

Design and mentation: Piaget's constant objects

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Introduction

Some years ago I wrote about (scientific) research and design: I argued that (scientific) research is a subset of design, and we should therefore not ask that design should be a subset of (scientific) research. Indeed, not only should we not ask it, it's not possible. (Glanville 1999.)

In this brief piece I want to outline an argument concerning design and thinking, but not to argue it in detail. The central thesis is that design is the essential part of thinking: that is, thinking is a type of design activity. So it's not just science and research that are design activities: to design is to be human, and vice versa! To construct this outline, I shall look at Piaget's account of how babies learn to recognise their mothers, surely one of the primitive human acts of mentation. I use the somewhat awkward word mentation to reduce arguments about cognition and perception.

Before I undertake this, I should say a word or two about how I wish to talk about design: what I consider to be at the heart of that activity.

For me there are many tasks the designer must undertake and somehow find a satisfactory response to. These include functionality and well-made-ness. But there is one activity which is particular and central to design, the activity by which we create form (truly, this is in-form-ation) and where we seek the distinctiveness, the novelty, that is essential to what we believe we do. This activity has traditionally been associated with sketching—and doodling. (I use the word doodle precisely because it has no pretence to special status: it's a word that removes grand purpose, downplays an activity to the everyday, to the child-like: which is exactly what I consider this activity to be—purposeless, child-like and everyday.) The act of doodling or sketching is circular: we make a mark and we look at it and we make another mark (the circle exists in the switch between making and looking). In switching between drawer and viewer, we are able to hold a conversation with ourselves through the medium of paper and pencil. We look and what we see is often other than what we thought we had drawn (hence, novelty). I do not want to argue this point, or to elaborate further, here: I believe designers will recognise what I write about, and further explanations are both being explored and also exist elsewhere in my work, already. (Glanville 2006, Geldenryd 1998.)

Although several people have written about sketching in this conversational manner, I always have in mind my professor, the great cybernetician Gordon Pask, whose major accomplishment was called "Conversation Theory," who taught at architecture schools, and

who first wrote about conversations (although not quite in the manner in which I wrote, above) in design in 1968. (Pask 1969, 1975.)

Piaget's objects

The Swiss “genetic epistemologist” (as he liked to call himself), Jean Piaget, made one of the most important contributions to the conceptual foundations of twentieth century thinking when he explored the way children come to see (and understand) the world, and, although it may seem strange to write about this in a journal concerned with design, I want to show how what he was talking about may be understood as design! (Piaget 1955.)

Piaget's work is, in some respects, currently under fire. This is not surprising if Popper's view of science as a process of “Conjectures and Refutations” has any credence (Popper 1963). It's also not surprising, given what appears to be the natural history of evaluation of our work after we have died—as it follows what seems to be a common path of accolade, dismissal and then balanced assessment. As I have said, Piaget's work concerns how children come to understand the world and their part in it. In broad terms, there are two aspects to this work: that which develops the notion of stages in our personal development, which is what is under attack and is not what interests me here; and that in which he postulates how we come to create concepts, that is, how we develop from our different experiences a notion of identity which allows us, in our experiential worlds, to take different experiences and see them as being of the same thing: an identity between different concepts which we can associate with objects that remain constant (are conserved).

Piaget asks how it is that the baby, considered as something akin to a conceptual tabula rasa, can come to recognise his/her mother. This question is a one of considering an experience so central to our experience that we have, before Piaget, scarcely stopped to question it. It is a surprisingly difficult and subtle question.

Piaget identifies two main mechanisms involved in this process: “assimilation” and “accommodation,” which we use to move towards what he calls “equilibration.”

Equilibration is the process by which we find balance (attain equilibrium), that is, we are at peace with ourselves and our world. It is thus a process that drives us to learn. Learning is done using the techniques of assimilation (incorporating new experiences into the structures of the experiences we have already built), and accommodation (changing these structures to incorporate new experiences). I use the word experience, here, in the most general sense where it may be seen to include, for instance, what we come to call information.

The primary act of the infant, according to Piaget, is to learn to identify, from (or in) a Heraclitian stream of experience, similarities that can be held to be constant between what thus become understood as distinct events in (or of) that stream. Thus, he argues, the baby learns to identify from this stream of experience in which (s)he lives certain events in which

(s)he finds a commonality. This recurrent theme, the commonality that is constant, creates the constant (i.e. conserved) objects of the child's existence. The objects are constant in that they survive within the experience of the child (and, indeed, the adult) and continue to be within the child's experience: this is how they are conserved. In Piaget's explanation, this is how the child moves to construct a personal world of objects that recur and remain more or less unchanging, becoming the objects that we consider a world external to ourselves to be made of. (I am trying to avoid, in this piece, arguments about the constructivist view that Piaget held of the world and our connection with it (Piaget 1972): another contentious area which can all too easily distract us from the point at hand).

Piaget asserts this essentially intellectual act is carried out by the baby, and indeed we humans continue to do it all our lives. Our method is, in Piaget's account, to compare events and to find in them this sense of the common. From this we propose (to ourselves) objects to which we add other experiences, assimilating them into our objects that, thus, remain constant. On occasion we have to change how we see the object (that is, we change the object, or even dispose of the object altogether) in order to accommodate the unexpected.

To many this seems like a most unlikely explanation. Surely the objects are in the world and we sense them through a connection with what is outside us? This is a view of the adult who can no more imagine what the baby experiences and thinks than the baby can tell us. It is also the view of the adult as shaped by the currently dominant view of the world (reality) and our relation to this. As I say, we cannot imagine ourselves back to our baby experience, so we have to rely not on testament but observation and the construction of what Gregory Bateson called "Explanatory Principles." Whatever else there may be, we live in our experience, and we can never know if our experience comes from these objects or if the objects come from our experience alone—or, indeed, a bit of both; or maybe even neither—because whatever we come to believe our experience is always present in it. There is no logical argument that can resolve this issue, which is why it is a source of freedom of action: we can chose as we like. (Von Foerster 1991.)

Accepting this Explanatory Principle, the activity of converting experience into objects is not an activity exclusive to babies. The explanation we form, which is a Piagetian conserved object, is not based on facts in an outside world, but on our observation, our experience. We all do it, all the time, and with great skill: we have built very complex views of very complex worlds through creating Piaget's objects, and we continue to do so all our lives. The baby's objects come first in this continuing process and thus, are building blocks of sorts which may become hidden by the many objects we continue to build, through assimilation and accommodation, that are based on earlier ones.

In effect, what we do is we add observations (what some might call evidence) that we collect through our existence in the stream of our experience; and we build understandings, testing

them in a process of confirmation and enrichment. If, after a bit, we find ourselves facing observations that we cannot account for, we handle them in one of several ways: we ignore them (are blind to them, a process sometimes known as denial); we dismiss them as anomalies; we find a way of changing the observation so that it fits what we expect; or we have to change our explanation (a constant object)—a process that gets harder the more we have invested in it, or have built on it, as we find reflected in the progressive difficulty of changing our concepts and as witnessed in therapy.

In these circumstances, how should we depict these processes of assimilation and accommodation, making them a little less abstract? Assimilation is a process of enrichment: we build more and more experienced events into the constant object, thus making it richer. Accommodation is what we do when we find assimilation doesn't work: we wish to assimilate some new experience event and cannot. We need to change—not by enrichment but in some more radical way. Accommodation means substantively changing an object, or making a new one, throwing away an old one, rather than just enriching it through assimilation. The difficulty of accommodation is, in effect, the difficulty we have in breaking old habits.

Mum: an Example

It will help to give an example. Please remember all the time that I'm writing from a strange position. The example I shall use is the baby learning to construct a constant object that it will eventually call Mum, but I am writing from a position in which I have, in my mind, built a vast structure of such objects, all related together in multiple ways, and what I give you is my explanation of what I believe to be the baby's exploratory, explanatory, object building process. It is most definitely not the baby's explanation or understanding. (This confusion of a description or explanation with that which is described or explained is a shortcut we use, all too often forgetting that the description and/or explanation is not the thing described or explained: indeed, it could not function if it were. This situation is reflected in Korzybski's well known dictum "The map is not the territory.")

Piaget was fascinated by this extraordinary question of how a baby comes to recognise its mother (and, following that, all the other things we eventually come to recognise). The question is extraordinary because it is so elemental that I suspect we have never really asked it: it is assumed, invisible, it is below our conscious event horizon. Think, for a moment about what the baby sees (assuming we would want to call what the baby does "seeing"), when it sees what we call Mum: different parts of the body (specially face and breast), different expressions, different hair, make up, different views (full face, profile), coming from different places and positioning itself within the baby's field of vision at various angles. Add to this other sensations: pitch and sound of voice, smell, taste and so on—sensory material we cannot begin to imagine for we have honed (and blunted) our senses so that what the baby

senses may well no longer be what we do. We have no idea. We do not know what they see, or how they understand that. We do not even know what other sees, perhaps not even what each of us see, ourself.

What amazingly complexity!

Piaget's account of how the baby comes to identify objects is based on his own ability to develop a viable concept, and to test it (I will not deal with that aspect here).

What Piaget tells us he believes is going on (that is, his explanation) is this: the baby has experiences and gradually begins to compose these together so that the dominating one—which we call the presence of Mum—is slowly identified. The process becomes one of experiences that are seen to share something in common (what become concepts) and are attributed to percepts (that are taken to be causes). Furthermore, when the percepts become firmly identified with some common concept, they are seen not as percepts, but as percepts of: that is, we attribute some independent existence to an origin of the percept that is outside ourselves which we come to think of as an object that persists (that is, a constant object that is conserved). The percept does not start as something that is of a MIR it is from the building of percepts from experience and the attribution that they are of constant objects that we get, in our experience, the notion of an external and independent reality (a MIR). Thus, in this view, the world of (constant) objects is a construction, which depends on the development of concepts that are tested against percepts in the medium of our experience. It is the concepts that allow us to associate the percepts together, through which we confirm the concepts by testing our conceptions against our perception, and then modifying as necessary: by assimilation, if the change we need to make is small, and by accommodation if the change is big. As a result, we can build our concepts to be so viable that we do treat them as constant and we conserve them: and at the same time, we propose an external (to our experience) world that these concepts are taken to be of, made of constant, conserved objects, and which we can treat as independent, and yet manipulable. Hence the power we believe we have over the world, and our participation in it. The process we are involved in is bidirectional: as we live in our experience, we both abstract into the mental world of concepts that we work at to form and then maintain (the constant object within) and at the same time we re-ify through the forming and conserving of our percepts that we take to be of the constant object (without). Note that this action does not mean that there is no external world. It just means we cannot be sure of it. Nor does it imply that this all happens at once: Piaget was careful to document stages in which we create an understanding our the world as independent from us that takes many years and which some of us find confusing and difficult throughout our lives. (This is the aspect of his work that is currently being questioned.)

I am, of course, giving Piaget's explanation, as understood and then re-explained by me in the hope that you, the reader, will be able to make your own understanding of it. As such, it is not

what goes on but an explanation of it (and an explanation of an explanation and so on).

Design

The process I have isolated as Piaget's explanation is one that will be familiar to all designers. It relates to that part of design that is not concerned with function or fabrication, but with the genesis of the idea that is new. What is happening?

I can explain it thus. There is a process that I call "enrichment": gradually more and more experiences of what we will come to call *Mum* are added in as we form this object, until such time that the object doesn't change significantly in the face of new experiences, which we may see as repeats of old ones. or "censor" so that they fit the already familiar, without modification. Some experiences have to be rejected, and sometimes we have to rethink the path we've been following. This is a circular process, a sort of conversation held with ourselves via pencil and paper: we isolate an experience we have and we build that into the constant object of our cognition (and that we come to treat as inhabiting an external world, a *MIR*). At a certain point the process of enrichment stops adding much except in particular circumstances. At that point the object (to use Piaget's word) we have made from our experiences (which Heinz von Foerster modelled through the mathematical metaphor of an *eigen-object*) is constant and further experiences conserve it (von Foerster 1977): they are assimilated without requiring change—except in the particular circumstances when an accommodation (even the extreme accommodation of rejection) must be made. The circular, feedback process is cybernetic in its nature: one of the two original descriptions of what (in a process mirroring the Piagetian) became cybernetics was couched in terms of 'Circular, causal and feedback mechanisms.' (Pias 2003.) But it is also the central and essential process of design where doodling and sketching lead us via a circular activity to an enrichment that defines and brings into form (*in-form-ing*) what will eventually, and through many iterations of assimilation and accommodation, become the constant object of our designs. Of course, there are difficulties on the way and we may get stuck in trying to force an enrichment that in the end either undermines the constancy (and viability) of the object we propose as a result of our wilfulness, or eventually leads to a radical rethink. As designers we are fully aware of these conditions!

(Note that all this comes from experience, and not from the outside world we come to propose.)

Conclusion

I could say much more about this notion that our mentation is an act of design, but it is difficult to imagine something more fundamental to our mental existence than an ability to create identities, to see the world we make from the experience we live in as consisting of patterns. I believe and hope that in the above I have shown clearly enough a homomorphism

between the understanding of the essential design act (of course there are other acts) as being this exploratory activity in which we bring something into form, in which the conversational circularity we practice leads us to make viable objects that can exist as concepts and as objects-in-the-world.

And, if I am right, then to be human is to be a designer, and there is no more important human act than to design—in this case, the constant objects with which we fill our worlds.

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