

44 FORMATION OF THE IMAGE

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This Chapter in an epistemological intermezzo in which psychologists, philosophers and artists enter the discussion (and the picture) regarding formation of the image. This short overview cannot do this topic justice. Positions will be briefly elucidated. Whoever wishes to read more is referred to other literature via the references. From the entire argument, only one pointer towards creativity is given: creativity pre-supposes leaving behind at least one notion otherwise considered self-evident. Furthermore, the idea that formation of the image pre-supposes a goal will be criticised, as this just shifts the issue of creativity to the concept of a ‘goal’. A goal, after all, is an image.

44.1 CONSTANTS IN CHAOS

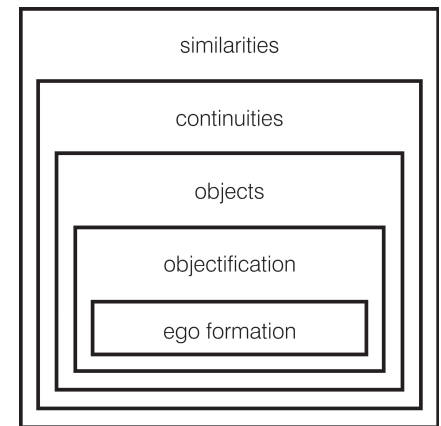
The great developmental psychologist Piaget describes a newborn’s visual worldview as a *tableau mouvant* of disconnected shapes and colours (chaos).^a Similarities and continuities must first be recognised to begin to be able to think *about* the world. It is not self-evident, for example, that a baby’s experience of his mother from a distance is the same as his experience of her from up-close. The visual impression of both is completely different. It is only through repeated experience of amalgamated and formative images in this *tableau mouvant* that the baby realises this process involves an object that changes place in perspective outside of one’s own body, but that otherwise remains the same itself (‘object constancy’). What is equally uncertain is the subsequent distinction between one’s own self and something that, on the basis of externally observed object constancy, leads its own life (‘objectification’). The difference between ‘I’ and that, which has been made into an object, has been postulated by Fichte^b as the first pre-condition for thinking. The object then temporarily remains a *object distinct* of the observer: “I see an object”. If the child later gives a verbal description, it becomes an active *subject* of a sentence: “the object is yellow”.

44.2 ‘INSIDE’ AND ‘OUTSIDE’

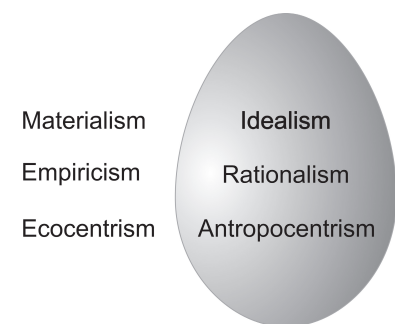
A familiar philosophical position proposes that the difference between what takes place inside and outside of our thinking is theoretically improvable, that the ‘I’ is the only thing about which one can make a statement (solipsism). This is understood in psychiatric disturbances as autism. This extreme assumption that there is no outside world, certainly raises the question, as an experimental idea, of what one’s own thinking would consist of if there were no conceivable astonishment *about* some unexpected thing that exists outside of us.

Psychological experiments depriving people of external stimulation (sensory deprivation^c) are never endured by volunteers longer than three days, and lead to hallucinations. According to some, forced sensory deprivation will, based on several known cases with babies and animals^d, lead to death. The neuro-physiological system requires external stimuli. If one pre-supposes a stimuli producing outside world (easy to do), then the question arises where, precisely, the border lies between the observer and the externally observed. The problem with the relationship between “inside” and “outside” of our thinking has been studied in philosophy for 3000 years.

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407 Continuities in similarities



408 External and internal priority

a Piaget, J. and B. Inhelder (1947) *La representation de l'espace chez l'enfant*.
 b Fichte, J.G. (1979) *Grundlage der gesamten Wissenschaftslehre (1794)*.
 c Sensory deprivation has been investigated by many psychologists; see Vernon, J.A. (1963) *Inside the black room, studies of sensory deprivation*.
 d See Montagu, A. (1971) *Touching*.



409 Magritte, R., *La condition humaine* (1934) Private collection, Paris.



410 Ghirlandaio, Domenico, *An old man and his grandson* (1480) Musée du Louvre, Paris

- a Plato can be seen as the founder of idealism. He thought of observed objects as reflections of ideas (comparison of size). Hegel gave the most extreme 19th century elaboration of this.
- b Descartes is the most important founder of rationalism. In his very readable *Discours de la méthode*, doubt as the result of contradictory notions in his environment is the main motivation to only trust in his own reason. Descartes, R. (1637) *Discours de la méthode*. Recent edition: Descartes, René and Clarke D. M. (1999) *Discourse on*

Is the observed only a projection of our way of seeing, or our underlying ideas (idealism^a, rationalism^b, and anthropocentrism^c, largely developed in continental Europe) or is there something more in our thinking than simply everything that has passed through our senses or even through our mouths^d (materialism^e, empiricism^f, ecocentrism^g, all of which are largely Anglo-Saxon)? Projecting an idea into a new context is obvious in design, in the making of artefacts, and in taking action.

44.3 'TRUE' AND 'POSSIBLE TO EXPRESS'

One finds several of the many attempts to unify both streams in human thinking in Kant (critical idealism)^h, Husserl (phenomenology)ⁱ, and logical empiricism (logical positivism, neopositivism). Logical empiricism is now considered the most widespread foundation of scientific thinking. Here, the expressability of thoughts in the form of language (logos, logic) forms the border of pure empiricist thinking. Science is only that which can be communicated. Wittgenstein (*"Wovon man nicht sprechen kann, darüber muss man schweigen"*) taught as a Viennese philosopher in Cambridge (amongst, for example, Russell, Keynes, and Skinner) and was thus also a literal bridge between continental and Anglo-Saxon thinking. The discovery in (particle) physics^j, biology (animal behaviour theory^k) and sociology^l that every reality is upset by human perception then set in motion yet another fundamental relativisation of perception.

44.4 INTERSECTION OF SENSES

According to Piaget, another crucial moment in the formation of consciousness in child psychology is the pre-supposition that what you see and feel can be 'the same' object. This requires that at least two very different, even theoretically incomparable impressions from two senses (for example vision and taste) repeatedly appear at the same time. Experiments where children are able to feel something without seeing it and are then shown the same thing without feeling it lead Piaget to conclude that at the age of approximately one and a half (for some a bit earlier, for others a bit later), one's conceptual capacity comes into existence. At the intersection of the two synchronous but various (syn-aesthetic) sensory impressions, the idea (the concept) liberates itself from an object that one can immediately feel and see. From that moment onward, one can also imagine that object without seeing, feeling, hearing, or smelling it.

Considered from this perspective, one has to see the popular children's game of 'peek-a-boo' as a serious string of repeated empirical experiments based on testing the hypothesis (by means of various sensory impressions) that objects continue to exist even though one does not always see them. The stereotypical shaking of the head or dancing to and fro goes hand-in-hand with the way small children will, as soon as they can stand, devote large and amounts of visual attention to the parallax between the foreground and background of what they observe. The child will often laugh as a result, which leads parents and grandparents to intervene, although this laugh is often not meant for these observers; the child starts to cry when the outsider affectionately interrupts the child's experiments. The adult's face in the background is, at that point, nothing more than an interesting demonstration of the parallax^m that confirms notions of object constancy.

- method, and related writings. Recent Dutch edition: Descartes, R. and Th. Verbeek (1997) *Over de methode*.
- c Anthropocentrism proposes that 'the world' and therefore 'nature' form part of human culture. "Humans are the measure of all things".
- d Feuerbach: "You are what you eat" (*"Der Mensch ist was er isst"*).
- e De Lamettrie (man is a machine) en Feuerbach (see previous note) are the most outspoken representatives of materialism.
- f Locke, Hume and Stuart Mill are the major Anglo-Saxon predecessors of empiricism who opposed rationalism.
- g Ecocentrism contrasts with anthropocentrism. It considers people and their culture a product of evolution.
- h Kant proposed that sensory impressions could be stored into 16 categories such as space, time, quantity, quality (Kant's categories). They represent the reception of impressions as systematic-critical bookcases of the consciousness.
- i Husserl (phenomenology) proposed forgetting about interior and exterior worlds ("put them between quotation marks") and instead focusing on the construction of their interface, the window on the world: phenomena.

Continued on next page

44.5 IMAGINATION BY INTERVENTION

An often under-estimated sense has to do with the use of our locomotor system. Even without feeling, seeing, and smelling, we can ascertain the relative position of our arms and legs, their weight, and what they are bearing. This enables coherence in our movements in space (co-ordination) and in time (synchronisation) and therefore also enables effective taking of action. Sequential reporting of our other senses on the basis of our actions (sensory motor system, the empirical cycle *avant la lettre*^a) is, according to Piaget, crucial for the development of the ability to imagine (conceptual capacity).

After the Second World War, this insight had an enormous influence on education. Since Piaget, more attention was consciously paid to manual dexterity and gymnastics during primary education. Children can now, thanks to his research, get up out of their chairs more frequently during lessons. Many new teaching methods try to use the locomotor system in the formation of concepts. This is perhaps also a call for the use of models in design education. The science of making (technique) may benefit from a scientific notion that avoids the philosophical discussion between empiricists and rationalists by proposing: “‘True’ is what works” (pragmatism)^b.

44.6 A SERIES OF ACTIONS

Conceptual capacity is defined by the biologists Harrison, Weiner, Tanner and Barnicot as “the ability to maintain an overview of a series of actions of which only the first can immediately be executed”.^c One could add: “and of which only the last brings satisfaction” (yet this is difficult for an observer to establish). In this respect, people are different animals. This capability pre-supposes Piaget’s definition, but goes further.

In archaeology, without written sources, discovery of tools provides proof of the early presence of people, even if various species also display the beginnings of this kind of capacity.^d The individual involvement of intrinsically senseless actions into an overall functional whole is not yet proof that the sequence of actions is seen in its totality (planning). With instinctive actions, one can still imagine a built-in stereotypical programme (routine, compare this with computer programmes) set in motion as result of triggering stimuli from the environment (with computers, the external tasks of ‘click’, ‘enter’ or ‘run’) without being consciously planned.

44.7 SETTING ROUTINES IN MOTION

The research of animal behaviour experts (ethologists) is specifically focused on genetically pre-determined series of actions and triggering stimuli that set them in motion (Tinbergen^e). Building nests, for example, will only begin at a certain temperature and solar position, and then only in specific environments. Humans also have any number of such routines, that can be learned partially, and that do not require further conceptual capacities. There is a counterpart in psychiatry: the blocking stimulus is very important. In these cases, setting in motion the theoretically self-evident routine is blocked. Removing these blockades is an important field in this discipline, and in design education as well. Sometimes attention from others can have a blocking effect. The idea is to unlearn the blocking habits by becoming conscious of unspoken pre-suppositions, and going back to their origins.^f

See Husserl, E. (1913) *Logische Untersuchungen*. Recent English translation: Husserl, E. and D. Moran (2001) *Logical investigations*.

This phenomenology had a major influence in the 20th century on his student Heidegger, on Sartre (existentialism: “Existence expresses itself in liminal experiences”) and their followers Foucault, Lévi-Strauss (structuralism: “The social structure drives our expression, our language”) and Derrida (postmodernism: “Grand narratives are deconstructed by external remarks in the margins”).

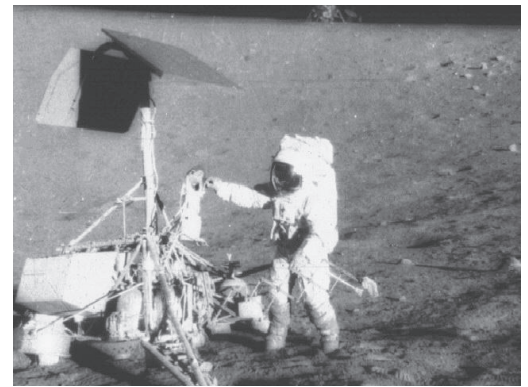
j Heisenberg demonstrated that the energy one draws from the motion of atomic particles in the process of perception

leaves us fundamentally in uncertainty regarding the location, or regarding the time of what is being perceived.

k Tinbergen, N. (1953) *Social behaviour in animals*. describes cases in which, for example, the behaviour of birds cannot neutrally observed.

l The Hawthorne experiment demonstrated that even a survey into working conditions was itself a work condition that improved performance. Roethlisberger, F.J., W.J. Dickson et al. (1939) *Management and the worker*.

m The shifting of object and background as a result of the observer’s motion.



411 ‘True’ is what works



412 A series of actions

a Groot, A.D. de (1969) *Methodology: foundations of interference and research in the behavioural sciences*. considers the cycle of experience, action, experience as the basis of science. One must therefore interpret action as the construction of models. Originally published in Dutch: Groot, A.D. de (1961) *Methodologie: grondslagen van onderzoek en denken in de gedragswetenschappen*.

b In 1878 C.S Peirce introduced the term ‘pragmatism’. William James popularised it (pluralism) and F.C.S. Schiller (humanism) and John Dewey (instrumentalism), G. Papini, and H. Vaihinger (“Concepts are tools which have us behave as if they were true”) elaborated on these ideas in various directions.

c Harrison, G.A. (1964) *Human biology*.

d On one hand one can consider the capacity needed to use tools, and apes do have this capacity, yet on the other hand is the question of the capacity to produce tools, and apes do not have this capacity (or have it only to a very limited degree). If they are taught a language, it seems that they can use it and pass it down to their offspring. See the various animal behavioural studies on the behaviour of apes.

e Tinbergen, N. (1953) *Social behaviour in animals*.

f Gaudi: “Originalidad es: volver al origen”, originality means returning to the origins.

In order to distinguish between conceptual capacity and routine, one has to be able to ascertain that the involved series of actions (or the results they lead to) have not yet taken place in the given form or context. In exceptional cases, this might even have to do with a genetic mutation, where co-incidence is the creative factor. Yet when artefacts are repeatedly created by an organism, this can be ruled out. One is then dealing with creative conceptual capacity (creativity).

44.8 CREATIVITY AND ROUTINE

Some routines can be learned. This can be done by aping all actions in the sequence (master-and-apprentice), but people can then only go through the motions, and then repeatedly follow the recipe. Over time, this becomes routine. Therefore, a goal-orientated and creative conceptual capacity is initially necessary to finally develop the automatism that then liberates this conceptual capacity for other tasks. The dark side of such routines is that one forgets one's pre-suppositions, and can no longer account for them. They become self-evident actions, also pre-supposed by those watching. This often leads to the case where those who practice these exercises (and who are often well-known) are bad teachers. The concept of 'culture' can be explained as the collection of unspoken pre-suppositions during communication: what does not have to be explained in a certain context, because it is already considered obvious. Some pre-suppositions in a culture are theoretically no longer capable of being traced: they are already pre-supposed in communication itself.



Academic

Impressionistic

413 Body or light

Left: Bouguereau, *Jeune fille se defendant contre l'Amour* (1880) Museum University of North Carolina in Wilmington.^b
Right: John Singer Sargent, *The canvas* (1889) Brooklyn Museum.^c

Language is just such a routine that, when being learned, pre-supposes creative conceptual capacity to connect words to experience. After that, it gives wings to creativity, but can ultimately also obstruct it as a collection of clichés which force themselves in. A new idea often consists of new combinations of routine ideas. The negation of one or several existing routines and assumptions is an important source of creativity. The ambiguity of the French word '*néant*' is telling: denial and birth. Thus we see in the origins of Impressionism the rejection of the academic notion that objects need to be painted in one colour scale if they are to be to be recognisable.^a This led to a completely new way of painting.

44.9 CREATIVE CONCEPTUAL CAPACITY

Creativity assumes a conceptual capacity according to Harrison *et al.*, and is also implied by Piaget, though it encompasses more and occurs less frequently than routine. This added value is attributed to an assumedly goal-orientated quality of human activity. Aimless experimentation (playing) can, however, also lead to something new (for example the invention of electrical power, or of Impressionism) when the formation of a goal is only addressed *afterwards* (electric motors, light bulbs, computers, Expressionism). A goal-orientated quality is thus not a *pre-condition* for creativity. A desire, goal or schedule of requirements is, after all, always an assumption of the result, be it an incomplete idea requiring means-orientated elaboration.

This again suggests the question *how one can take an idea to the point that it is no longer an already existing idea*. Let us call such an idea a 'conception' in order to distinguish it from Piaget's notion of a 'concept'. This question essentially refuses generalisation, and, therefore, predictive empiricism. Empiricism can only study existing pre-suppositions or causes verbally and visually, and not locomotorically their origins themselves (*generating* experience, which usually is temporarily transferable between master and apprentice). If this were the case, one would be able to predict new formations, along with their elaborations. Design would then no longer exist. The requirement of empirical research, i.e. that there be a problem from which an objective can be derived, which then has to be made operational in terms of concepts in order to begin the actual research itself, pre-supposes the creativity that is needed to devise objectives and to put concepts into operation. This research cannot therefore entirely solve the issue of creativity on its own.^d

- a See Struycken, P (1996) *De impressionistische doorbraak*.
- b Source: <http://sunsite.dk/cgfa/bouguereau/bouguereau2.htm>
- c Source: http://www.jssgallery.org/Thumbnails/Sargent_Paintings1889.htm
- d Further reading on creativity: Vanosmael, P. and R. de Bruyn (1992) *Handboek voor creatief denken*; Csikszentmihalyi, M. (1996) *Creativity: flow and the psychology of discovery and invention*.

44.10 APPLIED COMBINATORICS

In order to achieve recognition as an empirical researcher, some design researchers let themselves be seduced by the idea that a design is *exclusively* a new combination of existing assumptions (existing routine assumptions regarding situations, urban ensembles, buildings, constructional elements, building components, abstracted into types). In this sense, design is a form of applied combinatorics. The defenders of this position bypass the question how these assumptions themselves ever came about, or they implicitly assume that they need only indicate a historical co-incidence, like mutations in genetic evolution.

Yet, the number of new formations per year, or even per day, makes this pre-supposition improbable. In addition, one cannot learn to cook exclusively by using a summary of all recipes and ingredients ever devised (like Durand proposes for education of architects).^a Choosing from this abundance also assumes this negation, from the perspective of one's own preferences (discretion), while creativity even pre-supposes, except for new combinations, a rather focused rejection of generally accepted pre-suppositions (operative or typological *criticism* according to Argan^b or Tafuri^c, see page 103).^d

44.11 CONCEPTUALISING WORK OR ITS RESULT

In order to clarify creativity, one must distinguish between the spatial assumption of the result, and the assumption of the action or series of actions that lead to it. This demands a diverse (pattern and process-orientated) conceptual capacity, probably because they use the various senses (sensory and locomotor) as basic assumption or reference. There was a good reason for construction management to separate from the architectural profession as a distinct discipline. With this discipline, one that is more orientated to temporal sequences, there is indeed still design, though it is a kind of design based on a series of generally recognised actions with interim results. There are various series of actions that can lead to the same result, and the same actions can, in another sequence or in different circumstances, lead to a different result. This lack of a direct causal relationship between series of actions and result is a problem in business management with regard to the empirical model.^e

44.12 MAKING IMAGINATIONS

Despite this division on the process side of things, the architect (designer of the result) has to operate on another level of abstraction with a process (work): the management of consecutive design actions in order to arrive at a design. Let us call this 'design management'. Some designers, like Carel Weeber and Frank Lloyd Wright, claimed to see suddenly the final result before their eyes as a flash: architects with the 'magic touch'. Drawing is for them just routine elaboration of the conception. The design itself would then not be 'work', but rather inspiration without perspiration.

There are three reasons for doubt. One has to do with an internal process of theoretical transformative assumptions, or an experience that smacks of routine. Furthermore, many renowned designers, especially when working in a team-context or design competition, insightfully unfold their design process with interim results, which then form the basis for the subsequent design session. This is also advisable for beginning design students so that they obtain insight into their own strengths and weaknesses. Fundamentally, the 'future' of this process is largely unpredictable; there is always a case of beginning anew on the basis of what has been already achieved, or parting ways with what has already been achieved, and falling back on previous phases.

The crucial questions are always, "How do I begin to design? What do I accept from what already exists (including the previous design results) and what do I reject?" For designs that are more likely to be completed in phases, the dialogue with paper or screen, or construction of a model, is an accepted and sometimes crucial phase between taking inventory and analysing effects in the design process. In order to get a better grip on phases like the scientifically traceable process (without a preordained sequence), one should not presume a

- a Durand, J.N.L. (1975) *Precis des lecons d'architecture (1819)*.
- b Argan, G.C. (1965) *Sul concetto di tipologia architettonica*.
- c Tafuri, M (1968) *Teorie e storia dell'architettura*. English translation: Tafuri, M. and G. Verrecchia (1980) *Theories and history of architecture*.
- d See for a discussion of Tafuri and Argan, and for additional references Engel, H. (1999) *Hybride interventies*.
- e Riemsdijk, M.J. van (1999) *Dilemma's in de bedrijfskundige wetenschap*.

priori that there is one “best” method per context (series of phases and their sequences) that one should adopt as routine for designing in other contexts.

44.13 MORE DESIGN METHODS THAN DESIGNERS

Perhaps the candid starting point would be that there are just as many design processes as there are designs. Methodology is then not the establishing of all of these design methods, but rather “understanding each other’s methods”. If there is anything that can be *generalised* about design, this is included, but here this involves *generating* designs and only afterwards analysing their effects empirically. This evaluation of the design consists of projecting familiar relationships onto the new context of the design, and there is always doubt regarding the validity and reliability of this (see page 92). An important part of design education consists of trying to find the most productive sequences of (nameable) design actions and routines for each individual student.

The disciplines of construction management and design have gone their separate ways so as to give the designer the opportunity to develop his own more fruitful dynamics, apart from the construction process and therefore presumably in the competition of the marketplace. The designer who meshes this process with that of the standard construction process is lucky, as no differences in phase appear between his creative process and the interim products that the construction process successively demands. This is the case, for example, with designers who begin with a grid that establishes the basic structural frame (and thus the position of the foundation piles as well), and who only later complete the process of adding the final details that do not need to be known until later in the construction process. Again, many good designers are inspired precisely by these details in order to use the principles of form and measure that result from them in a total design.

44.12 IDEA AND ENVIRONMENT

The pre-eminent example of order in nature, the crystal, grows on the basis of an exogenous contamination. The accidental form of this contamination extends in the growth of the crystal as dislocation in the roster, without which the free molecules would not be able to find any point of application to allow the crystal to grow. This is a warning for perfectionists. Without small heterogeneities in the air, no raindrops could condense from saturated vapour, and no snowflakes could find a starting point to grow uniformly in six directions. Some designers need to find at least one exogenous starting point, even if this seems of secondary importance, in order to base their integral work upon it.

The remaining context then leads to new dislocations. The starting point is often the specification (of which a schedule of requirements may form a part), or the topography or bordering of a site, but it could also be an artificial fascination, an impression from the past. The capriciousness of these starting points sometimes awakens the desire to find once again an autonomously continuing idea (for example a grid) from which the constructional elements derive their dimensions (as in an automatism), and upon which they can be based. The designers of sweeping, often sudden interventions find precisely therein their formal (morphological) starting point, which can then be projected onto the specification and the site. Yet a crystal is not a design; it is the result of a physical automatism.

Every homogenous design theme winds up on the borders of the given site; it runs off into fascinating interim variants, or forms remarkable contrasts with the adjoining plot. This dialectic between homogeneity (or autogeneity) and heterogeneity in the creative conceptual capacity brings us back to Piaget or Fichte. One can also see a relationship with the dualism between idealism (Plato) and realism/relativism (Aristotle), rationalism (Descartes) and empiricism (Hume), the Expressionism and Impressionism of the 19th century, psychological distinction between projection and identification, and methodological distinction between goal-orientated and means-orientated design.