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## *Psychoneurology: The Program*

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'There is nothing in the universe except meanings and molecules.' (Anon)

As a science emerges from a common-sense understanding of certain kinds of phenomena it only gradually becomes clear what are the fundamental entities of the 'world' under study. Psychology grew out of our everyday reflections on the beliefs and practices relevant to people thinking, acting, feeling and perceiving. The scientific study of these phenomena should, we believe, be built on a common fundamental presumption: that *persons* are the basic beings at the root of a scientific psychology. It is persons who think, act, feel and perceive. Persons are the fundamental entities of psychology.

In a sense a person has no parts, in particular, a person is not a union of a mind and a body. However, while persons have no parts, each person, though a singularity, has a vast array of attributes. Some are material attributes and some are mental capacities, powers and dispositions. Though people are sometimes acted on by outside forces they always retain their status as ultimate agents, at least in principle. Personal agency, we might say, is the default position when we are studying what people do. When people lose their powers to think, act, feel and perceive the world around them and the condition of their own bodies, we take them to be in need of care and perhaps of cure. For example, in the law courts we consider the accused responsible for his or her actions, unless there is a successful plea of insanity.

For more than four centuries psychology was led away from the most fruitful research domain by the widespread assumption that we should treat the material attributes of persons as properties of the human body, a material substance, and the mental attributes of persons as properties of a parallel stuff, the human mind. Persons were taken to be 'miraculous' conglomerates of bodies and minds, a material thing somehow joined to an immaterial thing. In the 20th century this duality assumption subtly influenced the thinking of the majority of psychologists. Even those who rejected the idea of the mental aspects of a human being as attributes of a substantial mind, nevertheless still implicitly subscribed to the *distinction* between mind and body even and especially when they declared that the way human beings think, act, feel and perceive can be understood in material terms. We believe that the next step in the development of psychology, as a human science for the third millennium, will be achieved when the very distinction between minds and bodies is abandoned.

In this book we set out the various ways a hybrid conception of persons as meaning-making embodied agents depending on one another for their very existence as persons can advance the project of a scientific psychology. We will demonstrate the power of this proposal across the traditional domains of psychology, thinking, acting, feeling and perceiving to invigorate the traditional divisions of psychology as a human science.

**Wilhelm Maximilian Wundt (1832–1920)** was born in the town of Neckarau in Germany, the son of a Lutheran minister. After boarding school he went on to university to study medicine. According to the German custom he attended lectures at several universities, including Tubingen, Heidelberg and Berlin.

In 1857, he began to teach physiology at the University of Heidelberg. From 1858 to 1864 he was assistant to the Heinrich von Helmholtz, the great German polymath.

In 1864, he moved to Leipzig where he began experimental studies of the senses, particularly vision. By 1881 he had gained sufficient confidence to begin teaching a class on physiological psychology, essentially concerned with the correlations between various physiological phenomena and individual experiences of sight, sound and so on. In 1879, Wundt claimed that he had founded an independent *science* of psychology. The fame of his laboratory soon spread, attracting students from across the world, including E. B. Titchener and G. Stanley Hall.

According to Wundt, psychology was the study of conscious experience. A person was surely the best observer of his or her own experience, so introspection became the major experimental method, as a rigorous and highly disciplined research method, by which elementary sensations were extracted from the complexities of actual experience without imposing interpretations. Together with the intensity and duration of sensations went attention to the qualities of the feelings that accompanied them. The combination of sensations and feelings is what constitutes our mental functioning.

Later in life Wundt began a very different kind of psychology – *Volkerpsychologie* – something very like the cultural psychology we recognize today. Wundt set out to show by the accumulation of examples of cultural phenomena of all kinds, that key aspects of human life could not be accounted for by the attention to individual consciousnesses. They were distinctive in kind and origin, requiring the hypothesis of collective mental processes. Wundt never quite arrived at the current idea of how such processes are possible through the use of language and other symbolic systems to generate interpersonal psychological processes. He died in 1920.

This project is not new. In the 19th century Wilhelm Wundt directed a program of experimental researches to the study of the correlations between the elements of conscious experience and the physical stimuli which brought them about. However, he also undertook a vast study of the cultural side of human psychology and published an enormous 10-volume treatise on *Volkerpsychologie*, commonly translated as ‘folk psychology’ (Wundt, 1916). Here Wundt’s focus was on the form that human activities take by adherence to norms rather than by responding to events or states as causes.

Another version of a two-pronged psychology was proposed by William Stern at the beginning of the 20th century. Philosophers such as Ludwig Wittgenstein (1953) and psychologists such as Lev Vygotsky (1978a) and Jerome Bruner (1986) anticipated the idea of such a hybrid. It is being rediscovered in the 21st century. Stern coined the phrase ‘unitas multiplex’ to capture the idea that though persons are the fundamental unanalyzable units of the science of psychology each has a complex and unique manifold of attributes (Stern, 1938). Psychology must somehow blend our knowledge of meanings and our knowledge of molecules. While seeking universal features of the human form of life, psychology must acknowledge the individuality of each human being. During the latter part of the 20th century there emerged a robust literature representing psychology as a normative science, for example, as reflected by developments in cultural psychology (Cole, 1996), socio-cultural psychology (Valsiner & Rosa, 2007), as well as various other emerging normative research traditions (Moghaddam, 2002, 2005, ch. 20).

**William Stern (1871–1936)** was born in Berlin into a middle-class family, the only child. His father had a modest business designing wall paper. After high school he entered the University of Berlin in 1888 to study philology but soon changed to philosophy and psychology. He realized that psychology could not be fruitfully developed according to the methodology of the natural sciences as presented by the positivists. In 1899, he married Carla Josephy with whom he began their famous diary recording the development of their three children. After his doctoral studies in Berlin he moved to the University of Breslau in 1897 to work under Herman Ebbinghaus, staying until 1916. Though he invented the Intelligence Quotient (IQ) as a ratio of mental to chronological age he soon became sceptical of the uses to which it had been put.

His importance to the advent of hybrid psychology was his emphasis on the distinction between things and persons, and his realization that persons were to be understood as individuals. He came to this insight from his work on differential psychology. It is not a great step to realizing that acknowledging the importance of differences between people implies that each person is in many respects unlike any other. His conception of critical personalism came from the further insight that people are active agents capable of evaluating a huge variety of thoughts and actions. The person is a simple entity with complex attributes. For this he coined the phrase ‘unitas multiplex’.

In 1916, he moved to Hamburg where he helped to found the university in 1919. He continued in Hamburg until the Nazi regime banned anyone of Jewish origins from university teaching. In 1934 he moved to Duke University in the United States. He died in Durham, NC, on 27 March, 1938.

Under the principle of unitas multiplex our research will involve the study of ‘bodily’ aspects such as the running of molecular machines and ‘mental’ aspects such as the unfolding of sequences of meanings within the constraints of the norms of our local ways of life. The results of the study of each such aspect will reveal the tools and instruments with which people manage their lives.

## Scientific Methodology and the Two Concepts of Causality

In order to understand the way a scientific psychology *should* develop we need to understand the basic principles of scientific research thoroughly. Unfortunately, through a series of misunderstandings, a good deal of the psychological research of the last half century has been profitless, based on a flawed philosophical account of the nature of scientific explanations.

Human beings long ago became aware of the world around them and of their own lives as a flux of change. Though most change is smooth and continuous the human way has been to chop up the flow into sequences of events, happenings. The first step in a scientific research program is to develop a classification system for the happenings that are the focus of research. Sometimes events seem to defy all pattern and order, but more often regular sequences are discernible among types of happenings. We observe and catalogue sequences of changes, both continuous and discrete.

How can regularities in the flux of events be explained? Pairs of sequential events are picked out in terms of the concepts of 'cause' and 'effect'. To bring about a desired state of affairs one makes the cause happen, and then, all else being equal, we can expect that the desired effect will occur. We boil the oatmeal and the porridge thickens. But what mediates the transition from cause event or state to effect event or state, from the raw to the cooked? As a general rule when we first notice a regularity among pairs of events or states we have no idea what the intervening process might be. We soon turn to speculations about unobservable processes that link cause events and states with their effects. Alternatively, we ascribe some sort of efficacy, power or agency to something that seems to be the efficacious cause. Already we have the source of a long-running duality in how people understand causality.

Agency explanations abounded in the 17th and 18th centuries, particularly in physics and chemistry. They were matched by an equal abundance of hidden mechanism explanations. While Isaac Newton filled the universe with forces and powers, Robert Boyle filled it with invisible corpuscles or molecules. Though we can observe the effects of the action of forces, the forces themselves remain hidden. The same is true of the consequences of rearrangements of the minute parts of material things. We can observe the outcome of a chemical reaction but we cannot observe the interchanges of atoms among the invisible intangible molecules.

However, if we think that knowledge must be certified by observation then speculations about forces and powers as well as hypotheses about invisible atoms ought not to be included in the realm of scientific certitude. In an influential study published in 1787(1962), David Hume argued that the only legitimate meaning that could be given to the concept of causation among events and states must be limited to the fact of regular sequences in like pairs of events. Any idea of efficacy or power to bring about changes must be put down to the psychological effects of observing many such regularities. Our sense of the necessity of a causal process is nothing more than a tendency or habit to expect an event of the effect type when we have observed one of the cause type. No connection can be observed between them. To establish the existence of a causal sequence all we can do is to turn to statistical analyses of lots of similar cases. The danger of crossing the boundary between certitude and speculation precludes our seeking the active powers or the hidden mechanisms that bring about the effects in which we are interested. In the 20th century this point of view was revived in the influential writings of the positivists (see Ayer, 1978), the philosophers of the Vienna Circle. Intent on ridding the world of ungrounded metaphysical speculations and of the other-worldly

fantasies of religion, they managed to eliminate most of science as well. The effect of these ideas diffusing into psychology was disastrous. Unfortunately, under the influence of James B. Watson and the behaviorists, psychologists abandoned agent-causality completely and took up the Humean or positivist version of event-causality, without the underpinning of hypothetical causal mechanisms. In the intervening years various attempts to make up this deficit have been proposed, such as the computational model of cognition. From our point of view agent-causality is the appropriate concept for cultural/discursive studies of human thinking and acting, while a kind of event-causality that is based on hypothetical generative mechanisms is the appropriate concept for neuroscience and related programs.

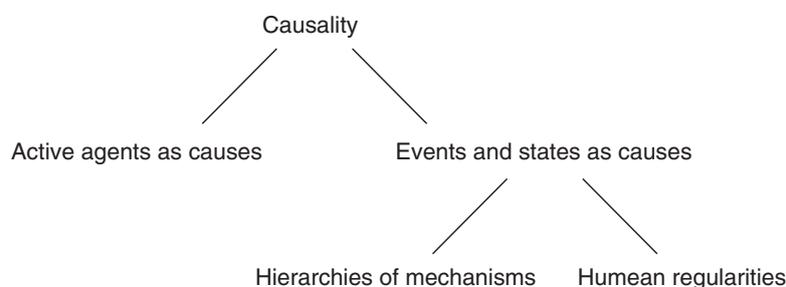
There is no place for the Humean regularity of sequence concept in any science. This point of view became a kind of dogma despite the fact that the sciences had advanced by the very route that Hume would have forbidden them, by developing hypotheses about the causal powers of natural agents such as magnetic poles and electric charges and about the hidden mechanisms that brought about orderly change in the world. The mechanism of the solar system explained eclipses, the seasons, the phases of the moon and so on. This mechanism was held together by the force of universal gravity and the kinetic energy and momentum of the moving planets. What was there not to like in this magnificent Newtonian analysis of the solar system?

Drawing on the triumphant success of the natural sciences we have two kinds of causality available for the psychology of the third millennium, each with its proper domain of application and each with its attendant implications. Agent-causality focuses on beings with powers to act, which are shaped and constrained by all sorts of environmental conditions. Event-causality focuses on hierarchies of hidden mechanisms which underpin the patterns of meaningful actions agents bring about. How to link these two causal modes into a coherent non-reductive hybrid is an important part of the approach to psychology we take in this book.

Cultural psychology is the study of active people carrying out their projects according to the rules and conventions of their social and material environments. Thus it is normative. It conforms to the principle of agent-causality.

Neuroscience is the study of the mechanisms which active people use to carry out their projects and plans. It conforms to the principles of hierarchical event-causality. Neuroscience does not reach to the depths of the physical processes on which neuro-events ultimately depend, and where agent-causality re-emerges among the basic electromagnetic groundings of the universe.

We can see the pattern of explanation formats in Figure 1.1.



**Figure 1.1** Varieties of causality



When we are dealing with cognitive phenomena, with social actions and relations, with emotional states and displays, with motives and with problem-solving abilities and much more, the causal mode we need is agent-causality. When we are dealing with the activities of the brain and nervous system the causal mode we need is hierarchies of mechanisms. If we want to create a science of the powers of human thought, feeling, action and perceptions, we never need Humean regularities except as the starting point for beginning a search for genuine causal explanations.

At present, and for the foreseeable future, both neuroscience and normative or cultural/discursive psychology are developing vigorously. In this text we will show ways in which various links can be established whereby the integrity of each paradigm is maintained, and how they can inspire each other.

Despite the rapid developments in normative psychology, the mainstream 'introduction to psychology' texts remain true to an event-causality model appropriate to neuroscience but wholly inappropriate to studies in the meaning-dominated realm of human thought and actions, and completely neglect the 'second psychology' based on persons as agents. Traditional Humean event-causality psychology is well represented by Kalat's highly popular introductory psychology text, in which he states:

One of the key points of the scientific approach is seeking the immediate causes of an event (what led to what) instead of the final causes (the purpose of the event in an overall plan). That is, scientists act on the basis of determinism, the assumption that everything that happens has a cause, or a determinant, in the observable world ... The assumption that behaviors follow cause and effect seems to work, and anyone planning to do research on behavior is almost forced to start with this assumption. (2005, pp. 5–6)

In line with the approach described by Kalat, traditional introductory psychology texts follow a strictly Humean approach to discussing the psychology of human beings, in a wide range of topics. An irony of the persistence of this kind of psychology is that it is based on an almost total misunderstanding of the nature of the method and metaphysics of the natural sciences. A major feature of this text is the way it demonstrates to students that neuroscience and cultural psychology exemplify the same paradigm of scientific method. Though the range of topics to follow will shadow those of traditional general psychology books, each topic will be presented as a hybrid, with its neuroscience aspects and its cultural aspects integrated into a coherent story.

## The Domain of Psychology

People are actively producing streams of thought and action, both public and private, embedded in a flux of bodily feeling. We routinely and unthinkingly partition this stream in all sorts of ways. We express *a* belief, we claim to have *a* memory, we make *a* decision, and we have *a* temper tantrum and so on.

Psychologists cannot but make use of these everyday partitions of the stream of human behavior, for they define the subject matter of their studies. If we could not tell a temper tantrum from a memory claim there would be no psychology, indeed no human life at all as we know it. This picture is filled out by the idea that we should think of our lives



as narratives, lived and told stories that are not only expressed in what we do, but, at the same time, shape what we do. The metaphor of life as narrative is one of the most important organizing concepts of the discursive method for many new-wave psychologists, for instance Bruner (1986), the Loughborough School (Billig, 1999; Edwards & Potter, 1992) and many others.

### The Act-Action Distinction

Can we find a general principle to partition the stream of private and public, individual and social human activity in the most psychologically illuminating way? We could say that 'actions' are what people do intentionally, while 'acts' are the meanings of such actions in some specific context. A nod is an action, which, in the appropriate circumstances, can mean that one agrees with what has been proposed. In other circumstances the very same action can mean something else; for example, a greeting, or a bid at an auction, as far as public recognition goes, mean nothing at all. Acts not only constitute narratives, but are constituted by the storyline that the narrative realizes. In the garden of Gethsemane a kiss is a betrayal. In greeting the Pope or the Grand Ayatollah it is a mark of submission and respect. Behavior without meaning is psychologically empty.

The cultural/discursive approach to psychology involves the following main theses:

- (a) We produce both public and private streams of meaningful acts in carrying out a huge variety of projects, ranging from practical work with the hands to highly abstract symbolic work with the relevant regions of the brain.
- (b) Some acts are conveyed verbally and some non-verbally, by gestures, postures, diagrams and so on.
- (c) Public and private, verbal and non-verbal acts fall under the same general system of categories, both analytically and explanatorily. Acts are the meanings of actions, determined in time and place by the identity of the actors and the nature of the cultural context.

### Mind as Discourse

The choice of 'discourse' as the leading metaphor for human thought and action is intimately related to the idea that the flow of intentional actions is the very 'stuff of mind'. Having a mind is to be master of certain discursive practices, for example, remembering, intending, regretting and so on. All sorts of practices fall under this heading. Some are linguistic, some are not. All involve meanings according to local lexicons, and all are subject to standards of correctness and propriety. The sort of practice with which cognitive activities are being carried on, linguistic or non-linguistic, will determine the choice of methods for the conduct of research into those patterns of acts and their sustaining actions. For example, if the practice is resolving a dispute we might try to discern the points of view of the opposing factions, their sense of their moral positions among rights and duties, religious affiliations and so on.

According to the 'discursive' point of view as sketched above, psychology is primarily the study of practices and their outcomes – streams of human actions and interactions, which can be understood in terms of their meanings for the actors and interactors and the norms and traditions that are generally accepted by the people involved and which shape their

actions. Many of these streams of meaningful actions can be made sense of as lived narratives, storylines well known to people who share the culture. Within this general scheme, conversation is the most useful, but not the only model for analyzing such streams of action. Adopting this model for a research program invites the researchers to treat all that people do collectively and individually, privately and publicly, as if it were a kind of conversation, that is, consisting of meaningful exchanges constrained by a local normative framework, including, of course, the method of research itself.

There are many different conversational jobs that language can be used for. We use words to give orders, to make apologies, to issue invitations, to express our hopes and fears, as well as to describe and explain matters in our environments.

How is it possible for a person to do all these things? Each human being must have acquired a body of knowledge, appropriate to the local culture. This is a resource for getting the performance right. Rarely is this body of knowledge accessed consciously. Mostly it is immanent in the activities of the actors, as habits of mind and action.

This leads directly to the study of what people must know and what skills they must possess to be able to produce the required actions. Complementary to each mode of collective action there must be a repertoire of individual skills and dispositions. One of the most difficult questions faced by psychologists is what form this knowledge takes. Is the common metaphor of a 'store of knowledge' of any value? How should we analyze the concept of a skill or disposition? This question will occupy us in later chapters.

**Ludwig Wittgenstein (1889–1951)** was born in Vienna on 26 April 1889, into a cultivated and wealthy family. Young Ludwig was brought up as a Catholic, and despite a 'metaphysical' scepticism, retained a strong attachment to Christianity as a way of life. Until he was 14, he studied at home with various tutors. He attended the Realschule at Linz from 1903 until 1906. By a curious chance, he was a classmate of Adolf Hitler.

The intellectual and musical elite of Vienna, then in its heyday as a center of European civilization, were often visitors to the Wittgenstein 'palace'. After finishing his secondary education Ludwig attended the Technical Hochschule in Berlin, studying the science and mathematics needed to equip himself as an engineer. In 1909, he began research at Manchester University into the design of aircraft propellers. However, by 1911, he had begun to interest himself in the foundations of mathematics. He was advised to consult Bertrand Russell at Cambridge if he wanted to pursue this interest further.

For the next two years he continued an intense and often emotional conversation with Russell and came to realize that Russell's views on logic were deeply unsatisfactory.

At the outbreak of the First World War in 1914, he volunteered for the Austro-Hungarian Army, serving with distinction on the Eastern Front. He exulted in exposure to danger in battle, as a test of character. Throughout the war he continued to write on logic, completing his first important book, the *Tractatus logico-philosophicus*, while a prisoner of war in Italy.

He thought that the perfect language worked out in the book would bring all philosophy to an end. What mattered in life, personal relationships, religion, art and music, could not be adequately expressed in language, if it was expressible at all. All that was left for him was a life of service.

*(Continued)*

In 1929, he returned to Cambridge where he began to forge a new approach to philosophy, the main thrust of which was his realization that the medium of cognition is not the formal algebra of logic, concealed within the word forms we use, but the language itself. It is both the instrument for living a human life, and at the same time full of pitfalls and temptations to error. He wrote extensively during these years but his *Philosophical investigations* (1953), in which he presented his later point of view, was not published until after his death on 29 April 1951.

Continuing the 'discourse' metaphor, we will find Wittgenstein's concept of a 'grammar' helpful. We have already referred to the idea of clusters of rules, implicit and explicit, which shape what we do, say and think in certain contexts. Sometimes a person is consciously following an instruction. This is one sense in which the word 'rule' can be taken. However, the word 'rule' can also be used as a metaphor for cases in which a person or group of people act in an orderly way by habit, custom, convention and so on, where no one is paying attention to explicit rules. Shweder (1991a) refers to such shaping principles as 'contingent universals'. He finds such principles implicit in the customs of cultures other than our own, and of course they can be found in ours too. These seem to be just the sort of principles that would be found in a Wittgensteinian grammar. Shweder illustrates the idea of 'contingent universals' with some of the taken-for-granted conventions for living one finds in a small town in India. It would be unthinkable to eat fish on the day of one's father's funeral, or to have one's hair cut for two weeks thereafter. People would no more dream of calling these 'rules' into question than we would cast doubt of the practical utility of the principle that two distinct things cannot be in the same place at the same time. Of course, dear reader, you have already been thinking of the kinds of things that would violate this rule! It is universal for some kinds of things, but not for others, just as the funeral customs of an Indian town are universal for some kinds of people, the Hindus who live there, but not for others, their Muslim neighbors.

The final step in a psychological study of a cognitive procedure, for instance, remembering or classifying, after the analysis of the streams of activity in which the procedure is carried on into elementary actions and acts, would be the proposal of a 'grammar' or 'grammars' expressing the norms that are evident in what people are doing. There are both tacit and explicit grammars. Garfinkel (1967) and Polanyi (1958) have pointed out that in order to use any explicit technique one must make use of a repertoire of tacit knowledge. When such knowledge is formulated explicitly the use of that knowledge as an explicit guide to thought and action will depend on yet another corpus of tacit knowledge. What was explicit in one context may be tacit in another.

In sum, standards of correctness for the uses of all sorts of tools in the performance of all sorts of tasks can appear either as explicit instructions for correct performances, or as rules expressing different kinds and levels of implicit norms displayed in the orderliness of what people do and how they comment on, correct and criticize the activities of others and themselves. In many cases habits acquired by following instructions come to be 'second nature', and are carried out without thought. They mimic the forms of cause-effect patterns of event-causality and stand in need of hypotheses about the neurological structures and processes that have thereby been established.

## The Grammars of Psychologically Relevant Discourses

Everyday psychological discourse has been ordered by many different clusters of rules and conventions. However, every one of them has been shaped around some local version of the concept of 'person'. By a person we mean an embodied self-conscious being, which is taken to be morally protected, that is, as a general rule, persons must be preserved and their welfare taken into account. Of course, in every culture there have been exceptions to various details of this prescription. For example, the retention of the death penalty in some parts of the United States appears to be such an exception. However, arguments to justify this practice cite higher order personal values, such as the protection of the innocent from the depredations of evil people, that reinterpret a seemingly anomalous practice in person-preserving terms.

Attempts at establishing a psychological science on the model of the natural sciences has evolved two more distinct grammars – that of the discourse of organic evolution and that of molecular biology. Let us look at these clusters of explicit and implicit rules in more detail. In neither is event-causation Humean.

### A Soul or S-grammar

In much of the world outside contemporary Western Europe, there is a powerful grammar in common use. The basic categories recognized in this grammar are God, the soul, sin, redemption and the like. Modernity theory would suggest that this grammar, as an acceptable and unquestioned way of shaping one's thoughts and actions, should have disappeared and where it still exists is confined to certain rather restricted tribes and regions, for example, the Mormon community in Utah. One notices, however, that by many measures (such as church attendance) religiosity is still high in the United States. Religious terminology is still in widespread use for rhetorical purposes, for example, in the speeches of candidates for the United States Presidency. Also, the rise of religious identity, as reflected in a resurgence of Islamic, Christian, Jewish and Hindu fundamentalist movements in association with globalization (Moghaddam, 2010), suggests that S-grammar is very much alive in most of the world, though it no longer plays a part in the grounding of academic and therapeutic psychological discourses.

### A Person or P-grammar

In using the discourse categories and rules of the P-grammar, persons are presumed to be the basic individuals and originating sources of activity. This grammar comprises the rules for the use of the tribal dialects and idiolects of everyday life. Among some of the specialized dialects of this generic grammar are the idioms of the courtroom, Freudian psychotherapy, the linguistic conventions of cookbooks, academic jargons, the ever-changing discourse conventions of the internet and so on.

A main feature of P-grammars is the way that responsibility is dealt with. This is particularly important for a philosophy of psychology, since the transition from the infancy to maturity of a being that has native agentive powers and acts teleologically, occurs along the dimension of growing responsibility for what it does. Shaver (1985) has proposed an analysis of responsibility dimensions that will do very well as a working analysis for much of the P-grammar of current English language folk psychology.



The attribution of responsibility according to Shaver runs as follows:

A judgment made about the moral accountability of a person of normal capacities, usually but not always, involves an agentive connection between the person being judged and some morally [approved or] disapproved action or event. (Shaver, 1985, p. 66)

Accountability of persons would then be an important feature of cultural/discursive social psychology in which persons are the basic agents.

However, responsibility also appears as an important feature of cognitive activities. The use of the P-grammar in ordinary cases of remembering, and bearing in mind that only people remember, not their brains, includes person responsibility for memory talk. To say 'I remember...' is to claim some kind of authority as to the verisimilitude of what has been said or otherwise indicated, to commit myself to what I assert about the past. It involves my moral standing as a person.

Playing tennis is another example. The exchange of shots is constrained by conventions of meaning: 'On the line is in', and of procedure: 'Change ends after four games'. Scores accrue to people and it is people who play shots, good and bad, for which they are responsible, and so on.

The priority of persons in the study of psychology can be linked to Wittgenstein's notion of the role of 'taken for granted' practices in a culture and the concepts with which they can be described. Many of these practices have that duality of material and cognitive aspects that Wittgenstein called 'Language games'. These involve tacit adherence to 'taken-for-granted' practices.

### An Organism or O-grammar

Current Western discourses make use of a third grammar, that in which the basic entities are organisms. While it has its natural domain of application in discussions about animals it has some important uses in discourse about the biology of human beings as homonids. The O-grammar is the vehicle for introducing biology into psychology. In the last two centuries treating human beings as organisms and adopting the O-grammar for this kind of discourse has taken the existence of human beings and their societies to be the products of processes of Darwinian evolution, introducing genetics and ethology into psychology.

### A Molecular or M-grammar

In discourse shaped by this grammar, molecules and molecular clusters are the basic particulars and originating sources of activity. Among the dialects shaped by M-grammar is molecular biology. This will play a major part in the hybrid psychology of the emotions. Discourse framed in this grammar includes such attributions of agency to molecules as the power (alleged) of melatonin to put one to sleep, reflux of stomach acid as the cause of heartburn, deficiency in the quantity of serotonin in the synapses as a cause of depression and so on. There are many other examples of the influence of this grammar and its discourse of molecules and molecular states and processes as causes; for example, eating a banana during a tennis match, using cortisone to reduce the inflammation in a cartilage and so on. Causes in this context invoke hierarchical generative mechanisms.





We have a loose cluster of grammars that set the standards of proper discourse for the human domain, the S-, the P-, the O-, and the M-grammars. Each has variants, and in certain circumstances they fit together into hierarchies, and, in other circumstances, they complement one another. However, S-grammar has an insignificant role in modern psychology as an academic discipline.

These grammars include taxonomies, classification systems for categorizing the sorts of entities that comprise their domains. A user of the P-grammar must presuppose that there are intended actions, classifiable into various types that can be identified in the flow of human activity. The O-grammar user presupposes that there are bodily forms and behaviors, also classifiable into types, and found amongst the behavior of pets and wild animals too. When someone uses the M-grammar to describe some aspect of their life, for example, Chronic Fatigue Syndrome, the sufferer talks about organo-phosphates damaging the immune system – the reality of molecular exchanges in organ systems and the hierarchical clustering of molecules is presupposed.

The four grammars must also include principles of sequence and order among basic and dependent particulars. For many people the S-grammar is the fundamental discourse mode for almost everything that they do. Think of such categories as sin and redemption, sanctity of people and places in relation to social behaviors and so on. In P-grammars these include semantic and syntactic rules, narrative conventions and moral imperatives, all of which are used to shape sequences of meaningful actions. Thanks to the work of the ethologists we now see the lives of many animals teleologically in terms of repertoires of actions directed towards maintaining their forms of life. This would be reflected in the O-grammar, if we came to understand the existence of these routines in Darwinian terms, serving some reproductive advantage. A complicated neurological causality is presumed in the uses of O-grammar in psychology. In M-grammar, discourse sequences of chemical phenomena are understood to be shaped by causal processes and described by causal laws. Only in the M-grammar do we have the means to provide event-causal explanations of the conventional ‘efficient causation’ sort, in which some prior state of the system brings about a present or future state. We note, however, that this explanation schema is not Humean. It presumes that efforts will be made to develop hypotheses of further levels in a hierarchy of generative mechanisms. The O-grammar is teleological, framing reproductive advantage in the theory of genetic mutation. In the P-grammar discourse it is persons who are credited with agentive powers, all else being equal.

The everyday discourses of contemporary Western life seem to be shaped by the same four grammars as are revealed in studying ‘psychology as discourse’. To illustrate this feature of our lives consider the field of uses of the phrase ‘red wine’, as a non-psychological example or model for the use of the four grammars we have selected for psychology. In the thinking and acting shaped by the S-grammar the meaning of ‘red wine’ is determined by its part in the ceremonies of the Christian churches – from a literal understanding of the ‘blood of Christ’ among Catholics to a potent symbol of Christ’s sacrifice among Protestants. The P-grammar includes rules for the uses of words and phrases where persons as conscious and discriminating judges are presumed – ‘red wine’ is an object of aesthetic significance in the discourse of wine-buffs. However, almost everyone has been made aware of the liquid that is the referent of the phrase ‘red wine’ as a health-giving supplement to an ordinary diet, that is, in relation to the good of the human organism. Finally, we can hardly miss the emphasis on biochemistry in discussions of the value of this substance as we talk about its role in eliminating ‘free radicals’ from our bodies thanks to the ‘anti-oxidants’ it contains.



The point is not whether the people whose talk is shaped by these four ‘grammars’ understand the theology or the science – rather that they manage to make use of these ways of shaping their lives discursively by drawing on all four. The labels on the bottles and packets in the supermarket display a discourse mode that draws on all of P-, O- and M-grammars, but not the S-grammar in the Western world. However, in shops attached to cathedrals the S-grammar is in daily use. People manage most aspects of their lives with the triad as a kind of hybrid, and it never occurs to them that there may be some contexts in which they are incompatible.

How is fruitful and coherent hybridization managed? Can we achieve the same level of hybridization that we encounter and manage in everyday life for the four grammars that have shaped psychology as a science over the last millennium?

**Anna Wierzbicka (1938–)** was born and educated in Poland. She is Professor of Linguistics at the Australian National University. Her work has become very well known in recent years for her creation of the ‘Natural Semantic Metalanguage’ together with her Australian colleague Cliff Goddard (Goddard & Wierzbicka, 2002). This proposal, based on the empirically established intersection of all sampled natural languages, has important consequences for psychology. The central hypothesis is that this metalanguage corresponds to the innate and universal ‘lingua mentalis’ – the hardwired language of the human mind, and that the small lexicon of this metalanguage constitutes the ‘alphabet of human thoughts’ once envisaged by Leibniz. This intersection between neuroscience and language is of great significance for the project of this book.

She is also very well known for her studies of emotions in their cultural and historical diversity. Most recently her book, *Experience, evidence and sense: The hidden cultural legacy of English* (2010), opens up the fundamental question of how far the current lingua franca shades the psychology of most of humanity.

## ‘Mind-body’ Ties: Two Links Between P-, O- and M-Discourses

We are now in a position to deal with one of the most persistent problems in the foundations of a scientific psychology – the relation between mind and body. We seem to be forced to admit the truth of two incompatible theses. Mental and material phenomena seem to be radically different in kind. For example, thoughts are weightless, quite free of the power of gravity. Limbs are locked in the gravitational field of the earth. Yet mental processes, such as deciding to throw a ball, seem to lead to material processes, the hand and arm moving in such a way as to project the ball into something like the trajectory the thrower intends. Injuries to the body seem to be the cause of painful sensations. Molecules of acetyl-salicylic acid, aspirin, seem to be effective in eliminating the pain of a headache. And so on, through a huge catalogue of ways that the mental aspects of a person’s being are interrelated with the material aspects. Mental and material phenomena seem to be correlated with one another by simple event-causality. If they are radically different in

kind, how could such causal relations possibly exist? Not only must there be regularity in the pattern of these happenings, but there must also be a generative process, observed or hypothesized, between the occurrence of the one and the occurrence of the other. But if there are only meanings and molecules in the universe the generative mechanisms would have to be either a sequence of meanings or a sequence of molecular transformations. The problem simply reappears when we think of how meanings and or molecular happenings could be related to either kind of mechanism.

The situation seems irresolvable. It is easy to see how philosophers of psychology could be driven to adopt one or other extreme solution denying the reality of one or the other of the poles of the distinction between mental and material phenomena on which the existence of the problem depends. If there are only material phenomena there is no fundamental problem. If there are only discursive phenomena there is no fundamental problem either.

## Breeding a Viable Hybrid

The project of setting up a hybrid science, in which the symbol using capacities of human beings are brought into a unified scheme with the organic aspects of members of the species *Homo sapiens*, demands the *dissolution* of the mind-body problem, somehow setting it aside as an illusion, based on mistaken presuppositions. The possibility of a unified cognitive science depends on shifting the focus from entities to discourses. We have already encountered the metaphor or leading idea with which the unification of the whole field of psychologically relevant discourses is to be accomplished, the metaphor of cognitive tasks and neural tools. It is not the only candidate for a unifying principle. In this section some other possibilities are examined, each having a role in the total project.

Having shifted the focus of our enquiries from the misconceived puzzle about how two wholly disjoint substances, mental and material, could interact, and avoiding the complementary pitfall of the attempt to build a human science on the basis of one or other of these alleged substances exclusively, we can turn to examine ways in which the person-based discourse, the organism-based discourse, and the molecule-based discourse are related to one another. There are at least three ways in which links are in fact established between these ways of talking that currently dominate the discourses of the human form of life *and* its scientific investigation. There is the task-tool metaphor by which tasks defined in terms of the P-discourse are accomplished by tools described in terms of the O- and M-discourses. For example, the task may be to recall as accurately as possible the events of yesterday, a task for which such bodily organs as the hippocampus and the entorhinal cortex are the material means. Then there is the way in which dispositions and powers defined in the P-discourse are grounded in structures, states and processes described in O- and M-discourse terms. Ability to respond to the individuality of a face is grounded in the structure of the parvo-cerebral tract, linking the visual cortex with the frontal lobes. The third interrelation appears in the way that classificatory systems applicable to the entities, states and processes describable in the O- and M-discourses are dependent on classifications of beings which are identified as belonging to types defined in the P-discourse. For example, only if we can already identify an emotion as anger or grief or jealousy, can we try to locate the regions in the limbic system that are activated when that emotion dominates someone's thoughts and feelings. We now turn to examine these strategies in more detail.



## The Task-Tool Metaphor

The idea that cognitive tasks often require the use of material tools introduces the metaphor of 'brain-as-tool'. First, consider the way we human beings carry out certain cognitive tasks, such as adding up a bill. We are accustomed to think of a pocket calculator as a tool for doing sums. But since that gadget is a prosthetic device, accomplishing cognitive tasks formerly performed by our brains, it seems entirely appropriate to apply the same concept to the brain, or a relevant region of it, when we are engaged in performing the cognitive task without using a prosthesis. A certain electronic device is a 'calculator' only in relation to the task it is used to perform. Similarly, a certain region of the brain is the organ of calculation only in relation to the task we use it to perform.

Material tasks also engage persons as agents. There too we make use of material tools. Some of these are prostheses for other body parts than the neurological. For digging we need spades. They are prostheses for hands, to which, in the absence of spades, we are obliged to have recourse, even now. Pieces of iron are 'spades' only in relation to the task they are devised to perform.

There are some tools which far outstrip their prosthetic ancestors, for both cognitive and material tasks. Bulldozers are spades of a sort, but of another order altogether when the task in hand is shifting earth. The same is true of computing machines when the task in hand is arithmetical or the reliable storage of vast amounts of data.

Finally, there are cognitive tasks for which we use cognitive or symbolic tools, for instance, reasoning carried on with propositions. At this point the simple task (P-grammar)/tool (M-grammar) scheme seems to be in need of further development. To produce a statement, expressing a proposition, which is to serve as a tool in the task of solving a problem, is to engage in a task using a material tool, one's brain. Here we seem to have the use of a tool to produce a tool. This, too, is a metaphor with a familiar origin in industry. Every engineering works depends on the skill of the tool makers.

What advantages does the task/tool metaphor have over other ways of expressing the role of O- and M-entities and states as enabling conditions for P-activities? People do not generally talk of their brains as tools. However, the point of introducing a metaphor is to extend the power of the existing language to cope with new insights and situations. Boundaries that seem to be impenetrable need to be re-examined. The metaphor of body parts as tools seems unproblematic in such a piece of advice: 'If you can't find a trowel, use your hand to scoop out a hole to plant the seedling'. The idea of 'tool and task' seems already to be fully formed in the common injunction to someone stuck in some problem: 'Use your loaf!', meaning 'Use your head [brains]'. 'Brain as a tool' is the scientifically innovative or creative concept that comes from the extensions of the 'Use your ...' metaphor, inviting us to look on our brains in a new way. Philosophical justification can be found in the prosthesis argument, set out above. Since the calculator, electronic organizer and even one's pocket diary are tools for cognitive tasks, though there are cognitive skills required to use them, we can also use our brains as prostheses for prostheses, stand-ins for 'extrinsic' cognitive tools, for example, by trying to remember the appointments recorded in a mislaid diary. The brain or one of its modules is functionally equivalent to something which it is not at all controversial to classify as a tool.

## The Taxonomic Priority Principle

We now turn to the classificatory technique by which neural states, structures and processes are identified as relevant to cognitive processes, emotional displays and social acts.



By the use of the Taxonomic Priority Principle, the proper tools can be picked out from among all the available material things as just those relevant for the tasks in hand. The molecular bases of memory, for instance, can be identified only if they are picked out in relation to acts of remembering performed by the people whose brain states and processes are being investigated. Similarly, we can only identify certain features of people's brains as abnormalities if we have a way of identifying abnormal kinds of speech or conduct. Unless we could identify cases of people having word-finding problems we could never identify a tangle of plaques as the relevant abnormality for Alzheimer's Condition, nor damage to the immune system as the relevant abnormality for Chronic Fatigue Syndrome.

In general, the criteria of identity for states, processes and structures of the P-discourse exercise 'taxonomic dominance' over the criteria of identity for neural states and processes relevant to psychology, that is, for the M-discourse. Relevant neural states and processes are picked out by attention to the cognitive states and processes that are occurring. This is the way we will be using the Taxonomic Priority Principle. It has the effect of making the relation between mental states and processes and the relevant brain states and processes conceptual, not empirical. This is an important point that needs spelling out. If the relation were empirical each 'side' of it would have to be able to be picked out independently of the way the other is identified. Then research might reveal that there was a correlation between them. In medicine there are plenty of examples of this kind of discovery. For instance, we identify coffee drinking according to certain criteria, and we identify Parkinson's disease by another and different set of criteria. These sets of criteria have nothing to do with each other. Research has established a very good correlation between coffee drinking and a low incidence of developing Parkinson's disease. However, if we use a PET scan, a method of research discussed in Chapter 3, to pick out the parts of the brain that are activated when someone is reading, the criteria for identifying these parts include the criteria for knowing whether someone is reading. It is a matter of logic that these are parts of the 'reading machine'. This way of picking things out has been called 'top-down' classification.

There are ways in which such taxonomic relations, once established, are protected against disturbance. The most important has a central role in the establishment of empirical research projects in neuroscience. Here is how it works: suppose we do an experiment on a subject using a PET scan, while the subject is performing some cognitive task, for example, calculating. The Taxonomic Priority Principle allows us to identify what is revealed in the PET scan as among the relevant neural processes for calculating. Imagine that we repeat the experiment on the same subject on another occasion and find a different neural process seemingly showing up in the PET scan when the subject is performing the same task. Do we abandon the thesis? No. We save it by the hypothesis that there is a so-far unobserved neural process common to both occasions, and then we set about trying to find it. The case is somewhat different if we repeat the experiment on a different subject and get a different result. In that case we tend to partition the population into groups, for each of which the TPP holds. For example, the finding that men and women read with different parts of their brains is not permitted to upset TPP. The problem is resolved by partitioning the human population into two groups by gender with respect to the common P-discourse defined skill of reading. Thus we have men readers and women readers as two P-discourse categories, each with their relevant but different brain

mechanisms, though apart from the early years, the reading abilities (P-grammar) of the sexes are identical.

## Psychology as a Hybrid Science

Having looked at three ways in which the P-, O- and M-grammars can be bound together into a comprehensive conceptual system fit to serve as the basis of a science, what kind of science will it be? Since doing psychology is a human activity, the same principles should apply to it, as to any other pattern of action which realizes well-established storylines. If psychology is a cluster of narrations: what are the relevant grammars? It would surely be unacceptable to most psychologists to describe their professional activities in the O- and M-grammar. Only if presented in the frame of the P-grammar could credit be claimed for a successful research project. Only in a frame in which the concept of 'person' picks out the basic active beings, professors and their students, does the concept of responsibility have a place, and hence the concept of credit.

There is, in a sense, only one stream of action. As described in the P-grammar it displays such phenomena as 'emotions', 'attitudes', 'memories', 'items of knowledge', 'performance of athletic feats', and so on. Using the metaphor of a stream we might think of these phenomena as eddies, whirlpools, froth and waves in the continuous flow that dries up only on the brain death of the actor. Some are ephemeral and others more enduring.

It seems that the basic type-hierarchy that has evolved in psychology in recent years has two main branches, one material and one discursive.

The first branch consists of the agents that produce material processes, in the environment and in the bodies of organisms. The active entities are molecular clusters of a huge variety of types. For this branch we have recourse to a discourse-style shaped by the molecular grammar. The mode of action of M-entities is causal in the sense that it is explained by the discovery or supposition of hierarchical generative mechanisms.

The first branch includes those agents to whom we assign goal-seeking capacities, and for our purposes the basic agents are predominantly whole organisms. For this branch we have recourse to the O- or organism-grammar. The mode of action of O-entities is teleological, seeking practical goals, such as the bear that looks for honey.

The second branch consists of the agents who produce discursive patterns, normatively regulated streams of meaningful actions, the psychological practices of human beings, singly and in groups. The active beings are people as intentional agents. For this branch we have recourse to the P- or person-grammar and agentive causation. The mode of action of P-entities is intentional, that is, by recourse to meanings and 'rules' in the carrying out of projects.

As singular sources of action and the embodied centers of perceptual fields people are centers of discursive activity. They produce complex private and public intentional and ever-changing and evolving structures of discursive acts. Those that are private we are inclined to call mental, thoughts and feelings, but *qua* intentional acts they differ not at all from public acts, except in so far as the interactor whose uptake completes the action as a meaningful act, is, in the case of private acts, oneself. We produce our own minds with the connivance of others (Vygotsky, 1978a), just as we produce conversations, tennis matches, orchestral performances, ditch digging and so on with others.

**Lev Semionovich Vygotsky (1896–1934)** was born on 17 November 1896, in a prosperous middle-class family in Orsha, a small town in Byelorussia. The family moved to the larger town of Gomel, where his father had a senior position in a bank. The town was completely destroyed in the Second World War, but a good deal of Vygotsky's early life has become known through the stories of his friend, Semen Dobkin. Young Lev was educated at a private Jewish secondary school. He seems to have owed a great deal to a tutor, Solomon Ashpiz, who developed his mind through searching conversations, rather than through formal exercises.

He entered Moscow University just before the First World War, in the medical faculty. He enrolled at another university, the unofficial but influential Shanyavskii People's University, to study psychology and philosophy. He graduated in 1917, an ominous year in Russian history.

Lev Semionovich returned that year to Gomel, where he spent the next seven years as a teacher. The setting up of a psychology laboratory in the local Teacher Training College, in relation to his teaching, furthered his interest in experimental psychology. While teaching, he read widely – poetry, fiction and psychology. The idea came to him that there could be a new psychology that would transform the human race, a psychology that centered around historical change and the centrality of language as a major instrument in the life of human beings.

Shortly after he came to Moscow in 1924 he met Alexander Romanovich Luria and Alexei Nikolievich Leont'ev, the founder in later years of activity psychology. These friendships matured into a famous collaboration. Their key ideas had some antecedents in the West, for example in the writings of William James, but they took a form that owed a great deal to Vygotsky himself. The principles of the cultural/historical/instrumental method are simple to state but profound in their consequences.

The first idea was that the social life of human beings was the source of their individual psychological traits and capacities. The second idea seemed to lead away from the individual as the locus of psychological reality to the history of languages, cultures, material practices and so on that went into the formation of individual minds. The third idea was that human beings acquired a repertoire of skills, including linguistics capacities, which should be looked on as instruments in the management of life. This was the cultural/historical/instrumental method.

Throughout these years, until his death from tuberculosis in 1934, he conducted a vigorous research program. There can surely be no doubt that the frenetic pace of his life was a response to his realization that tuberculosis was sure to claim his life very soon, and yet, at the same time, his response to this intuition was hastening the end. After a serious hemorrhage, he entered the Serebryani sanatorium on 2 June 1934, and died a few days later. As S. E. Toulmin rightly said: 'Vygotsky was the Mozart of psychology.'

There are no hidden mechanisms in the P-domain, according to the point of view being developed here. The program of scientific psychology is not to be fulfilled by postulating an imperceptible realm of unobservable mental mechanisms, as Freud did in introducing the unconscious mind. Scientific ideals in psychology are achieved by making use of the Task/Tool metaphor in proposing neural mechanisms as among the devices that people use for accomplishing their P-grammar tasks. The workings, but not the roles, of these tools are described and explained in the M- and O-grammars. Their domains are tightly woven

together in that O-processes are routinely accounted for by recourse to hypotheses about hidden molecular processes. Since at least some M-processes are observable in principle, the proposal of a hidden mechanism explanation can often lead to a research program in an effort to verify the verisimilitude of the working model of the mechanisms on which the hypothesis depends.

Neither component of the hybrid psychology we envisage can colonize the other. Human beings in the molecular ontology are machines with no moral attributes. Brains in the person ontology are tools for use in tasks set discursively by people who are morally responsible for what they do with them. Giving priority to the P-grammar preserves the outlines of human life as a moral world while finding the place for our brains as tools for morally constrained tasks. However, if we were to prioritize either O- or the M-grammar, people as a category would disappear from the world of psychology, taking the moral universe with them.

Psychology is about the life-long activities of human beings and their relations to one another in a huge variety of social formations. As such it cannot help but be a moral science (Brinkmann, 2010). The admiration due to the natural sciences, their methods and their discoveries must not blind us to the fact that cultural phenomena are also fit subjects for the application of scientific method, *properly understood*. One of the main aims of this book is to show how the method of honest and accurate description and the building of explanatory models, common to both the natural and cultural sciences, can be the core of working hybrid science. We must resist the temptation into which our predecessors fell – they insisted that we were less than we are for fear we might think we were more than we are. Our modest aim is to display human beings just as they are.

## Conclusion

We can approach the development of a hybrid psychology, fit for the third millennium, by setting out the insights we have tried to present in this introductory chapter in relation to some important basic concepts, dispositions, powers, skills and capacities. The hybrid we are seeking is reached by linking these psychological concepts to their material groundings. Thinking of human beings and their lives in these terms leads us far from aiming at the explanation of human cognitive and social life exclusively in terms of event-causation of either kind, Humean or hierarchical.

People have *powers* to act, they have *skills* for performing tasks properly, and they have *capacities* for undertaking projects of many kinds. In each case the common feature of all these P-grammar attributes is the conditionality of the relevant performance on the existence of situations appropriate for their display. So for every power, skill and capacity and so on, we can offer a dispositional formulation in ‘if ... then ...’ terms, to express the conditional aspect of the attribute (Ryle, 1949).

This formulation captures only the minimal sense of these terms, since each has further implications. For instance, the exercise of a person’s powers is not just conditional on the coming to be of certain states of affairs, but on the person as the active source of the behavior. ‘Jim has the power to jump that fence’ implies that if Jim is so minded he will successfully negotiate the obstacle. But Jim must be so minded. If he jumps it is his act, and not

the effect of some extrinsic stimulus. Even as he is being chased by a bull he must very quickly estimate his best strategy for self-preservation.

Cognitive capacities, powers and skills are grounded in brain states, structures and processes. Here we have another way of binding the P-grammar to the O- and M-grammars. For example, cognitive skills are described in terms derived from the P-grammar. It is persons who decide wisely, tot up accounts correctly and so on. These skills are grounded in permanent neural states and patterns of dendrites in the brain. When brains are damaged cognitive skills are affected, even lost. 'Grounding' here can mean only that the *instrument* by which a person performs the skillful activity is made up of neural states and processes, that is, it is describable in the M- and O-grammars. Other instruments could be used for many of these tasks.

Though it is an obvious truth that the brain must be in a certain state for cognitive activities to be performed, one has to be cautious in assuming that that is also a sufficient condition. All sorts of other conditions must be in place. For example, the presence of other people in active conversational engagement with the thinker is sometimes required. One must also be cautious in how one interprets the many studies on loss of cognitive skills by virtue of brain damage. One would think it would be obvious that because a certain psychological skill cannot be exercised if a certain part of the brain is damaged, that when the person is exercising the skill, that part of the brain is the module that is the tool in question. If the bike chain breaks the bike no longer provides transport, but a bike chain alone will not afford locomotion. A moment's reflection tells us that the lesion that stultifies the proper exercise of the skill may be just one aspect of the whole mechanism, and indeed perhaps a minor part at that. The battery of my mini-laptop runs down but all else is in order.

The disposition-grounding link and the task-tool link are connected in that powers exercised in tasks are grounded in neuro-physiological mechanisms which are thereby the relevant tools, or parts of the relevant tools. There is no place for attempts to find evidence for the hybrid relation. All we can do is to assemble a complex array of metaphors to characterize the nature of a unique relationship between the findings of neuroscience relevant to psychology and the findings of research into the cultural discursive forms of actual psychological functioning. Our task of assembling such metaphors of which the Task-Tool image is one, can never be completed. New insights are sure to emerge.