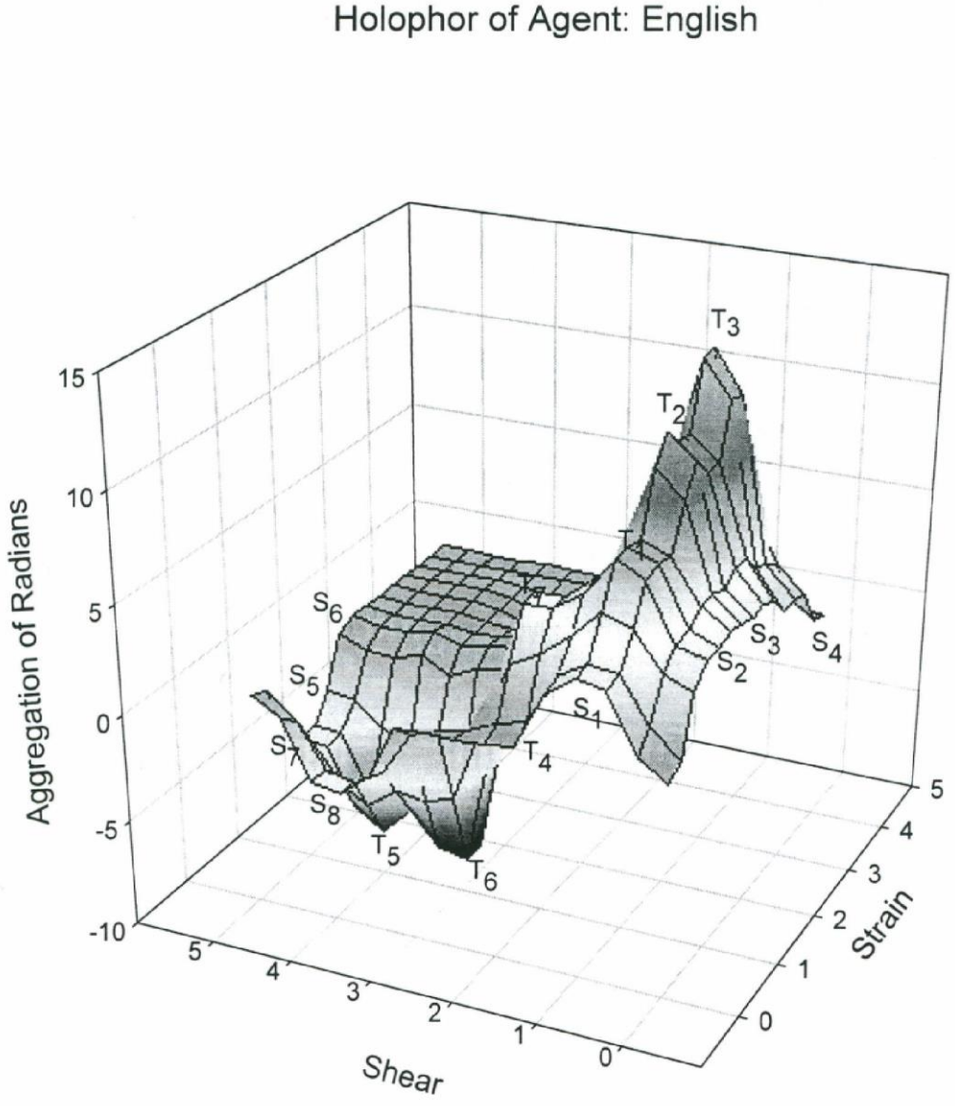


S_1 = Enforcement
S_2 = Extremity
S_3 = Limitless
S_4 = Professionalism
S_5 = Endowment
S_6 = Pushing
S_7 = Selection
S_8 = Selection

T_1 = Radical Expression
T_2 = Powerfulness
T_3 = Efficiency
T_4 = Embodiment
T_5 = Manipulation
T_6 = Refinement
T_7 = Empowerment

Figure 6.

The Convoluted Space of the Motifs of Behaviourism



S_1 = {'I'}
S_2 = {'I'} T_1 = Refinement
S_3 = {'I'} T_2 = Radical Expression
S_4 = {'I'} T_3 = Manipulation
S_5 = {'I'}
S_6 = {(X)} T_4 = Powerfulness
S_7 = {'I'}
S_8 = {'I'} T_5 = Efficiency
T_6 = Embodiment
T_7 = Empowerment

The Figures 5 and 6 are demonstrating the explicitness of the functional relation between the A- and the O-component of the "scientific principles of human behaviour". Parallel operating stress relations have established the X- and Y- axes of the pattern. The X-axis represents the straining effects whereas the Y-axis accounts for the stretching effect. The Z-axis denotes the acceleration in the rotations. Together they show that each landscape has its specific adaptive layout.

The phenomenon of "operant conditioning" will be made the starting point for the study. But Skinner's formulations will make up the theoretical framework, since it is expected to contain a discussion of the essential elements, i.e., the type of learning that involves an increase in the probability of a response occurring as a function of reinforcement and shaping. According to Skinner, the latter is a technique, whereby "experimental subjects" are taught to perform complex behaviours through successive approximation.

For example, the termini at the foothills of Figure 5 are *"Powerfulness"* and *"Radical Expression"*, which are manifesting behavioural engineering principles. In fact, Skinner's purpose becomes specified through the depth of the termini *"Manipulation"* and *"Refinement"*. It follows that their implicitness can be manifested through their appearance below sea level. What these termini are approving is that any individual, which is under experimental control is treated by techniques of positive control. In addition, *"Empowerment"* concerns differential reinforcement through successive approximations in the shaping of the individual. Finally, approximation is conceived of as the *"Efficiency"* of the process of *"Embodiment"*.

One more step in the reconstruction of the configuration has to be taken, if the mechanism shall be capable of manifesting the effect of the separated strands of the double helical curve. The unscrambling of the cyclically overlapping α- and β-strands is producing an elaboration of the "point of observation", which is reflected in the coupling between Figure 5 and 6. Both make full use of the text producer's articulation capacity. Obviously, in their autonomously ticking mode, their clocks are generating novel relations, as shown in Figure 6.

The information specificity of the A-component allows a concise description of the "formation of intention" and its lawful relationship to the involved perspectivation of the O-component, i.e., the "formation of orientation". The immediate implications of this perspective transformation are attested by their complementary relationships. The rockiness of the terminus *"Manipulation"* refers to the intentional explicitness of the planner or engineer. Indeed, Skinner (1960, 1972, 1974) asserts that freedom is nothing but an illusion and that the autonomous man is a myth. For accessing the meaning of this terminus, when related to the emerging alternative to orientation, it is essential to conceive several steps in the fusion process. In rebounding the variables of the β-strand, cyclic and pendular processing is extracting *"Refinement"*, but now as the explicit expression of the perspective alternative.

Another cycle of extraction is reaching its highest point at the location where *"Radical Expression"* is extracted, however now as a more pronounced state of the perspective. This is the singularity nearest the end of the first cycle of swings through the configuration of the β-strand. In the example, the thermodynamic stability of the first path is emerging in the explicitness of intention. In contrast to Figure 5, *"Manipulation"* at the end of the first path, appears as the proper equilibrium and becomes characteristic of the formation of intention, shown in Figure 6.

Furthermore, the intentional explicitness, which is manifesting itself in the terminus *"Radical Expression"*, guarantees the effects of operant conditioning, likewise reflected in immediate behavioural *"Refinement"*. It follows that its manifestation is a sensitive expression of the potential associated with the text producer's "point of observation". Through the perspective shift, the condition of behavioural engineering appears to be the

intentional focus. However judgement of its success in the form of *"Empowerment"* is emerging at the brink to the depth, which is the region, dominated by the state attractor (T_7) and related to the implicit part of the perspective. It means that behaviour becomes part of the history of the organism. Here, the notion of "depth" refers to the degree of processing as well as to the termini and their relation within the holophor.

Below sea level appears what is implied by the operant conditioning principles. That an environment can be created, which will optimise the development of individuals and societies, is something that is captured by the terminus *"Embodiment"*. Intentional evidence comes from Skinner's essay on "Walden Two" in which he illustrates the *"Efficiency"* of planning and behavioural engineering, for example, in the paragraph on "The Philosophical Lambkin" (Skinner, 1960, p. 14).

In sum, in reversing the implicit part of the O-component, the A-component refers to the explicitness of the intention to design a technology of behaviour, which makes feasible the manipulation of the environment. In Skinner's (1972, p. 88) words: "It is no doubt valuable to create an environment in which a person acquires effective behaviour rapidly and continues to behave effectively". And in Walden Two (p. 220), it is asserted that anyone, who has been grasping the principle of positive reinforcement, "can enjoy a sense of unlimited power". This is the underlying intention, which is reflected in the terminus *"Empowerment"*, appearing at the brink. What has been extracted structurally are the explicit and implicit properties of the extreme position of behaviourism, namely that no one needs freedom, dignity or goodness. Operant conditioning is the efficient key to guidance, development and growth.

Translation as Straining Function

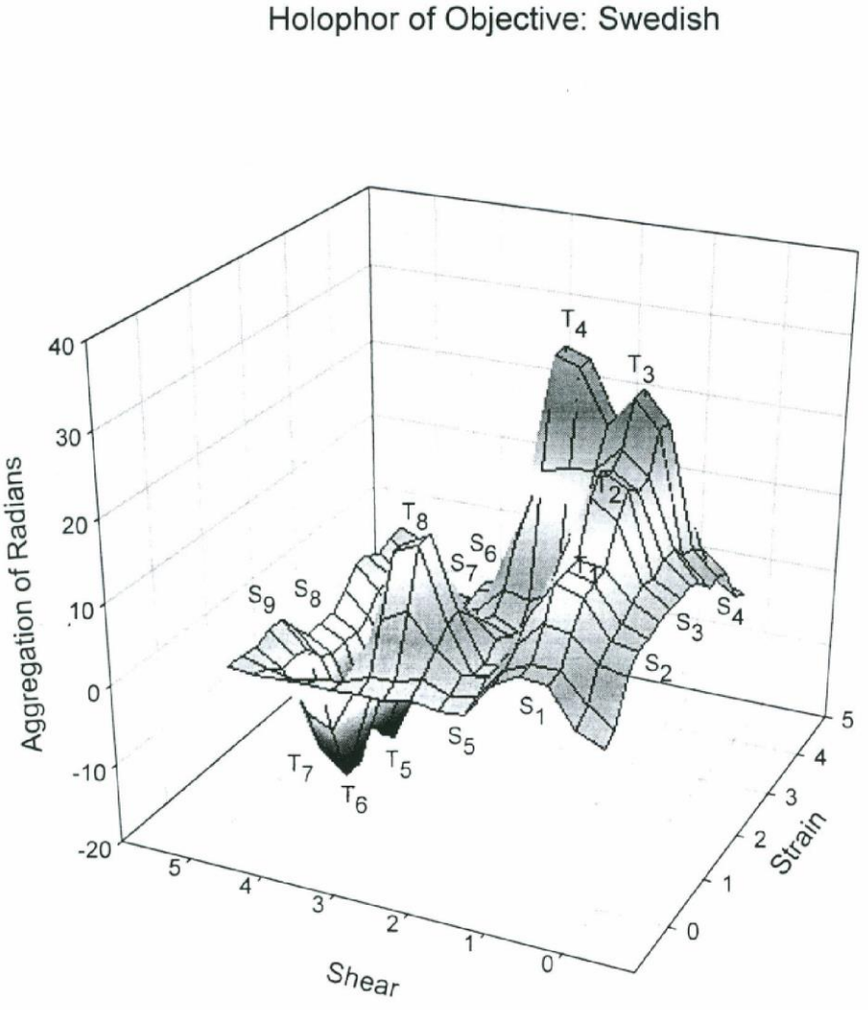
If a concept such as "operant conditioning" is an essential component in the scientific approach toward a particular behavioural phenomenon, it is important to investigate the way in which other researchers are reproducing the concept. Therefore, the next step concerns the reproduction of the concept by means of a natural language translation, which has been produced by an experienced Swedish researcher:

> Ge mig ett dussin välskapta, friska barn och jag garanterar att jag ska ta vart och ett slumpvist och träna det till att bli vilken slags specialist som helst, läkare, advokat, konstnär, ja till och med mästertjuv, och det helt bortsett från barnets förmåga, läggning, ras eller förfäder.

The significance of using translation as the experimental straining function in the validation of the obtained results lies in its meaning, namely to determine the specific property of the emerging profile and to give a foundation for the manifestation of the termini, which are embedded in the shown convoluted shapes. Validation in holophoric evolution means that variations must have required a novel way of changing during the integration of the basic patterns into a proper geometric layout. Non-change in a particular segment of an evolving kinematic path is a definite demonstration of existing flow constraints. However, it would be difficult to establish a definite connection between operating information flows and the selection of a proper linguistic form, because holophors are organised hierarchically. This means that their formation follows different thermodynamic trajectories. Less stringent criteria for the establishment of holophoric resemblance are required, since no one-to-one mapping can be expected in any textual translation. The Figures 7 and 8 reflect the re-established holophors and show how the structural relationship to the preceding Figures has been determined.

Figure 7.

The Convoluted Space of the Swedish Translation: Profile of the Objectives

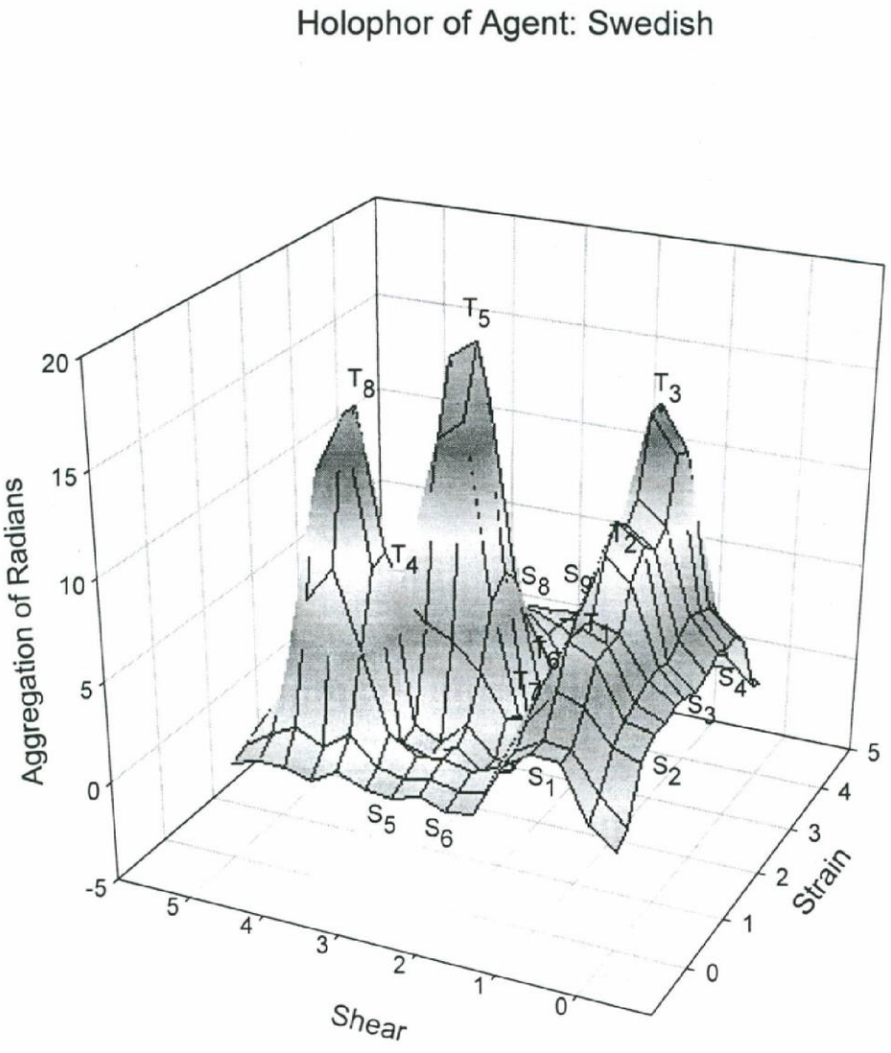


S_1 = Extremity
S_2 = Pushing
S_3 = Potential
S_4 = Limitless
S_5 = Enforcement
S_6 = Manipulation
S_7 = Professionalism
S_8 = Selection
S_9 = Selection

T_1 = Radical Expression
T_2 = Embodiment
T_3 = Powerfulness
T_4 = Compelling
T_5 = Expertness
T_6 = Manifestation
T_7 = Refinement
T_8 = Empowerment

Figure 8.

The Convoluted Space of the Swedish Translation: Profile of the Agents



S_1 = {'jag'}
S_2 = {'jag'}
S_3 = {'jag'}
S_4 = {'jag'}
S_5 = {'jag'}
S_6 = {'och det helt'}
S_7 = {'jag'}
S_8 = {(X)}
S_9 = {'jag'}

T_1 = Refinement
T_2 = Compelling
T_3 = Embodiment
T_4 = Expertness
T_5 = Powerfulness
T_6 = Radical Expression
T_7 = Powerfulness
T_8 = Grant Qualification

Since the explicitness of the termini *"Radical Expression"*, *"Embodiment"*, *"Powerfulness"*, as well as *"Empowerment"* is preserved, it can be concluded that the Swedish translation has led to a consistent and compatible relationship. The point to be stressed is that the previously established implicitness of the terminus *"Refinement"* reappears. Moreover, what is implied by the concept is expanded with *"Manifestation"* and *"Expertness"*. However, there is also a noteworthy emergent novelty, which is captured in the terminus *"Compelling"*. Furthermore, some remarkable changes have occurred in the A-component. For example the implicitness, marked by the terminus *"Embodiment"* of the original, is in the Swedish translation changing into explicitness. There is also a small transformational change, which is reflected in the naming. Since *"Efficiency"* has been renamed into *"Expertness"*, a shiny change in shading has become evident. The same kind of transformational change can be attributed to the renaming of *"Manipulation"* into *"Manifestation"*.

However, these changes do not invalidate the observed close reconstruction of the structural relations. It is precisely for this reason that a holophoric analysis can discover the deep structural commonalty as well as the unique orientation of a particular structure. That it may be difficult to arrive at the same degree of similarity in the "formation of intention", concerning the perspective contained in the flow of the quotation is demonstrated with Figure 8. Clearly the dissimilarity in the shapes of the Figures is an indication of a difference in the moulding of the perspective potential. The degree of sensitivity to the proposed advantage of behaviourism has resulted in a perspective shift that is reflected in the way in which the landscape is convoluting as defined by some enhancements. By concentrating attention on these shifts, the critical structural relation appears as overstated confidence in the capacity of operant conditioning. Especially the novel emergence of the terminus *"Grant Qualification"* is properly illustrated by a passage of Skinner' (1960, p. 218) namely: "By careful cultural design, we control not the final behaviour, but the inclination to behave – the motives, the desires, the wishes". Furthermore, switching from the termini of its explicitly stated capacity to the termini, which capture implicitness, brings out the behaviourist's pre-occupation with a planner's ability to override practical limits when fitting behaviour to a "code" through the implied *"Radical Expression"* and the reiterated *"Powerfulness"* of behaviourism (Skinner, 1960, p. 135).

Now, in following up the intended sequence of translation, the focus of attention will be shifted towards the phase, of which the results relate to a Swedish translator, who is teaching Gymnasium students the use of the Italian language.

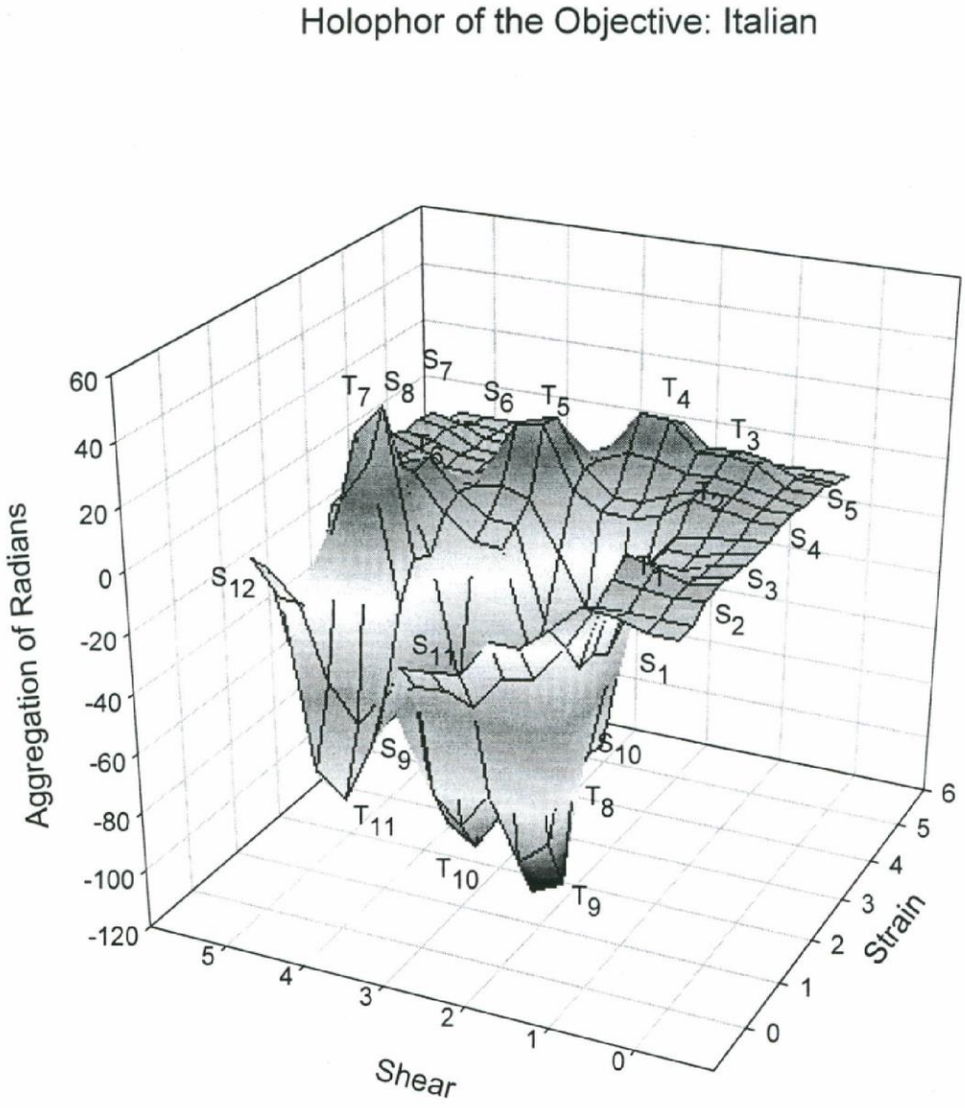
> Datemi una dozzina di bambini sani, e garantisco di poter prendere ognuno di loro casualmente per educarli a diventare specialisti in qualsiasi campo, medico, avvocato, pittore e perfino un ladro esperto senza considerare la capacità del bambino, il suo temperamento, la razzo o i suoi antenati. [Translator: Swedish Subject Teacher Elisabeth Palazzi, Gymnasium in Lund, Sweden]

This condition is stressing the sequential component in the experimental design, and hence is expanding the straining of the translation function. In discussing the holophors of the Figures 9 and 10, an attempt will be made to establish a second step in the study of informational invariance.

The holophor of the Italian O-component reveals obvious differences in the contour of the shape when compared to the preceding holophors. Since these differences are noteworthy, especially when the disparities in shape are considered, it becomes apparent, that further transformational refinements must have taken place.

Figure 9.

The Convoluted Space of the Italian Translation: Profile of the Objectives

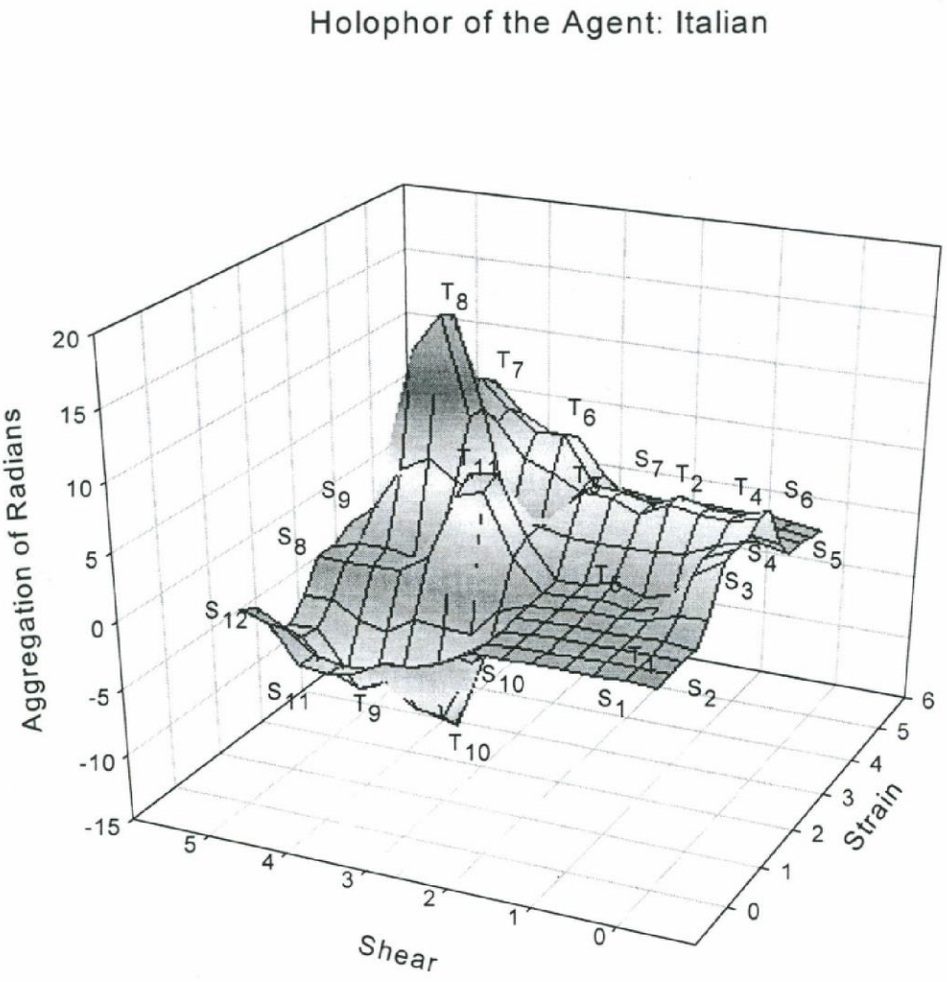


S_1 = Limitless
S_2 = Condition
S_3 = Pushing
S_4 = Selection
S_5 = Potential
S_6 = Capacity
S_7 = Selection
S_8 = Endowment
S_9 = Enforcement
S_{10} = Enforcement
S_{11} = Professionalism
S_{12} = Training

T_1 = Materialisation
T_2 = Manipulation
T_3 = Embodiment
T_4 = Radical Expression
T_5 = Refinement
T_6 = Adaptation
T_7 = Expertness
T_8 = Powerfulness
T_9 = Compelling
T_{10} = Mastery
T_{11} = Empowerment

Figure 10.

The Convoluted Space of Italian Translation: Profile of the Agents



S_1 = {(X)}
S_2 = {(X)} T_1 = Materialisation
S_3 = {(X)}
S_4 = {(X)} T_2 = Powerfulness
T_3 = Radical Expression

S_5 = {(X)}
S_6 = {(X)} T_4 = Manipulation
S_7 = {(X)} T_5 = Compelling
T_6 = Refinement

S_8 = {(X)}
S_9 = {'perfino un ladro esperto senza'} T_7 = Adaptation
S_{10} = {(X)}
S_{11} = {(X)} T_8 = Expertness
S_{12} = {(X)} T_9 = Adaptation
T_{10} = Mastery
T_{11} = Empowerment

On the basis of Skinner's essay "Beyond Freedom and Dignity" of 1972 and his essay "About Behaviourism" from 1974 it will be judged whether this translation is capturing the essentials. As shown in Figure 9, the asymmetry in the O-component is the result of a new kind of thermodynamic constraint.

In discussing the holophor of the Italian O-component, an attempt will be made to establish the effect of expanded straining operations on the boundaries of the informational invariants and their remoulding. In this context, straining may be regarded as the process of testing whether text building behaviour is resonating reasonably the boundaries in the Italian sample text. First of all, it can be noticed that the corresponding invariants have produced a selective change in which the termini *"Expertness"* and *"Adaptation"* as well as *"Refinement"* are defining a particular part of the landscape, which however, appears to have a quite shallow surface-layout. The invariants mark a relationship, which refers to a basic component in Skinner's theoretical framework, namely the "fitting-function" of "natural selection".

In this way, Skinner suggests, nature has taken care of unstable but important environmental features in the change of an organism toward increased "*Expertness*". Skinner (1972, p. 16) writes: "The trouble was that the environment acts in an inconspicuous way: it does not push or pull, it selects. The fact that "operant conditioning" (Skinner, 1974, p. 47) has to be conceived of as a product of natural selection has emerged through the Italian translation and has been made explicit in the terminus *"Adaptation"*. In Skinner's view, the effect of positive environmental reinforcement is strengthening the behaviour, while negative reinforcement is reducing or terminating the behaviour that produced environmental consequences.

The explicit properties of Skinner's radical position mean a *"Radical Expression"* of behaviour. He asserts that the cause of behaviour always remains outside the body, but when the operant, which imposes its form, is no longer present in the environment where the response occurs, *"Embodiment"* has become a distinctive property of the organism. The experimenter is imposing a form, which is controlling and maintaining the desired behaviour. Hence, the term *"Embodiment"* is an explicit expression of its *"Materialisation"* through *"Manipulation"*. Finally, the implicit properties are captured in the termini, which appear below sea level. For example the abstraction of the implicitly stated purpose, carried by the terminus *"Compelling"*, can be verified through the import of the terminus. The following passage of Skinner (1960, p. 210) makes this point of behaviourism clear: "Walden Two is a marvel of efficient co-ordination – as efficient as an anthill".

The intentional condition is reflected in the holophor of the A-component. Due to the transformations in the A-component, emphasis on the environment and certain contingencies is appearing in the undercurrent. Accordingly, the explicit expression of *"Expertness"* and *"Adaptation"* appears for the radical behaviourist as the task of making visible the controlling relationship between environmental contingencies and proper behaviour. Both termini remain as the explicit expressed properties of the holophor.

Phrased in the language of Walden Two, Skinner (1960, p. 165) says: "Our conception of man is not taken from theology but from a scientific examination of man himself. And we recognise no revealed truth about good or evil or the laws or codes of a successful society". Hence the intention is to induce people not to be good but to behave well. In perfect agreement with Skinner's intention is the implication of the formed intention during translation. The termini *"Manipulation"* and *"Mastery"* appear as depth-relations.

Discussion

The focus of this article has been on the demonstration and discussion of informational invariants. An explanation of the emergent formation of pattern and their maintenance depends on the mechanisms for the formation and emergence of order. These mechanisms are anchored in the spherical coupling of self-organisation and self-reference. As a property of nature and not as a technical construct self-organisation is present whenever self-reference in a non-equilibrium state is pushing towards equilibrium. Self-reference is observable as order, since order is manifesting itself in a certain pattern in the flow of equilibration processes.

Hence, movement equations must come into existence during the production of natural language expressions. These are the micro-equations at the edge of nature and society from which any discussion of man-environment interaction must take its departure. The procedure for the establishment of this "interface" phenomenon has been shown to involve the following five steps: (1) Production of interval-specific markers, (2) Determination of elementary dynamical steps, (3) Identification of phase-transitions, (4) Processing of angular variable articulation, (5) Determination of resolved macro-variables.

Without invalidating the structural kernel of the Watson-quote, a realistic test has been made. But in order to subject the basic hypotheses of the article to a radical test, the Swedish translation of the English text has been translated into Italian. Especially the impact of the translation function on already existing structural constraints has been made evident. In that the translations must meet the same functional demands, the latter analysis has created a severe condition for the test. In contrasting them, it becomes observable that variations in the information flows have generated some slight variation in the expression of informational depth. This means that the emerging structural invariants of the quotation are reflecting the essence of Skinner's view of behaviour. Since it has been possible to name the corresponding thermodynamic states in similar fashion, informational invariants have become evident, which are concentrating potential information. Consequently, with variable positions, the implicitness of the quotation can be grasped. Furthermore, changes between explicitness and implicitness can be extracted and discussed in the framework of radical behaviourism.

References

Anderberg, M. R. (1973). *Cluster analysis for applications*. New York: Academic Press.

Bierschenk, B. (2001). Geometric foundation and quantification of the flow in a verbal expression. *Cognitive Science Research, 81*. ERIC Document Reproduction Service, No. TM 033 479)

Bierschenk, B., Bierschenk, I., & Helmersson, H. (1996). Die Ökologie des Sprachraums (The ecology of the language space). In: W. Bos, & C. Tarnai (Eds.), *Computerunterstützte Inhaltsanalyse in den Empirischen Sozialwissenschaften. Theorie - Anwendung - Software* (pp.11-31). Münster: Waxmann.

Connes, A. (1994). *Noncommutative geometry*. New York: Academic Press.

Kugler, P. N., & Turvey, M. T. (1987). *Information, natural law and the self-assembly of rhythmic movement*. Hillsdale: Erlbaum.

nonlinear dimensionality reduction. *Science*, *290*, 2319-2323.

Roweis, S. T., & Saul, L. K. (2000). Nonlinear dimensionality reduction by locally linear embedding. *Science*, *290*, 2323-2326.

Skinner, B. F. (1960). *Walden two*. New York: Macmillan.

Skinner, B. F. (1972). *Beyond freedom and dignity*. London: Jonathan Cape.

Skinner, B. F. (1974). *About behaviourism*. New York: Knopf.

Sokal, R., & Sneath, P. H. (1963). *The principles of numerical taxonomy*. San Francisco: Freeman.

Tenenbaum, J. B., Silva, de, V., & Langford, J. C. (2000). A global geometric framework for
Thom, R. (1989). *Structural stability and morphogenesis*. Reading: Addison-Wesley.
Ward, J. H. (1963). Hierarchical grouping to optimise an objective function. *Journal of the American Statistical Association, 58*, 236-244.

Accepted January 15, 2002

Author's Note

The convolution procedures presented in the article have been discussed with research colleagues at the 9th Herbstakademie on Self-Organization of Cognition and Applications to Psychology, a Conference on Dynamical Systems in Cognitive Science, October 25-28, 2000 in Ascona, Switzerland. The Holophors have also been presented at the Meeting of the Swedish Group of Cognitive Psychology, 2001, May 7-8, University of Växjö, Växjö, Sweden.

Correspondence should be sent to Bernard Bierschenk, Department of Psychology at Lund University, Paradisgatan 5P, S-223 50 Lund, Sweden.
E-mail: bernhard.bierschenk@psychology.lu.se