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STRUCTURES OF PERSONALITY ALONG PIAGETIAN LINES

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ABSTRACT

Patterns of self-knowledge can be defined by extending Piaget's concept of structure. For example, Robin experiences both a certain ball game and making contact with a girl as:

lovely win/lose	*good feeling* about being active
fine with this group	*satisfied* with the game
lovely contact/rejection	*good feeling* about seeking contact
fine that friends are here	*satisfied* with the acquaintance

The theory of self-knowledge describes the genesis of patterns of self-knowledge, first in the case of the child, then in the case of the adult in psychotherapy. An example of the latter is the case of Fred, a young man without any musical ability who expects to become a world-famous pop star in five years.

Some connections with Piaget's genetic epistemology are sketched. Some advantages of the theory of self-knowledge for the psychology of personality and for psychotherapy are summed up, such as the direct link between diagnosis, intervention and assessment.

Introduction

Piaget and the psychology of personality are not often associated with one another. Piaget's main interest was in epistemology: How does intersubjective — i.e. valid, reliable and applicable — knowledge come into existence? To the best of my knowledge, he only lectured on the psychology of personality between 1952 and 1963, at the Sorbonne in Paris.[1] On the other hand, his theory does play a part in the psychology of personality, albeit a minor one. Piaget is regularly quoted or referred to in psychoanalytic literature, and he has inspired many psychoanalysts like Winnicott, Mahler and Levenson. In non-psychoanalytical theories of personality relations with Piaget are rare, but not absent.[2]

We just mentioned Levenson, a New York psychiatrist. With the

help of Piaget's 1968 concept of structure, he reinterpreted Freudian transference as the so-called content-form transformation. Picking up where Levenson left off, I have coined the concept of 'pattern of self-knowledge'. Its empirically demonstrated genesis along Piagetian lines is described in the *theory of self-knowledge*.[3]

Part 1 sketches the development from Piaget's concept of structure to patterns of self-knowledge. Part 2 deals exclusively with the theory of self-knowledge. Part 3 concludes with some remarks on the Piagetian approach to structures of personality.

1. *Piagetian structures, content-form transformations, and patterns of self-knowledge*

We will treat the developmental line from Piaget's epistemological concept of structure to the non-epistemological concept of 'pattern of self-knowledge' in three subsections: 1.1 deals with the genetic-structuralistic approach to personality; 1.2 elaborates on the distinction between content and form of 'structures of personality'; 1.3 provides Levenson's approach with a neurophysiological basis, and extends it to patterns of self-knowledge.

1.1. *Development of and structure in personality*

Piaget is best known for his research on the cognitive development of children. That does not alter the fact that his objective and theory also relate to the cognitions and cognitive development of adults. Piaget wanted to study the roots of scientific thinking, such as the first notions of number (in connection with the theory of number and algebra), the invention of the wheel (in connection with mechanics), and so on.

Since Piaget aimed at an empirical rather than a speculative epistemology, and since he took those roots to be situated in prehistory, he had to focus on the cognitive development of the contemporary child. Archaeological findings may hint at prehistoric thinkers and investigators, but by definition their activities are undocumented and they cannot be questioned about their investigations. Around 1919[4] Piaget reasoned that very young children and prehistoric humans have in common the fact that they do not yet have a number of cognitive skills at their disposal which

a Western adult *anno* 1919 does have. Consequently, he argued, if he was to have any chance of making empirical discoveries about the roots of scientific concepts, fundamentals and procedures, he would have to start with the contemporary child who is confronted with everyday concepts from the exact sciences.[5] It was only much later that Piaget extended his theory to the exact sciences themselves; see Piaget & Garcia, *Psychogenèse et histoire des sciences* (1983) in particular.[6]

We shall come back to the relation between the psychological operations of children and those of adults in part 2.2, but then in connection with subjective rather than exact knowledge.

Beside the developmental theme, 'structure in thinking' is a major Piagetian theme. An example is that, if one takes 10 sticks of different length, 90 relations are at stake: 45 >- and 45 <- relations. A second example is at the level of psychological operations. They too form a structure in each field of knowledge: length, whole numbers, and so on. For example, conservation of length and the reversible relations '>' and '<' are interrelated. In the same way, non-conservation and irreversible operations are interrelated in each field of knowledge.

Developmental or genetic psychology in connection with epistemological questions has an advantage that research into personality particularly lacks: epistemological research has empirical criteria on which experts agree. For example, in 1994 all mathematicians agree that the 5 of 5 black draughtsmen (or checkers) is equal to the 5 of 5 white draughtsmen, irrespective of their spatial arrangements. With such an expert-bound criterion the psychological researcher is confronted with the task of explaining deviating answers: non-conservation, different preoperational structures, and so on.[7]

Criteria of content such as '5=5 irrespective of spatial arrangements' do not exist in the field of personality. However, some approaches to personality do postulate criteria of content. Clear-cut examples are Freud's *Lieben und arbeiten* (love and work) in connection with personal maturity, and Perls' emphasis on autonomously taken decisions, also in relational affairs. All the same, there is a big problem here: psychologists of personality are absolutely not in agreement about these and similar criteria. Indeed, if we take into consideration the growth of individualisation, at least in the Western hemisphere, and the constantly growing scale of successful life-styles, it looks as though such agreement is even less likely than ever to materialise.

That is why many theories of personality do not postulate such criteria, but then the question is: What does one want to see developing? One approach is to remain strictly agenetic. Eysenckian questionnaires and the approach to personality of classical theories of learning are good examples. The agenetic side of approaches lacking criteria raises the question of to what extent, if at all, they empirically do justice to the everyday experience that at the subjective level something changes in a child: the seven-year-old's 'I want to be a nurse' is very different from that of a fifteen-year-old.[8]

One way out of this blind alley would be the existence of a *form* criterion. Obviously, some criterion is necessary in view of the question 'In regard to personality there is something developing, but exactly what is developing and in what direction?', whereas the diminishing possibility on agreement over criteria of content does not then play a part.

We shall see that such a form criterion does in fact exist. It has a dual basis: the form of knowledge in general and of exact knowledge in particular, and the neurophysiological basis of psychological operations. Since this form criterion is conceptually a continuation of Piaget's concept of structure, we must start here.

1.2. *Content and form*

In *Le structuralisme* (1968) Piaget extended the theme of structure, which he had previously used mainly in relation to the thinking of children, to scientific knowledge. He defined a structure as a 'systematic whole of self-regulating transformations'.[9] Examples are: Galois groups in mathematics, Maxwell's electrodynamics in physics, and Chomskyan grammar in linguistics. Levenson introduced three modifications.

Levenson's first modification of Piaget's concept of structure rests on the Freudian concept of 'the compulsion to repeat'. Freud supposes that neurotics prefer to reenact a traumatic event rather than to become aware of their traumatic feelings. That is why Levenson replaces Piaget's 'self-regulation' in the definition of a structure, with Bertalanffy's concept of equifinality: a biological system tends to the same final situation, irrespective of the initial situation. For instance, sand or clay, much or little rain, and a sunflower seed will tend to produce a sunflower, and not a tomato plant. In precisely the same way a masochist will always feel tormented when, standing under a shower, he asks his partner to turn off

the cold water tap: either his partner does so and then the hot water produces the vexation, or he says, in a badgering voice, 'No, I won't do that' and this produces the vexation.

Levenson's second modification is concerned with the concept of transformation. Let us take a heap of 2 marbles and one of 3 marbles. For Piaget a possible transformation is a displacement of a marble from the first heap to the second one. In formal terms: $2+3=5$ is transformed into $1+4=5$. Levenson, however, thinks here more in terms of a conceptual correspondence than in terms of an actual modification. He compares this conceptual correspondence to the parallel between the colours of a traffic light and their codes: 'Thus the *ordering of go-caution-stop* is the same as *green-yellow-red*. The color system and the signal system have the same "structure"; the one is a *transformation* or an isomorph of the other'.[10]

Levenson is now able to redefine Freudian transference as a transformation. While according to Freud, on account of the compulsion to repeat, a neurotic tends to reexperience repressed feelings from childhood, for instance with his therapist, according to Levenson, on account of the principle of equifinality, a neurotic tends to mould the content of the therapeutic material, at the very same moment that he deals with it, into a form that is allied to that content: reliving rather reexperiencing. Let us take a neurotic who is talking about his father as an authoritarian figure. In the Levensonian approach he will experience the therapist's further questioning and empathic listening as something authoritarian. However, a neurotic who sees his father as someone who did not give him enough guidance in childhood, will experience that same listening behaviour as something non-directive.

In short, irrespective of the empathic initial conditions, content and form constitute a totality that is laden with authority for the first neurotic, but a totality without direction or control for the second one. Neither is transferring static feelings from childhood, but each of them is assimilating this session to a relevant compartment of his personality: one to the compartment that is sensitive to authority, the other to the compartment that is apt to feel unguided.

Levenson calls his reinterpretation of Freudian transference the *content-form transformation*. This concept is built on Piaget's approach to content and form. Inspired by Gödel's theory of 1931, Piaget distinguishes a form and a content in a logical system. In between, he assumes

an alternating, diachronic content-form-content-form-...-sequence in connection with the expanding limits of formalisation: '[...] tout élément [...] jouant simultanément le rôle de forme par rapport aux contenus qu'il subsume et du contenu par rapport aux formes supérieures [...]'.[11] So, in his content-form transformation Levenson replaces this diachronic relationship with a synchronic one, for an authority-laden form and content are present at the same time.

In other words, in reinterpreting Freudian transference as the content-form transformation, Levenson modified Piaget's concept of structure in three ways. He replaced self-regulation with equifinality; he conceived of a transformation as a conceptual parallel and not as a material change; and he placed content and form in a synchronic rather than a diachronic relationship.

1.3. *Patterns of self-knowledge and their neurophysiological basis*

For the sequel to Levenson's content-form transformations we must turn to the distributed memory model.[12] With this model the physicist and neurophysiologist Cooper explains a number of findings by Hubel and Wiesel concerning the visual cortex of the cat and the monkey.[13] The working of a distributed memory differs in principle from a local memory. In the latter a memory element is stored in a clearly defined spot, such as the storage of zeros and ones in a computer. A distributed memory, however, has no such localisability, for it stores a memory element in more than one place, *viz.* in the synapses (*i.e.*, the connections between the nerve cells) of the visual cortex, and not in the cortical cells themselves. In spite of the distribution, this memory is able to recognize an image that it has seen before. A distributed memory recognizes an image — or rather, believes that it recognizes an image — every time that a similar pattern of neuronal activity presents itself at the synapses.

To take an example, let us suppose that the image of a horizontal line is represented by the activity of 100 synapses. Synapse 1 has an activity 1.9 times as great as when it is at rest, synapse 2 an activity 2.3 times as great as when it is at rest, and so on up to synapse 100 with an activity 1.1 times as great as when it is at rest.[14] Every time that this pattern of activity presents itself in the cortex, the cortex has a certain image, *viz.* that of a horizontal line.

The idea of well-defined knowledge with an identical pattern of

neuronal activity can be linked to Levenson's transformations. In the case of the isomorphism between *green-yellow-red* and *go-caution-stop* there is an identical pattern as well, but in the sense of a 'conceptual code'. The same holds for a content-form transformation: the authority-sensitive neurotic experiences both his father and his therapist as 'authoritarian'.

Consequently, Levenson's reinterpretation of Piaget's concept of transformation, from 'concrete modification' to 'conceptual parallel', has a neurophysiological foundation. Besides, Piagetian transformations turn out to be a subclass of the class of neurophysiologically grounded parallels. 2+3=5 and 1+4=5 constitute a conceptual parallel as well: in both of them a whole number (3 respectively 4) is added to a whole number (2 respectively 1) to form a sum (in both cases 5).[15]

To elaborate on this example, not only are 2+3=5 and 1+4=5 each other's transformation, but so are all other additions of the whole numbers as well, even if their sum is not 5. So: 2+3=5, 1+4=5, 4+7=11, 9+0=9, 237+848=1085, but also 4+(-7)=4-7=-3 and so on are each other's transformation.[16]

This idea can be transposed to feelings, personal experiences, wishes and other subjective constructs, in short *subjectiva*. What we get is a pattern of self-knowledge (see next paragraph). However, their occurrence is not restricted to the therapeutic situation. For instance, the 'authority-sensitive 'neurotic will experience many other events, situations and meetings as authority-laden. This does not even have to become manifest to the outer world: even if he is reading a newspaper by himself or if he is using his imagination at the sight of clouds passing by, he may connect an image or thought to 'authoritarian behaviour'. Evidently, a parallel does not have to occur between two events, it may also be the case between three or more events.

An example of a pattern of self-knowledge is that Robin (age sixteen and a half) experiences a subjective similarity between playing in a game of *korfbal*[17] and approaching a girl in a disco whom he likes but does not know.

To begin with, at the start of both events he loves the 'win or lose' tension, for he can win or lose the game, and the girl may want to talk and dance with him, or she may reject him.

Next, Robin realizes that it gives him a good feeling that he can participate actively in both situations. He could watch the *korfbal* games as a spectator or watch other boys approach the girls of their preference.

No, Robin likes the feeling of being in action himself.

In the third place, he likes the fact that in both situations people whom he can trust are around: he likes playing with this team of twelve players and he likes being in the disco with his friends. It should be noted, however, that in view of the foregoing feelings, he could just as well do a solo sport or go out on his own.

Finally, he gains a sense of satisfaction from a positive result. As far as the game is concerned, he enjoys winning, but he is not dissatisfied with losing as long as his team has played fair and done their best, which is always the case. As for the girl, he knows that if she wants to make his acquaintance, she also wants to talk and dance, and that satisfies him very much.

I ask Robin if he knows of other events in which he has the same feelings as with the game of *korfbal* and when he tackles a girl? Yes, he replies: facing a storm on a Navy training ship, where he would like to get a job. Robin: *'On the water: of course, it's dangerous, a storm and so on, but that's what I like. Good sports: you can win, you can lose. And it's impossible to break a storm: you have to fight it. And you do that with an entire crew. I think that's marvellous: you do it together'*. As for the good result, he assumes that the Navy boat is stormproof, and that there is always radar contact with a rescue team.

Schematically, Robin's pattern of self-knowledge looks like this:

lovely win/lose	*good feeling* about being active
fine with this group	*satisfied* with the game
lovely contact/rejection	*good feeling* about seeking contact
fine that friends are here	*satisfied* with the acquaintance
lovely safe/unsafe	*good feeling* with fighting against it
fine with the entire crew	*satisfied* with the good result

To sum up part 1, there is a logical line of development from Piaget's structuralism via Levenson's content-form transformations to patterns of self-knowledge. An example of such a pattern is Robin's (lovely, good feeling, fine, satisfied) pattern. The concept of structure, of which patterns of self-knowledge are only a particular manifestation, is rooted in the human psyche that, neurophysiologically speaking, seems to be a distributed rather than a localized memory. Patterns of self-knowledge give the study of personality an unambiguous research criterion, not because of its content, but because of its form.

2. *Patterns of self-knowledge and their genesis, in children and in adults*

This section elaborates on the theory of self-knowledge. In 2.1 we sketch the broad outline of the genesis of patterns of self-knowledge in the child. After two intermediate sub-sections, the use of the theory of self-knowledge in psychotherapeutic treatment of adults is demonstrated in 2.4.

2.1. *The development of patterns of self-knowledge in the child*

It goes without saying that a new-born child is not yet capable of patterns of self-knowledge. It does not yet have any notion of a ball, a *korfbal* ball, or a game of *korfbal* and its rules. The same holds for a disco and courting, and for a boat, a crew and a storm. Consequently, a baby cannot explicitly and conceptually construct his or her subjectiva in any of these cases.

However, even from the moment that the latter is possible, it is questionable whether a child constructs a pattern with it. Has Piaget's theory something to say about the kind of operations that are a condition for a pattern of self-knowledge? As we shall see, the formal operations are this condition.

First, the elements of a pattern of self-knowledge are double constructs, such as Robin's '*lovely* win or lose the game' and '*fine* with the entire crew'. In other words, the activities in connection with a game of *korfbal* and the cooperation on a boat are on a first level of construction, while subjectiva like 'lovely' and 'fine', that Robin associates with them, are on a second level. Consequently, a pattern of self-knowledge presupposes, in Piaget's terminology, operations to the second power, or formal-operational intelligence.[18]

Second, we can handle balls, ship ropes and so on: we throw them up and catch them, swing them to and fro, etcetera. The same holds for everything on the first level of construction of self-knowledge. Things are different with the double constructs, on the second level of construction. One can not look at subjectiva from different sides nor handle them at all. Robin likes to be active with a game of *korfbal* and he is neither willing nor able to change that feeling. Since subjectiva are beyond material actions, their structuring requires at least a level of formal-operational intelligence.

Consequently, according to Piaget's theory, there are two reasons to assume that patterns of self-knowledge come into being after the stage of formal operations. This working hypothesis is corroborated in research by both open and standardised questions.[19] Robin was asked open questions. When he indicated his subjectiva with the game of *korfbal*, I asked him whether he recognized those subjectiva with something else. In his answer he tells how he experiences tackling a girl he does not know. Later on, he brings in his subjectiva with the facing of a storm.

Answers to standardized questions show that there are not yet patterns of self-knowledge at the levels of sensorimotor, pre-operational and concrete-operational intelligence. For instance, I tell children and adolescents from 5 to 16 years of age two stories about a certain Peter. a. Peter has a row with his friend Ann; suddenly he walks away from her; and so on. b. He has an argument with his father on the phone; all of a sudden he hangs up; and so on.

It is not until about 14 years of age, *i.e.* after the first manifestations of formal-operational intelligence, that adolescents construct a subjective parallel in their answers. On the other hand, children of about 5 or 6 years of age, in the pre-operational stage, conceive of the two stories about Peter as mutually independent and think that they differ in all relevant aspects. Not until the concrete-operational stage, from 7 or 8 years of age, do children assume some relation, but they take it to be of a behavioral nature and not yet of a subjective nature. They suppose Peter to do the same in both stories: quarrel, abruptly break off contact, and so on.

We have seen some interrelations with Piaget's theory, but the theory of self-knowledge consists of 15 stages. However, it is impossible to even sketch all of the interrelations for all 15 stages. In brief:

- Stages 1, 2 and 3 are sensorimotor in nature,
- stages 4 up to 7 are pre-operational,
- stages 8, 9 and 10 are concrete-operational, and
- stages 11 up to 15 are formal-operational in nature.

This is one division of the 15 stages of the theory of self-knowledge, in the light of Piaget's theory. Another division is into three main stages. In the light of the foregoing, it is convenient to start with stages 11 up to 15. They constitute main stage III, between 12 and 17 years of age. After two preparatory stages 11 and 12, the capacity to deal with patterns of self-knowledge of one's own comes into existence in stage 13 (about 14

years of age). This is the stage of self-exploration, as in the making of a career choice, which is a long-term choice (education plus exercise of a profession) on the basis of insight into how one has experienced things now and in the past. In stage 14 (about 15 years of age) the capacity to deal with someone else's self-exploration in a decentred way comes into being. In stage 13 one projects one's own self-knowledge into the experiential world of the other person, whereas in stage 14 one is able to listen with empathy to other people and to detect subjective patterns in what they say.

We can skip main stage II for a moment. Upon closer investigation, the elements of a pattern of self-knowledge that we have represented as '*lovely* win or lose the game' and '*fine* with the entire crew', turn out to have a common component. In fact it reads '*I* think winning/losing lovely' and '*I* think it fine to do this with the entire crew'. The 'I' refers to the notion of being one's own centre of subjective experiences, the *sense of self* or the *self-feeling*.[20] It comes into existence in stage 5 (about 2 years and 2 months up to 3 years). In stage 4 (from one and a half up to 2 years and 2 months) the absence of the sense of self is revealed in self-references by the first name rather than with 'I': *'Ed pelen'* ('Ed wil spelen': 'Ed wants to play'), and the like. So, main stage I covers stages 1 up to 5 and ends around the third birthday.

Finally, main stage II covers stages 6 up to 10, the period from 3 to 11 or 12 years of age. The child compromises continually between the sense of self, on the one hand, and the fact that (s)he cannot yet operate formally, on the other hand. For example, the capacity to perceive a behavioral relation between the two stories about Peter falls in stage 8 (around 7 or 8 years).

In brief, patterns of self-knowledge are subject to a genesis, consisting of 15 stages. They can be classified broadly in at least two ways:

A. according to Piagetian stages:
   - sensorimotor stage: stages 1-3;
   - pre-operational stage: stages 4-7;
   - concrete-operational stage: stages 8-10;
   - formal-operational stage: stages 11-15.

B. according to 3 main stages:
   - main stage I (the genesis of the sense of self): stages 1-5;
   - main stage II: stages 6-10;
   - main stage III (formal-operational intelligence): stages 11-15.

2.2. *Psychological operations in children and adults*

In 1.1 we saw that Piagetian psychology links the child's and the adult's operations directly to one another. We shall dwell on this subject in connection with the development of personality, as psychotherapy for adults is an important application of the theory of self-knowledge.

In regard to the relation between childish and adult operations, we can make this central epistemological assumption: the genesis of a formal theory in the exact sciences is different *in content* from the genesis of formal intelligence in the child, but *in operational respect* there is no difference of principle. This has at least two implications.

First, whether a field of knowledge is explored and investigated by a child or by an adult scientist depends on the degree of complexity of that field. Examples are: whole numbers versus functions that map the real numbers in the complex two-dimensional plane; throwing an object into a basket versus projecting a rocket to the moon; and so on. That is why the complexity of a field of knowledge is decisive for the question of whether an adult has the relevant operations in his daily life at his disposal or not: operating with whole numbers to settle a bill, throwing a key to someone, and so on.

Second, however simple or complex a field of knowledge may be, it is to be expected that irreversible operations precede reversible ones, that operating with simple systems precedes operating with complex ones, that a field of knowledge has to be understood in its concrete workings before a successful formalisation can be devised, and so on.

Piagetian psychology thus assumes operations to have a fixed sequence. Empirical epistemological research supports this assumption. One example will suffice.[21] Pre-operational children do not yet arrange 10 sticks as A>B>...>J, but in pairs and later in pairs and trios, *e.g.* as BEF-DG-CHI-AJ. The explanation for the pairs is that pre-operational children still operate irreversibly. They conceive of the proposition 'X is bigger than Y' as if X had 'biggerness' on which Y supposedly depends in a unilateral way. In the transition from pre- to concrete-operational, children relate for example F and D to one another and conclude that F<D rather than F>D. By means of a number of accommodations, A>B>...>J comes into existence. On the basis of their reversible operations, concrete-operational children make this kind of correction beforehand, so that they can construct the >-series at one time without

errors. Now, such a transition from irreversible to reversible is also found in the case of Newton, for example. Kepler's theory of gravity (1609) postulates a unilateral attraction of a planet by the sun. At the end of 1684 Newton applied his law of action and reaction to the sun-planet system (*e.g.* the sun and Mars), and arrived, after a reversal in Kepler's sun-planet relation, at a bilateral attraction between the sun and a planet.[22]

The relation between children's and adult operations is thus one of parallelism. To put it metaphorically, just as in arithmetic $2 \div 3 = 200 \div 300$ holds, so in cognitive psychology one can say (**k** and **K** are fields of knowledge):

pre-operational in the child on field **k** ÷ concrete-operational in the child on field **k**

=

pre-operational in the adult on field **K** ÷ concrete-operational in the adult on field **K**.

A similar relation for children's and adults' operations holds for subjectiva. In other words, the stages of the theory of self-knowledge are not age-bound, but constitute a fixed operational sequence that holds for the human psyche in general. Therefore, in principle the genesis of patterns of self-knowledge in children does not differ from the that in adults. What makes the former special is that it is the first manifestation of that generally applicable sequence in dealing with subjectiva.

2.3. *Dimensions in operational structures*

In part 1 we saw that the Levensonian reinterpretation of the concept of structure yields an unambiguous criterion in regard to the direction of the development of personality. We shall now see that this concept of structure specifies empirical research in a rather unexpected way. As has been set forth elsewhere[23], it can be shown formally that the genesis of a structure in general and of a pattern of self-knowledge in particular has to be described in terms of 4 dimensions. These 4 dimensions are:

- *relations*: are subjectiva always arranged in patterns of self-knowledge? No. *E.g.*, in stage 12 the ordering relations are oppositions rather than parallels.
- *conceptualisation*: are subjectiva always represented as double constructs (see part 2.1)? No. *E.g.*, in stages 8, 9 and 10, children

represent subjectiva and behaviour on one level of construction, not on two.

- *account*: how does one account for one's subjectiva? For example, in stage 13 one explores one's own inner world via patterns of self-knowledge, but for example in stage 12 one seeks the confrontation with others.
- *causality*: how does one explain subjectiva? If Robin (stage 13) is asked why he would like to be at sea during a storm, he can refer to his pattern of self-knowledge. Before stage 13 there is, among other things, the possibility of referring to a general type or character (stage 11).

As part 2.1 did not take these 4 dimensions into account, it introduced the 15 stages in an incomplete way. To complete the picture, we shall elaborate on stage 13. In stage 13 subjectiva are arranged in parallels, the so-called patterns of self-knowledge (relations), and represented as double constructs (conceptualisation), while these patterns render self-exploration possible (account) and one explains one's subjectiva by referring to a pattern of self-knowledge (causality).

Thus the genesis of subjective operations is described in terms of 4 dimensions. However, the development of personality has a fifth dimension: the genesis of the sense of self. After all, a stage is described if and only if its 5 parts are described: one part for 'relations', one for 'conceptualisation', one for 'account', one for 'causality' and one for 'sense of self'.

Now, because of the 5 dimensions in the genesis of patterns of self-knowledge, we can distinguish two kinds of genesis. In the first place there is the *orthogenesis* of self-knowledge. Orthogenesis occurs when the stages successively follow one from one another, *e.g.* when the 5 parts of stage 8 develop out of the 5 parts of stage 7, whereas those of stage 8 prepare the 5 parts of stage 9.

However, the stages may also run *across* rather than *after* each other. In that case, two successive stages constitute a short-cut system that impedes a further orthogenesis. The result is *pathogenesis*. Pathogenesis can occur with exact knowledge as well (*e.g.* hallucinations), but for at least two reasons it is more common with subjective knowledge: a. There are no criteria of content for subjective knowledge by which subjectiva and dealing with them could be measured. b. Because of the absence of criteria of content, it is impossible to reach agreement on subjectiva with

others.[24]

Absence both of criteria of content and of intersubjective agreement give more degrees of freedom to self-knowledge than to exact knowledge. That is why pathogenesis is commoner in the former than the latter.

2.4. *Psychodiagnostics and psychotherapy in adults*

The first example of pathogenesis is taken from main stage I. Anton, a young man of 30, thinks that other people know his thoughts and feelings without having spoken with him and without having seen him. How do they manage to do this? His answer is: one night he was anaesthetized in order for a small transmitter to be planted in his brain that could register his thoughts and feelings.

Technically speaking, Anton's idea may be very advanced, but psychologically his sense of self has not (fully) come into existence. As we saw in 2.1, in the orthogenesis of self-knowledge the notion of being one's own centre of experience comes into existence during stage 5.

We shall dwell at more length on the second example. It is taken from main stage II. Fred, a young man of 27, wants to be a world famous pop star very soon. One failure follows another. This constantly causes him bad feelings, which he represents with analogies borrowed from show business. In the next example the analogy is with a pop star. In the context of his pop star dreams, he advertised in the paper for a girl who is willing to join him on a trip to Canada in order to make a lot of money there. A girl reacted, but she did not show up at the *rendez-vous* they made on the phone. How did he feel about this? Fred thinks of a pop singer, Robert Gray: *'He has a song about a date that does not show up. He has two glasses of wine waiting, and his candles burn out. Now, that is fantastic to experience, because, you know, singing is what I really want'*. So, Fred does not relate the feeling of disappointment in Gray's song to his own situation, but he identifies himself with Gray as a pop star.

This is a short-cut between the 'exceptionality sense of self' of stage 9 and the relation of stage 10, 'analogy'. Since this requires some explanation, we shall provide an example of each of them, taken from children.

In the exceptionality sense of self of stage 9, children indicate that they have exceptional capabilities which distinguish them from others,

physically (represented in the 'motosomatic sense of self' of stage 7) or mentally (represented in the 'skill sense of self' of stage 8). In our first example, Stans (8 years and 10 months) knows that she is better than all her friends in writing names of animals (*e.g.*, animal names starting with a B). In the second example, Adrie (10 years and 11 months) proudly tells that he was the best in climbing trees when he and other children from his neighbourhood had organized a competition. He also thinks that he can produce a sound that no one else can make.

So much for stage 9. An analogy, the relation of stage 10, treats a subjectivum metaphorically. In our first example, Fien (10 and a half) thinks that fire and quarrelling have something to do with each other: *'It is as if the fire is angry'*. In the second example, Karin (9 and a half) identifies her little sister as Cinderella and herself as the witch: recently, Karin got her sister to do things against her will.

Fred's exceptionality sense of self is not restricted to his immediate surroundings, but extends to the whole world: he wants to be the best pop star in the world. Unlike Stans and Adrie, however, Fred has ideas and plans that most probably are very unrealistic, for Stans and Adrie have actually set a record in naming animal names or in climbing trees, while Fred does not know yet to sing, to make music, to act, and so on. All the same, he thinks that within 5 years he will have given top performances in these fields. For instance, by then he will have won an Oscar for a movie, directed by himself...

Other examples of analogies are: Fred, who thinks that he's got more to tell than others: *'And I cannot keep it inside. It's an urge, that you have or that you don't have. It is said: "Many are called, few are chosen"'*; when he left his girl friend, he just said he was going to get some cigarettes: *'I looked like Jack Nicholson'*.

How can one intervene therapeutically in pathogenesis? The theory of self-knowledge offers two fundamental approaches. The first, *empathic listening*, is not specific to the theory of self-knowledge. Precisely because subjective knowledge is individual, one has to associate oneself as closely as possible with someone's point of view in order to acquire knowledge about his subjectiva and about the way he deals with them.[25]

The second fundamental intervention in pathogenesis is the *principle of the oldest stage*. *I.e.*, if stages 9 and 10 are short-cut, one has to connect with stage 9. The reason is that interventions at the level of stage 10 or higher would leave the short-cut undisturbed. This can be illus-

trated from the case of Fred. Comparisons are the relations of stage 9, and they evidently precede analogies, the relations of stage 10. Consequently, one can stimulate Fred to make comparisons. *E.g.*, when he says that he would rather pick coffee beans in Nicaragua than beans in the Dutch province of Friesland, I ask him to compare these places and these activities with one another. Amongst other things, he touches upon 'sun versus gray weather' and 'building up a capital versus not building up a capital'.

Admittedly this is not a sensational example, but he is neither capable of nor inclined towards more introspection. Besides, in his own view, he has more important things to think about ... Nonetheless, just a couple of sessions are enough to produce a visible positive effect. As mentioned above, initially he believed that he could start as a director and soon win an Oscar. At a certain moment he says that he wants to join a film team in the Caribbean and that he is ready and willing to start as a scenery porter rather than as a director, adding cautiously: *'Bottom-up is interesting too'*. Indeed, that seems to be more realistic than winning Oscars right at the start.

We have seen how diagnosis and intervention are interrelated directly: the diagnosis 'Pathogenesis between stages 9 and 10' calls for interventions at the level of stage 9, as in inviting Fred to make comparisons. It also turns out that interventions and assessment are interrelated: Fred's pathogenic exceptionality sense of self was diminishing.

Let us take a brief example of the interrelation between diagnosis, intervention and assessment for a main stage III case. Ronald, a student of 24, sees himself as a type that feels attracted by what he considers repulsive. Here 'general regularity', the causality of stage 11, and oppositions, the relations of stage 12, are short-cut. When I connect with stage 10 (bodily sensations), via general regularities (stage 11) and oppositions with me (stage 12) he reaches a pattern of self-knowledge (stage 13). *I.e.*, he realizes that he experiences a visit to a bar, a meeting and this session with me in an identical way: *feeling threatened* by someone else's unknown or vague intentions, *wishing* to leave, and so on.[26]

3. *Conclusions*

What have we gained in going from Piaget's concept of structure to psychotherapeutic interventions, derived from the theory of self-knowledge? Let me point to a number of advantages of the Piagetian approach to 'structures of personality' and their genesis for both psychology and philosophy.

We have seen how Piaget's concept of structure can be elaborated in the psychology of personality, a field of investigation that was not Piaget's. In extending the line from Piaget via Levenson's content-form transformations to patterns of self-knowledge, a solution is offered for an old and tough problem in the psychology of personality: Are there unambiguous research criteria different from criteria of content? Besides, patterns of self-knowledge prove to be in accordance with the neurophysiological substratum of psychological operations.

We have seen that the genesis of patterns of self-knowledge is closely related to the operational sequence found by Piaget: behaviour (rather than subjectiva) and concrete-operational stage, formal intelligence as a condition for patterns of self-knowledge, and so on. Consequently, the theory of self-knowledge is a theory of personality that is empirically testable and that leans heavily on Piaget's theory that already is corroborated in much research both by Piaget himself and his collaborators, and by others, and this is so in the psychology of personality where the empirical tenability of its many theories is not its strongest trump. Besides, that the theory of self-knowledge builds on Piaget's theory is a kind of convergence, whereas the psychology of personality is renowned for its great divergence.

Thus Piaget's experimental approach can be extended to the psychology of personality via the concept of structure. In this respect too, the theory of self-knowledge makes psychotherapy a more scientific enterprise, at the same time offering advantages for psychology in general.

Finally, in parts 1 and 2 we have seen two other advantages for psychology and/or psychotherapy. First, diagnosis, intervention and assessment are interrelated, which is not the case in most diagnostic systems.

Second, because of its 15 stages and the 5 parts of every stage, the theory of self-knowledge offers the possibility of doing very precise empirical research into personality and its development. For example,

Fred feels very frustrated by the fact that nobody takes his pop star plans seriously. Now, because of pathogenesis it has no therapeutic value (apart from a personal one) to listen empathically for hours to complaints of this kind: Fred is not exploring himself at the level of stage 13. In other words, the theory of self-knowledge enables us to differentiate between subjectiva. In this case, 'not feeling that one is taken seriously' differs in the orthogenic and the pathogenic case.

For philosophy too, the Piagetian approach of 'structures of personality' is important, especially if we conceive of 'philosophy' in its classical sense. In titles like *Philosophia naturalis principia mathematica* (Newton, 1687) and *Natural philosophy* (Young, 1807) 'philosophy' stands for a scientific activity that is both empirical (but then based on reflections on the field of knowledge at stake, and in retrospection on empirical research) and theoretical (but then in connection with empirical facts and with a prospective view of the what and how of further empirical research). In that sense this article stands in a long and respectable philosophical tradition since it connects empirical research and theoretical reflection with one another, in interaction with specified 'structures of personality', and not independently of them.

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NOTES

1. J. Piaget, 'Les relations entre l'intelligence et l'affectivité dans le développement de l'enfant', *Bulletin de psychologie*, 1953-54, pp. 143-150, 346-361, 522-535, 699-701 and 702-709.
2. The American psychotherapist Rogers ended his plea for a relevant scientific psychology of personality with the words: 'It will become a science based on careful observation of inner cognitive processes, such as we find in Piaget. It will involve the exploration of inner, personal, emotionalized meanings', C.R. Rogers, *A way of being*, Boston, Houghton Mifflin, 1980, p. 239.
   The founder of transactional analysis, Berne, sees a parallel between his concepts 'Adult' and 'Parent': 'A simple illustration (...) is a three year old boy who reverts to previously abandoned thumb suck-

ing when a baby brother is born. The Adult and the Parent in the actual child are exactly what Piaget is principally interested in: his construction of reality and his moral judgment', E. Berne, 'Ego stated in psychotherapy', *American Journal of Psychotherapy*, 11 (1957), pp. 293-309.

3. E. Vervaet, *Strukturalistische verkenningen in kennisleer en persoonlijkheidsleer* ('Structuralistic explorations in epistemology and psychology of personality'), dissertation University of Amsterdam, 1986.
4. This was probably during his stay in Zürich, or shortly after it. He visited Bleuler's clinic in Zürich in the hope of collecting facts about the genesis of knowledge via the peculiar ways of thinking of psychotics and neurotics. However, in the autumn of 1919 he took the train to Paris with the aim of reaching his goal via the thinking of children. He had a letter of recommendation with him addressed to Simon, the head of a laboratory for research on how children think.
5. Piaget did his first conservation experiments with epileptic children; see E. Vervaet, 'Jean Piaget (1896-1980) en de genetische epistemologie' ('Jean Piaget (1896-1980) and genetic epistemology'), *Struktuur en genese*, 3 (1990), pp. 3-29, esp. p.6f.
6. In my own work too I have extensively connected the history of science with epistemology. See for instance:

   Theory of gravity from Plato via Newton to Einstein: E. Vervaet, *Strukturalistische verkenningen* (op. cit), pp. 103-124, and 'Newton's construction of the law of gravitation', in *Newton's scientific and philosophical legacy* (eds. P.B. Scheurer & G. Debrock), International Archives of the History of Ideas (123), Dordrecht, Kluwer, 1988, pp. 281-288.

   Spectral analysis: E. Vervaet, 'De geboorte van de spectraalanalyse' ('The birth of spectral analysis'). *Intermediair*, October 23, 1987, pp. 43, 45, 47.

   Steam engine: E. Vervaet, 'Theorie en praktijk (2)'. *Maandblad Geestelijke Volksgezondheid*, September 1989, pp. 970-974.

   Colour-blindness plates: E. Vervaet, 'De eerste kleurenblindheidsproeven' (The first colour-blindness plates). *Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen, wiskunde en techniek*, 1991, 14(2), pp. 74-95.

7. J. Piaget, 'Quantification, conservation and nativism', *Science*, 162 (1968), pp. 976-979.
8. Ages with stages, ways of operating, and so on are just global indications and may not be conceived of as if Piaget's theory and the theory of self-knowledge were *age*-bound.
9. J. Piaget, *Structuralism*. New York: Harper (1970); translation of *Le structuralisme*, Paris, PUF, 1968.
10. E.A. Levenson, *The fallacy of understanding*. New York: Basic Books, 1972, p. 35.
11. Piaget, *Le structuralisme* (op. cit), 1968, p. 32.
12. L.N. Cooper, 'A possible organization of animal memory and learning', in *Proceedings of the Nobel symposium on collective properties of physical systems*, eds. B. Lundquist & S. Lundquist, Academic Press, New York, 1973, pp. 252-264, and M.M. Nass & L.N. Cooper, 'A theory for the development of feature detecting cells in visual cortex', *Biological cybernetics*, 19 (1975), pp. 1-18.
13. H.H. Hubel and T.N. Wiesel, 'Receptive fields of single neurons in the cat striate cortex', *Journal of physiology*, 148 (1959), pp. 574-591, and 'Receptive fields and functional architecture of monkey striate cortex, *Journal of physiology*, 195 (1968), pp. 215-243.
14. Expressed as a vector: {1.9; 2.3; ...; 1.1}.
15. See further E. Vervaet, *The formal concept of structure* (1991), unpublished manuscript, Archives Jean Piaget, Geneva.
16. The complete definition of a 'transformation' or 'isomorphism' reads: 'We speak of a transformation between $(p_1,p_2,...,p_n)$ and $(q_1,q_2,...,q_n)$ when $p_1,p_2,...,p_n,q_1,q_2,...,q_n$ are elements of a totality with relations P_k between the pairs p_1 and p_2, p_1 and p_3,..., p_{n-1} and p_n and the relations Q_k between the pairs q_1 and q_2, q_1 and q_3,..., q_{n-1} and q_n (so k runs from 1 up to ½(n-1)), whereas set $\{P_k\}$ and set $\{Q_k\}$ are identical to each other', translation of Vervaet, *Strukturalistische verkenningen* (op. cit), p.15.
    Piaget's definition of a structure in *Biologie et connaissance* (1967, p.163) comes very close to this definition: 'Une structure comporte [...] des éléments et des relations qui les unissent', while ...les éléments ne sont pas donnés indépendamment de leurs relations'.
17. A Dutch variant of basketball.
18. See for instance J. Piaget, *Epistémologie génétique*, Paris, PUF, chapter I, §6.

19. See Vervaet, *Strukturalistische verkenningen* (op. cit), pp. 183-196 for the synchronic part and pp. 197-335 for the diachronic part of the theory of self-knowledge.
20. Besides formal-operational intelligence, the coming into existence of the sense of self or the self-feeling is a condition for the genesis of and dealing with patterns of self-knowledge.
21. E.g., see Vervaet, 'Newton's construction' (op. cit).
22. In the course of 1685 Newton formalized this relation to his well-known law of gravity. He did so after an intermediate step in which he related sun, Jupiter and Saturn, *i.e.* at the level of complex structures, to each other.
23. E. Vervaet, *Strukturalistische verkenningen* (op. cit.), pp. 48-51; E. Vervaet, *Formal concept of structure* (op. cit.), part II.
24. If one gets stuck in an exact field of knowledge, one can always turn to others in order to hear their findings or to replicate their actions and experiments. For self-knowledge this is a difference of principle. *E.g.*, if one cannot make a career choice, one can talk about it with others, but that does not say anything about how one subjectively experiences things oneself or in what structure those subjectiva are.
25. The theory of self-knowledge shares empathic listening, that is rooted in stage 14 (as we saw in 2.1) with most psychotherapies: Freud's 'free floating attention', Rogers' 'empathy', and so on.
26. See further E. Vervaet, *Voorbij het onbewuste* ('Beyond the unconscious'), Utrecht, SWP, 1989, pp. 60-66.