A COGNITIVE-SYSTEMIC RECONSTRUCTION OF MASLOW'S THEORY OF SELF-ACTUALIZATION

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Maslow's need hierarchy and model of the self-actualizing personality are reviewed and criticized. The definition of self-actualization is found to be confusing, and the gratification of all needs is concluded to be insufficient to explain self-actualization. Therefore the theory is reconstructed on the basis of a second-order, cognitive-systemic framework. A hierarchy of basic needs is derived from the urgency of perturbations which an autonomous system must compensate in order to maintain its identity. It comprises the needs for homeostasis, safety, protection, feedback and exploration. Self-actualization is redefined as the perceived competence to satisfy these basic needs in due time. This competence has three components: material, cognitive and subjective. Material and/or cognitive incompetence during childhood create subjective incompetence, which in turn inhibits the further development of cognitive competence, and thus of self-actualization.

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INTRODUCTION

ONE OF THE MAIN VALUES driving systems research is to provide concepts and methods for stimulating learning, growth and development, as well in individual persons as in society, thus enhancing well-being and the overall quality of life. The same positive aim characterizes so-called *humanistic* psychology [9], which defines itself as a "third force", in contrast with clinical psychology, influenced by Freudian psycho-analysis, which studies mental illness, i.e. the negative side of human behavior, and traditional academic, experimental psychology, influenced by behaviorism, which tends to reduce human behavior to statistical correlations between different kinds of stimuli, responses and personality traits. Instead of merely modelling normal behavior or of curing clear dysfunctions, a humanistic psychologist tries to help people to develop in a better way, thus making them more competent, more aware, more happy, in the hope of reaching some state of "optimal" mental health [12].

Probably the best known proponent of this approach is Abraham Maslow. What distinguishes his work from that of other "humanists", such as Carl Rogers or Erich Fromm [12], is that he proposes a model of how a happy, healthy, well-functioning

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person behaves, which is based on concrete observations of real people, rather than on formulating ideal requirements. Moreover Maslow proposes a simple, and intuitively appealing theory of motivation [8], which explains where such a "self-actualizing" personality comes from. In parallel with systems theory, Maslow reacts against too much reductionism in psychological modelling, and proposes an alternative holistic approach of personality research [8].

However, in academic psychology Maslow has been criticized for his lack of scientificity. In recent years, Maslow's ideas have been taken up by the so-called "transpersonal" psychologists [9], who study altered, "ego-transcending" states of consciousness, inspired by mystical traditions, Eastern philosophies and psychedelic experiences. Although the transpersonalists claim to carry out scientific investigations, it is in practice often difficult to draw a boundary between their research and approaches characterized by irrationality and mysticism

The general problem is that if holism as a reaction to reductionism is understood in a too simple-minded way, then any type of scientific analysis, of precise, formal modelling becomes meaningless. The main advantage of the systems approach as a scientific method is that it allows the integration holistic and reductionistic principles, leading to models where both "the whole is more than the sum of the parts" and "you must understand the behavior of the parts in order to understand the emergence of the whole" applies. Hence the conceptual framework of systems science appears particularly well-suited for reformulating holistic theories, such as Maslow's, in a more precise, more explicit, more scientific way.

That the time is ripe for integrating humanistic and systemic approaches is also shown by the recent emergence of a "second" or "non-classical" systems science, exemplified by the work of "second-order" cyberneticists such as Maturana [10], Pask and de Zeeuw [1]. Mechanistic concepts are here replaced by concepts such as self-organization, autonomy, cognition, self-awareness, conversation, etc., which are clearly related to humanistic concepts surrounding the central idea of self-actualization. However, most "second-order" theories remain very abstract, lacking the simplicity, concreteness and intuitive appeal of Maslow's descriptions.

What I wish to do in this paper is to review Maslow's theory and the criticisms raised against it, and try to reconstruct its main concepts on the basis of a general "second-order" cognitive-systemic framework, in order to make them more general, more precise and more coherent.

A REVIEW OF MASLOW'S THEORY

Maslow's theory of personality [8, 9] is based on: 1) a theory of human motivation, characterized by a hierarchy of needs; 2) a description of a particular type of maximally healthy personality, called "self-actualizing", which is supposed to emerge when all these needs are satisfied.

Theory of motivation

According to Maslow human behavior is motivated by a set of basic *needs*. Which needs are most active in driving behavior depends on two principles: (1) a need which is satisfied is no longer active: the higher the satisfaction, the less the activity (the exception to this rule is the need for self-actualization, see further); (2) needs can be ordered in a *hierarchy*, such that from all the non-satisfied needs, the one which is lowest in the hierarchy will be the most active. A lower need is more "urgent" in the sense that it must be satisfied before a higher need can take over control.

The lowest level of needs may be called *physiological* needs. These are needs of the body as a physiological system which tries to maintain homeostasis. They consist of the need to breath air, hunger, thirst, avoidance of extreme heat and cold, etc. These needs are such that if they are not satisfied the organism dies. If the threat of

dying because of perturbation of the physiological equilibrium has vanished, the organism can direct its attention to more indirect threats, such as the danger of being caught by a predator, and try to avoid them. This corresponds to the second need level: the need for *safety*. Once safety and physiological needs are met, higher, more typically "human" needs come to the foreground, in the first place the need for *love and belonging*. This is the basic social or affiliation motive, which drives people to seek contact with others and to build satisfying relations with them. Satisfaction of belongingness needs triggers the emergence of the *esteem* need. In this stage of need gratification, persons also want to be esteemed, by the people they are in contact with, as well as by themselves: they want to know that they are capable of achievement and success.

When all these needs are satisfied, we are left with the last one, the highest need, the need for *self-actualization*. This need is fundamentally different from the previous ones, in the sense that all the previous ones can be conceived as drives towards the reduction of a *deficiency*. Such a deficiency means that there is a discrepancy between the actual state of the individual, and some fixed optimal or equilibrium state, characterized by adequate values of the basic variables, as well physiological variables such as temperature, level of sugar in the blood, etc., as psychological ones such as feeling of safety, of belongingness, of esteem. The control which deficiency needs exert over the individual's behavior is implemented as a negative feedback loop, which diminishes deviations from the goal state.

Self-actualization, on the other hand, may be called a *growth* need, in the sense that deviations from the previously reached equilibrium state are not reduced, but enhanced, made to grow, in a deviation-amplifying positive feedback loop. The deviations to be amplified are changes which can be interpreted as improvements in some way of the overall personality, as de-velopment of remaining potentialities. If you eat food, your desire for it becomes less and less, in accordance with principle (1). However, if you develop your capacities, you want to develop them more and more.

Definition of self-actualization

Self-actualization is reached when all needs are fulfilled, in particular the highest need. Because of the positive feedback, self-actualization is not a fixed state, but a process of development which does not end. The word derives from the idea that each individual has a lot of hidden potentialities: talents or competences he or she could develop, but which have as yet not come to the surface. Self-actualization signifies that these potentialities of the self are made actual, are *actualized* in a continuing process of unfolding.

According to Maslow, self-actualization corresponds to ultimate psychological health. Health is more than the absence of disease. On the psychological level, diseases correspond to neuroses due to the frustration of one of the basic needs. For example, a person whose safety need has not been adequately fulfilled may develop paranoiac tendencies, and believe that everybody and everything is threatening him.

An interesting case is the situation where all the lower level needs have been satisfied, but the highest need, self-actualization, has not. In that case you have a person who apparently has everything to be happy: a comfortable and safe environment, a loving family, friendship and respect from peers, a sense of personal achievement... Yet the individual will not be really happy, because he has no longer a goal to live for, he has achieved everything he wanted. This will result in feelings of boredom and meaninglessness, which might even lead to suicide, unless the person becomes aware that there is more to life than reducing deficiencies, that is to say unless he becomes aware of his need for self-actualization. Though one may continue to live in a more or less stable

manner, trying to satisfy the deficiency needs without developing acute problems or neuroses, he will not be really healthy unless he succeeds in satisfying his self-actualization need, thus liberating his most profound capacities.

This definition of self-actualization derives from Maslow's motivation theory. However, Maslow has also undertaken an empirical observation of existing healthy personalities, more or less independently of the theory. Though he has tried to explain his empirical results by means of the theory, the observations are more detailed than what the theory can predict, and as we will see further they sometimes even seem to contradict the theory. Though he uses the same word, "self-actualizing", to label the personality type coming out of his observations, and the one coming out of his theory, it is not obvious that it describes the same phenomenon. Therefore it is important to study his observations in detail, and to try to correlate them with theoretical explanations.

I find it quite dangerous to summarize the observations, and I would propose to read the original text [8] (and not [9], which was revised after Maslow's death, and where several remarks—among other things about love—were deleted), rather than simply take over one of the many existing reviews such as the ones proposed in [3, 11, 12], or in this paper. In my own experience, summaries by other authors do not carry the same intuitive feeling of "this is it!" as the original, perhaps in part because they lack the many concrete examples and illustrations of self-actualizing behavior which Maslow proposes. Yet I will try to make a selection of the (at least for me) most important features.

Maslow's study was carried out by an analysis of the biographies of historical and public figures (such as Lincoln, Spinoza, Einstein, Eleanor Roosevelt, etc.) and by observation and interviewing of a few contemporaries, who were rigourously selected on the basis of absence of any signs of neurotic behavior, together with the presence of positive signs of psychological health or well-being, the criteria for which were derived from previous observations. To Maslow's amazement these highly disparate personalities appeared to have many non-trivial characteristics in common, which together could be taken to define a new personality type. We will now review these basic character traits, not in the somewhat arbitrary seeming order in which Maslow lists them, but building up from the perception, to the behavior, and to the social relations, concluding with what makes these personalities so unique.

Perception and experience

Perhaps the most striking feature of self-actualizing persons is their *openness to experience* (see also [21]): they are eager to undergo new experiences, learn new ideas and skills, try out new things. This also applies if the new observations do no fit into their existing schemata or contradict their previous opinions. The result is that in general they have what Maslow calls an *accurate perception of reality*: in contrast to ordinary people they do not tend to deny, repress or deform perceptions in order to make them fit their prejudices, a tendency which is well-documented in traditional psychology. There is also no contradiction between what they experience or feel on a intuitive level, and what they think on a conscious, rational level. A general reason for this openness may be that self-actualizers are *attracted towards the unknown*, rather than afraid of it like most people.

Together with this openness to new stimuli, there is a tendency to experience old, well-known stimuli in a new way, what Maslow calls *freshness of appreciation*. A self-actualizer may walk for the thousandth time through the same street, yet suddenly experience beauty and excitement as if he or she saw it for the first time. Such sense of beauty, wonder or revivification is usually triggered by the same type of objects or situations; depending upon the individual, these may be: na-

ture, children, in certain cases sex or music. Sometimes these spontaneous feelings of awe and wonder become so intense, that they may be called *mystical* or *peak experiences*.

Attitude towards problems

The behavior of self-actualizers is generally characterized by *spontaneity* or naturalness. They do not tend to wear masks or play roles, or feel inhibited or restricted in their thoughts, feelings and actions. They are not afraid that what they are doing might be wrong or that other people might think so. This spontaneity is also expressed by their general *creativity*, which is not of the specialized, "Mozart" type, where someone may create outstanding things in one restricted area (e.g. music), but behave in a quite inhibited and immature way in other areas. Self-actualizing creativity consists rather of a general playful attitude towards problem-solving and self-expression which assumes that the conventional way to do it is not necessarily the best way. This applies as well in the intellectual domains of art, science and philosophy, as in everyday tasks such as decorating the house.

This lack of inhibition or tension may be understood by their general attitude of *acceptance* towards nature, people and themselves: they do not feel unhappy, anxious, ashamed or guilty because of apparent constraints or shortcomings they cannot change, such as the weather, physiological processes (e.g. urination, pregnancy, menstruation, etc.), or old age. They will only feel bad about discrepancies between what is, and what might be or ought to be. Their intrinsic *stability* allows them to maintain a relative serenity in situations of deprivation, failure or disaster.

When confronted with problems, self-actualizers have little difficulty in making decisions, because they know how to *distinguish* between what is *good* and what is *bad*, and between *means* and *ends*, that is to say they have a well-developed system of personal values, which is aided by their unbiased perception. They will not tend to continuously vacillate or hesitate between alternatives, asking the question "Am I making the right decision?", because they are confident about themselves, and their capacity to solve problems. However, in situations of uncertainty they will postpone a decision rather than make a premature one, without feeling unhappy because of the remaining ambiguity.

In general they will *focus on a problem* or task outside themselves, rather than continuously question their own motives. This task may become a general "mission" to which they have devoted their life. Accomplishing this task is what they like most, and they do not tend to separate work from fun or vacation.

Following the old dictum, we might summarize their attitude towards problems as follows: they have the patience to endure the things that cannot be changed, the courage to change the things that can be changed, and the wisdom to distinguish the ones from the others.

Social interactions

Their relations with other people, society and culture are characterized first of all by their *autonomy*. They do not really need other people, and they make their decisions for themselves, without having to rely on the opinions of others, or on the rules, conventions and values imposed by society. They like solitude and detachment, and have a need for privacy and independence. Their world view is generally independent of the particular culture or society in which they live, and they pay little attention to the social conventions, though they will superficially respect them if transgressing the rules would bring about needless conflicts.

On the other hand, self-actualizers have a general feeling of *empathy* and kinship towards humanity as a whole. They tend to be friendly towards everybody they meet, especially towards children. They are willing to listen to, and especially learn from, people of any class, race, age, reli-

gion or ideology, without being inhibited by prejudices (Maslow calls this a *democratic character structure*).

They are capable of more intense and profound interpersonal relations than other people, though they are highly selective about which people they relate to, preferring that company which allows them to be spontaneous. The intimate friends and lovers of self-actualizers are in general close to self-actualization themselves. Self-actualizing relationships are characterized by extreme *sincerity*, *self-disclosure* and *intimacy*, by the dropping of all defense mechanisms. *Sexuality* can be deeply enjoyed, yet it does not take an important place in the system of values of a self-actualizer. They are quite uninhibited about sex, willing to experiment with different roles (which may go as far as resembling sado-masochism), but they are in no way obsessed by it, and will in general not look for sex without affection. Self-actualizing *love* is characterized as well by respect for the other's autonomy as by ego-transcending identification of the partners' needs, as well by profound concern and care for the other's well-being as by playfulness and laughter.

Imperfections and peculiarities

The above description may have created an impression of an almost saintly perfection, but it must be understood that self-actualizers have their weaknesses and difficulties too. From the principle of bounded rationality we may infer that self-actualizers make errors as well as other persons, though in general they will be faster in admitting and correcting them. Moreover reaching self-actualization is not a matter of all-or-none, but a never-ending, gradual process of improvement. In spite of this continuity between more and less self-actualizing levels of development, there are clear qualitative differences between self-actualizers and "normal" people.

This may be exemplified by problems and difficulties which are typical for self-actualizers. Since society is based on the behavior and values of the majority, we may expect that self-actualizers, which form a very small minority (Maslow is not clear about which percentage of the population they constitute, though we may estimate less than 1 in 1000), will not be really at home in or adapted to their culture. According to Maslow, "they sometimes feel like spies or aliens in a foreign land and sometimes behave so". Their detachment and unconventionality will often be interpreted as discourtesy, lack of respect or affection, or even as hostility. Their unemotional and clear-cut decision-making in the treatment of others, e.g. in cutting off unsatisfactory relations, may seem cold and ruthless. Their philosophical, unhostile sense of humor, makes them look rather serious in the eyes of ordinary people. In certain situations their problem concentration may be exacerbated into stubbornness, absent-mindedness and shortness of temper.

A more general difficulty "normal people" have with self-actualizers is simply to understand them, since they behave and think in a quite unusual manner. In particular it is difficult to situate them along one of the many dimensions or polarities which are used to describe ordinary personality types and behaviors, such as: selfish-altruistic, extravert-introvert, active-passive, intuitive-rational, sensual-spiritual, serious-playful, etc. Self-actualizers are neither selfish (extravert, active, etc.), nor altruistic (introvert, passive, etc.), nor somewhere in between: their behavior is somehow selfish *and* altruistic at the same time, because what they like for themselves is in general also good for others.

This is what Maslow calls *transcendence of dichotomies*. They often do not make a choice between two apparently opposite behaviors, but find a way of solving the problem which synthesizes the advantages of the two alternatives, without the disadvantages. This capacity for "dialectical synthesis" is perhaps the characteristic which most fundamentally distinguishes them from average people, and which

makes it difficult to situate them in one of the conventional psychological classifications of personality types.

CRITICISMS OF MASLOW'S THEORY

Theoretical framework

Maslow's ideas have been criticized for their lack of an integrated conceptual structure. His writings are heterogeneous (his major book [8] is based on a collection of papers published in the 1940's and 1950's), and consist often of apparently unstructured lists of remarks. According to Ewen [3, p. 368]: "Maslow's eclecticism [...] seems insufficiently thought out and includes too many confusions and contradictions. His study of self-actualizers has been criticized on methodological grounds, and his theoretical constructs have been characterized as overly vague, equivocal and untestable".

Though the need hierarchy seems relatively simple and consistent, the concept of self-actualization is not clearly defined. There is a difficulty with the concept of "actualization" itself, because it presupposes that there is somehow a well-defined set of potential talents an individual is capable of developing, but a human system is much too complex to allow the discrimination between "potential" developments and "impossible" ones. Moreover the definition of self-actualization as fulfilment of all the basic needs does not always correspond with self-actualization as observed in existing persons: Maslow himself acknowledges that sometimes self-actualization seems to spring from the frustration of a certain need rather than from its gratification [8].

Another criticism [11] stresses the subjectivity and specifically American bias of Maslow's criteria for psychological health, and suggests that in different societies, such as Japan, an individualistic, autonomous personality like Maslow's self-actualizer, would not be considered healthy or well-adapted. To Maslow's defense, I can remark that the state of ultimate well-being as conceived by Japanese Zen Buddhism, "satori", seems quite similar to "self-actualization", especially in its emphasis on the openness to experience, the not deficiency-motivated behavior and the transcendence of dualities, and this reinforces my tendency to believe in Maslow's statement about the culture independence of self-actualizing behavior.

Empirical validation

The problem with Maslow's observations is that they are difficult to reproduce (though there does exist a validated test for measuring the degree of self-actualization a person has reached [13]). Maslow is rather vague about how he selected his subjects, and he acknowledges that his work could not conform to the conventional criteria of psychological experimentation because of the complexity of the problem. Yet I would agree with his defense that it is preferable to carry out methodologically primitive research about fundamental problems, such as the conditions of human well-being, rather than restrict oneself to technically sophisticated observations about minor issues.

The hierarchical emergence of needs seems easier to test in an objective way, and some empirical research has effectively been done, mostly in the area of management and work satisfaction, but the results are mixed at best, sometimes seeming to support the theory, sometimes contradicting it [14, 15]. In particular the specific order in which needs (e.g. love and esteem) emerge, seems to be ambiguous.

Mook [11] illustrates another problem by means of two case studies, one about an African tribe which has lived in conditions of misery and insecurity for generations, and one about the behavior of people in Nazi death camps. In the first case, Maslow's theory seems to be confirmed: the frustration of the safety and sometimes even the physiological needs seems to have erased any behavior aimed at the satisfaction of the higher needs: there is no sign of

love, of affiliation, of esteem or achievement among the people of the tribe. In the second case, however, in spite of the continuous threat to safety and to life, people still retain some form of dignity and altruism.

Specific problems

This last example points to where the basic problem lies: though it seems intuitively evident that somebody who has been fighting for survival during his whole life will have difficulty to develop a higher sense of love, understanding and creativity, need gratification alone does not seem sufficient to explain in which circumstances self-actualization will or will not emerge. Other factors must be involved. The main difference between the African tribesmen and the Jews in the concentration camps seems to be that the first ones never experienced need gratification in their life, while the second ones probably have led a relatively satisfying life before their persecution by the Nazis. So one important factor seems to be the period during which basic needs were or were not satisfied. Maslow partly acknowledges this when he remarks that self-actualizers can endure need frustration much better than other people, because they have already received so much gratification in the past.

I want to propose another fundamental factor: *cognition*. It is striking that many, if not most, of the characteristics of self-actualizers listed by Maslow are cognitive: accurate perception, creative problem-solving, effective decision-making, high capacity for learning, etc. Self-actualizers give an impression of a superior, flexible intelligence. Though Maslow mentions the existence of a cognitive motive [8], cognition is absent in his need hierarchy explaining the emergence of self-actualization.

A SYSTEMIC FRAMEWORK FOR NEED THEORY

Autonomous systems

An analysis of the shortcomings of Maslow's theory has led us to the conclusion that in addition to need gratification we must introduce a temporal factor, specifying when particular needs were gratified, and a cognitive factor. If we want to build a well-structured, transparent model, we will have to integrate these factors into a theory of the development of intelligent, goal-directed action. Non-classical or second order cybernetics has recently led to an insight into the relations between autonomy (self-steering) and cognition [5, 7].

An *autonomous system* can be defined as a system which is able to actively maintain or reconstruct its basic *organization* (which defines its *identity*), by counteracting or compensating the *perturbations,* induced by changes in the environment, or by internal processes (e.g. entropy production). The appearance of autonomous systems can be understood from evolution through natural selection [5, 6]. Typical examples are biological organisms, whose organization has been analysed as autopoietic (i.e. self-producing) by Maturana and Varela [10].

Autonomy presupposes cognition since in order to effectively compensate perturbations, the system must be able: a) to *distinguish* or recognize specific perturbations, b) to *know* which action will be adequate to compensate for the potentially destructive effects of that specific perturbation. The compensation process can be conceived as *problem-solving*, where the problem is defined by the discrepancy between the actual "perturbed" state of the system, and the desired or goal state where the perturbation has been compensated, restoring the stable organization of the system. Solving the problem means finding an adequate sequence of actions which brings the perturbed state back to the desired state.

If perturbations are conceived as simple deviations from an equilibrium, which can be controlled by negative feedback, the system reduces to a cybernetic homeostat. This may provide an adequate model for Maslow's physiological needs, but not for

the higher needs. However, the "goal" of an autonomous system is not a fixed equilibrium, but a dynamic process which continuously reconstructs the system's identity. This leads to the following extensions.

Maintenance and growth of identity

The identity or organization to be maintained is a rather abstract, high-level property emerging from a continuously changing network of interactions. Though initially corresponding to the "life" or survival of the organism, it may develop into something even more abstract, such as a concept of "self", or as the survival of an idea with which the actor has identified.

This allows us to explain the motivation of a martyr who gives his life for his religion or country. Though his biological organism has died, in the eyes of the martyr he has succeeded to ensure the survival of his higher-order identity. The shift of the organization to be maintained from biological organism to abstract idea carried inside the organism is normally a continuous process, so that we cannot say that at any point there was a lack or disappearance of identity. A conceivable exception would be a sudden conversion or brain-washing, where the actor is induced to shift his identity in a discontinuous way, but this is from the point of view of the actor an unexpected process, which she did not "will", and which hence does not need to be explained by a theory of motivation.

A good way to ensure the long-term survival of a particular type of organization consists in maximally reproducing this organization: the more copies of the initial organization there are, the smaller the chance that all of them would be destroyed. Hence the biological need for reproduction (and thus sexuality) may also be understood as a special case of the general need for identity reconstruction. More generally, the "growth" or "development" of a particular organization, in the sense of making the organization larger, more numerous, more adaptive, stronger, etc., can

be conceived as a long-term strategy for survival. This leads us to distinguish between short-term and long-term processes.

Urgency of perturbations and needs

A perturbation in this conception is not assumed to cause an immediate annihilation of the system if it is not compensated, but to "announce" or "direct the attention towards" a possible annihilation in some far or near future. The threat posed by a perturbation depends on two factors:

a) how probable is the future annihilation, given the present perturbation?

b) how far in the future is the expected annihilation, i.e. how much time does there remain for compensating the perturbation?

Since the system cannot cope with all perturbations at once, there will be a problem of resource allocation: the system must order the perturbations according to their "urgency", starting with those where the probability for destruction is highest, and the time for compensation shortest. This provides a first model for Maslow's hierarchy of needs.

In general—though not necessarily in specific circumstances—direct physiological perturbations such as hunger or thirst are more urgent than indirect threats, e.g. because of the presence of predators in the environment: in the first case the probability of destruction without compensation is maximal, and the time horizon relatively short, depending upon the type of perturbation (hunger is less urgent than thirst, for example). In the second case the probability is smaller than 1, and the time horizon is in general longer, though an attack by a lion may of course be imminent. This case corresponds to the safety need.

In order to explain the higher needs, we must look at cases where the probability becomes even lower, and the time horizon even larger. These are situations where we cannot not really speak about a "perturbation", but rather about a "potential perturbation". For example, as I am sitting behind my desk now, I do not experience any

actual threat to my health, yet I know that statistically there is a non-negligible probability that I would die from a heart attack sometime in the years to come. If I want to compensate for this potential perturbation, there is no obvious equilibrium to be restored or danger to be fled. The only thing I can do is trying to understand as well as possible all the possible factors increasing the probability of a heart attack, and to find a protective environment and life-style where these factors are minimally present.

There are two aspects here: the need for external *care* or *protection*, and the need for individual *knowledge*. I might find the first one by having a loving family which cares for me if I am ill, and a good doctor and hospital, which can discover the symptoms of a threatening heart attack and protect me against it by adapted medicine. The need for protection is a prolongation of the need for safety. It explains part of Maslow's "love and belonging" need, because we will find external help and protection in the first place by our belonging to a group and by our interpersonal relationships.

If the external protection is good enough, there is no need for personal knowledge: if I do not know how to avoid a heart disease, the doctor will know it for me. However, the doctor's knowledge will be restricted to general, statistical properties of heart diseases, and cannot include all the individual peculiarities of my own life-style and sensitivity to diseases. This is a general principle: no existing knowledge will be perfectly adapted to all the specific situations an autonomous system will encounter. The only way to compensate for that is to equip the autonomous actor with a capacity for individual learning.

A basic paradigm for learning is the strengthening or weakening of associations by positive or negative reinforcement, as exemplified by operant conditioning. This learning mechanism explains the emergence of a motive or need for reinforcement or *feedback*: if you are trying to solve a problem or doing something about which you have some expectancies, but no certainties, you would like to get some reaction, which either confirms your expectancies (this is of course the best case), or disconfirms them. However, you would feel quite unsatisfied if you did not get any reaction, feedback, or reinforcement at all, positive or negative. It is because of the feedback you get, that you can strengthen your confidence or improve your knowledge about which results can be expected in which circumstances. This feedback motive may explain Maslow's esteem need, because receiving acknowledgment from others, and experiencing personal achievement is clearly a basic form of feedback or reinforcement. It also explains part of the love motive, because interpersonal relations do not only provide protection, they also provide interaction and conversation, i.e. a continuing process of mutual feedback.

Getting knowledge by feedback is still quite limited, however, because it presupposes that there is already a sensitivity or recognition for certain variables between which an association could exist. It is not sufficient if you want to learn completely new variables and associations. What you need to do then is *exploration*, i.e. trying out things without any a priori expectations which can be confirmed or disconfirmed. This defines a next motive, the curiosity or exploration need, which may explain part of Maslow's self-actualization need. The difference between self-actualization as a drive to maximally develop one's competences, and simple exploration, is that the first one integrates everything which has been achieved before by satisfaction of the lower needs: the confidence about the situation of the actor developed from the satisfaction of the safety and protection needs, and the confidence the actor has about his own competence for problem-solving and capacity for learning achieved by the satisfaction of the feedback need. This is the highest level of needs, because exploration has the least direct effect on short-term perturbations, but has the most

potentiality for securing and developing the identity in the long term.

We may summarize the analysis until now as follows: all different needs can be understood from the basic need of maintenance and reconstruction of the organization, defining the identity, of an autonomous system. They can be ordered according to their degree of "urgency" which corresponds to the probability of, and expected shortness of time before, destruction, associated with a specific perturbation. Though this ordering of needs is continuous, it is possible to distinguish *approximately* separate classes of needs: homeostasis, safety, protection, feedback, and exploration. Maslow's basic needs are just special cases of these more general need classes. We must not forget that the urgency ordering is not absolute, since it consists of (at least) two dimensions, probability and duration, and since the estimation of the value of these dimensions is in general context-dependent, and not very reliable. The strict ordering of the needs proposed by Maslow must hence be considered as merely a rough approximation.

SELF-ACTUALIZATION AND COGNITIVE DEVELOPMENT

Self-actualization as perceived competence

Now that we have reconstructed Maslow's need hierarchy, we can look again at his explanation for self-actualization (SA). According to him SA is the result of the gratification of all the lower needs, making the energy available for the continuous gratification of the highest need, the need for SA.

However, we must remark that the gratification of a need [i.e. the compensation of a (potential) perturbation] is not objectively given, but depends on how the subject perceives his needs and his external situation. The subjectivity of this perception is obvious for higher needs, such as esteem, but it can be illustrated for lower needs as well. For example in the case of

anorexia, the subject does not experience any need to eat food (i.e. hunger), though physiologically the intake of food may be urgently required for survival.

In particular the relative urgency of different needs is subjective, and this may account for empirical findings in which Maslow's postulated order for emergence of the needs seems violated. For example, someone may think that getting esteem is more urgent than building up a love relationship. We have defined urgency in terms of probability and expected duration, but it is clear that no model is capable of exactly calculating these variables for realistically complex situations. The approximate perception of urgency will depend on the cognitive system with which the subject interprets the world. The only guarantee for some sort of objectivity is that if the difference between perceived and actual urgency is too large, the autonomous system will be eliminated by natural selection. This means that in practice the postulated "objective" ordering of needs according to urgency will only be valid in a rough approximation, with many exceptions.

What seems essential for SA, however, is not the (subjective or objective) actual gratification of needs, but the fact that the subject feels *competent* to find gratification. For example, it is not because a self-actualizer feels thirsty (frustration of his physiological need), or is alone (frustration of his belongingness need), that suddenly he is not longer a self-actualizer. Such a need frustration will not change the personality structure, world view or self-image of the subject, as long as the subject knows that he is able to get gratification in due time (i.e. in a short term for urgent, lower needs, in a longer term for higher needs). The subject is aware that he can solve the problem easily, e.g. by drinking a glass of water in case of thirst (in ten minutes), by going to see a friend in case of solitude or lack of feedback (next week), or by getting enroled for a university program in case of frustration of the need for learning (next year).

Having redefined the origin of SA as the *perceived competence to satisfy basic needs in due time*, we must proceed to analyse the components of this competence. First, in order to be competent, you must obviously dispose of the needed *resources* for solving the problem: you cannot satisfy your thirst, if you are in a desert without water; you cannot go and see a friend if you are marooned on an uninhabited island; you cannot enrol in a university course if you are in jail. This may be called *material competence*. Second, it is not sufficient that the needed resources are there, you must also be able to recognize them, find them and apply them effectively. Except in trivial cases, problem-solving demands *cognitive competence*, i.e. knowledge, intelligence and creativity. Finally, the third component of perceived competence is the *subjective awareness* of competence. It is not sufficient that the resources are there, and that you are capable to find them: if you are convinced that you cannot solve the problem, you will not be motivated to do the necessary search for the resources, even if they are very easy to find. This component may be called *subjective competence*.

We have here assumed that perceived competence is a special case of actual competence, but of course we can also imagine situations where a subject believes to be competent, yet is unable to solve the problems. However, we may suppose that such situations are not very stable: if the actual need of the subject is not satisfied, when the subject expects it to be, the subject will normally review his expectations. Of course the reliability of this natural self-correcting mechanism will depend on the urgency of the frustrated need: in case of long-term, non-urgent needs the incompetent subject could maintain for a long period that he is competent; in case of urgent needs, self-delusion would rapidly lead to fatal errors. In general, though, it seems improbable that someone would continue to actually believe (and not simply publicly state) that he is competent to solve all his personal problems, while he is not.

Cognitive competence and distinction systems

We will not analyse material competence, since this falls outside the scope of personality theory, but proceed directly with cognitive competence. We must remark first that cognitive competence is not some form of "expertise", i.e. specialized knowledge which can be applied to a particular class of problems. It is not even "intelligence", in the sense of what is measured by IQ-tests. Though a certain type of expertise, or a high IQ, may obviously help to reach competence, they are not sufficient. Like Maslow notes [8], many people with a high IQ limit their activities to unimaginative "puzzle-solving". This corresponds to the solving of well-defined problems, e.g. mathematical or chess problems.

Satisfying one's basic needs is not a well-defined problem, however: it is not a priori clear what the needs or goals are, or which means can be used. Attaining gratification on all need levels requires not only intelligence, but also a profound self-knowledge and the ability to formulate one's own goals, and to question values and basic assumptions. This is something which clearly cannot be measured by traditional IQ-tests. Therefore we will have to analyse more deeply how problems which are not a priori well-structured, can be solved.

A problem is defined by a goal or end, and by possible means to reach this end. Solving it requires: a) the ability to distinguish satisfactory from non-satisfactory situations (value or ends distinctions); b) the ability to distinguish relevant objects and properties (means distinctions); c) the knowledge about how the different states, defined by the objects and properties, are causally connected. Distinctions and connections together define a *distinction system* [4, 5, 6], which is a basic model of a cognitive structure allowing problem-solving. A problem is well-structured if all the

fundamental means and ends distinctions are explicit, precise and invariant. An ill-structured problem, on the other hand, is characterized by lacking, ambiguous or variable distinctions.

In general, the more urgent the need, the better it is to have a well-structured problem, because this reduces the search needed to find a satisfying solution. This explains why homeostatic needs correspond to biologically inherited, fixed distinctions between satisfactory and non-satisfactory situations (e.g. thirst as distinguishing between sufficient and insufficient concentration of water in the tissues). If each time something is going wrong in your physiology, you would have to think: "What do I lack? Am I hungry, or am I thirsty or am I sleepy?", you would not be very well-equipped for survival. In the same way, when confronted with a predator it is better not to begin doubting about whether the animal is a jaguar, or a leopard, or perhaps a panther: it suffices to make the clear-cut observation: "This animal is dangerous!"

On the other hand, for the higher-order needs, it is not so urgent to make clear distinctions. Moreover, it is more difficult to make early distinctions since these needs correspond by definition to situations which belong to a still far away and uncertain future. In such problems it is wise to question whether some conceived future situation would or would not be satisfactory, since its effects will in general extend over a much longer period than the effects of drinking or escaping a predator. For example, if you consider marrying, it is normal to ask: "Am I really in love with her?"

The "least urgent" needs correspond to completely ill-defined problems: if your goal is learning or exploration, then there is no criterion which tells you when you have achieved your goal, i.e. when you can stop learning. Moreover, if you want to explore unknown domains, then by definition there is not much knowledge available which can help you to choose the most effective way to do it. Everything is vague

and uncertain.

Cognitive competence in the gratification of basic needs can hence be conceived as requiring a *stable foundation*, consisting of invariant distinctions representing low-order needs, pertaining to the short-term maintenance of the self, and an open-ended *flexible superstructure*, consisting of variable, easily adaptable distinctions, pertaining to long-term potentialities for development. This type of cognitive organization can be easily recognized in Maslow's description of SA behavior.

Self-actualizers are characterized by: a simple, accepting attitude towards their physiological needs, a great self-confidence, autonomy and stability in the face of frustration and danger, yet a profound flexibility and creativity in learning and discovering new ideas. This is particularly clear in their problem-solving attitude: their stable system of values allows them to make decisions without hesitation if this is necessary, yet they will withhold judgment and explore alternative distinctions, if there is still insufficient certainty to make an informed decision, and if a decision is not urgently needed. The flexible superstructure provides the platform for all the typical traits of self-actualizers: creativity, openness, spontaneity, unconventionality and especially transcendence of dichotomies. Indeed, what Maslow calls a "dichotomy" is just a rigid distinction, which is not necessarily adapted to the specific context. In contrast to other people, self-actualizers are not bound to the once learned distinctions, but are able to change them in a way which takes into account the unique characteristics of the specific situation.

Developmental requirements for self-actualization

Let us now try to understand which are the requirements for developing perceived competence, i.e. SA. We will assume that in our present Western society there are sufficient resources for most people, so we will not consider the obvious case of mate-

rial competence. Another requirement is a sufficiently high level of genetically inherited intelligence (and perhaps also other traits which may be influenced by inheritance, such as curiosity or emotional stability): we do not expect children born with mental defects to achieve high competence. We may expect that the higher the "inherited" component of someone's IQ, the easier he or she may reach self-actualization. However, this is far from sufficient, and relative deficiencies in genetically determined IQ can be compensated by good education and other externally stimulated forms of cognitive development.

This determines a second component necessary for SA: most of the distinctions we make are learned from other people. So if our parents, teachers, and cultural environment propose adequate distinction systems (i.e. adapted to the external reality *and* to our basic needs), it will be easier for us to build up a competent system of personal values and concepts. For example, a strictly puritanical education may fail to convey a distinction between natural sexual desire and sexual pathology, and this may lead to a personality which is incompetent to satisfy its sexual needs. This educational and cultural component must especially stimulate the individual learning of new distinctions, i.e. it should entice us to explore things for ourselves, and not to accept ideas on the basis of pure authority. Thus a liberal, open-minded education should be more effective in reaching self-actualization, than one based on the unquestioned transmission of traditional concepts and rules, however positive those traditions may be.

These two components, genetic and educational, are not sufficient, however. Everybody knows people who are highly intelligent, well-educated, and with a broad cultural background, yet who are unhappy and neurotic. The "mad scientist" or "crazy artist" have become a cliché, and history provides many examples of creative geniuses who had deep psychological prob-

lems (e.g. Van Gogh or Newton). For the third component, we must go back to the origin of *subjective* competence.

Suppose that one of the basic needs (physiological, safety, protection, feedback...) has been frustrated during prolonged periods in early childhood, i.e. at a stage of development where there is not yet a sufficiently stable cognitive system of distinctions, then the child will develop a feeling of insecurity and incompetence with respect to this particular need or needs. Even if the need is satisfied later on, the child (and later the adult) will always suspect that it may be suddenly frustrated once again, and that it will not be able to compensate the perturbation. In other words, the child will experience a continuous threat to the need, even if there is no objective, actual threat. This will in general lead to a lack of self-confidence, and to different types of fears.

This may be understood because the distinction system, representing the possible ways to formulate and solve the problem corresponding to the need frustration, has not received sufficient reinforcement: the child was not able to solve the problem because of external deficiencies, or cognitive incompetence. Hence the child will (consciously or unconsciously) doubt about the adequacy of the learned distinction system, so that the distinction system will not be stabilized.

Because of the lack of internal stability of the system of personal concepts of values, the person will now look for external stability and reinforcement, clinging to what looks like a stable support. Mostly this will be found in society at large, or in one of its subcultures, in the form of conventions, fashions, traditions, ideologies, religions, etc. The problem with collective distinction systems like these is that they are directed at a kind of "largest common denominator", and hence not very flexible: like in the example of the doctor, they cannot take into account all the idiosyncrasies characterizing a particular person in a particular situation.

The result will be a person who is uncertain about basic aspects of his or her personality: sense of physical well-being, of security, of protection, of self-confidence, yet who tends to be rigid about less basic, less intimately personal concepts and rules, such as social conventions, metaphysical ideas and everyday knowledge. In other words, the opposite of a self-actualizing person, who is basically confident about issues pertaining to the maintenance of his or her identity, and thus free to doubt about more abstract, more distant concepts and rules (and even to doubt about certain of the more basic aspects, if the rest of the system is stable enough to support this questioning).

If in a later stage of life the basic needs are nevertheless satisfied, after initial frustration, it will be quite difficult to reorganize the hierarchy of distinction systems in order to reach a more self-actualizing system. The perception of incompetence and hence insecurity will tend to maintain, even though all actual danger has disappeared, because subjective incompetence tends to create actual incompetence. Even if after many years the person has sufficiently gained confidence about his basic values and competences, there will still be the problem of the rigidity of higher-order distinctions which restricts the openness to experience and thus thwarts further development. In such cases it may be necessary to break open the rigid perception of reality, by radical interventions, such as profound psychotherapy, mystical experiences, hallucinogenic drugs, etc.

If this does not happen, the typical situation will be that the person continues to look for more and more gratification of the lower needs, even though the level of gratification he or she has reached may be more than sufficient. For example, though the safety and protection needs require a certain level of material well-being, let us say sufficient to buy or rent a house, they do not require a level sufficient to buy a castle. Though the feedback need may be satisfied by the love and esteem of a few persons, it does not require that one be loved and respected by everybody. The remaining uncertainty about basic needs together with the inability to make new distinctions, will lead the non-self-actualizer to want more and more of the same, without ever getting satisfied.

Let us now consider the opposite development pattern: gratification of needs during childhood in due time. Under "in due time" we must understand: not too late, i.e. before the frustration has had destructive effects on the sense of safety and self-confidence, but not too early either, i.e. not immediately after the child has expressed its need. Otherwise, the child will become spoilt: its tendency to solve problems and learn by itself will not be reinforced, and it will get lazy. How long "due time" is, will depend on the specific need: short for urgent needs, longer for higher needs. If the early gratification is accompanied by sufficient inherent intelligence and by the presentation of adequate distinctions systems by parents and educators, we may assume that the person will succeed in building up a well-adapted hierarchy of distinction systems, with stable foundations and a flexible superstructure, leading to an overall perception of competence. If such a person is in adulthood confronted with a situation of extreme deprivation and threat to the basic needs, for example in a Nazi concentration camp, this will have little effect on his or her perceived competence. Indeed the flexibility of the higher-order distinctions will allow the person to formulate the problem situation in such a way that the external causes of the problem become clear, so that there is no reason to doubt about one's own competence or system of values.

In conclusion, although we have started by separating material, cognitive and subjective competences, we see that they interact in a quite intricate way: if during the period of basic cognitive development, the child experiences either material or cognitive incompetence, or both, this will create subjective incompetence, and this will in turn hinder the further development of

cognitive competence because of the resulting cognitive rigidity and lack of motivation. In other words, subjective incompetence acts as a *self-fulfilling prophesy*: once you start to believe that you are incompetent, you effectively become incompetent. Conversely, if you believe you are competent (and if this belief is not brutally falsified by the facts), you tend to be less inhibited by possible threats to your self-image, and hence you have more energy and are more motivated for further developing your competence by learning and exploration. Hence we see that both self-actualization and non-self-actualization are reinforced by positive feedback loops.

It looks as though a child at birth stands before a bifurcation, with two "attractors": perceived competence and perceived incompetence. Positions in between the attractors are unstable: any not directly resolved frustration of a basic need, due to *external scarcity* of the needed resources (insufficient food, unsafe environment, lack of love and reinforcement by the parents, etc.), or to *cognitive incompetence* to solve the problem (insufficient intelligence, inadequate models proposed by education, complexity of the problem), during development may be sufficient to push the child into the attractor of incompetence. We should hence not be surprised that self-actualizers form such a small minority. Yet I believe that this picture in its simplicity is a little too pessimistic, and that one may develop a feeling of competence for many needs, even though not for all, and that if this domain of perceived competence is large enough from the start, it may continue to grow during the whole childhood and adulthood.

DISCUSSION

Summary

A review of Maslow's theory and the criticisms raised against it has led us to pinpoint the following shortcomings: the conceptually and empirically confusing definition of self-actualization, and the insufficiency of simple need gratification to account for its emergence. Apart from gratification, we have proposed to include temporal and cognitive factors.

This has led us to study cognitive development from the point of view of an autonomous system trying to maintain its identity in a complex and changing environment. This allowed us to reformulate Maslow's need hierarchy, in terms of the "urgency" of (potential) perturbations experienced by the system, such that urgent perturbations correspond to situations where the destruction of the system has high probability and short time horizon, whereas non-urgent "perturbations" correspond to long-term phenomena, with a weak probability of destruction, but with a high potentiality for "growth". The urgency ordering of perturbations led to a corresponding ordering of the needs to avoid such perturbations, generalizing Maslow's hierarchy: the need for homeostasis, the need for safety, the need for protection, the need for feedback and the need for exploration.

Unsatisfied needs or perturbations correspond to problems which must be solved. This led us to redefine self-actualization as the perceived competence to solve these basic problems in due time, where the required time depends on the (subjective) urgency of the need. Perceived competence has three components: material, cognitive and subjective. Cognitive competence requires adequate distinction systems: lower-order needs demand well-structured, closed cognitive systems, with invariant, precise distinctions; higher-order needs require open-ended systems with variable distinctions. Self-actualization is hence characterized by the successful implementation of the following principle: *stable low-order distinctions form the basis for flexible high-order distinctions*. This allows us to explain most of Maslow's observations of self-actualizing behavior.

However, if a distinction system is not sufficient to solve a problem and thus to

satisfy a need, the corresponding distinctions will not be reinforced and hence will remain unstable. The inability to reduce a low order deficiency during the period in which basic distinctions are developed, will lead to subjective incompetence, and to a hierarchy of distinctions systems which is not well balanced—in the sense that higher order distinctions are more rigid than lower order ones—and thus to perceived incompetence. Perceived incompetence tends to be self-enforcing since it diminishes the motivation to solve problems, to learn from experience, and hence to increase competence.

This inability can have two types of causes: *absence* or *scarcity* of the needed resources, and *cognitive incompetence* to solve the problem. The first, motivational type of cause corresponds to Maslow's theory stating that self-actualization requires the gratification of all the basic needs by the environment. The second, cognitive type of cause is omitted in Maslow's theory, and may explain some of its shortcomings. In particular it allows us to explain why the frustration of a basic need at a later age does not impede self-actualization, and may in certain cases even stimulate it, by forcing the subject to reconsider his or her rigid system of distinctions.

This cognitive-systemic reconstruction of Maslow's theory gives us some hints on how to promote self-actualization in society. An obvious way to eliminate the first type of cause is to make society wealthier and more democratic so that everybody can get what he or she needs. This is the traditional *socio-economic* solution, which is the driving force behind political systems such as social democracy. However, the second factor reminds us that this is not sufficient, and that we also need to develop subjective and cognitive competence. This can be stimulated by traditional educational programmes, which provide their pupils with a variety of distinctions systems which have shown their adequacy in different contexts. However, this must be further complemented by an education where individuals are taught to develop their own distinctions, partly by opening up or de-automatizing [2] their existing rigid distinction systems (this is the "*transpersonal*" solution [9]), partly by providing them with powerful methods and support systems for constructing more adequate distinction systems, thus enhancing their creative intelligence [1, 6] (this is the "*cybernetical*" solution).

Issues for further research

It is clear that a problem as complex as the promotion of human well-being demands a much more detailed study than what could be offered in the present paper. Such study might allow the formulation of more general and more concrete guide-lines for enhancing self-actualization in individuals and in society.

The classification of basic needs, their emergence from more or less urgent perturbations, and the way they interact, must be further elaborated. Also the different components of perceived competence and their very complex interactions must be analysed with much more detail, and their effect on concrete behavior, such as social interaction, must be examined.

In particular, the newly introduced theoretical concepts and assumptions should be empirically tested. It would be interesting to measure the correlation between different types of competence, different types of need gratification, and self-actualizing personality traits, at different stages of psychological development. This might help to check and elaborate the conceived interaction mechanisms stimulating or inhibiting self-actualization. Partly, this would require the development of operational definitions (psychological tests) for the newly introduced concepts, in particular the concepts of perceived competence to satisfy basic needs in due time, stability of low order distinctions, and flexibility of high order distinctions.

A possible avenue to approach this problem might be found in attribution theory [16, 17], which examines how people

attribute causes to perceived events, such as success or failure to solve a personal problem. The theory basically states that causes are attributed on the basis of co-variation between effects and their antecedent conditions, as they are experienced. Fundamental dimensions of attribution include stability (is the cause likely to maintain?), control (is the subject capable to change the cause?), and locus (is the cause external or internal to the subject?) [17, 18]. In particular the factor of attributed *control* is clearly related to the concept of perceived competence. We might hypothesise that control too has a "material" component (does the subject dispose of the resources necessary to produce the desired effect?), and a "cognitive one" (is the subject capable to make an adequate choice from the repertoire of available actions or resources?). Experiments on the attribution of controlability might shed more light on the emergence of perceived competence and its components.

Other constructs related to perceived competence are "self-efficacy expectancy" [20], which measures the belief concerning one's ability to adequately execute actions, and "locus of control" [19], which measures the degree to which a subject feels capable to control events through his or her actions. Though these constructs are to some degree ambiguous or controversial, and though they lack a clear theory about where the "competence" they measure comes from, they have the advantage of offering more or less reliable psychological tests. They could hence be used as provisional tools for testing the basic model proposed in this paper.

For example, these constructs could function as partial measures for the postulated independent factor ("cause"), perceived competence. The dependent factor ("effect"), SA or one of its necessary components, could then be measured by Shostrom's test [13], or through the well-established construct of "openness to experience" [21], which is similar to what we called "flexibility of high order distinc-

tions". A significant correlation between independent and dependent variables would confirm the present theory, a lack of correlation would point to basic difficulties. However, one should not rely too much on such tests, since perceived competence presupposes an analysis of basic needs and their relative urgency, which is as yet absent in any of the existing "control" or "efficacy" measures.

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(Manuscript received July 1991)