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Part III. The Psychology of the Will

1. Self-Control

Introduction

Writing in the aftermath of the Russian Revolution, Lev Vygotsky (1896–1934) and his collaborators – especially Alexander Luria (1902–1977) – founded a scientific current of psychology which he referred to as Cultural-Historical Theory.

Vygotsky built his theory through immanent critiques of the whole range of psychological theories current at the time, and although he never read Hegel, his study of Marx's *Capital* allowed him to appropriate Marx's use of Hegelian logic. Vygotsky declared that psychologists "must create our own *Das Kapital*" (1927, ch. 13), noting in particular the use of the 'germ cell method' or 'analysis by units' alluded to by Marx in the Preface to the first German edition of *Capital*.

Vygotsky used this method together with experiments (some of them thought-experiments) in which subjects – usually children – were placed in situations while the researcher intervened to offer the subject a means of resolving the problem. This method allowed Vygotsky to understand the *development* of the human mind from birth to adulthood through the use of cultural artefacts and social interaction.

What Vygotsky did *not* study, however, was the processes that produced the social situations in which subjects would actually find themselves. In the next chapter, I will deal with Activity Theory, later developed by Vygotsky's followers, which sheds more light on the sources of motivation and, consequently, on the formation of social situations.

We have learnt from Rousseau and Hegel that the study of the individual Will alone cannot complete the science of the Will. For that we must venture into Social Theory, which will be the topic of the next section. Crucial to Social Theory is understanding the source of subjects' motivation and how this can create situations in which they are called upon to exercise their Will. Although Vygotsky and the early Activity Theorists confined themselves to Psychology, their theory was by its very nature interdisciplinary. In the current chapter, however, I will confine myself to Vygotsky's *psychology* of the Will.

In their investigations of the Will, nineteenth-century physiologists could only explain the trivialities of behaviour in terms of involuntary reflexes. Voluntary behaviour remained as much a mystery as it had been for Spinoza. Using his unique experimental technique, Vygotsky was able to identify and study the locus of voluntary behaviour in what he called the 'higher psychological functions' – complex assemblies of 'auxiliary reflexes' which are artificially introduced into a person's mind as they are raised and educated in childhood and interact with other people.

The Higher Psychological Functions

Vygotsky made epoch-making discoveries in the understanding of the psychology of the Will through his study of the "higher psychological functions."

A higher psychological function is distinguished by (1) not being present at birth but constructed through the experience of the individual organism, (2) replacing the function of each innate organ of the brain (memory, attention, etc.) with a system which performs the same function by means of a combination of those innate organs and (3) enabling *voluntary* control of the organism's behaviour.

Behaviour

To clarify this, it is first necessary to understand the difference between the four distinct ways in which the behaviour of an animal is controlled by its nervous system: stimulus–response, conditioned reflexes, practical intellect and voluntary control.

1. The reflex arc

The reflex mechanism was first identified by the British physiologist Marshall Hall in the 1830s, and during the nineteenth century physiologists identified nerve pathways throughout the body in both humans and animals; Helmholtz had even measured the time taken for nerves to travel to and from the brain. So by the beginning of the twentieth century, mechanical models of animal behaviour based on the 'reflex arc' were well developed. The reflex arc is found across the animal kingdom including human beings and functionally similar biochemical mechanisms exist even in plants.

The reflex arc, – stimulus→response – takes the place of cause→effect in the case of living matter. Rather than being an immediate causal process, in the reflex arc the connection between the cause/stimulus and the effect/response is mediated by a nervous system. In all but the most primitive animals this involves 'messages' to and from a central nervous system.

In general, nineteenth- and twentieth-century physiologists rejected spiritual explanations of human behaviour, and correctly believed that the mechanical process they had discovered lay at the roots of human behaviour. None of them, however, had any viable explanation for the rich and complex character of human life, and to this very day physiologists and neuroscientists do not have any adequate explanation for the conscious awareness of human beings. Behaviourists such as J.B. Watson and B.F. Skinner have only ever been able to explain the most trivial aspects of human psychological phenomena on the basis of reflexes.

All behaviour from that of a cat when it hears the rustle of a nearby mouse to the seasonal migration of storks, is explicable in terms of reflexes in combination with Darwinian evolution. The entire complex behaviour of animals can be explained by intricate networks of *excitatory* and *inhibitory* reflexes, the ones and zeros of the neural network.

However, only the natural will can ever be explained by reference to the reflex arc. The voluntary behaviour of human beings and of many animals cannot be explained by Behaviourism.

Nonetheless, just as the natural will resolves itself ultimately to the reflex arc, an understanding of the human Will must also have the reflex arc at its foundation, because the reflex is how our biology works – the same biology we share with the rest of the animal kingdom.

2. The conditioned reflex

In 1903, I.V. Pavlov described an experiment in which a dog was trained to salivate in response to the sound of a bell. A dog normally salivates in anticipation of food; that is to say, the sight or smell of food is an excitatory reflex. This reflex is built into the biology with which the dog is born. The sound of a bell, however, is normally a *neutral* stimulus, neither excitatory nor inhibitory. What Pavlov did was to train the dog to *associate* being fed with the sound of a bell, thereby acting on an *already existing reflex curve*. The bell became an excitatory stimulus just like the sight of food, with a corresponding result. Pavlov called this a "conditional reflex," though the idea has come to be referred to as "conditioned reflex" and the process of training the dog 'conditioning'.

No new reflex is introduced into the dog; the same reflex is attached to a different stimulus. This is an important distinction because the reflex is, at root, a biochemical process and nothing has changed in the biochemistry of the dog. A new connection has been made, though. Nothing in the behaviour of the salivating dog is voluntary; it did not choose to be subject to conditioning, and having been conditioned to expect food where it hears the sound of the bell, its salivation remains involuntary.

Pavlov banned any reference to 'consciousness' in his lab. He regarded any reference to consciousness as unscientific, convinced that the entire human experience would eventually be explained through the conditioned reflex.

Conditioned reflexes are well known to animal trainers, but the process is not limited to deliberate training. Young birds learn their song by hearing their mother's song and wild animals learn to avoid areas populated by humans. The conditioned reflex is part of human learning as well. When we learn to drive a car we train ourselves to respond to red lights by hitting the brake – that is to say, to act appropriately without thinking about it, just as sports-training centres on creating complexes of such conditioned reflexes. A great deal of human behaviour can be explained by means of the conditioned reflex, but as with the innate reflex, conditioned reflexes are largely confined to the trivialities of human psychology.

This led Wilhelm Wundt (1832–1920) to suggest in 1896 that Psychology should be divided into two, Experimental Psychology based on physiology and a Cultural Psychology based on the analysis of human culture and its history. Wundt believed – correctly as it turned out – that conditioned reflexes could not on their own explain the whole richness of human mental life.

3. Practical Intellect

Karl Bühler identified a higher form of behaviour which he called 'problem-solving'. Vygotsky reflected on this form of intelligence as observed in apes. The ape's ability to solve problems was limited by the requirement that all the elements of the solution to a task had to be within its field of vision at the same

time; if the ape saw the key and the lock in the same scene, it could use the key. The sight of the key would then take on a certain functional significance for the ape whenever it saw it.

The sight of each of the components of the solution to a problem was not therefore *neutral* stimuli; they were *part of the situation*, and the ape learnt to recognise them as such.

But what the ape could *not* do was to hold the image of the key in its mind as a solution when it was not present. Furthermore, this kind of behaviour, which manifests an elementary level of the freedom of the Will, was peripheral in the life of an ape. It can nevertheless be regarded as a rudimentary form of what became the dominant form of behaviour of human beings in which objects together with their functional significance can be held in the mind.

4. Voluntary behaviour

The great contribution Vygotsky made to the study of the Will was to show how *voluntary* human behaviour is built on reflexes, which nonetheless remain *involuntary* processes. As with Pavlov, Vygotsky's experiments created an entirely *new* connection to include an otherwise neutral stimulus in the reaction. The problem was not solved by recognising some aspect of the situation, but by *introducing a stimulus previously unrelated to the situation*. Further, unlike with Pavlov, the new connection is made by the subject themself, voluntarily.

The entire range of human activity, including conscious awareness and verbal thinking, is built on the capacity for voluntary control of all the basic psychological functions. This is possible because human beings are social beings and the development of their voluntary behaviour begins as soon as another human being recognises them as a person and begins to treat them as a person.

The first step, the 'germ cell' of all voluntary behaviour, is a person learning to choose between two simple actions by introducing a simple new stimulus into the situation. Vygotsky described an experiment to demonstrate this in Chapter 12 of the manuscript on the higher psychological functions, entitled "Self-Control."

Self-Control

Chapter 12 was entitled "Learning to master one's own behaviour by internal processes," but was published in English under the title "Self-Control" (1931/1997).

In this chapter, Vygotsky describes an experiment in which children were required to choose freely between two possible actions. The subject would not be instructed as to which action to take; they were required to decide for themselves which action to take.

The child was asked to choose between something that the child finds pleasant and something they find unpleasant. The task is then complicated such that the task exceeded the child's psychological capacity to resolve the choice and decide which action will give them the desired result. This could be done by requiring the subject to resolve ambiguous instructions or by not giving the subject enough time to think.

The experiment thus modelled the situation of a *conflict of motives*, in which a subject is motivated but cannot decide which action is the right one. This is the same situation which prompted Augustine of Hippo to invent the concept of the Will and which later Hegel made the starting point of his study of the Will.

Once the difficulty of the task begins to induce hesitation, vacillation and suspension of motives in the subject, the researcher places on the table a dice with alternate black and white faces and allows the child to play with it. The researcher may then allow the subject to observe another child using the dice to solve the problem, or if necessary, asks the subject to *try* using the dice. But the observations were made only when the the subject adopted the use of the dice as a *voluntary* means of making the decision.

The researchers observed that once the task was made sufficiently difficult, the subject readily resorted to using the dice. In doing so, the subject:

> introduces into the situation new stimuli that are completely *neutral* in comparison with the whole situation and ascribes to them the force of motive. He decides in advance that if the dice turns black side up, he will choose one series, and if it turns white side up, the other series. In this way, the *choice is made in advance*.
>
> Vygotsky, op. cit.

This neutral stimulus is called an 'auxiliary stimulus' and the device is called an 'auxiliary motive'. The subject leaves the choice to the auxiliary device. Is the action taken by the child free or unfree? On the one hand, it was not free because the action was completely determined by the dice in response to the stimulus generated by the dice. On the other hand, it cannot be said that the dice in any way *compels* the subject to take this or that action; the subject themself ascribed the force of a motive to the dice *in advance* and themself linked one action to the white side and the other to the black side of the dice. The subject did this freely with the aim of determining their selection. The first part of the action is completely free. Nothing compels the subject to use the dice or assign this or that side of the dice to this or that action. The action as a whole is completely voluntary.

The child recognised the necessity of having a motive in order to act. Freedom of the Will is not freedom from motives. By recognising this necessity and using the auxiliary device to provide the motive, the subject demonstrated the well-known maxim that "freedom is the recognition of necessity."

Vygotsky observed:

> The basic law of our behaviour states that behaviour is determined by situations and reaction is elicited by stimuli; for this reason the key to controlling behaviour lies in controlling stimuli. We cannot master our own behaviour except through appropriate stimuli.
>
> op. cit.

So human behaviour is no exception to the laws of Nature.

I shall note in passing that Vygotsky used a dice in the experiment to be sure that the auxiliary stimulus was entirely independent of the nature of the situation itself, and in that sense 'neutral'. But there should be no implication that *randomness* has any part whatsoever to play in the development of human activity. The randomness is simply a condition of the *experiment*.

Note that unlike the stick which an ape might use as a tool to act upon a problem in the material world, the device here is not doing anything to the material world; it is simply generating a *sign* which the subject uses to *control their own behaviour*. It is widely agreed that the routine use of objects as *tools* was crucial in the evolution of Homo-sapiens, but the development of tools proved to be a gateway that opened the way to the use of *signs*. It is the use of objects as signs to act upon the minds of *others* and subsequently to control one's *own* behaviour that constitutes the truly voluntary form of behaviour characteristic of human beings.

Marx and Hegel had observed the determinative role of the means of labour in the historical development of labour. Tools only indirectly act on the mind, by transforming the scope and character of human labour. Signs, however, act *directly* on the mind.

Vygotsky offers a couple of examples from outside the laboratory which show how we freely control our actions by means of auxiliary stimuli. If, reluctant to get up in the morning, I tell myself "I will get up on the count of three," and then count out loud: "one, two, three …" I will respond with a conditioned reflex to the sound of "three!" But I gave *myself* that auxiliary motive, so my getting up was a voluntary act even though it happened under the compulsion of a conditioned reflex.

Lewin gave the example of deciding to drop a letter in the mailbox. I go out on to the street and when I come to the mailbox, the sight of the slot acts as an auxiliary stimulus and my hand moves automatically, without any voluntary control, to put my letter into the slot. My memory recalls the connection between the mailbox and the posting of a letter, and as soon as I decide to post a letter, this memory creates an intention. Lewin calls this reaction a 'quasi-need' because it acts in the same way as any natural need.

Vygotsky points out that a need, such as this, differs from a *habit*, which can be formed in much the same way as a conditioned reflex, but whereas a need is exhausted by the reflex, a habit is not exhausted and may even be reinforced. But I do not put a letter in the slot every time I pass a mailbox as I would if I had created a habit. Essentially therefore, intention creates a need.

> Intention is a typical process of controlling one's own behaviour by *creating* appropriate situations and connections, but *executing* it is a process that is completely independent of Will and takes place automatically. … the paradox of the Will consists in that the Will creates involuntary acts.
>
> op. cit.

Human behaviour that does not have a specific intention is subject to the power of the situation.

> the great uniqueness of the Will consists of man having no power over his own behaviour other than the power that things have over his behaviour. But man *subjects to himself* the power of things over behaviour, makes them serve his own purposes and controls that power as he wants. He changes the environment with his external activity and in this way affects his own behaviour, subjecting it to

> his own authority.
>
> op. cit.

Another oft-cited example is the waiting room experiment. A subject is asked to wait in an empty room, but the researcher does not return, but secretly watches the subject. The subject becomes more and more agitated by being abandoned and is torn between two conflicting motives: to be a cooperative subject and wait patiently for the researcher to return, or having been abandoned, to free themselves and leave the room. Sooner or later, the subject seizes on something, typically, they look at the wall-clock and select a time, say 3 pm, and tell themself: "When the clock turns to 3 pm, I'm going!" Lacking any motive to act, like the subjects in Vygotsky's experiment with the dice, they find some artefact that can generate an auxiliary device that *provides a motive for them to act*. There is no such thing as an unmotivated action.

The phase of a voluntary action in which a subject selects the stimulus which is to provide the motive for some action is called *closure*, because it is like fixing a new link in a network. A "cerebral apparatus" is constructed like this just as habits are formed by repeated exposure to a situation and the nervous system is constructed in process of phylogenesis. A certain stimulus is linked to a certain action.

The *actuating process*, that is, executing the cerebral connection already formed in the closure phase, and carrying out of the voluntary action, happens exactly the same way as an action carried out as a result of *any other* initiating stimulus, automatically, according to conditions. It is just as one does not alternately think about your left foot and your right foot, etc., as you walk down the street. The nervous system controls such actions entirely independently of consciousness. Thus,

> the paradox of the Will consists in that we create with its help an involuntarily acting mechanism.
>
> op. cit.

Vygotsky distinguished between stimulus and motive. A stimulus is "the more or less simple stimulation acting directly on an already established reflex curve" while a motive is "a complex *system* of stimuli connected with the construction, formation, or selection of one of the reflex curves." A stimulus becomes a motive when it activates a "complex reactive formation" in the nervous system which evaluates the stimulus as a motive. It is not the stimuli which are in conflict, but such "assemblies" of reactions which are in conflict. The conflict between these "reactions" is a conflict over the whole motive field for the control of the closure mechanism, for the choice of closure path, not for control of the actuating mechanism itself, which is involuntary.

The implication of this is that the conflict takes place not at the moment of action, but at an earlier moment, like a plan which is actuated only at the decisive moment according to conditions. This also means that very strong stimuli do not necessarily overcome weaker stimuli because in fact it is not the stimuli but the motives which have to be resolved. A strong stimulus may become a weak motive. In this way, a patient will endure pain at the hands of a doctor if the pain was anticipated and is known to be necessary for the cure of a serious illness.

Also, these reflections show us that the freedom of the Will means control "in itself," or "potentially," in advance of the actual situation. At the moment of action it is the *situation* which will determine action to the extent that the subject has recognised what the situation demands.

> Human freedom consists specifically of man's ability to think, that is, that man is cognisant of the developing situation.
>
> op. cit.

The implication of this maxim is that human beings perceive the world not just immediately, as it is, but also perceive the *meaning* of a situation.

Vygotsky consistently approached all the problems of psychology from a developmental point of view. In the development of the Will he shows how the two phases of a voluntary action (the closure and the actuation) each have independent origins in the cultural development of the child. This I will deal with in the next chapter.

'Original sin'

The astute reader may have observed a sleight of hand in Vygotsky's explanation of the freedom of the Will as I have presented it above. In each case, the voluntary action is preceded by the voluntary process of 'planning' how to respond to a situation. The voluntary act is only voluntary to the extent that the preceding closure was voluntary. So it appears that I have set up an infinite regression in which an action is free only thanks to a *previous* free action. Pavlov's dogs were not free, because their natural will played no part in the conditioning to which they were subjected, unlike an athlete whose choice to train is voluntary.

The solution to this infinite regression lies in child development. Fichte's (1796) observation – that a person becomes conscious of themselves as a free person only thanks to being treated as a free person by other people – remains true. A newborn child has no freedom of the Will at all, but only a natural will. The child acquires all the higher psychological functions, that is to say, mastery of all aspects of their own behaviour, thanks to their induction into a definite cultural formation by their parents and others who treat them as persons and potential subjects.

All living creatures have a "natural will," that is to say, a system of reflexes which has evolved through phylogeny. Hegel was correct when he remarked that the problem of the Will is not whether the Will is free but *how* the Will *becomes* free, and there is nothing of self-determination in the natural will. Freedom and self-determination surely means that the organism is able to make a decision about how to act, and Vygotsky has shown that this is possible only to the extent that the organism is conscious of the developing situation and creates a plan of action prior to the formation of the decisive situation. The Will is therefore tied up with the development of *conscious awareness*. The formation of the reflex substrate which underlies conscious awareness and the Will is a result, as Fichte had long ago said, of other people, especially the people who raise us from infancy, treating us as free beings and demanding that we control our own behaviour, implanting in the child's mind *artificial* auxiliary stimuli.

At a certain stage, a child gains control over their own behaviour by appropriating the methods that adults have used to control them. But more of this in the next chapter.

Vygotsky traced the process of development of the child through a series of phases in each of which the Will developed to a qualitatively distinct stage. That is the subject of the next chapter.

Single acts of voluntary sign-mediation do not have an isolated impact on the mind. Each such action leaves behind an enduring connection in the nervous system. The accumulation of such connections form organised systems of reactions, 'higher psychological functions'.

The structure of the higher psychological functions

It is thanks to the 'higher psychological functions', which are unique to human beings, that persons have mastery of their own behaviour. Vygotsky used the same method of placing an experimental subject in a situation which was beyond their psychological capacity to resolve, and then intervening by offering the subject an artificial means of resolving the situation. He applied this method to memory, attention, selection, comparison, obedience, intention, decision, and so on and in each case he observed the conditions under which the subject was able to use the artefact successfully.

In particular,

> Using *words* as a means of remembering was enough to make all the processes connected with remembering the instruction assume a single direction.
>
> Vygotsky, 1931, Chapter 4

A child may use memory cards as reminders, but at any earlier age the memory card only confuses the child and at a later age the child can solve the puzzle without the use of a memory card. An infant cannot use a pointing finger to direct their attention, but soon learns to do so and use their own finger to control their attention, and later do so by entirely internal means.

In their actual life, it is not a researcher who offers an artificial means of action to a child, but more likely a parent. In the first months of a child's life, their every function is controlled by the adults around them, but over time, the child takes control of their own behaviour.

> The child begins to apply to himself those forms of behaviour that adults usually apply to him, and this is the key to the fact of mastery of one's own behaviour.
>
> op. cit.

Human beings are born with a complete range of psychological functions with distinct "organs" controlling attention, perception, volition, etc. At birth, these primitive functions form a working system constituting a viable organism, albeit dependent on the assistance of other people.

This layer of primitive functions operates by means of reflex arcs connecting *object-stimuli* to the organism's response apparatus. Over this primitive layer an entirely new layer of "higher psychological functions" is constructed entirely of *auxiliary stimuli*. Systems of these auxiliary stimuli overlay and incorporate the

primitive functions with which a person is born. Immediate reactions to stimuli from the object are replaced by *mediated* responses to signs.

> Everything that in human behaviour is connected with the use of artificial means of thinking, with social development of behaviour, and specifically, with the use of signs
>
> op. cit.

Moreover, these mediated forms of action are increasingly aimed at *other people* rather than the actual object of their Will. Once a person is using words to control their behaviour, their memory, their attention, etc., the *visual field* is completely structured by words. This is what is behind the optical illusion where what at first looks like a vase is suddenly recognised as the silhouette of two people facing one another. *Meaning* structures how we see and hear.

In a very early speech (1924), Vygotsky went so far as to say: "Consciousness is only the reflex of reflexes" (1924). From a philosophical point of view this cannot be correct, but we *could* say that the material substrate of consciousness is this assembly of reflexes of reflexes.

So it is that the mind is a system of systems of systems: an overall system of higher psychological functions incorporating the innate systems. The formation of concepts is the product of both the system of the mind which produces representations and the system of the mind which determines actions, that is, the Will.

The higher psychological functions develop throughout childhood, and with this comes increasing conscious awareness of the subject's own thinking. Thus:

> Thinking in the true sense, formation of concepts, judgment and conclusions are based on the intervention of Will in a representation.
>
> op. cit.

It is the way sensual representations and feelings are suffused with meaning that constitutes conscious awareness. So:

> the focal point of development for the school-age child is the emergence of the higher psychological functions, functions which are distinguished precisely by intellectualisation and mastery, by conscious awareness and volition.
>
> Vygotsky, 1934, Chapter 7

Germ cell and unit

I have presented in some detail Vygotsky's analysis of how a person gains mastery of decision-making. Only the behavioural act which is subject to voluntary control can be called an 'action'. Rousseau and Hegel likewise took *actions* to be the units of the Will and began their discourse on social life from this germ cell. Vygotsky has drawn attention to the fact that the voluntary action is always essentially a *mediated* action. So it is the nature of the available artefacts and how they are used which impresses a particular cultural shape on to activity, that is, cultural development.

The mediated action is therefore the starting point of any science of human life, be it Psychology, Law or Economics. However, it is not quite true to say that the mediated action is a 'unit of analysis' (the term Vygotsky coined for 'germ cell'

or ‘unit’). Any particular phenomenon of human life is characterised by the particular nature of the object and especially by the particular means used, the mediating artefact. Marx and Hegel have both said as much in their reflections on the labour process.

The mediated action is the germ cell of the Will, but “the Will” is, of course, an extremely general concept, present in any human endeavour whatsoever. Further, in any science a number of different units will be generated at a successively more general levels of action. But the basic unit is always one or another type of mediated action, be that a commodity or a spoken word.

Volition and the Will

In the classic texts, “the Will” is spoken of as if it were a distinct function, like in the modern neuroscientific concept of the ‘executive function’, and we see that Vygotsky continued with this form of speech. It must be noted, however, that *all* the psychological and practical functions of an adult human being are *systems* of means-reflexes which incorporate the entire psyche of the person; not just taking an action (the manifestation of the Will), but also thinking, reading, running, feeling, and so on.

So there is no inconsistency in Vygotsky referring to the Will as if it were a distinct function alongside other psychological functions; all psychological functions are functions of the entire nervous system. But in a strong sense, the Will is the master psychological function which both incorporates and leads all the other high psychological functions.

Nevertheless, the Will does not arrive fully fledged. As in the case of other psychological higher functions it is constructed during childhood and modified gradually throughout a person’s life. In particular, voluntary control of different psychological functions is achieved at an early or later age and the place of every function in the functional systems of the Will varies as the child develops.

The bridge between Psychology and Social Theory

In addition to the development of the Will in ontogeny (which I will deal with in the next chapter), the nature of the Will changes with the development of the productive forces which place into our hands qualitatively different means.

> Just as the use of one tool or another dictates the whole system of a work operation, *the character of the sign used* is the base on which the construction of the rest of the process depends. The same fundamental relation that lies at the base of the higher structure is the special form of organisation of the whole process which consists of the process being constructed by involving certain artificial stimuli in the situation as signs.
>
> Vygotsky, 1931

Consequently, the nature of the Will develops also on the cultural and historical planes as well as on the ontogenetic plane.

Conclusion

Hegel had tried, on almost entirely speculative grounds, to reconstruct the structure of systems of natural, biological functions up to the point where volitional behaviour, that is to say, the Will, could emerge.

Vygotsky achieved this task strictly on the basis of experimental science. He showed that, like all the other higher psychological functions, volition, that is to say, mastery of one's own behaviour, developed by appropriating the use of artefacts, and in particular *signs* used by others.

The germ cell of the Will is an artefact-mediated action.

But

> what replaces the hand of the experimenter who deliberately evoked the process in the laboratory?
>
> Vygotsky, 1931.

Hegel had remarked in relation to tools:

> The *means* is *superior* to the *finite* ends of *external* purposiveness: the *plough* is more honourable than are immediately the enjoyments procured by it and which are ends. The *tool* lasts, while the immediate enjoyments pass away and are forgotten. In his tools man possesses power over external nature, even though in respect of his ends he is, on the contrary, subject to it.
>
> Hegel, 1816, §1615

Once we learn to use a sign to master our own behaviour, the sign lasts and will be used to control our activity in future situations. What remains, however, are our *ends* to which we remain subject.

As I remarked above, it was outside the scope of Vygotsky's work to answer this question, but I will return to it in the next section where I will have to review the findings of Social Theory.

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