

MORE THAN NEIGHBORS: A COMMON BASIS FOR RELATIONSHIP-CENTERED MEDICINE AND SCIENCE

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Abstract

Causal linearity is still one of the fundamentals in scientific thinking. It remains unquestioned in spite of the fact that scientific results in important fields of human life such as genetics and brain function obviously do not follow linearity. Instead, they follow non linear laws as conceptualized in the Chaos Theory, the concepts of complexity or the quantum theory. Because of the fact that the same dynamics can also be found in relational oriented dialogic communication, the traditional gap between natural sciences and humanities seems to vanish. It appears that there has not been made use of the resulting open space for creative interdisciplinary research and practice in human sciences up until now. The reason is obviously a fear of losing stability. The final discussion in this paper deals with the consequences of rigidity and discrepancies in the conceptualization of pathology, rehabilitation and psychotherapy. The balance of the dialectic tension between the pole of security as a human need and the aspect of playful creativity seems to be fundamental for a relationship oriented medicine.

Key words: *brain research; genetics; complex systems; quantum theory; humanities vs. natural sciences; dialogic communication; linear-causal relationship; non-linear dynamic systems; chaos theory*

Beyond castor oil and bloodletting: triumph of the hard facts

The beginning exploration of the laws of nature during the renaissance also gave the medicine a new foundation. Up until then, the ideas of the ancient gladiator-physician Galen had been applied in human anatomy, with the blessing of the church. Students receiving their academic training stood in a gallery watching a barber-surgeon cutting open the corpses, meanwhile listening to the professor reading from Galen's works. No one cared for the fact that the scientific consensus, which for the most part was based on the dissection of animals, often times did not correspond with the actual proportions of the human body.

It was the physician Andreas Vesalius from Brussels who said that his greatest achievement was to „describe the complete human body, whose anatomy no one understood“ (Andreas Vesalius Google Personenlexikon 2009). His working conditions had little to do with those of a modern scientific laboratory at first. He searched for bones in the cemeteries of Paris, where he did research on the corpses of hanged felons and had to “fight off the many wild dogs”. Even by the time he was the personal physician of Emperor Charles V and his groundbreaking work of human anatomy was gaining recognition, there were still attacks such as the one from a certain Jacobus Silvius: “I beg you not to listen to a certain ridiculous and

insane person, who lacks all talent and who curses and insults his teachers in the most blasphemous ways" (Ibid.). The advancing orientation towards scientific explanatory models led to the increase in diagnostic and therapeutic possibilities in medicine which still continues today. Castor oil and bloodletting were less often the method of choice. Psychic abnormalities were no longer seen as a sign of "moral depravity" but were attributed to pathological changes in the brain and, instead of punishment, they were treated with the respective current knowledge. Medical proof, supported by empirically funded "hard facts" became more and more important. Diagnostic and therapeutic strategies led by experience and relationship-aspects were outsourced into separate fields of study (such as "Psychosomatic medicine") or shifted towards "non-scientific alternative" cures. They increasingly disappeared from conventional medicine. The newest attempt to explain the individual characteristics of the particular person with only scientific data can be found in "individual medicine". Professor Dr. Regine Kollek, technological impact assessment expert for modern biotechnology at the University of Hamburg and a member of the German Ethics Council, expects medicine to develop from an "empirical medicine" into a "rational, molecular science". The individualization of medicine will cause medical actions to become more and more dependent on scientific analysis and interpretational competence. In "Pro Gesundheit" from the self-help initiative HFI e.V. Karl-Gustav Werner explains that the physician's role will differentiate itself between "a continuous companion of the insurant for bio-psycho-social-medicine" and an "anonymous specialized care provider". Kollek says that the categories of health and sickness will change as well: "If health is the result of will, sickness is the effect of a wrong or missing will." She understands the term "individualized" not as a self-interpretation of the individual person and the individual doctor-patient relationship, but rather as a concept of illness based on the molecular processes of the genetic deposition of humans (World Health Summit: Personalisierte Medizin 2009, p. C1733–1736).

On the basis of technically refined methods, science-oriented brain research is

becoming a leading science even beyond the medical field. Humanities such as education, psychology and psychotherapy increasingly subordinate themselves to it. According to brain-researcher Wolf Singer, "brain research is one of the big adventures of human curiosity, similar to cosmology and particle physics..., though regarding its consequences for our idea of man, brain research is probably the most exciting of these scientific disciplines" (as quoted in Görnitz and Görnitz 2006, p. 58). In a "Manifest of eleven leading neuroscientists" it says that "In the foreseeable future, say the next 20 to 30 years, brain research will be able to explain the relationship between neuroelectric and neurochemical processes on the one hand and perceptual, cognitive, mental and motor skills on the other hand to such an extent that predictions concerning the links in both directions will be possible with a high degree of probability. This means that the mind, consciousness, feelings, acts of will and freedom of action will consistently be regarded as natural processes, because they are based on biological processes (Das Manifest 2004, p. 36). A "biological psychiatry" has already drawn the conclusions that classical psychiatric concepts of illness such as depression, psychosis etc have become obsolete and that these diseases are to be defined as metabolic disorders in the brain (Mayer 2002, quoted after Bauer 2003).

The hard facts are melting

What characterizes all these concepts is the fact that they are based on research that uses new technical capabilities to advance into smaller and smaller (molecular) dimensions. Molecular genetic data plays an important role in this. However, the foundations of the scientific fields used to achieve this increased precision are not being noticed and therefore are not being discussed. This is especially relevant with regards to new developments in genetics, where the idea of the role of genes has fundamentally changed. While it used to be assumed that a linear-causal relationship existed between genetic information and its implementation, it is now known that genetic information, in order to take effect, needs an environment-dependent activation by a "gene expression" (Bauer 2002, Kandel 2006). Furthermore, research in the field of epigenetics has shown that genes, if they are

chemically encased – by methyl-groups for example –, can be inaccessible for generations and then become effective again because of environmental factors (Bauer 2008). The notions of “Individualized medicine” are therefore based on scientifically outdated genetic data. All subjective, relationship-oriented aspects remain to be excluded, even though they belong to the environmental factors that newest concepts suggest are involved in activating genetic information. The increasing accuracy at the level of technical measurability loses sight of crucial factors and becomes inaccurate while attempting to become more exact. The same can be said for the previously mentioned biological psychiatry and the increasingly popular notion that the marking of biochemical-processes in the brain will lead to a better understanding of psychiatric disorders. These are based on the explanatory model that organic factors are causal and that a process can only be understood when its organic factor is found. Not least because of findings of brain research it has been proven that this relationship also applies in the reverse: That environmental experiences, which include interpersonal psychological processes (such as in psychotherapy), can cause structural changes in the brain, again through the activation of genes. Even in the “manifest”, the biological, scientifically explorable processes are seen as causal: Mental phenomena are “based” – as has been quoted above – “on biological processes” (further discussions on this subject in von Lüpke 2006).

Now the findings of brain research itself call into question the sole orientation towards organ structures. Zieger (2009) for example quotes studies which found that cortex neurons and cortico-subcortical connections over the thalamus – the connections between the cerebral cortex and deeper brain sections – are not linked during the fetal development until the 22nd week. Ultrasound examinations on the other hand show that in the 12th week fetuses already have a sophisticated movement repertoire. Studies with anencephalic children who were born without a cerebrum also show a behavioral spectrum that can’t be explained by the verifiable brain structures. The ability of tonic-empathic dialog with smiling, “spontaneous reactive physical, mimic and vocal self-tractualisations and expressions as

well as implicit procedural and associative answering, learning and recognition performances were observed” (Zieger 2005, p. 6). Studies of the American brain researcher Freeman (1995) also question the linear-causal orientation towards definable functions of individual brain areas. Freeman acquainted bunnies with smells and found specific brain wave activities for each smell in a brain region that was activated during the processing of these perceptions. When he offered the animals a new smell, they reacted with a new pattern as expected, but at the same time the patterns for all the other smells had changed. This backlash of context on the structure is also evident on the neurophysiologic level. Not one particular cause leads linearly to an effect, but a change in one point of a system leads to changes in the entire system. Therefore it can be assumed that complex cognitive-emotional processes can lead to interactions within the whole brain. It seems that concepts beyond a linear-causal relationship are required. Thelen & Smith speak of “non-linear dynamic systems”: “Although behavior and development appear structured, there are no structures. Although behavior and development appear rule-driven, there are no rules. There is complexity. There is a multiple, parallel, and continuously dynamic interplay of perception and action, and a system that, by its thermodynamic nature, seeks certain stable solutions. These solutions emerge from relations, not from design. When the elements of such complex systems cooperate, they give rise to behavior with a unitary character, and thus to the illusion of structure” (Thelen and Smith 1994, p. XIX). Cilliers (1998) describes the elements of complex systems, where a sufficient number of such elements are in a state of dynamic interaction. This interaction doesn’t need to take place on a physical level, it can also be a mere exchange of information. The single elements are neutral, they hold no information and have no specific meaning. Cilliers uses the carbon-atom as an example, which is always the same, whether it is in a table, in a tree or in a human being. The mutual influence remains unpredictable. Big changes can have little effects, tiny marginal factors can have dramatic consequences. Cilliers compares this concept to the meaning of words in the language as well as to the neurons of the brain: “Meaning is determined

by the dynamic relationships between the components of the system. In the same way, no node in a neural network has any significance by itself – this is the central implication of the notion of distributed representation. Significance is derived from patterns of activity involving many units, patterns that result from a dynamic interaction between large numbers of weights” (Cilliers 1998, p. 46–47). Exchange through dialogue within the context of relationships is equivalent to such a complex system. Milani Comparetti (1996) illustrates this in his graphic of an upward moving spiral which is open at the top. The crucial factor in this case is the difference between the ideas of both dialogue partners in the proposal and counter proposal and therefore the unpredictability of the exchange. Milani Comparetti sees this as the dimension of creativity. However, the model also shows the limitations of graphic illustration. The exchange in dialogue takes place not only consecutively, but also simultaneously through an infinite variety of signals. While one partner is talking, the act of listening performed by the other partner is already an active communicative process. His facial expressions continuously send messages of acceptance, rejection or disinterest to the speaker. These messages affect the speaker and influence his current statement, which again in turn influences the listener. Such interactions cannot be described linear-causal anymore, they can only be described as elements of a complex system. The single elements, whether they are verbal or non-verbal, receive their meanings only through different contexts.

Music concretizes dialogical structures and raises them above the psychodynamic constellations of individuals. In this case the sequence in a temporally progressing process is inseparable from the simultaneous coming together of different voices. Again, the meaning is given through the context: The theme of the fugue often times becomes interesting only towards the end, a dissonance, which in the classical theory of harmony requires a resolution, can be used as an acoustic color in modern music. Musil explains the interaction of such elements using the example of melody: “In this (melody, added by the author) the tones have their independence and can be recognized

on their own, and their neighborhood, their togetherness, their sequence and what else can be heard is not a mere term, but is filled to the rim with sensual performance; but even though despite it’s connectedness all this can be listened to individually, it can also be listened to as a whole, because that in itself is the melody, and when listened to there is not something new next to the tones, intervals and time, but with them. The melody is not added as an extra, but as a second way of appearing, a special form of existence, under which the form of individual existence can barely be perceived” (Musil 1952, p. 1313).

The concept of non-linear complexity is also important for science. Another complex model, the Chaos Theory, developed from natural sciences after it became clear that linear-causal models were insufficient, for example in meteorology. Again it’s about the reciprocal influence caused by unpredictable interaction between the individual elements. This includes marginal factors whose influence can be more significant than the Gaussian distribution would predict it to be. The metaphor of the butterfly, whose wing beat in Brazil causes a typhoon in Florida, has become popular. The development of quantum physics also stems from the need for increasing accuracy. Görnitz and Görnitz wrote: “That quantum theory is more precise than classical physics – contrary to a widespread prejudice –, becomes obvious through the fact that it was first discovered at a time when classical physics had become very precise experimentally as well as theoretically. Furthermore the quantum theory disregards aspects of reality as ‘unimportant’ less than the classical physics do, seeing that it also considers the relationship between objects. Relationship between separate objects can lead to a new whole with all the consequences associated with it. Because of that it allows better predictions than classical physics and a fundamental understanding of nature” (Görnitz and Görnitz 2006, p. 162). The role of the individual elements as information carriers in a context of relationships is also evident at the level of physical measurability: The physical becomes the artifact of the experimental conditions. According to Einstein’s formula $E=mc^2$, “even deeper in the ‘inside of matter’ there is nothing physical left. The matter dissipates into energy, i.e. into

motion, but not ‘into motion of something’, but ‘into motion by itself’” (p. 159). “Quantum information becomes meaningful, when it is able to effect or control something inside its living carrier” (Ibid. p. 175). The observer also becomes part of this process. He establishes a relationship to the measuring process “and through this interaction, the internal quantum structure of the quantum object changes” (Ibid. p. 161). This results in “vast quantum states, which encompasses psyche and soma and cannot be explained as an interaction through electromagnetic or chemical information transfer” (Ibid. p. 179). “The quantum theory describes ‘vast wholes’ that extend across space and time. The creation of Einstein-Podolski-Rosen-paradoxes (EPR-paradoxes), i.e. of quantum states extended over many kilometers that, when measured, change immediately as a whole, already establishes itself experimentally” (Ibid. p. 174). Such models would be the methodological requirement for brain research that comprehends the sort of phenomena that Freeman describes. A notion of that can be found in the “Manifest”: In reference to the role of quantum physics the authors write: In the long term we will establish a “theory of the brain” accordingly, and the language of this theory will probably be a different one than that which is known in neuroscience today” (Das Manifest 2004, p. 37). The reference of Görnitz and Görnitz to the scientific significance of focusing on relationships in terms of accuracy is of particular interest here. Using the example of therapeutic relationships they say: “Psychoanalysis can’t help but to consider the patient in his relationships, which makes it more concrete and therefore more accurate than a science, which simply tries to understand the patient as an isolated object” (Ibid. p. 178).

The consequence of the depictions up until now is that the affiliation between relationship-oriented medicine and scientific models goes beyond mere neighborhood. Contrary to widespread notions the humanities, which are often classified as speculative, soft, metapsychological and inaccurate, are often times more precise than the sole focus on “hard facts” of evidence-based, linear-causal research approaches. Especially the advancing accuracy in physics has shown that the “hard

facts” are softening increasingly, while the aspect of relationship as a central element becomes easier to grasp not only in the field of human sciences. Relationship is no longer the “icing on the cake” that is kindly added for the sake of humanity, instead it has become an equally essential factor in both medicine and education. The decomposition into smaller units often carried out in research has already affected the “vast wholes”. Görnitz and Görnitz exemplify this with the search “for the needle in the haystack”: “It is done classically by examining piece by piece. The quantum search captures all at once, and then – though only with probability – finds the right straw, i.e. the needle” (Ibid. p. 173). This however is no longer conceivable.

Questions remain

Is this not another attempt to explain human scientific phenomena using natural scientific methods and therefore regard them as “natural processes, because they are based on biological processes” – as stated in the “Manifest”? Aren’t relationship-medicine and education just searching for the “blessing of natural science” again? In contrast to a biologically oriented medicine that solely relies on natural scientific data, this is about an epistemological level. This epistemological level, although developed in a multidisciplinary manner within the limits of the natural science physics, provides models with which humanistic phenomena cannot be explained but can only be described more accurately. Complex structures should no longer be reduced to simple ones – albeit at the price that these models aren’t conceivable anymore.

Given this abstraction, the question arises to what extent linear relationship structures such as the still conceivable causal ones are actually dispensable. Don’t a number of scientific research approaches and their technical applicability continue to rely on this relationship structure? Starting with infancy, doesn’t orientation develop from causal relationships? The baby already learns to associate steps, to understand the clatter in the kitchen as preparation for a meal, to associate the rattle of the keys with the return of one of the parents. “Why-questions” are key issues during infancy and continue over the course of a lifetime in different variants. Causality could

be described in complex structures as well, as an element of limited validity – An “attractor” in the sense of the chaos theory. “Hard facts” are replaced by probabilities. The examples of childhood development also make clear that the orientation towards causal relationships is inseparably tied to relationship experiences. In the given examples, only the experience of a coherent mutual relationship allows the experience of reliable causal structures. Again we are talking about information that receives its meaning through context: every sound, every word, a glance or a touch now attain a meaning that is negotiated in a dialogic reciprocity.

Does the subject become arbitrary?

What becomes of the subject in the “vast wholes” and a “determinacy of possibilities combined with an indeterminacy of facts” (Görnitz and Görnitz, p. 163–164)? Is it left up to randomness, an infinite number of “attractors” whose orientation remains unknown and can’t be influenced? “Although behavior and development appear rule-driven, there are no rules”: This sentence from Thelen and Smith (1994), already quoted above, now becomes relevant again. The subject is also made up of individual elements which for themselves are neutral and which only receive meaning through context. In physics, the observer decides through his method of research whether to perceive energy or mass – he changes the context by becoming part of it. In the development of a human being, relationships decide upon which given possibilities can unfold. We will never know what chances were left unused. The inherent self, seemingly being pushed forward by rules, as described by Thelen and Smith, the recurrent theme of identity can only be detected dialectically: “Through the thou a person becomes I” (Buber 1979). Only the other creates the conditions for identity, shown graphically in the dialog spiral of Milani Comparetti. In one’s life – beginning with the fusion of egg and sperm cells – there is no development stage beyond this dialectical polarization.

Practical consequences

Dialectically cryptic formulations, as well as pointing out that “vast wholes” are only comprehensible using quantum mathematical

models, may give the impression as though this is an abstract theoretical discussion without applicability. As mentioned, Görnitz and Görnitz discuss their view of quantum physics in the context of more accuracy in psychoanalysis. Explicitly referring to Thelen and Smith and the papers of Freeman, the “Boston Change Process Study Group” (which includes Daniel Stern) discussed consequences of unpredictability in the psychotherapeutic process as an expression of non-linear structures. In a paper of 2004 the word “sloppiness” plays an important role. The authors speak of inter-subjective systems, which they characterize with terms such as uncertainty, surprise, confusion, improvisation, variation and redundancy. “Although the sloppiness of the exchange of meaning introduces substantial uncertainty into the interaction, creating what usually are viewed as errors or mishaps, it paradoxically introduces new possibilities for increasing the coherence of the interactive process between analyst and patient. Sloppiness is potentially creative” (Boston Change Process Study Group 2004, p. 695). Beebe et al. (2000) – also against the backdrop of Thelen and Smith’s concepts concerning non-linear dynamic systems – studied the language coordination between adults and infants at the age of four months and compared these results to the attachment behavior of the children at the age of twelve months. They found that a very close coordination as well as an extremely loose coordination were both associated with insecure attachment behavior, while a somewhat loose coordination showed a secure attachment. The authors called the importance of rhythm “one of the fundamental organization principles of social communication” (Beebe et al. 2000, p. 77). Disturbances, irregularities, “perturbations” are believed to promote development and attachment, since they keep the system in motion. “In order for a pattern to be changed, a part of the system must disturb the – up until that point – stable pattern” (Ibid. p. 73). In a very close-knit coordination the system can not change itself in order to explore new solutions. Overly stable patterns can only be torn apart. Rigidity becomes a definition of pathology to the authors. Beebe et al. also apply the consequences of these studies to the psychotherapeutic process. Contrary to

the optimal satisfaction of the child's needs, which in German literature – based on Ainsworth's concept – is a requirement for the development of secure attachment (Brisch 2000), the development promoting role of "disrupt and repair" has been discussed in American infant research for a long time. Reck et al. (2001), within the context of mother-child-interaction during postnatal depression, refer to studies in which the crucial factor for the quality of the interaction is not seen in the extent of agreement between mother and child in their emotional expression, but the ability of the interacting partners concerning "interactive repair", i.e. to flexibly move back and forth between matched and mismatched states. If a pair has reached a mismatched state, it ideally moves back into a matched state within two seconds. So once again, it is not about structure, but – in accordance with the dynamics of complex systems – about the variability within a system. Compared to the healthy control group, a "friendly responding to each other" is described for the depressed adult interaction partners. The authors interpret this as a possible sign of conflict prevention and restricted authenticity. A high conformance in the interaction behavior between depressed partners is seen as an indication for relationship problems and a pathological communication structure.

Where is the controversy?

All these concepts and experiences, however, are hardly noticed by the broad "scientific community". This becomes obvious with the example of quantum theory. Even though Einstein's relativity theory is part of the general education now, the advancement of physics it has triggered has been of little consequence for the academic activities. The complexity of the associated mathematical operations should not be the only and may not be the crucial reason. The desire for "hard facts": A medicine which defines precise organic findings as cause of disorders corresponds to a deep human need for security and support. Behavioral problems also bring along the problem of guilt. In science, this leads to a tendency to delve even more into the details of limited fields of study – accepting the risk that in the meantime the foundations of these fields of study might lose their validity. The open conflict traditionally carries with

it the risk of calling the own results into question and realizing that defining parts of ones lifework are wrong. It is possible that experiences from the past continue to have an effect in the present, for example the futile polemics of Jacobus Sylvius against Vesalius or, in the 19th century, the desperate uprising of the 73 year old hygienist Max von Pettenkofer against Robert Koch's claim that cholera was triggered by living pathogens. In front of witnesses he swallowed a cholera bacteria culture which Robert Koch had produced in Egypt and said: "Even if I was wrong and the attempt would put my life in danger, I would still calmly look death in the eye, it would not be a reckless or cowardly suicide; I would die in the service of science, like a soldier in the field of honor." Thanks to his immunity, the consequence of an earlier cholera infection, he survived. He did however carry out the suicide nine years later with a pistol (Wunderlich 2009). Today's academic activities have more in common with the interaction between an infant and a depressive mother.

Postmodernism could be considered a further line of development. Lyotard recommends (as portrayed by Cilliers 1998) to give up the idea of consensus, as it leads to impoverishment. His idea was for knowledge to be continued in discourse, without trying to find a permanent grid. Rather than excluding all that does not fit into a pattern, he considered it a matter of finding meaningful relationships between different discourses. Cilliers considers this "an inevitable feature of a complex, self-organizing network" (Ibid. p. 118). However, he also speaks of the danger of overloading the network, which then "will show 'pathological' behavior, either in terms of chaotic behavior or in terms of catatonic shutdown" (Ibid. p. 119). Currently the trend is more towards catatonia. It is possible that "pure dissent", similar to continuous dissonance in music, leads to stupor and arbitrariness. Perhaps this is about the preservation of a dialectical tension between harmony and dissonance, security and anxiety, reliable support and risky adventure – which is similar to the subject of identity. Cilliers postulation for a postmodern ethic within complex structures can only become effective in this tension: "Respecting otherness and differences as values in themselves" (Ibid. p. 139). This leads

us back to the aspect of creativity in Milani Comparetti's dialog model. Can we affect the balance in this tension? Certainly not by propagating adventures. This would destroy the dynamic in the core. The well-designed and from an educational point of view carefully constructed adventure-playground prevents all the risky and forbidden adventure that used to be possible on the abandoned property. Kids "are irresistibly attracted to waste ... in waste products they recognize the face which the material world turns towards them, and only them" (Benjamin 1977, p. 22). Suddenly, we are transported back to Vesalius' work place, where he had to "fight off the many wild dogs". The dividing line is not between natural science and humanities, but is marked by the dialectical tension between the desire for safety and the curiosity for the unpredictable. If one wants to be of influence, the confirmation of the wish for security seems advisable, since it appears to be tabooed and frowned upon. The psychoanalyst Steve Mitchell describes this in the development of romantic relationships: "The need for the feeling of knowing both his/herself as well as another person, the need for a completely secure attachment is important for children and adults. But certainty and predictability are difficult to achieve in human relations. We constantly try to reach an illusionary sense of duration and

predictability. When patients complain about the lack of love in their marriage, one can show them how precious this deadness is to them, how carefully they preserve it and how much they insist upon it – how the mechanization and the complete predictability of the act of love serve as a protective shield against surprise and unpredictability. Therefore, 'the secure attachment' is not a particularly useful model for the romantic love between adults, except in regard to the dimensions of the imagination; the illusionary as well the security procuring. Love is not secure by nature, but we are constantly trying to make it secure" (Mitchell 2002, p. 47–48). What Mitchell says here about love applies analogously to any form of development, development-rehabilitation and therapy. In fear of surprise and unpredictability we also search for security within the deadness and predictability of learned techniques. The dimension of imagination, the playful, is the antithesis. It is therefore necessary to mourn the loss of hope for "specifically directed" encouragement in order to make room for creative leeway.

In this tension, "we can hope to keep in touch with our primitive selves whence the most intense feelings and even fearfully acute sensations derive, and we are poor indeed if we are only sane" (Winnicott 1978, p. 150).

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