

Comparison

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Abstract

In this paper I argue the central significance of comparison in building accounts of our ability to construct the sort of worlds we inhabit.

Comparison is shown to require at least 4 components: an agent with intention that has (two) experiences at overlapping moments. These conditions appear to be enough to develop a proto-logic that describes the 3 forms of comparison characterised as: identity, scope and contrast. It also accounts for negation. This logic is based in time and derives from the moments of each experience.

It is shown that, with this equipment deriving from comparing, it is possible to account for basic human mentation, leading to a re-interpretation of perception and cognition, an explanation of the creation of the constant objects which we derive from and with which we populate our experience, and the composition together of such constant objects to create the heterarchies of our worlds.

Introduction

The epistemological position taken in this paper is that we live in experience, and that the connection of that experience to any reality external to each of us (such as a so-called “real world”) is at best tenuous and arbitrary, a matter of personal choice. In this paper, I chose not to make this choice, but to work from and with experience, although, in describing experience I am (it seems inevitably) drawn into a pseudo reification of that experience. It is against this background that a discussion of comparison is presented.

In this paper I have two aims. The first is to explore just what is involved in making a comparison. Using an approach inspired by Nicholas Rescher’s “The Logic of Commands” (1966), I analyse what elements are needed in order that a comparison may be made, and how these elements might work. The result is an integration of the different types of comparison in a temporal logic that derives from the time during which we experience our experiences (i.e., the moments of experience). From this I develop a proto-logic from the one act of comparing.

The second is to understand how the act of making comparisons can also explain basic human mentative acts. Living in experience, it is these acts that are at the source of our being. They centre around the act of creating pattern, without which our experience would remain unformed, and we would indeed live, in that Heroclitian stream, just in the now.¹ The amazing abilities we humans have developed depend upon our being able to create pattern. The key abilities are explored through the lens of comparing.

In this manner, comparing is shown to be a key activity of how we handle our human experiencing and thus our existence.

PART I: making a comparison

What is required that we can make a comparison?

A traditional account of comparison would perhaps tell us that we needed two objects to compare: but this simple and obvious account plays too much to the realist camp. For what we compare is not the objects of a real world, but our experience of them. Consider Bateson's famous demonstration when he asks his audience for a show of hands as to "How many of you will agree *you see me*?" and then corrects the audience that they don't see him, but compose an image from a bunch of pieces of information about him: "You make that image." (Bateson 1972a) Furthermore, comparing is an activity carried out by some agent: it is not something that just happens, as if automatically.

In this exploration of the notion of comparing, we will step back from the realist view, and consider comparing as an activity carried out by an agent dealing with experiences. These experiences may be of objects in some realist world, or they may not be: this paper does not try to confront the eternal question of what has been called "Mind Independent Reality" although it will be clear from my preference to talk of experience that I hold to the view that the question is undecidable and therefore that we can either choose as we like (there can be no right), or we can choose to maintain the fence that we sit on it and keep sitting on it!

That is a reason I treat experience, and it is a position that will become clearer as this paper is argued, in a Catch 22 where the assumptions are re-inforced by arguments based on them, and so on.

Treating comparison as the act of an agent's experience brings it into the realm of mentation (a

¹ Which some consider preferable.

word I shall use to avoid the somewhat peculiar interpretations of the words perception and cognition that are currently in vogue, although I shall discuss both of the terms perception and cognition later.

The constituents of comparing

In this paper, then, we take it that comparing is carried out by an agent as an act demanding the active choice and participation of that agent, and is made between experiences the agent owns (in the sense of claiming and taking responsibility). It is thus an act requiring intention or purpose. The agent's taking responsibility is an important element in this understanding and connects with both the ownership of experience and the agent's purpose in making the comparison.

The purpose is the cybernetic insight that powers the act: without a wish to make a comparison, why compare? The agent wishes to discover something about how two experiences relate, in that agent's mentation processes. Because purpose is ubiquitous, and because it drives the wish to compare and the choice of the context in which to make a comparison, it will frequently be assumed, remaining unmentioned.

We also require time: experience happens (and changes) in (and over) time. Experiences have beginnings and ends, and in that sense are either rooted in, or generate time. The time of the experience in comparing I call a moment, and is specific to each experience. As we shall see, in this account comparing involves attempting to establish a synchronicity between experiences. Understanding experience as time-based gives us great advantages and removes our need to rely on such external constructions as measuring rods.

Finally, there is the agent's willingness to see similarity and difference in experiences (there can be no similarity without difference: see Glanville 1980).

As a rider, at least in strict (English) grammatical terms, comparing is used of two (and only two) experiences. One experience does not provide any resource for comparison. Three (or more) can lead to a complex ranking which, in English grammar, gives rise to the superlative. In English these are distinguished by the endings -er (for the comparative) and -est (for the superlative). However, the word compare is used in more senses than simply as a comparative.

Types of comparison

According to Apple Computer's OS X version of the Oxford American Dictionaries,² (to) compare is defined thus:

*estimate, measure, or note the similarity or dissimilarity between : individual schools **compared** their facilities **with** those of others in the area | the survey compares prices in different countries | total attendance figures were 28,000, **compared to** 40,000 at last year's event.*

- (**compare something to**) point out the resemblances to; liken to : her novel was compared to the work of Daniel Defoe.
- (**compare something to**) draw an analogy between one thing and (another) for the purposes of explanation or clarification : he compared the religions to different paths toward the peak of the same mountain.
- [intrans.] have a specified relationship with another thing or person in terms of nature or quality : salaries **compare** favorably **with** those of other professions.
- [intrans.] be of an equal or similar nature or quality : sales were modest and cannot **compare with** the glory days of 1989.

Based on this definition we can insist that there are two quite distinct (but related) types of comparing:

1) comparing to create identity

“Comparing these two colours I see they are both red.”

(My experience of the “redness” of one is identical to my experience of the “redness” of the other.)

This we will refer to as an identity comparison, abbreviated to identity. We construct a relationship between our experiences such that there is no significance difference between the two (while they nevertheless remain distinct and different).

2) comparing to create scale (the grammatical comparative)

“You are taller than I.”

(My experience of your and my height is that you are taller than I am.)

This we will refer to as a scale comparison, abbreviated to scale, or alternatively as a

² We are using words here to represent experiences. The question of whether there can be experience without language is outside the scope of this paper, as is the paradox of communication.

comparative. What is important is that both experiences are seen as significantly the same, while one has more (and the other less) of that which is significantly the same.

Along with these two varieties of comparison, there is a complement: contrast. Whereas the two types of comparison already mentioned above are based in a similarity in different experiences (in the agent's view), contrast is the outcome of the agent's interest in the difference between them. Quoting, again, the Oxford American Dictionaries on my computer, to contrast is:

differ strikingly : his friend's success **contrasted with** his own failure \ [as adj.] (**contrasting**) a contrasting view.

• [trans.] compare in such a way as to emphasize differences : people **contrasted** her **with** her sister.

This definition indicates that we can compare to find difference: not a difference in some shared quality (ie, scale), but a difference in expression of the quality (such as opposite poles). This we will refer to as a contrast comparison, abbreviated to contrast.

3) comparing to create contrast

“The red colour of the sofa contrasts with the green colour of the walls.”

A special case of contrasting is contrast by negation:

“The red of the sofa contrasted with the non-red of the walls.”

There is a final outcome of the act of comparing, and that is a failure. It is possible to try to make a comparison and yet fail. This occurs when there is nothing in common in what is compared.

Thus, for example:

4) no comparison

“nothing compares to you.”

In general we will not discuss the variety of comparison that is no comparison.

Relationships

What is the relationship between comparisons of identity, scope and contrast?

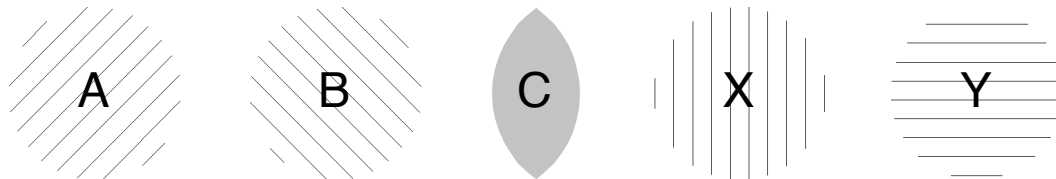
All three depend, of course, on the agent and the two experiences. The difference between them may be shown in logical form, i.e., they each depend on a different logical relationship.

We can express these relationships in both logical and in diagrammatic form, for which we use

the following graphic key, in which the shading is what indicates the identity of the components:

Key

Experiences labelled by letters are graphically translated by shading (which may be combined) as follows:



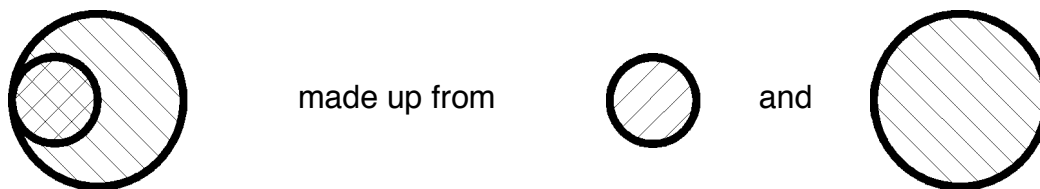
1) In the case of identity, the relation is the logical identity. Indicating the two experiences as A and B, we have:

$$A \leftrightarrow B$$

In the case of scale we have implication (deduction/inference):

$$A \rightarrow B$$

Scale



2) The case of implication is, in a certain sense, ambiguous. Translated as in every case of A there is B, but in some cases of B there is not A, we have an inductive relationship of B to A, and a deductive one of A to B.

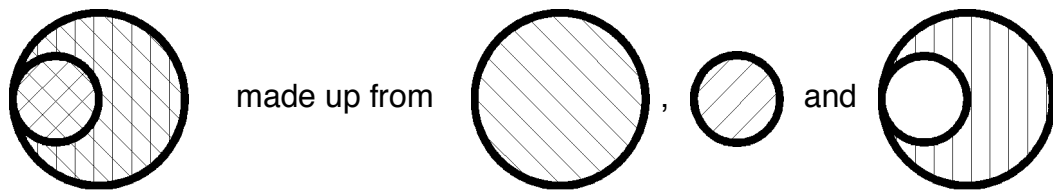
We also have an implicit negation: that there is a part of B that is not A, while there is also a part of B that is A. Dividing B into the part that is A and the part that is not A but is X (the complement of A in B), we can express the relationship as

$$B \leftarrow [A + X]$$

Here, X would indicate what is in B but not in A, such as a difference in size thus:

“80 cm is shorter than 100cm (by 20 cm).”

scale (e.g., size comparison)



(A is 80 cm, B is 100 cm, and x is 20 cm.)

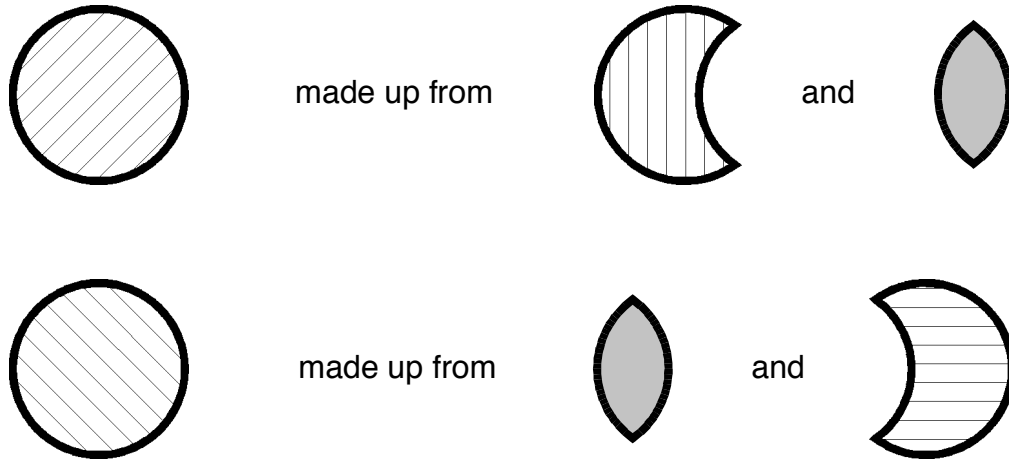
3) In the case of contrast, While there is some element of similarity (C) between A and B, there is also a difference in each (X, Y).

$$A \leftarrow [X + C]$$

$$B \leftarrow [C + Y]$$

$$A \leftarrow C \rightarrow B$$

contrast: construction



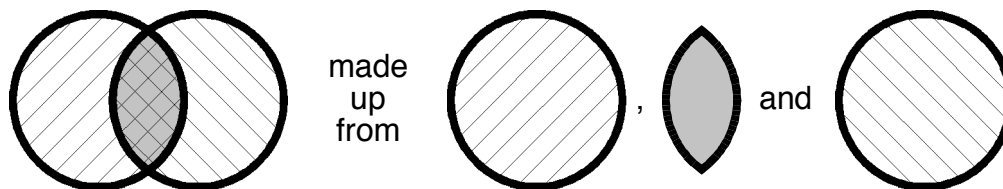
Here we retain X as the complement, in B, of A, and allow Y as the complement of B in A, with C as that which is held in common.

These relationships constitute a proto-logic: they contain enough richness to establish from the three varieties of comparison a set of connecting logical relationships. Thus, if you have comparison in the mentative sense used in this paper, you establish the basis of a full range of logical connectives.

In effect, using a more conventional notation, we have in the last case the inclusive or:

$$A \vee B$$

contrast (conventional representation)



Relationships in time

The question arises as to how these experiences may be so composed together by the agent that they may be understood to form a comparison with one of the three outcomes (four, if we include negation) described.

If the arrangement is in space, it requires, at least in any visualisation based on our 3D perspectival account, a separation in space that is somehow bridged. This leads to all sorts of problems. But it turns out this way of looking is an unnecessary complication.

We have insisted that experiences, because they begin and end for any agent (making a comparison), involve time: they last for a moment (no matter how long or short) that is the agent's experience, which has a start and a finish both of which may be represented as occurring on a time line. Thus, experiences that are concurrent are already in a relationship.

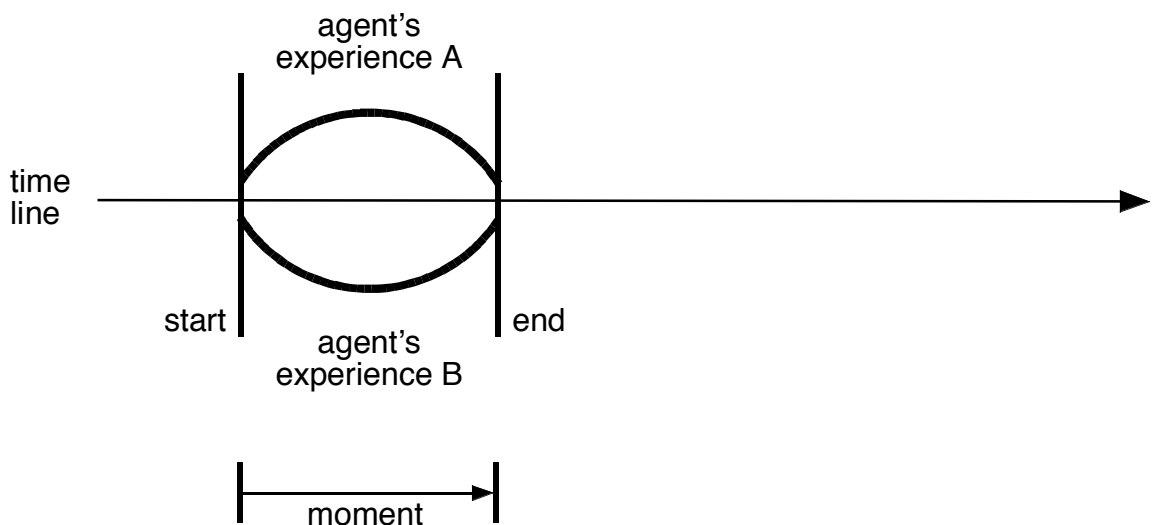
What determines the relationship? We will follow de Saussure's (1966) description of synchronicity in representation. For de Saussure, what that which is represented and that which represents have in common is synchrony: they concur because the speaker slices the (temporal) continuum in such a way that both are present over a time span of interest.

In earlier work, stemming from my doctoral dissertation (Glanville 1975), I proposed a logic that was inherent in the act of observing. It derived from concurrent moments of observation of what we thought of as separate "entities" (called Objects): the equivalent to what is called, in this paper, the moments of an agent's experiences. The arrangement of the moments of observing give rise to a full set of logical operators, of which 4 appear, in this paper, as constituting the various types of comparison—identity, scale, contrast (and negation), that may be argued through the relationship made by an observer of his/her experiences in the act of comparing.

The notation I developed, which I use again here, is an arc. In terms of this paper, the arc represents the moment of a particular experience for a particular agent. The convention I developed is this. The start of the moment is indicated on the left, the end on the right (the passage of time is depicted as passing from left to right). The direction of the curve (upwards or downwards on the page) is of no significance and is just a graphic convention intended to help legibility. The length of the curve is equally of no particular significance: what matters is overlap. The vertical lines indicate the period of interest of the agent in the different experiences, the disposition of which form the particular type of comparison being introduced.

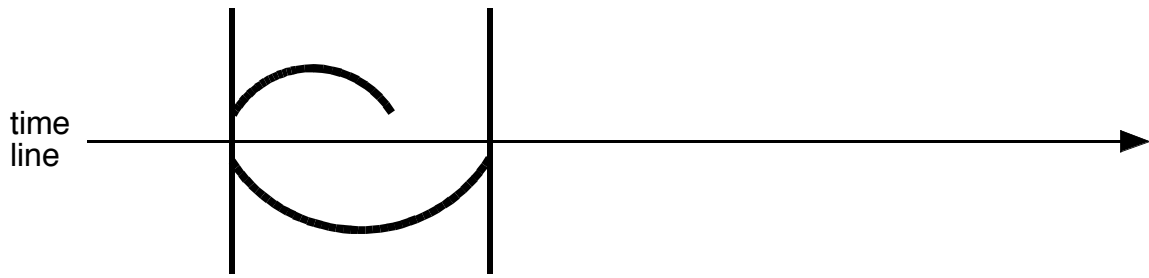
In the following case, where both arcs indicating the agent's two experiences have the same start and end points, I claim that the synchronous concurrence of the two establishes the identity relation; that is, we have an identity comparison (type 1) above).

identity



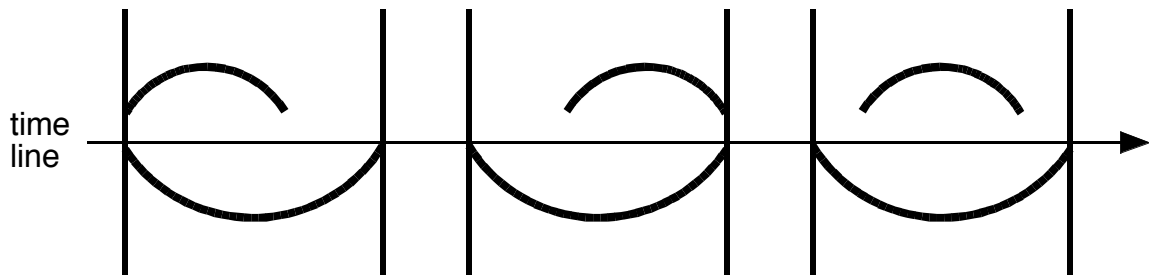
In the next case, we have implication. The moment of one of the agent's experience starts before the other, and the end of the one is after the other: that is, one experience is completely contained within the other. This is a scale identity (type 2) above).

implication (scale)



Put another way, it is possible for both experiences to begin at the same time, or to end at the same time, but not both. Thus:

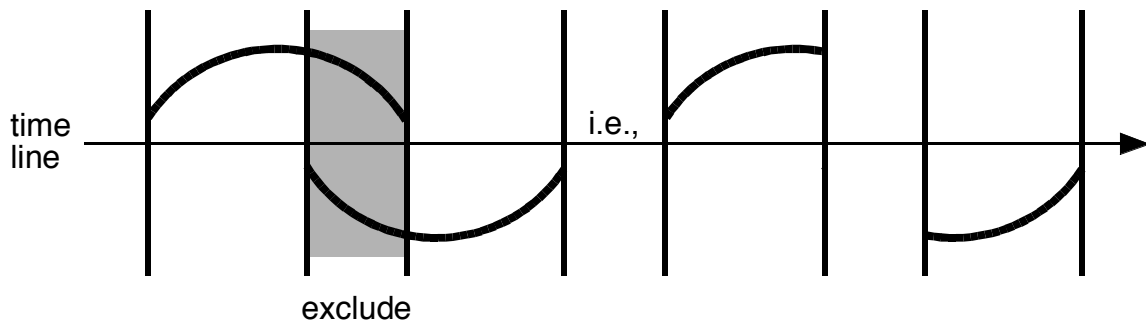
implication (three variants)



In the case of contrast, we have a more complex arrangement that generates the logical relationship called exclusive or. This may be considered as two implications with a shared middle (that is, a middle that, when severed from its parents, constitutes an identity). In this relationship, one experience begins before the other, which ends after the one. The interest (that is, the expression of the agent's purpose) is in the parts of the experiences that do not occur together (the differences, as referred to above), while it is important that there is the part that does occur together (the sameness): the contrast is in those parts of the experiences that occur before and

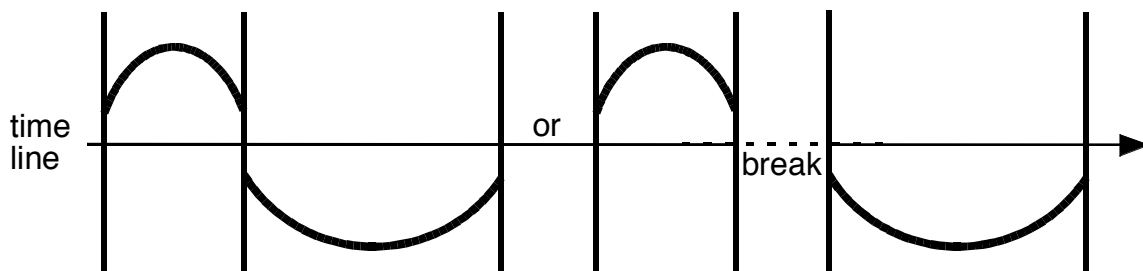
after both occur together. Thus type of synchronous concurrence creates contrast (type 3 above).³

contrast (excluded or)



Finally, and for completeness, I include negation (a strange outcome in which there is no comparison), which is depicted by there being no overlap in the moments of the agent's two experiences. This is similar to contrast, but without the shared part of each moment: ie, is akin to an exclusive or.

negation



Thus, we can consider that the act of comparing produces and is also dependant on 4 proto-logical relationships (proto- because most full logics would list more relationships). The structure

³ However, if the end of the one occurs when (or before) the other begins, we have negation (see next item).

of the act of making a comparison as based in time and depending on the moments of an agent's experiences gives birth to this logic: there is no need to create a logic, merely to interpret the temporal relationships as they are experienced, i.e., from within.⁴ Comparing expresses these relationships, which it generates and which it also depends upon. The circularity of this dependence is exactly the sort of productive circularity that is the province of second order cybernetics.

For this reason and in this manner, we may consider that the purpose of comparing both establishes and builds on a simple logic that constructs (or, better, embodies) relationships. Behind the individual purpose of a particular comparison, there is a more general purpose—to relate. Comparison is, in this account, the basis of relating and hence of building.

PART II: mentation and comparison

What does this approach to comparing tell us, apart from clarifying what is involved in making a comparison and showing how the different types of relations in (and hence outcomes from) comparing are related and form a proto-logic? In this second part of the paper I explore how the act of comparing can help us understand the essential acts of mentation acts that at least begin to provide an explanation for the special peculiarity of human experience: that we can act (through our ability to compare) to create special abilities that give us the sort of mastery over our worlds that we believe we have.

Against this, it is important to express a counter view. We have come to believe that our ability to behave with these special abilities is a great benefit and advance. Yet there are those who understand them also as the source of much unhappiness and who argue that the path of life should be to remove their presence. Consider, for instance, Gregory Bateson quoting an unnamed Japanese Zen Master:

”To become accustomed to anything is a terrible thing.”

(in Gregory Bateson (1972b) in “Steps to an Ecology of Mind,” the (final) essay, “Ecology and Flexibility in Urban Civilisations.”)

I do not mean, here, to move into the metaphysical. I could talk of the Fall from Grace of Adam and Eve, and many other stories of lost innocence, but I do not. That is not my purpose. This

⁴ The account I have given has been made, using the traditional observer viewpoint, from the outside. We are talking through an explanation of experience, but it is the actuality of the experience we have in mind.

paper is not intended as an argument for Zen or indeed any other metaphysical and (semi-) religious position. I want only to remind us that these special abilities have their downside: indeed, it is in creating the downside that their power is truly seen.

Mentation, Perception and Cognition

Earlier in this paper I stated that I would use the word mentation, to avoid perception and cognition. I also said that later I would introduce the words perception and cognition. We have now arrived at later.

Perception and cognition are familiar and useful terms, but, given the epistemological position taken in this paper, there are problems of unstated and hidden expectations in how they have come to be used that are based on assumptions of a real world. Thus, perception is generally assumed to be of some thing that exists out there in a real world (and which is accessed through the familiar sensory systems, which we take to convert the way we believe the external world presents itself to us into experience, or percepts),⁵ regardless of whether we think our sensing of the thing is somehow transmitted from that thing to our sensory organs, or as the ancient Greeks thought, is a targeting (and, perhaps, reflection) coming from the senses and bouncing off this thing (i.e., in the manner of radar). In both these cases, there is an assumption of an independent existence of the thing. To recapitulate, we have chosen to take the position, here, that, while there may or may not be such a thing existing independently, we can never know it in this postulated independent existence nor can we know (if it exists) how it might present itself to us and therefore what our sensory systems might be doing. What we can believe is experience, for that is what we exist in: swimming in the stream of our own experience. It is the assumption of this philosophical position that has lead me to avoid these terms up till now. And it is the assumption of this philosophical position which makes conventional understandings of perception and cognition irrelevant, as has been indicated.

But to change how we think of perception and cognition, and of their interdependence, is a difficult and challenging task, for their usage reflects one of the core beliefs that so many of us have grown up with, unquestioning.

Nevertheless, now that we have established how we may understand comparison as operating, it becomes possible to examine how we might extend this understanding into how we understand perception and cognition.

We have discussed comparison in terms of three (four, including negation) types of relationship.

⁵ This assumption is what allows us to talk of, for instance, what we call visual illusion as illusion.

These are identity, scale, contrast.

I shall deal first with identity.

The operation identity is carried out by an agent to take two separate (and thus necessarily different) experiences and treat them as (of) the same. In our terms (developed in the first part of this paper), this happens when both experiences co-exist completely synchronously. The operation of creating identity (making the relationship identity) is one of compression (reduction): metaphorically saying that I can treat these two experiences as one.⁶

It is this act of relating, and specifically of relating reductively, that I take to be the origin of cognition. It is in relating that we can transform experience so that we have, in the case of identity, the beginnings of constancy and a world of objects; and, in the case of scale and contrast, relational computational connections between experiences. Thus, what we come to think of as knowledge or knowing becomes imaginable.

What, then, of perception? In a conventional view, we need perception to have the material on which an agent can act creating relationships, and thus to develop cognition. In this view, cognition depends on perception.

However, in the case that we do not assume an external world, a MIR populated by objects, but talk rather of experience, perception cannot go first: for there is nothing other than the stream of experience for us to work with. The world of objects awaits our invention as we learn to create identities between experiences such that we can take two (or more) experiences to reduce to one and treat this one as an object.

I propose the following, which I believe matches well the traditional view of perception, within this different framework.

Consider that we have, by comparing, carried out the cognitive act by which we construct an object. That is, we treat two experiences as one, and we call the compression an object.⁷ We must experience that object which each of us, as an agent, has constructed through the act comparison: the object is experienced, and we know it as experience. It is important to keep in mind that there may be no external object: whether or not there is, we cannot know. We treat the outcome of our cognitive act in bringing together two experiences as one, but for that one to be of value to us, we have to be able to experience it (eg, so that we can relate it to other experiences). Our universe of discourse is one of experience. Thus, we must experience the object, which is itself a

⁶ In the next sections I shall discuss this economy and how we use it.

⁷ As will be discussed in the next section, we may—and do—continue to bring experiences together within one such object.

compression of experiences.

This is perception: the experience of experiences, yes, but the experience of experiences that have been processed by us to produce such an object (the outcome of the identity relationship), the creation of an identity through comparison by an agent acting on two simultaneous, synchronous experiences, which is then experienced: for it is when we can treat the object as if it were the source of a next experience that we can talk of perception.

Thus, in the world predicated on the primacy of experience that gains coherence and form through comparison in an act of identity construction we call cognition, perception is consequent upon cognition rather than, as the traditional view would have it, cognition being consequent upon perception.

Object Constancy

In our mentative acting, there is perhaps one act more than any other that express the mental powers that seem so to characterise our accounts (and experience) of human experience. It is precisely this comparison of two experiences that establishes identity.⁸ This is, in essence, the act at the heart of Piaget's concept (1955) of "object constancy" or "the conservation of objects:" the idea that we can bring two experiences together so we identify them, each with the other, creating constancy between the two. Having once established an identity, we can take the relationship and compare it to another experience. I.e., we cognise two experiences, which thus become cognate, as identical (through comparing), thus becoming another experience, after which a new experience can be compared and identified with the identity that was made by comparing the first two experiences—a process of concatenation and recursion.⁹ In this way, it is possible to take a vast number of distinct experiences and, by comparing them, establish a continuing identity such that we can think of the identity as a source of the different perceptions (experiences). It also explains how we can add to a body of (identified) experiences, thus enriching them; but find it hard to create an identity (pattern) between many distinct and and previously unrelated (by us) experiences.

Thus, using the primitive act of comparing which has been explored in this paper it is possible to

⁸ In a relatively early paper (Glanville 1980) that was intended to be somewhat humorous and ironic but which now seems to be central, sensible and salient in foreshadowing this understanding, I proposed that we would better think of the duplication of our eyes not as giving rise to depth vision, nor as providing increased reliability through redundancy (although these are immensely valuable side-effects): rather, I suggested, we could understand the value of having two eyes as giving us, simultaneously, two different views (experiences) from which we could compute an identity and thus create a Piagetian constant object.

⁹ This is very similar to process of von Foerster's Eigen Objects. See von Foerster (1977).

construct an identity between different experiences such that they can be treated as if belonging to the same “object” that is placed out in the world (as an economic convenience of effort in the manner promoted by Occam), thus populating this constructed world with (what seem to be) the independent objects we so often refer to. It is also possible, given that we have cognised such a object, to give this object a type of “precedence” in how we experience so that we shape experience to the constant objects we have already conceived. In this manner, our explanation (to ourselves) of the world shapes our (continuing) experience.

In this action we have created an explanation of how we can use comparing to construct the objects with which we come to populate our world, to place these as if they were in a real world that is independent of us (a Mind Independent Reality); and to develop ways of understanding and shaping our experience to fit the cognising that comes through this act of comparing.

Pattern making

We do not stop at making objects. Man is a pattern making animal. We do not generally consider our experience as a constant flow, nor do we live in a cognitive world of unconnected perceptions, of an infinitude of constant objects floating in the sea of our experience. We live in pattern.

The most elemental way in which we create patterns is by comparing to create identities: at the centre of our cognitive world is the act of identity comparison, through which we can create constant objects.

However, a universe populated only by constant objects, a plethora of unrelated objects created by comparing experiences, would be (in as far as we can imagine it) a vastly disorganised place. But we live in worlds we experience as organised and coherent, at least to a reasonable extent and much of the time. We bring our experiences together, not only by making constancies (conserved/constant objects) but also through other relations that constitute patterns that we form between our (constant) objects, or our ability to reduce the infinite (or the unformed) to the finite and limited.¹⁰ This is how we become “accustomed to anything”—which may be, as Bateson’s Zen master says, a terrible thing.

The proto-logic that derives from comparing allows more operations than creating identity between two experiences. It also enables us to create between experiences the relationships implication (as either deduction or inference) and inclusive or, as well as negation. Thus we create a means by which experiences, and the constant objects that can be made of them by

¹⁰ I owe this understanding of the role of pattern in part to Chaitin’s work on randomness. See Chaitin (1975).

identifying those that—to the agent—share the same moment, can be composed together to create what may be understood as dependencies and, with that, a larger scale pattern and ordering of experience. The same logic that can be derived from relationships in time of experience which allows the creation of constant objects can also be used to relate experiences (and, through them, objects) in other ways, giving a personally generated heterarchy of connection and dependency.

(It should be noted here that this account of the coming into being of pattern, itself an act of making a pattern, can only be constructed from a position in which pattern has already been made. Indeed, this whole account is a bootstrap, and can only explain how what is already taken to exist arises in order that it can come into the existence we construct it to have.)

Conclusion

In this paper I have argued for the central significance of comparison in accounting for our ability to build the sort of worlds we inhabit.

Comparison requires at least 4 components: an intentional agent that has (two) experiences at overlapping moments. These conditions appear to be enough to develop a proto-logic that describes the 3 forms of comparison: identity, scope and contrast. It also accounts for what I have also argued may be considered a form of comparison (or, at least, an outcome of comparing), negation. This logic is based in time and derives from the moments of each experience.

It is shown that, with this equipment, it is possible to account for basic human mentation, leading to a re-interpretation of perception and cognition, an explanation of the creation of the constant objects which we derive from and with which we populate our experience, the composition together of such our experience of constant objects to create the heterarchies of our worlds.

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