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FROM SYNTAX TO REALITY: THE PICTURE THEORY OF MEANING.
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1.   An empiricist/behaviorist linguistics

In a paper entitled 'Eliminative connectionism: its implications for a return to an empiricist/behaviorist linguistics' (Place 1992), I have argued that the emergence of an eliminative connectionism opens the way for a return to the empiricist/behaviorist linguistics which prevailed before the revolution which overtook that discipline in the late nineteen fifties under the influence of Noam Chomsky (1957; 1959). As defined by Pinker and Prince (1988), eliminative connectionism envisages the total replacement of the serial-digital or von Neumann computer by the parallel distributed processor (PDP) as the preferred model for the functioning of the brain. A PDP is a device which learns to recognise patterns by a process of trial and error without having to be specifically 'programmed' so to do, provided it is given

(a)   a sense organ sensitive to differences between encounters with positive instances of the pattern to be discriminated and encounters with otherwise similar negative instances,

(b)   reliable feedback as to when its judgments are correct and when incorrect (errors).

It follows that, in so far as eliminative connectionism succeeds, the acquisition of linguistic competence will be accounted for by the same process of trial-and-error discrimination learning as is observed both in animal learning and in the learning of any other skilled activity in the case of human beings. That, needless to say, is the essence of the empiricist/behaviorist theory of language.

2.   The problem of novel sentence construction

Linguists, however, will not be persuaded to return to such a theory unless and until it can be shown that it can deal, as effectively as its nativist/mentalist rival, with the phenomenon which, as Chomsky correctly perceived, traditional empiricist/behaviorist theories, such as that of Skinner (1957), had totally failed even to address, the phenomenon of novel sentence construction. The phenomenon whereby sentences are very rarely repeated word for word, but are constructed anew on each occasion of utterance presents two problems for an empiricist/behaviorist theory of the acquisition and maintenance of linguistic competence. One problem can be overcome without too much difficulty. This is the problem presented by the fact that in traditional behaviorist learning theory the unit of behavior that is instrumental in changing the organism's environment, thereby securing an 'error' or 'correct' message as a consequence of its emission, is the same unit as that which will be repeated as a consequence of success on

previous occasions. In a Skinner box, for example, the key peck or lever press which secures or fails to secure reinforcement is also the unit of behavior which is repeated as a consequence of reinforcement. In language, by contrast, these two functions come apart. The unit of behavior which is required in order to control the behavior of the listener and secure a 'correct' or 'error' message in the form of what conversation analysts call a 'response token'[1] is either a grammatically complete sentence or, at the very least, a part sentence whose completion can be readily predicted by the listener.[2] But since such sentences are seldom repeated, it follows that the units of linguistic behavior which are repeated on subsequent occasions as a consequence of the previous successful construction and utterance of a sentence will be sentence constituents, things such as words, phrases and sentence frames, rather than sentences as such. This complicates the story that needs to be told in order to explain the speaker's ability to construct novel sentences; but it does not, on the face of it, require any additional principles over and above those required to explain the acquisition of any complex skill.

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[1] Response tokens, both 'correct' and 'error', reinforcing and 'disinforcing' (Harzem and Miles 1978), are specific to the kind of speech act being performed. Thus statements of opinion call for expressions of agreement and occasional disagreement, news-telling (Jefferson 1981) calls for expressions of interest and surprise and occasional *ennui*, troubles talk (Jefferson 1980) calls for expressions of sympathy and occasional impatience, instructions call for expressions of comprehension and occasional doubt or incomprehension, etc.

[2] Evidence that the listener's response tokens are placed rather precisely at the points where sentences become complete is pointed up in Place (1992; 1997) in a passage drawn from the transcript described and analyzed in Place (1991).

The second problem which is presented to an empiricist/behaviorist theory by the phenomenon of novel sentence construction is much more serious. This is the problem presented by the way in which an imperative sentence like

<p align="center">Pick up the red cup</p>

which the listener may never have heard before can induce him or her to emit behavior which he or she has never before emitted and which an animal or pre-linguistic infant could only be induced to emit after a lengthy process of behavioral shaping.[3] Similarly a novel indicative sentence like

<p align="center">There is a cake in the red tin</p>

can enable the listener to adapt effectively and appropriately to a contingency of which he or she has had no previous personal experience and which could not otherwise impinge on his or her behavior.

Clearly, the ability to respond appropriately to such novel sentences depends in part on past associations in the listener's experience between occurrences and uses of the words and expressions of which the sentence is composed, and occurrences of the kind of object, feature or situation[4] to instances of which the word or expression is regularly used to refer. But something more than is required in order to explain the listener's ability to respond appropriately to sentences where neither the sentence, nor the situation it

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[3] I am indebted to Dr. Israel Goldiamond of the University of Chicago for this point. See his Goldiamond (1966).

[4] 'Situation' here in Barwise and Perry's (1983) sense.

depicts, nor the combination of the two have been part of the listener's previous experience.

3.   *The picture theory of the meaning of sentences*[5]

The solution to this problem which I favor is an application to the sentences of natural language of the so-called "picture theory" developed by Wittgenstein (1921/1971) in the **Tractatus Logico-Philosophicus**. On this theory, a simple sentence like *Shut the door* or *The door is shut* functions for the listener, in the case of an imperative or interrogative sentence, as a plan or blueprint for an action or utterance that is required by the speaker from the listener, and, in the case of an indicative sentence, as a map or diagram of some past, present or future feature of the extra-linguistic environment. It does so by virtue of an isomorphism or one-to-one correspondence between the syntactic structure of the sentence and the senses or intensions of its terms (constituent noun phrases and verb phrases) on the one hand and the structure and content of the segment of extra-linguistic reality which is thereby depicted on the other.

In order to give substance to this notion of an isomorphism between the structure and content of the sentence and the structure and content of the segment of extra-linguistic reality which it depicts we need two parallel taxonomies, one linguistic or syntactic, to be more precise, and the other

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[5] This section is reproduced from Place (1990).

ontological. The syntactic taxonomy which I favor derives from Frege's (1879/1960; 1891/1960) function and argument analysis of the structure of sentences which he introduced in place of the classical subject-predicate analysis in order to accommodate relational or multi-place predicates. Compound sentences are analysed into simple sentences. Simple sentences are analysed into function, predicate or verb phrase on the one hand and one or more arguments or noun phrases occupying the argument places determined by the function/predicate/verb phrase on the other. Verb phrases are analysed into verb with or without adverbial qualification, or adjective plus copula in both cases with indicators of tense and aspect. Finally noun phrases are analysed into nouns, pronouns, quantifiers and qualifying adjectives. Corresponding to this syntactic taxonomy, I propose an ontology which derives partly from Aristotle's taxonomy of Categories and partly from the taxonomy recently proposed by Barwise and Perry (1983) in conjunction with their "Situation Semantics". According to this view, every thing in the universe belongs to one or other of three basic categories:

(1)   concrete particulars, or physical 'substances' to use Aristotle's term, space-time worms which are extended and bounded in three dimensions of space and one of time,

(2)   features which are of two kinds,

(a)   properties which are properties of some other thing, but only one such thing, and

(b)   relations in which two or more other things stand to one another, and

(3)   situations which are also of two kinds

(a)   states of affairs whereby a property of a thing or a relation between two or more things persists unchanged over a period of time and

(b)   events whereby a property of a thing or a relation between two or more things changes either at a moment of time or over an extended period of time.

It should be noted that in this taxonomy the things that properties are properties of and that relations hold between may be either concrete particulars, features (properties of relations or relations between properties) or situations. Relations, however, can only hold between things of the same category, between concrete particulars, between properties or between situations. Moreover, there are no situations which do not involve the persistence of or changes in the features of one or more concrete particulars. As Aristotle puts it, substances are the ultimate subjects of all predication, the ultimate bearers of all properties, the entities between which all relations ultimately hold.

The way in which these two taxonomies map onto one another may be illustrated by means of the well known example of a simple relational sentence **The cat is on the mat**. Thus:

(a)   **concrete particulars** are represented by the noun phrases **the cat** and **the mat** occupying the argument places generated by the function (the verb phrase *is on*)

(b)   **features of concrete particulars** (in this case a relation between the two) are represented by a function or multi-place predicate expression (in this case the verb phrase *is on*)

(c)   *situations* are represented by the complete simple sentence (**The cat is on the mat**)

(d)   **features of features** are represented by adverbs and adverbial phrases (e.g. the adverbial phrase *without moving a muscle* in the sentence **The cat is sitting on the mat without moving a muscle**) while

(e)   **features of situations** are represented by compound sentences (e.g. **It is irritating to find the cat always on the mat**, **Dawn has broken and the cat is on the mat**, **If the cat is on the mat, it will be fed**.

A more elaborate presentation of this mapping of ontology onto syntax and *vice versa* is shown on Table 1.

Ontology   Syntax
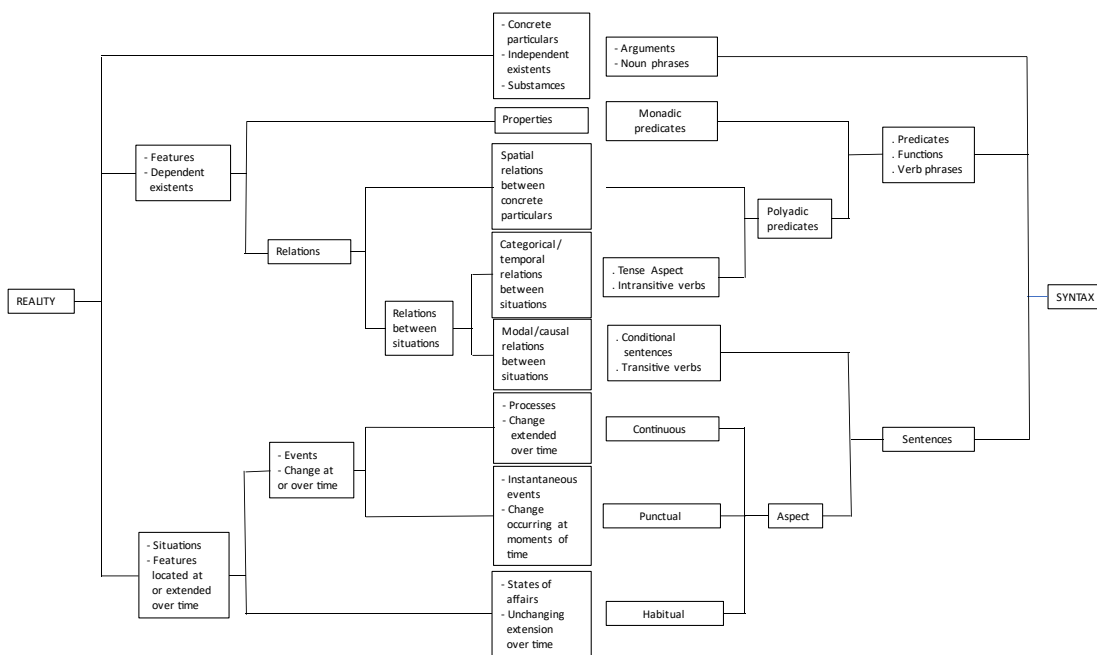
Figure 1

Reading from left to right: reality imposes its structure on syntax.

Reading from right to left: syntax predicts the structure of reality.

It is a consequence of this version of the picture theory of the meaning of sentences that

(a)   an imperative is complied with in so far as the listener creates a situation which **conforms to** that specified by the sentence,

(b)   an indicative or declarative is contingently true in so far as there exists a situation which **corresponds to** that specified by the sentence (the correspondence theory of truth).

Another implication of this view is that Frege's (1892/1960) distinction between the sense (**Sinn**) and reference (**Bedeutung**) of a singular term applies **pari passu** to all linguistic expressions from phrases to complete sentences. The

sense of an expression, on this view, is the kind of concrete particular, feature or situation which, if it existed, would constitute the referent of the expression in question. Equally, the referent of an expression is that actually existing concrete particular, feature or situation, or class of such actually existing concrete particulars, features or situations to which a speaker who uses the expression in question is able to draw the attention of any competent listener who has the background knowledge required to identify the referents of any constituent indexicals or proper names. But since the function of an imperative sentence is to specify a situation which will not exist unless or until it is brought into existence by the listener, it is only in the case of a true indicative/declarative sentence in the past or present tense that the feature represented by the predicate and the situation represented by the sentence as a whole actually exist. It is only in these cases that predicates and sentences can be said to have referents.

4.   Some pitfalls in the argument from syntax to ontology

The importance of the picture theory of the meaning of sentences for our present purposes is that it is only on some such hypothesis as this that we can explain and justify what in my paper 'Is consciousness a brain process?' (Place 1956) I referred to as

> the curious phenomenon whereby questions about the furniture of the universe are often fought and not infrequently decided merely on a point of logic.

Only if there is, indeed, an isomorphism between the structure and content of sentences and the structure and content of the reality that is thereby depicted, can we make sense of the philosopher's claim to draw ontological conclusions, conclusions about "the furniture of the universe", from a study of the syntax of sentences in natural language.

It must, nevertheless, be emphasized that in endorsing a version of the picture theory of the meaning of sentences, I am not committed to the view that there is always, or even typically, a simple and invariant mapping between types of syntactic unit and the types of entity, feature or situation they depict. As a conceptualist, one who believes that universals are mental constructions, I am committed to denying the existence of abstract objects. According to this view the belief in abstract objects is a result of the practice of nominalising an expression whose natural occurrence within simple sentences is as or within a predicate expression, in order to be able to put the expression into an argument place (usually the subject argument place). Thus instead of saying 'The glass is brittle' we can say 'Brittleness is a property of the glass.' This device enables the speaker to focus on the predicate and what it stands for, instead *using* it, as in the first case, simply to say something *about* something else, in this case the glass. Unfortunately argument places, particularly the subject position, have a double function. One is the function of bringing something into the focus of discussion. The other is function which it has in cases like 'The glass is brittle' or 'The cat is on the mat' of indicating that what is being mentioned by this part of the

sentence is an object (in the sense of a physical substance or concrete spatially extended and bounded particular). Clearly 'brittleness' is not an object in this sense. So we are tempted by the use of the noun form occupying the subject position in the sentence to suppose that what we have here is another kind of object, an abstract object.

A similar argument applies in the case of intentional objects or 'referentially opaque contexts', as Quine calls them. In this case a linguistic expression occupying the direct-object argument place, as in the case of the noun phrase 'an apple' in the sentence 'I would like an apple, if there is one', is used, not to refer to any actual object, as the form of the sentence might suggest, but to specify a range of possible objects any one of which would satisfy the speaker's desire. Here again we are tempted by superficial grammar to follow Meinong in postulating an **Aussersein** inhabited by these 'inexistent' intentional objects. A similar thought process has led philosophers in recent years to propose the ontology of possible worlds in order to accommodate another grammatical device, the counterfactual conditional.

But once we admit these exceptions to the principle whereby the structure of sentences mirrors the structure of reality, we are confronted with what is arguably the most fundamental problem in the methodology of ontology, namely, the problem of how to decide which parts of the structure of a sentence correspond straightforwardly to objects and features of reality and which do not.

The only answer I can suggest to that problem is that in deciding such questions we should be guided by three principles:

(1)   the principle of choosing those ontological assumptions which make best sense of the human ability to construct and construe novel sentences in natural language,

(2)   the principle whereby the child will begin by construing and constructing sentences in which there is a one-to-one correspondence between lexical items and some aspect of the extra-linguistic environment, and will only begin to use more devious and sophisticated forms of expression, such as nominalisation or referentially opaque expressions, at a later stage in its linguistic development,

(3)   the principle of ontological parsimony (Ockham's razor).

5.   From syntax to ontology: the phenomenon of aspect

How far these principles will suffice to resolve the disputes between the different ontological schemes proposed by different philosophers, and how far, if they do suffice, they will command acceptance, only time will tell. In the meanwhile, the only argument that will bear much weight is a demonstration of the practical utility of conclusions drawn from an examination of syntax in helping us to disentangle the actual phenomena which the syntax is used to depict.

In my view, the most convincing demonstration of the practical utility of an ontological classification derived from a study of the syntactic conventions governing sentence construction in natural language comes from the domain of 'common sense' or, as it is somewhat irreverently termed these days, 'folk psychology.' I refer to the classification of psychological verbs and verb phrases in terms of the 'aspects' which do and do not yield an intelligible sentence when applied to the verb or verb phrase in question.

By the 'aspect' of a verb or verb phrase is meant those variations in the tense of the verb or verb phrase as it occurs within a sentence which serve to indicate more subtle relations between a situation and its temporal context than the simple relation of past, present or future relative to the **now** of utterance. Although some aspectual variations reflect differences of an ontological kind, others do not; and even in those cases which do reflect an ontological distinction, this is apparently incidental to their primary function. The primary and, in some cases, the sole function of aspectual variations is to locate the situation depicted

by the sentence in relation, not just to the **now** of utterance, but also to the **then** of narrative and the **then** of prediction. This is illustrated by the distinction between the **imperfective** and **perfective** aspects in relation to which the term 'aspect' was first used by students of the Slavonic languages in which this difference is marked by two radically different form of the verb. The nature of this distinction and the semantic function of the different tense forms which it qualifies is depicted on Table 2.[6]

Ontological differences only begin to emerge in the case of distinctions of aspect such as that which we have in English, but not, so far as I am aware, in other European languages,[7] between the **continuous** and **habitual** aspects. In this case, the continuous aspect marks a continuous ongoing activity, whereas the habitual aspect signifies a propensity to do something intermittently from time to time. However, even in this case it is arguable that the ontological significance is subordinate to the primary semantic function of aspect, that of locating the

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[6] I am indebted to Tony Galton's book *The Logic of Aspect* (Galton 1984) both for this example, for the terminology used throughout this section (except where I have adapted it to my own purposes), and, indeed, for such understanding of this difficult topic as I have managed to achieve.

[7] Other languages do, of course have ways of marking the distinction. For example, the continuous aspect is marked in French by the use of the phrase *être en train de*, the habitual aspect by phrases like *avoir l'habitude de*.

Aspect/Tense	Example	Function
Imperfective Past	*I was writing a book*	Locates the **then** of narrative within the period over which the speaker's book-writing took place.
Imperfective Present	*I am writing a book*	Locates the **now** of utterance within the period over which the speaker's book-writing took place.
Imperfective Future	*I shall be writing a book*	Locates the **then** of prediction within the period over which the speaker's book-writing will take place.
Perfective Past	*I wrote a book*	The **then** of narrative coincides with the period over which the speaker's book-writing took place.
Perfective Present	[When/If] *I write a book*	The **then** of prediction coincides with the period over which the speaker's book-writing will take place.
Perfective Future	*I shall write a book*	Locates the **now** of utterance as prior to the period over which the speaker's book-writing will take place.
Table 2		

now of utterance and the **then** of narrative and prediction within the overall time scale. This is illustrated on Table 3.[8]

There is also another distinction of aspect which is of ontological significance on the opposite side, as it were, of the continuous aspect from that occupied by the habitual aspect. This is the distinction between the *continuous*

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[8] This example is also borrowed from Galton (1984).

Aspect/Tense	Example	Function
Continuous Past	**Jane was swimming**	Locates the **then** of narrative within the period over which Jane's swimming took place.
Continuous Present	**Jane is swimming**	Locates the **now** of utterance within the period over which Jane's swimming took place.
Continuous Future	**Jane will be swimming**	Locates the **then** of prediction within the period over which Jane's swimming will take place.
Habitual Past	**Jane used to swim**	Locates the **then** of narrative within the period over which Jane habitually swam.
Habitual Present	**Jane swims**	Locates the **now** of utterance within the period over which Jane habitually swam.
Habitual Future	**Jane will swim**	Locates the *then* of prediction within the period over which Jane will habitually swim.
Tabel 3		

and *punctual* aspects. On contrast to the continuous on-going activity signified by the continuous aspect and the intermittent repetition signified by the habitual aspect, the punctual aspect signifies an isolated instantaneous event. The distinction between this and the continuous aspect is illustrated on Table 4.

Aspect/Tense	Example	Function
Continuous Past	*Joe was striking his fist on the table*	Locates the **then** of narrative within the period over which Joe's fist-striking took place.
Continuous Present	*Joe is striking his fist on the table*	Locates the now of utterance within the period over which Joe's fist-striking took place.
Continuous Future	*Joe will be striking his fist on the table*	Locates the **then** of prediction within the period over which Joe's fist-striking will take place.
Punctual Past	*Joe struck his fist on the table*	Locates the **then** of narrative at the point when Joe's fist strikes the table.
Punctual Present	*Joe's fist strikes the table - NOW!*	Locates the **now** of utterance at the point when Joe's fist strikes the table.
Punctual Future	*Joe will strike the table with his fist*	Locates the **then** of prediction at the point when Joe's fist strikes the table.
Table 4		

6.   *Aspect and the ontological taxonomy of situations*

Although neither of them used that terminology, the first philosophers to use aspect as a criterion for distinguishing different types of situation were Wittgenstein (e.g. 1953, p. 59, footnote [a]) and Ryle (1949, Chapter V). In a paper entitled 'Sensations and processes - a reply to Munsat' (Place 1972), I argued that using these aspectual criteria (I call them 'logical criteria' in the paper) enables us to distinguish three categories of situation:

(a)   **processes** which involve continuous change over time and correspond to the **continuous** aspect,

(b)   *instantaneous events* (referred to simply as 'events' in the paper), changes which occur at points of time, but are not extended over time, and which correspond to the *punctual* aspect,

(c)   *states* or *states of affairs* which, like processes, are extended over time, but in this case without change.[9]

There are at least three different kinds of state:

(a)   *categorical states* such as spatial relations between objects which remain constant over a period time,

(b)   *process states* (as we may call them) which are simply processes viewed from the standpoint of what remains constant from its onset to its cessation and thus individuates one process from another,[10]

(c)   *dispositional states* which, according to Ryle (1949), are a matter of what would happen, if certain hypothetical conditions were to be fulfilled, but which persist without change in the absence of those conditions.

Of these the process states, like the processes of which they consist, are distinguished by the use of the continuous aspect; whereas the categorical and dispositional states are marked by the habitual aspect. This gives us the threefold

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[9] Kenny (1963) and Vendler (1967) have proposed similar threefold, or in Vendler's case, fourfold classifications of situations based on aspectual considerations which also have their source in the Wittgenstein/Ryle tradition. To my mind, both these classifications confound the distinction between the Continuous/Punctual/Habitual aspects with that between the Imperfective/Perfective aspects.

[10] Galton (1984) restricts his usage of the term 'state' to states of this kind. This detracts from the utility of his analysis from the perspective adopted here.

classification of situations by the criterion of aspect, (a) processes (or activities), (b) instantaneous events and (c) dispositional states, which provides the foundation for a taxonomy of the psychological predicates of ordinary language which, to my way of thinking, is an invaluable guide to the way language, thought and behavior are controlled by the brain.

7.   *Aspectual differences between psychological verbs*

Although, as we have seen, Ryle did not use this terminology, it was he who first pointed out that the psychological verbs of ordinary language differ in the aspects they do and do not accept, and can be classified accordingly. There are some psychological verbs which are distinguished by the fact that they accept the continuous aspect. These Ryle calls 'activity verbs.' Of those that do not take this aspect, some take the punctual aspect. These Ryle calls 'achievement' or 'got it verbs.' I prefer to call them 'act' or 'instantaneous event verbs.' Others take the habitual aspect. These are Ryle's 'dispositional verbs.' Examples of these different varieties of psychological verb are presented on Table 5.

8.   *Mental activities and mental processes (experiences)*

There are two things to notice about this table. Firstly, you will notice that I have divided those verbs and verb phrases which take the continuous aspect into two: 'mental activity verbs' and 'mental process verbs.' The distinction is between those ongoing processes in which it makes sense to talk of human beings and other

Mental Activities (Active Control of Experience)

Motivational

is enjoying doing ST
is trying to do ST

Imaginative

is contemplating ST
is dreaming
is daydreaming
is picturing ST in the mind's eye

Cognitive

is paying attention to ST
is concentrating on ST
is studying ST
is watching ST
is looking at ST
is looking for ST
is listening to ST
is savouring ST
is feeling ST with the fingers
is thinking about ST
is pondering ST
is calculating ST

Mental Processes (Passive Experience)

is feeling a glow of pleasure
is feeling pain
has got an itch
is feeling sick

is having a dream
is seeing an image
is having an hallucination
is conscious of a train of thought

it seems to O as if p
it looks to O as if p
it sounds to O as if p
it smells to O as if p
it tastes to O as if p
it feels to O as if p
is feeling a sensation
is seeing ST in the mind's eye
is hearing a ringing in the ears

Instantaneous Mental Events (Onsets of Dispositions)

decided to do ST

inferred that p
concluded that p
decided that p
it occurred to O that p

noticed ST
recognised ST
realised that p
remembered ST
found ST
saw ST
heard ST
smelled ST
tasted ST
felt ST

Mental States (Dispositions)

wants ST
wishes that p
likes ST
intends to do ST
is pleased
is excited
is angry
is frightened
is afraid
is disgusted
is miserable

believes that p
thinks that p
considers that p
expects ST to happen

knows ST
knows that p
understands ST
remembers ST

Table 5

living organisms 'being actively engaged' and those which we describe them as 'passively undergoing' (their experiences). This is not a distinction which is marked by aspect in the strict sense. Nevertheless the criteria on which the distinction rests are syntactic. Not only is it a matter of what one can be said 'to engage in' versus what one can be said 'to undergo.' Another mark of the language used to characterize mental processes (experiences) as distinct from mental activities is the use of impersonal verbs, as in the sentences such as **It hurts** or **It was as if I were falling from a great height**. The utility of the mental-activity/mental-process distinction is that it gives us something, namely mental processes (experiences) which it is the function of mental activities to regulate and control or, as in the case imagining something, generate.

Secondly, you will also notice that the different groups of psychological classified according to aspect have been arranged in the form of an information flow diagram with the input end at the top and the output end at the bottom.

9.   Instantaneous mental events: the interface between process and disposition

The justification for arranging examples of these different varieties of mental situation presented on Table 5. in the form of an information flow diagram comes from a discovery which I reported in a paper entitled 'The mental and the physical – a reply to Dr. Meynell' (Place 1973) as follows:

> By mental or conscious acts I understand those occurrences which are referred to by such verbs as 'seeing', 'hearing', 'noticing', 'perceiving',

'recognising', 'recollecting', 'realising', 'grasping', 'understanding' (in some of its uses), 'judging', 'concluding', 'inferring' and 'deciding.' These are all what Ryle[11] has called 'achievement verbs.' They all share the common characteristic of referring to an event that occurs at a particular moment of time, but which, like processes and unlike instantaneous events, are extended in time but unlike processes cannot be said to be occurring at any time during the period over which they apply. As I have observed elsewhere, 'any process like any state entails at least two events, its beginning and its end.'[12] One might add that every instantaneous event is both the end of one state or process and the beginning of another. For example, in Hume's famous case of the billiard balls, when the event of a ball's hitting the cushion occurs, one process (movement towards the cushion) ends and another process (movement away from the cushion) begins. In other cases, as when the ball loses momentum and stops, a process gives way to a state. When the ball is struck by the cue or by another ball, the stationary state gives way to a process of movement, although in such cases our attention is more commonly focused on the transformation of the process whereby the cue moves towards the ball into the process of movement in the ball itself. Changes from one state to another without an intervening process, though logically possible, belong to the realm of magic and miracles rather than to reality as we know it in everyday life.

If we examine the mental or conscious acts I have listed, in the light of these distinctions we notice that they are all instantaneous events which constitute the termination or culmination of a mental process or activity and the institution of a new mental state. Thus seeing, in the ordinary visual sense, involves an antecedent mental process of looking and a subsequent and consequent mental state of knowing what it is that is visually present. Hearing involves an antecedent mental process of listening and a subsequent and consequent mental state of knowing what was said or what sort of sound it was. Noticing involves the antecedent mental process of looking, listening or otherwise attending and the subsequent and

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[11] Ryle *op. cit.* Chapter V, 5, pp. 149-53.

[12] Place (1972) *op. cit.*, p. 111.

consequent mental state of knowing that there is something answering to the description in question in one's stimulus field. Perceiving consists in the coming about of the mental state of knowing something as a consequence of a variety of mental processes, all the way from looking, listening or otherwise attending, to thinking, pondering, calculating or even dreaming or day-dreaming. Recognising consists in the acquisition of the mental state of being in a position to impart correct information based on past experience consequent upon the mental process commonly referred to as 'racking one's brains.' Realising involves knowing that what is realised was, is or will be the case as a consequence of almost any kind of antecedent mental process. Grasping or understanding, in the mental act sense of that word, involves the antecedent mental process of either reading what is written or listening to what is said and the consequent mental state of knowing what it means. Judging, concluding and inferring involve the antecedent mental process of thinking, pondering or calculating, and the subsequent and consequent mental state of believing the proposition in question either to be true or at least to be a valid inference from the premises of an argument. Deciding, in the sense in which it means something different from judging or concluding, involves, as a consequence of the same sort of antecedent mental process, the mental state of intending to do something.[13]

This analysis of an instantaneous mental act or event, as the interface between an antecedent mental activity and/or process and a subsequent and consequent dispositional mental state which is thereby induced, when combined with the introspective observations of human subjects, yields the picture of our mental life as a whole which is represented diagrammatically on Table 5. It consists in a continuous sequence of mental activities spread out horizontally over time. These mental activities are of three basic kinds:

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[13] Ryle, *op. cit.* Chapter V, 5, pp. 151-3, makes the same point with his distinction between 'task verbs' and 'achievement verbs.' [original footnote]

(a)   the activity of **paying attention** to stimulation of the sense organs generated by events and states of affairs occurring and persisting both inside and outside the body, yielding a corresponding sequence of sensory experiences (mental processes).

(b)   the activity of *imagining* something, whereby a generally rather fainter experience (mental process) resembling a sensory experience is created in the absence of the sensory stimulation which would be required in order to generate the sensory experience(s) it resembles,

(c)   the activity of **thinking** which, in the human case, consists partly in imagining things, partly in talking to oneself, whether out loud, **sotto voce** or by imagining oneself saying something, and partly in the intermittent occurrence of instantaneous thoughts with no obvious connection with or dependence on the current flow of sensory experience, images and self-directed speech.

At intervals which are usually quite brief, a matter of milliseconds, this sequence of mental activities and mental processes is punctuated by instantaneous mental events of which the instantaneous thought occurrences which form part of the process of thinking are typical. As we have seen, the effect of these instantaneous mental acts is to initiate a subsequent and consequent mental disposition. Most of these mental dispositional states are extremely short-lived, evanescent thoughts which are dismissed or are rendered inoperative by the succession of environmental events almost as soon as they appear. Others, such as the intention

to do something, may persist for some time until the opportunity to do so appears. Some become part of the individual's permanent stock of beliefs and desires and can persist for a lifetime. But however long they last, they consist, if Ryle (1949) is right, in a capacity or propensity which, if it is manifested at all, manifests itself as much in things the individual publicly says and does so long as the disposition persists, as it does in the individual's private thoughts and experiences over the same period.

10.   Conclusion: 'Consciousness as an information-processing system'

In a forthcoming paper [Place (2000)] entitled 'Consciousness and the zombie within: an evaluation of the blindsight evidence', I try to show that there is a remarkable convergence between this picture of human mental life and the 'Information flow diagram for the organism' presented by Donald Broadbent in his book *Perception and Communication* (Broadbent 1958, p. 299) and revised, though without producing a new diagram, in his later book **Decision and Stress** (Broadbent 1971, pp. 7-17). If this convergence is substantiated, we can look forward, I believe, with some confidence to the day when the linguistic and introspective evidence will be able to take its place alongside the evidence from experimental psychology, experimental neurophysiology and clinical neurology in the study of the human brain in its control and production of language, thought and behavior.

For although he acknowledges (Broadbent 1958, p. 301) the resemblance between his theory and the philosophically and introspectively based account of the phenomenon of attention given by William James (1890, Chapter XI), Broadbent's picture of the brain as an information-processing system is constructed entirely in the light of evidence derived from the detailed experimental analysis of human performance. What we now have, if I am right, is a remarkable convergence between the picture which emerges from that evidence and that which emerges from evidence of a very different kind. As we have seen, this evidence comes partly from a neo-Rylean conceptual analysis of the psychological language of ordinary discourse, and partly from the introspective reports of naive human subjects, formulated, as they necessarily are, in terms of the psychology of ordinary language and interpreted, as they need to be, in the light of a conceptual analysis of that language such as that presented here. Assuming that the convergence is more than a coincidence and that Broadbent's layout for the organism is broadly sound, it is my submission that the conclusion that that is how things actually are will prove difficult to resist, particularly if a similar picture also emerges from the neurophysiological and neurological evidence.

11. References

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