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The methods of reflexological and psychological investigation

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The methods of the reflexological investigation of man have now reached a turning point in their development. The necessity (and inevitability) of a turnaround results from the discordance between, on the one hand, the enormous tasks which reflexology sets itself – that of studying the whole of man's behaviour – and, on the other hand, those modest and poor means for their solution which the classic experiment of creating a conditional (secretory or motor) reflex provides. This discordance becomes more and more clear as reflexology turns from the study of the most elementary links between man and his environment (correlative activity in its most primitive forms and occurrences) to the investigation of the most complex and diverse interrelations necessary for the detection of the fundamental laws of human behaviour.¹

Here, outside the domain of the elementary and primitive, reflexology was left only with its general bare claim – equally well applicable to all forms of behaviour – that they constitute systems of conditional reflexes. But neither the specific details of each system, nor the laws of the combination of conditional reflexes into behavioural systems, nor the very complex interactions and the reflections of some systems on others, were clarified by this general, far too general statement and it did not even prepare the way for the scientific solution of these questions. Hence the declarative, schematic character of reflexological works when they state and solve problems of human behaviour that are somewhat more complex.

Classical reflexology sticks to its elaboration of the universal scientific principle, the law of Darwinian significance, and reduces everything to a common denominator. And precisely because this principle is too all-embracing and universal it does not yield a direct scientific means for the study of its particular and individual forms. After all, it is for a concrete science of human behaviour as impossible to confine itself to it as it is for concrete physics to confine itself to the principle of gravity. We need scales, we need our instruments and methods in order to appreciate the concrete, material, limited terrestrial world on the basis of this general principle. It is the same in reflexology (everything incites the science of behaviour to transcend the boundaries of the classic experiment and to search for other cognitive means).

And now the tendency to broaden the reflexological methods has not only clearly

revealed itself, but the line this broadening will follow has taken shape as well. This line is directed towards the increasing approximation of and eventual definitive merging with the methods of investigation that were established in experimental psychology a long time ago. Although this sounds paradoxical with regard to such hostile disciplines, and although in this respect within the milieu of reflexologists themselves there is no complete unanimity and they assess experimental psychology completely differently – despite all this we may speak of this merging, of the creation of unified methods for the investigation of human behaviour, and therefore also of its unified scientific discipline, as if it were a fact that is realized before our eyes.

The short history of this approximation is as follows. Initially an electro-cutaneous stimulus was applied on the sole, which evoked a defensive reflex of the foot or the whole leg. After that Professor Protopopov² introduced a very essential change in the procedure – he changed the leg for the hand, reasoning that it is much more profitable to select the arm as a criterion for the reaction as it is the most perfect response apparatus, more finely tuned to the orienting reactions to the environment than the leg (cf. Prof. Protopopov, V. P., 1923, *The methods of the reflexological investigation of man, Zhurnal Psikologii, Nevrologii i Psikhiatrii*, 3. Moscow–Petrograd: Gosudarstvennoe Izdatel'stvo). He argues extremely convincingly the importance of a suitable choice of responding apparatus for the reaction. Indeed, it is clear that if we choose the speech apparatus as the responding apparatus in the case of a stutterer or a mute, or with a dog the extremity of which the corresponding cortical motor centre has been removed, or, in general, an apparatus that is little or not suitable for the corresponding type of reaction (the leg of a person for grasping movements) – that in all these cases we will establish very little about the speed, accuracy and perfection of the animal's orientation, although the analysing and synthesizing functions of the nervous system are completely preserved. 'And indeed, the experiment proved', says Professor Protopopov, 'that the formation of conditional reflexes in the hand is reached much faster, the differentiation is also reached faster and is more stable' (ibid. [p. 22]). Moreover, the change in methods of the reflexological experiment makes it very much like the psychological ones. The hand of the subject is placed freely on a table and his fingers touch a plate through which runs an electric current.

Thus, if in the study of human reflexes we wish to go further than the establishment of a general principle and set ourselves the goal of studying the different types of reactions that determine behaviour, the choice of the reacting organ is a factor of vital importance. 'Man and animal have many responding apparatuses at their disposal, but undoubtedly they respond to the various environmental stimuli with those that are for them the most developed and most suitable for the given case', says Professor Protopopov.

Man runs away from danger with his legs, defends himself with his arms, etc. Of course, it is also possible to create a defensive synthesizing reflex in the foot, but if it is necessary to investigate not only the synthesizing function of the cerebral hemispheres as such

(= the general principle, LV), but also the degree of rapidity, accuracy and perfection of the orientation, then for this type of investigation it turns out not to be indifferent which type of responding apparatus to choose for observation. (ibid. [p. 18])

But in for a penny, in for a pound. Professor Protopopov has to confess that the reform cannot stop here.

Man has at his disposal an effector apparatus in that same motor area that is much more developed (than the arm), with the help of which he can establish a much broader link with the surrounding world – here I have in mind the speech apparatus . . . I think it already possible and useful to turn in reflexological investigations to the use of the object's speech, considering this latter as a specific case of those conditional links that determine the interrelation between man and his environment through his motor area (ibid. [p. 22]).

That speech has to be considered a system of conditional reflexes hardly needs any discussion: it is for reflexology almost a truism. The benefits that the use of speech can bring to reflexology by broadening and deepening the circle of the phenomena studied are also evident to everyone.

Thus, with respect to the reacting apparatus, there is no longer a disagreement and difference of opinion with psychology. Academician Pavlov pointed to the suitability of the salivary reflex in the dog as being the least voluntary, conscious. That was indeed extremely important as long as it regarded the solution of the principle as such of the conditional reflexes, the 'mental saliva' at the sight of food. But new tasks require new means, the advance forward requires a changed road map.

The second and more important circumstance is that the methods of reflexology stumbled upon 'certain facts' that are well known to every child. The process of stimulus discrimination is not quickly established in man. Much time is required for the established reflex to turn from generalized into differentiated, that is, for man to learn to react only to the main stimulus, and to inhibit his reactions to irrelevant ones. And here '*it turned out* (my emphasis, LV) that by influencing the object with corresponding suitable speech it was possible to create both inhibition and excitation of the conditional reflexes' (ibid. [p. 16]). When we explain to a person that only one specific sound will be combined with the electric current and no others, discrimination is realized immediately. Through speech we can also evoke the inhibition of the conditional reflexes to the *main* stimulus and even of the unconditional reflex to an electric current – we only have to tell the subject not to withdraw his hand.

Thus, 'corresponding suitable speech' is included in the methods of the experiment in order to establish discrimination. But the same means can not only be used to evoke inhibition but also to stimulate the reflex activity. 'If we verbally suggest to the object to withdraw his hand after any signal', then the result will be nothing worse than in the case of a withdrawal of the hand after the electric current passed through the plate. 'We will always elicit the desired reaction' (ibid.). It is clear that from the point of view of reflexology the withdrawal of the hand after a verbal

instruction is a conditional reflex too. And the whole difference between this conditional reflex and the one established with a reflex to an electric current is that here we have a *secondary* conditional reflex and there a *primary* one. But also Professor Protopopov acknowledges that this circumstance is rather to the credit of such methods. 'Undoubtedly', he says, 'in the future the reflexological investigation of man will primarily have to be carried out with secondary conditional reflexes' (ibid. [p. 22]). And, indeed, is it not evident that in analysing human behaviour the most essential aspect – both quantitatively and qualitatively – is precisely the *superreflexes*, and that precisely they explain behaviour in its statics and dynamics?

But with these two assumptions, (1) the stimulation and limitation (differentiation) of reactions with the help of verbal instruction; (2) the use of all sorts of reactions including verbal, speech ones, we enter fully the area of the methods of experimental psychology.

Twice in the quoted historical article Professor Protopopov raises this issue. He says: 'The set-up of the experiments in the given case . . . is fully identical to the one used for a long time in experimental psychology in the investigation of the so-called simple psychological reactions'. He further includes 'various modifications in the set-up of the experiments. It is, for example, possible to use the so-called associative experiment of Jung for reflexological goals and, with the help of it, to take account of not only the present object, but to detect the traces of earlier stimuli, including inhibited ones as well' (ibid.).

Turning with such resolution from the classical experiment of reflexology to the very rich variety of psychological experimentation – so far forbidden for physiologists – outlining with great courage new roads and methods for reflexology, Professor Protopopov, for all his high assessment of the psychological experiment, leaves *two extremely essential points* unsaid. The present article is devoted to the foundation and defence of these points.

The first point concerns the techniques and methods of investigation, the second one the principles and goals of the two (?) sciences. Both are intimately connected with each other and both are connected with an essential misunderstanding that obscures the problem. The acknowledgement of both of these remaining points is dictated both by the logically inevitable conclusions from the tenets already accepted by reflexology and by the next step that is already implied by the whole line of development of these methods and which will be taken in the very near future.

What is left that prevents the final and complete coincidence and merging of the methods of the psychological and reflexological experiment? In Professor Protopopov's understanding of the problem *only one thing*: the interrogation of the subject, his verbal account of the course of some aspects of the processes and reactions that cannot be perceived by the experimenters in another way, the utterance, the testimony of the object of the experiment himself. It would seem that the root of the difference of opinion is to be found here. Reflexologists are not against making this difference of opinion a principal and decisive one.

Thereby they connect it with the second question, that of the different goals of the two sciences. Professor Protopopov not once mentions the interrogation of the subject.

Academician Bekhterev frequently says that 'from the standpoint of reflexology subjective investigation is permissible only on oneself' (V. M. Bekhterev, 1923: *General Foundations of the Reflexology of Man*, Gosudarstvennoe Izdatel'stvo; chapter XVIII; [1932, pp. 61-2; p. 220]).³ Meanwhile, *precisely from the point of view of the completeness of the reflexological investigation* it is necessary to introduce the interrogation of the subject. Indeed, the person's behaviour and the creation of new conditional reactions is not only determined by the exposed (manifest), complete, fully disclosed reactions, but also by reflexes that are not demonstrated in their external part, that are half-inhibited, interrupted. Following Sechenov academician Bekhterev demonstrates that a thought is only an inhibited reflex, a reflex that is non-manifest, interrupted after two-thirds; verbal thinking, in particular, is the most frequent case of a non-manifest speech reflex.⁴

One may ask why it is allowed to study complete speech reflexes and even to put great hopes on this area, and why it is forbidden to take account of these same reflexes when they are inhibited, not exposed in their external part, but nevertheless undoubtedly exist objectively. When I pronounce aloud, audible for the experimenter, the word 'evening', then this word that comes to my mind by association is taken into account as a verbal reaction = a conditional reflex. But when I pronounce it inaudibly, for myself, when *I think it*, does it really stop being a reflex and change its nature? And where is the *boundary* between the pronounced and the unpronounced word? When the lips started moving, when I whispered, but inaudibly for the experimenter, what then? Can he ask me to repeat this word aloud, or will that be a subjective method, self-observation and other forbidden things? When he can (and with this, probably, almost everybody will agree), then why can't he ask one to pronounce aloud a word that was pronounced *in thought*, that is, without the movement of the lips and the whispering - for it still was and remains a motor reaction, a conditional reaction, without which there would be no thought. And this is already an interrogation, an utterance of the subject, his verbal testimony and declaration about reactions that *undoubtedly objectively existed* but were not manifest, not perceived by the experimenter's ear (here we have the sole difference between thoughts and speech, only this!). We can convince ourselves in many ways that they existed, existed objectively with all the signs of material being. And what is most important, they themselves will take care to convince us of their existence. They will *express themselves* with such a force and vividness that they *force* the experimenter to take them into account, or to refrain fully from the study of such streams of reactions in which they pop up. And are there many of those processes of reactions, of those courses of conditional reflexes in which non-manifest reflexes (= thoughts) would not pop up? Thus, either we refrain from the study of human behaviour in its most essential forms, or we introduce the obligatory registration of these non-manifest reflexes into our experiment. Reflexology has to

study both thought and the whole mind if it wishes to understand behaviour. The mind is only inhibited movement, and what is objective is not only what can be felt and seen by everyone. That which is only visible through the microscope or telescope or with x-rays is objective too. Inhibited reflexes are equally objective.

Academician Bekhterev [1932, p. 411] himself points out that the results of the Würzburg school in the area of 'pure thought', in the highest spheres of the mind, essentially coincide with what we know about conditional reflexes. And Professor Krol' ('Thinking and speech', official talk at the State Institute in Minsk – 'Trudy BGU', vol. 2) openly says that the new phenomena detected by the Würzburg investigations in the area of imageless and non-verbal thinking are nothing other than Pavlovian conditional reflexes.³ And much sophisticated work in the study of reports and verbal testimonies of subjects was required in order to establish that the act of thought itself cannot be perceived through self-observation, that it is found ready-made, that one cannot account for it, i.e. that it is a pure reflex.

But it is evident that the role of these verbal reports, of this interrogation, and its meaning for both reflexological and psychological investigations does not fully coincide with the ones attributed to them at times by subjective psychologists. How do psychologists-objectivists have to look at them and what is their place and meaning in the system of scientifically verified and rigorous experimentation?

Reflexes do not exist separately, do not act helter-skelter, but club together in complexes, in systems, in complex groups and formations that determine human behaviour. The laws of composition of reflexes into complexes, the types of these formations, the sorts and forms of interaction within them and the interaction between whole systems – all these questions have paramount meaning for the most acute problems of the scientific psychology of behaviour. The theory of reflexes is only in its beginning, and all these areas still remain to be investigated. But already now we may speak, as if it were a fact, about the undeniable interaction of different systems of reflexes, about the *reflection* [interpenetration] of some systems on others, and we can even in general and rough traits provide a preliminary clarification of the mechanism of this reflection. *The response part of each reflex (movement, secretion) becomes itself a stimulus for a new reflex from the same system or another system.*

Although I never came across such a formulation in any of the works of the reflexologists, its truth is so evident that it is evidently only omitted because it is tacitly implied and accepted by everybody. The dog reacts to hydrochloric acid by salivating (a reflex), but the saliva itself is a new stimulus for the reflex of swallowing or rejecting it. In free association I pronounce 'nasturtium' to the word stimulus 'rose' – this is a reflex, but it also constitutes a stimulus for the next word 'buttercup'. (This is all within one system or between related, interacting systems.) The howling of a wolf elicits, as a stimulus, the somatic and mimic reflexes of fear in me; my changed respiration, my palpitation, my trembling, my dry throat (the reflexes) force me to say: I am afraid. Thus, a reflex can play the role of stimulus with regard to another reflex of the same or another system and elicit it in the same way as an extraneous stimulus. And in this respect the association of reflexes is evidently fully

determined by all the laws governing the formation of conditional reflexes. A reflex is linked to another reflex according to the law of conditional reflexes, and will under certain circumstances become its conditional stimulus. This is the obvious and fundamental first law of the association of reflexes.

This mechanism also leads us to a very rough and global understanding of the (objective) meaning that verbal reports of the subject may have for scientific investigation. Non-manifest reflexes (mute/silent speech), internal reflexes which are not accessible to direct observation by the observer can often be exposed indirectly, in a mediated way, via the reflexes that are accessible to observation and for which they form the stimuli. Through the presence of a full reflex (a word) we judge about the presence of a corresponding stimulus, which in this case plays a *double* role: of stimulus for the full reflex and of reflex to a preceding stimulus. Taking into account the gigantic, colossal role that precisely the mind (that is, the non-manifest group of reflexes) plays in the system of behaviour, it would be suicidal to refrain from exposing it through the indirect path of its reflection [bearing] on other systems of reflexes. (Recall academician Bekhterev's theory about the internal, external-internal etc. reflexes. All the more as we often have internal stimuli hidden from us, hiding in somatic processes, but which can nevertheless be exposed via the reflexes they elicit. The logic is the same here, as is the line of thought and the proof.)

In this understanding the report of the subject is not at all an act of self-observation that as it were puts a spoke in the wheels of scientifically objective investigation. *No self-observation whatsoever*. The subject is not put in the position of an observer, does not help the experimenter to observe reflexes hidden to him. The subject *fully* remains – also in his own account – the *object* of the experiment, but in the experiment itself some changes, a transformation, are introduced through this interrogation. A new stimulus (the new interrogation), a new reflex is introduced that allows us to judge the unclarified parts of the foregoing. In this respect the whole experiment is as it were filtered through a double objective.

Indeed awareness itself, or the possibility of becoming conscious of our acts and mental states, must evidently be understood, first of all, as a system of transmission mechanisms from some reflexes to others, which functions properly in each conscious moment. The more correctly each internal reflex, as a stimulus, elicits a whole series of other reflexes from other systems, is transmitted to other systems, the better we are capable of *accounting* for ourselves and others for the experienced, the more consciously it is experienced (felt, fixed in words, etc.). 'To account for' means to translate some reflexes into others. The psychological unconscious stands for reflexes that are not transmitted to other systems. Endlessly varied degrees of awareness, that is, interactions of systems included in the system of the acting reflex, are possible. The consciousness of one's experiences does not stand for anything other than their being changed into an object (a stimulus) for other experiences. Consciousness is the experience of experiences in precisely the same way as experience is simply the experience of objects. But precisely this, the capacity of the reflex (the experience of an object) to be a stimulus (the object of an experience) for a new reflex (a new

experience) – this mechanism of awareness is the mechanism of the transmission of reflexes from one system to another.

It is approximately the same as what academician Bekhterev [1932, p. 44; pp. 421–2] calls the accountable and non-accountable reflexes. The results of the investigations of the Würzburg school speak, in particular, in favour of such an understanding of awareness. They established, among other things, the unobservability of the thought act itself – ‘one cannot think a thought’ – which escapes from perception, that is, cannot itself be the object of perception (the stimulus), because here we speak about phenomena of a different order and a different nature than the other mental processes, which can be observed and perceived (= can serve as stimuli for other systems). And the act of thought, the act of consciousness is in our opinion not a reflex, that is, it cannot also be a stimulus, but it is *the transmission mechanism between systems of reflexes*.

Of course, in such an understanding, which makes a *principled* and radical methodological distinction between the verbal report of the subject and his self-observation, the scientific nature of the instruction and interrogation also changes in a most radical way. The instruction does not suggest the subject do part of the observation himself, to split his attention and direct it to his own experiences. *Nothing of the sort*. The instruction, as a system of conditional reflexes, as a preliminary, elicits the reflexes of the set necessary for the experiment, which determine the further course of the reactions, and the set reflexes of the transmission mechanisms, precisely those which have to be used in the course of the experiment. Here the instruction regarding the secondary, reflected reflexes in principle differs not at all from the instruction regarding primary reflexes. In the first case: say the word which you just pronounced for yourself. In the second: withdraw your hand.

Further: the interrogation itself is not any more the *questioning* of the subject about his experiences. The case changes principally and radically. The subject is not any more a witness testifying about a crime, which he witnessed as an eyewitness (his role earlier), but the criminal himself and – what is most important – at the very moment of the crime. Not interrogation *after* the experiment, when the experiment is finished but interrogation as the continuation of the experiment, as its organic inherent part, as the experiment itself. Interrogation is absolutely inseparable from the first part and merely utilizes the experimental data in the process of the experiment itself.

The interrogation is no superstructure on the experiment but the experiment itself which has not yet been finished and still continues. The interrogation has to be composed, therefore, not like conversation, speech, an interrogation by the experimenter, but as a *system of stimuli* with an accurate registration of each sound, with the strictest choice of only those reflected systems of reflexes, which in the given experiment can have an absolutely trustworthy, scientific and objective meaning. This is why each system of modifications of the interrogation (to take the subject unawares, a partial method, etc.) has great meaning. A strictly objective system and methods of interrogation have to be created as parts of the stimuli introduced in the experiment. And, of course, non-organized self-observation, as most of its testimony, can have no

objective meaning. One has to know about what one can ask. In the case of the vagueness of words, definitions, terms and concepts we cannot in an objectively trustworthy way connect the testimony of the subject about 'a slight feeling of difficulty' with the objective reflex-stimulus that elicited that testimony. But the testimony of the subject – 'at the sound "thunder" I thought "lightning"' – can have a perfectly objective meaning which can indirectly establish that to the word 'thunder' the subject reacted with the non-manifest reflex 'lightning'. Thus, a radical reform of the methods of the interrogation and instruction is needed which will take into account the testimony of the subject. I claim that in each particular case such perfectly objective methods are possible, which will turn the interrogation of the subject into a perfectly accurate scientific experiment.

Here I wish to raise two points: one restricting what was said before, the other extending its meaning.

The restricted sense of these claims is clear of itself: this modification of the experiment is applicable to the adult, normal person, who can understand and speak our language. Neither with the newly born infant, nor with the mental patient, nor with the criminal, who hides something, can we conduct an interrogation. We will not do it precisely because with them the interlacing of the systems of reflexes (consciousness), the transmission of reflexes to the speech system, is either not developed, disturbed by a disease or inhibited and suppressed by other, more powerful set reflexes. But for the adult, normal person who has of his own free will agreed to the experiment this experiment is indispensable.

Indeed, in man a group of reflexes that we should correctly call the system of reflexes of social contact (A. Zalkind) easily stands out.⁶ These are reflexes to stimuli that in their turn can be created by man. The word that is heard is a stimulus, the pronounced word a reflex that creates the same stimulus. These reversible reflexes, that create the basis for consciousness (the interlacing of the reflexes), also serve as the basis of social interaction and the collective co-ordination of behaviour, which, by the way, points to the social origin of consciousness. From the whole mass of stimuli one group clearly stands out for me, the group of social stimuli, coming from people; it stands out because I myself can reconstruct these stimuli, because they very soon become reversible for me, and thus determine my behaviour *in another way* from all others. They make me comparable, identical with myself. The source of social behaviour and consciousness also lies in speech in the broad sense of the word. Speech is on the one hand a system of reflexes of social contact and on the other hand primarily a system of reflexes of consciousness, that is, for the reflection of the influence of other systems.

That is why the key to the solution of the problem of the external Ego, of the cognition of another person's mind, lies here. The mechanism of consciousness of the self (self-consciousness) and the cognition of others is the same; we are conscious of ourselves because we are conscious of others, and with the same method as we are conscious of others, because we are the same *vis-à-vis* ourselves as others *vis-à-vis* us. We are conscious of ourselves only to the extent that we are another to ourselves, that

is, to the extent that we can again perceive our own reflexes as stimuli. There is in principle no difference in mechanism whatsoever between the fact that I can repeat aloud a word spoken silently and the fact that I can repeat a word spoken by another: both are reversible reflex-stimuli. That is why in the social contact between the experimenter and the subject, when this contact proceeds normally (with persons who are adult etc.), the system of speech reflexes has all the trustworthiness of a scientific fact for the experimenter provided that all conditions have been observed, and something absolutely correct has been selected, something absolutely needed and of which the connection with the reflexes under study has been taken into account by us beforehand.

The second, extended sense of what was said above can be most easily expressed as follows. The interrogation of the subject with the goal of a perfectly objective study and account of non-manifest reflexes is *an essential part of each* experimental investigation of a normal person in the waking state. I do not have in mind here the testimony of the self-observation of subjective experiences that academician Bekhterev rightly considers to have but supplementary, secondary, subsidiary meaning, but the objective part of the experiment that cannot be missed by *hardly any* experiment and that itself serves as a verifying instance which provides the sanction of trustworthiness to the results of the preceding part of the experiment. Indeed, compared to the complete reflexes mind in general plays a larger and larger role in higher organisms and man, and to not study it is to refrain from the study (precisely the objective study and not its one-sided, subjective caricature) of human behaviour. In experiments with intelligent persons *there is not one case* where the factor of inhibited reflexes does not in one or the other way determine the behaviour of the subject and could be completely eliminated from the phenomena under study and ignored. There is no experimental study of behaviour where the manifest reflexes are unaccompanied by reflexes that are not accessible to the eye or the ear. Therefore, there can be no case where we could refrain from this, albeit purely verificatory, part of the experiment. And in essence it, this element, is introduced by experimenters (it cannot be not introduced) but precisely as speech, as a conversation, which is not taken into account on the same scientific level as the other elements of the experiment.

When your subject tells you that he did not understand the instruction, do you really not take into account this speech reflex later as a clear testimony of the fact that your stimulus did not elicit the set reflexes you needed? And when you yourself ask the subject whether he understood the instruction, is not this natural precaution really an appeal to a complete reflecting reflex of the word 'yes' or 'no', as to a testimony about a series of inhibited reflexes? And the declaration of the subject 'I recalled something unpleasant' after a very delayed reaction, is it really not taken into account by the experimenter? Etc., etc. We could give thousands of examples of the *unscientific* use of this method, for the method cannot be avoided. And when a reaction is delayed unexpectedly and not in line with the other series of tests, would it really not be useful to turn to the subject ourselves with the question 'Were you thinking of something else during the experiment?' and to receive the answer 'Yes, I was all the

time calculating whether in all places I received enough change today'? And not only in these cases, in these *accidents*, is it useful and essential to ask for a testimony from the subject. In order to determine the reflexes of his set, to take into account the essential hidden reflexes elicited by us, to check whether there were no extraneous reflexes – yes, for a thousand other reasons – it is necessary to introduce scientifically elaborated methods of interrogation instead of the talk, the conversation that inevitably pops up in the experiment. But, of course, these methods are in need of complex modifications in each particular case.

Curiously enough, to finish this topic and switch to another one intimately connected with it, the reflexologists who have fully and entirely accepted the methods of experimental psychology omit precisely this point, evidently because they think it superfluous and in principle without anything to do with objective methods, etc. In this respect volume four of *New Ideas in Medicine* (Petrograd: Obrazovanie, 1923) is very interesting. In a number of articles a new line of development in methods is outlined that goes in the same direction as that of Professor Protopopov, and with the same peculiarity – the exclusion of the interrogation.

Matters stand the same in practice. When it turned to experiments with humans the Pavlovian school reproduced all methods of psychology with the exception of interrogation. Would not this partially explain the meagreness of the conclusions, the poverty of the results of the investigations which we witnessed in this congress during the presentations about these experiments? What can they establish other than the general principle that has been established a long time ago and more eloquently, and the fact that in man reflexes can be created faster than in dogs? This is clear without any experiments. To ascertain the obvious and to repeat the ABC remains the inevitable fate of all experimenters who do not wish to alter radically the methods of their investigation.

Here I have set myself the goal of creating a plan for the construction of a *unified* scientific-objective system of methods for the investigation of and experiment with human behaviour and to defend this attempt theoretically.

But this technical problem is intimately connected, as I have said already, with another difference of opinion of a theoretical nature which the reflexologists emphasize even when they acknowledge the methods of investigation shared with psychology. Professor Protopopov expresses himself as follows:

The inclusion into these methods (of reflexology) of methods of investigation applied already a long time ago in experimental psychology . . . formed the result of the natural development of reflexology and does not at all imply the transformation of reflexology into psychology. The gradual perfection of the reflexological methods *by accident* (my emphasis, LV) led to forms of investigation that *only seen from the outside look like* the ones applied in psychology. The foundations of principle, the subject, and the goals of these two disciplines remain completely different. While psychology studies mental processes as spiritual experiences from their objective side . . . (ibid.)

etc., etc. – the rest is well known to anyone who reads the booklets on reflexology.

It seems to me that it is not difficult to show that this rapprochement is *not accidental* and that the similarity in forms is *not only external*. To the extent that reflexology aspires to explain the *whole* behaviour of man it will inevitably have to deal with the same material as psychology. The question is as follows: can reflexology dismiss and fully ignore the mind as a system of non-manifest reflexes and interlacings of different systems? Is a scientific explanation of human behaviour possible without the mind? Does the psychology without a soul, the psychology without any metaphysics, have to be transformed into a psychology without a mind – into reflexology? Biologically speaking it would be absurd to suggest that the mind is completely unnecessary in the behavioural system. We would either have to accept that clear absurdity or deny the existence of the mind. But for this not even the most extreme physiologists are prepared – neither academician Pavlov, nor academician Bekhterev.

Academician Pavlov [1928/1963, p. 219] openly says that our subjective 'states are for us a reality of the first order, they give direction to our daily life, they determine the progress of human society. But it is one thing to live according to the subjective states and quite another to analyse their mechanism in a purely scientific way' (*Twenty Years of Experience with the Objective Study of Higher Nervous Activity*, Petrograd, 1923).⁷ Thus, there is a reality of the first order that gives direction to our daily life – this is the most important – and yet the objective study of higher nervous activity (behaviour) can ignore this reality that gives direction to our behaviour, this mind.

'Only one thing in life', says academician Pavlov, 'is of actual interest for us – our psychical experience . . . What interests man most of all is his consciousness, the torments of consciousness' (ibid. [1928/1963, p. 80]). And academician Pavlov himself acknowledges that 'we cannot ignore them (the mental phenomena), because they are intimately connected with the physiological phenomena that determine the integral functioning of the organ' (ibid.). After this can we refrain from the study of the mind? Academician Pavlov himself very correctly defines the role of each science when he says that reflexology builds the foundation of nervous activity and psychology the higher superstructure:

And as the simple and elementary is understandable without the complex, whereas the complex cannot be explained without the elementary, it follows that our position is better, for our investigations, our success, do not in any way depend on their investigations. On the contrary, it seems to me that our investigations should have great significance for psychologists, as they eventually will have to lay the main foundation of the psychological building (ibid. [1928/1963, p. 113]).

Any psychologist will subscribe to that: reflexology is the general principle, the foundation. *Until now*, while the building of the foundation common to animals and man was in process, while we were talking of the simple and elementary, there was no need to take the mind into account. But this is a temporary phenomenon: when

the 20 years of experience will have become 30 years the situation will change. That is what I said in the beginning, that the crisis of methods in reflexology begins precisely when they turn from the foundation, from the elementary and simple, to the superstructure, to the complex and subtle.

Academician Bekhterev expresses himself even more decidedly and openly and, therefore, takes a view that is still more intrinsically inconsistent and contradictory. 'It would be big mistake', he says, 'to regard subjective processes as completely superfluous or subsidiary phenomena in nature (epiphenomena), for we know that everything superfluous in nature becomes atrophied and obliterated, whereas our own experience tells us that the subjective phenomena reach their highest development in the most complex processes of correlative activity' (*General Foundations of the Reflexology of Man*, Gosudarstvennoe Izdatel'stvo, 1923; [1932; p. 103]).

Is it possible, one may ask, to exclude the study of those phenomena that reach their highest development in the most complex processes of correlative activity in that science that has *precisely* this correlative activity as its subject of study? But academician Bekhterev does not exclude subjective psychology and draws a boundary line between it and reflexology. For it is clear to everyone, that here only one of two things is possible: (1) a complete explanation of the correlative activity without a mind – this is accepted by academician Bekhterev – and then the mind is made into a superfluous, unnecessary phenomenon – which Bekhterev denies; (2) or such an explanation is impossible – is it possible then to accept a subjective psychology and mark it off from a science of behaviour, etc? Accepting neither of the two alternatives academician Bekhterev talks about the relation between the two sciences, about the possible rapprochement in the future, 'but as for this the time has not yet come. We can for the time being defend the point of view of the close interaction of one and the other discipline' (*ibid.*, first edition).

Further, academician Bekhterev speaks about 'the possible and even inevitable future construction of a reflexology with particular consideration for subjective phenomena' (*ibid.*, second edition [1932, p. 380]). But if the mind is inseparable from correlative activity and reaches its highest development precisely in its highest forms – how can we then study them separately? That is only possible when we assume that both sides of the matter are heterogeneous and essentially different, which for a long time has been defended by psychology. But academician Bekhterev dismisses the theory of psychological parallelism and interaction and claims precisely the unity of mental and nervous processes.

Academician Bekhterev often speaks about the relation between subjective (mind) and objective phenomena but all the time clearly defends a dualistic point of view. And in essence, *dualism* is the real name of academician Pavlov's and Bekhterev's point of view. For Bekhterev, experimental psychology is unacceptable precisely because it studies the internal world of the mind with the method of self-observation. Academician Bekhterev wishes to consider its results irrespective of the processes of consciousness. And about the methods he openly says that reflexology 'uses its own strictly objective methods' (*ibid.* [1932, p. 220]). With regard to methods, however,

we have seen that reflexology itself acknowledges their complete coincidence with the psychological methods.

Thus, two sciences with *the same* subject of investigation – the behaviour of man – and that use *the same methods*, nevertheless, despite everything, remain different sciences.⁸ What prevents them from merging? 'Subjective or mental phenomena' the reflexologists repeat in a thousand ways. But is the mind equivalent to subjective phenomena? In their views on this question – the decisive question – the reflexologists defend purely idealistic points of view and a dualism which might more correctly be called an idealism turned upside down. For academicians Pavlov and Bekhterev they are non-spatial and non-causal phenomena – they have no objective existence *whatsoever* as they can only be studied on oneself. But both Bekhterev and Pavlov know that they rule our life. Nevertheless they consider these phenomena, the mind, to be something different from the reflexes, something which has to be studied separately, and independently of which we have to study the reflexes. This is of course materialism of the purest order – to ignore the mind, but it is materialism only in its own area; outside of it is idealism of the purest order – to single out the mind and its study from the general system of human behaviour.

Mind without behaviour is as impossible as behaviour without mind, if only because they are the same. Subjective states, mental phenomena exist, according to academician Bekhterev, in the case of an electric potential, in the case of reflexes (NB!) of concentration connected with the inhibition of a nervous current, in the case where new connections are set going – what kind of mysterious phenomena are they? Is it not clear now that they can be completely and fully reduced to reactions of the organism, to reactions that are reflected by other systems of reflexes – by speech, by feelings (mimic-somatic reflexes), etc. Psychology has to state and solve the problem of consciousness by saying that it is the interaction, the reflection, the mutual stimulation of various systems of reflexes. It is what is transmitted in the form of a stimulus to other systems and elicits a response in them. Consciousness is a response apparatus.

That is why subjective experiences are only accessible to me – only I perceive my own reflexes as stimuli. In this sense James, who showed in a brilliant analysis that nothing forces us to accept the fact of the existence of consciousness as something distinguished from the world, is profoundly right although he denied neither our experiences, nor the awareness of them ('Does consciousness exist?').⁹ The whole difference between consciousness and the world (between the reflex to a reflex and a reflex to stimuli) is only in the context of the phenomena. In the context of stimuli it is the world, in the context of my reflexes it is consciousness. This window is an object (the stimulus of my reflexes), the same window with the same qualities is my sensation (a reflex transmitted to other systems). Consciousness is only the reflex of reflexes.

To claim that consciousness too has to be understood as a reaction of the organism to its own reactions, one has to be a bigger reflexologist than Pavlov himself. So be it, if one wishes to be consistent one sometimes has to raise objections to half-

heartedness and be a bigger papist than the pope, a bigger royalist than the king. Kings are not always royalists.

When reflexology excludes mental phenomena from the circle of its investigations because they do not fall under its jurisdiction, it acts just like idealistic psychologists who study the mind as having nothing whatsoever to do with anything else, as an isolated world. By the way, psychology hardly ever excluded from its jurisdiction on principle the objective side of mental processes and did not isolate the circle of internal life [viewed] as a desert island of the spirit. Subjective states in themselves – out of space and causality – do not exist. Therefore a science studying them cannot exist either. But to study the behaviour of man without mind as reflexology wishes to do is as impossible as to study mind without behaviour. There is no place, consequently, for two different sciences. And it does not require great perspicacity to see that the mind is the same correlative activity, that consciousness is correlative activity within the organism itself, within the nervous system, correlative activity of the human body with itself.

The contemporary state of both branches of knowledge urgently raises the question of the necessity and fruitfulness of a complete merging of both sciences. Psychology experiences a most serious crisis both in the West and in the USSR. 'A heap of raw material', it was called by James. The contemporary state of the psychologist is compared by a Russian author to that of Priam on the ruins of Troy. Everything collapsed – that is the result of a crisis that was not confined to Russia (cf. N. Lange, 'Psychology', in *The Results of Science*).¹⁰ But reflexology, having built the foundation, reached a dead end too. The two sciences cannot manage without each other. It is imperative and vital to elaborate common scientifically objective methods, a common formulation of the most important problems that each science treats separately and that can no more be posed, let alone solved. And isn't it clear that the superstructure cannot be built except on the foundation, but that the builders of the foundation too, having finished it, cannot lay another stone without checking it against the principles and the character of the building to be erected?

We have to speak openly. The enigmas of consciousness, the enigmas of the mind cannot be avoided with any methodological tricks or subterfuges of principle. You cannot cheat them. James asked whether consciousness exists and answered that breathing exists, of this he was convinced, but about consciousness he was in doubt. But that is an epistemological statement of the problem. Psychologically speaking consciousness is an indisputable fact, a primary reality, a fact of the greatest significance, and not a secondary or accidental one. About this there is no dispute. Thus, we should have and might have *put aside* the problem, but not have *removed* it. As long as in the new psychology one does not make both ends meet, the problem of consciousness will not be stated clearly and fearlessly and it will not be solved in an experimentally objective way. On which level do conscious indications of reflexes evolve, what is their nervous mechanism, the details of their course, their biological sense? These questions we have to pose, and we have to prepare to work on them, to solve them in an empirical way. The only thing is to state the problem correctly and timely, and

then the solution will sooner or later be found. Academician Bekhterev in his 'energetic' enthusiasm talks to the point of panpsychism, stating that plants and animals are animated beings. In another place he cannot bring himself to repudiate the hypothesis about a soul.¹¹ And in such primitive ignorance with respect to the mind reflexology will remain as long as it steers clear of the mind and isolates itself in the narrow circle of *physiological materialism*. To be a materialist in physiology is not difficult – try to be it in psychology and if you cannot, you will remain an idealist.

Quite recently the issue of self-observation and its role in psychological investigation sharpened acutely under the influence of two facts. On the one hand objective psychology, which apparently initially was inclined to sweep aside introspection completely and thoroughly, begins lately to try to find the *objective* meaning of what is called introspection. Watson, Weiss¹² and others spoke about 'verbalized behaviour' and they link introspection with the functioning of this verbal side of our behaviour; others talk about 'introspective behaviour', about 'symptomatic speech' behaviour, etc. On the other hand the new current in German psychology, the so-called *Gestalt-psychologie* (Köhler, Koffka, Wertheimer and others), which acquired tremendous influence in the last three to four years, raised sharp criticisms on both fronts, accusing both empirical psychology and behaviourism of the same sin – not to be able to study the real, daily behaviour of man with a *single* accepted method (objective or subjective).

Both of these facts add new complications to the question of the value of self-observation and therefore compell us to carry out a *systematic* examination of those essentially different forms of self-observation that are used by the three sides in the debate. The following lines present an attempt to systematize this question. But as a preliminary we make some general remarks.

It is first of all remarkable that in this new complication of the problem attempts to solve it take place during a more and more explicit crisis within empirical psychology itself. Nothing could be more false than the attempt to picture the crisis that breaks up Russian science into two camps as a local Russian crisis. The crisis in psychology now takes place on a worldwide scale. The rise of the psychological school of *Gestalt-theorie*, which came from the depths of empirical psychology, clearly testifies to this. Of what do these psychologists accuse introspection? Essentially, that in using this method of investigation the mental phenomena inevitably *become* subjective because introspection, which requires analytical attention, always isolates contents from their own connections and inserts them into a new connection – 'the connection of the subject, the Ego' [Koffka, 1924, p. 151].¹³ Using this method the experience inevitably *becomes* subjective. Koffka compares introspection which can only study *clear* experience with a pair of glasses and a magnifying glass, which we utilize when we cannot read a letter. But whereas a magnifying glass does not alter the object but helps to observe it more clearly, introspection *changes* the very object of observation. When we compare weights, Koffka [1924, p. 151] says, the real psychological

description in this view should not be 'this weight is heavier than that', but 'my sensation of tension is now stronger than before'. In this way such a method of study *transforms* that which is objective in itself into something subjective.

The new psychologists acknowledge the heroic bankruptcy of the Würzburg school and the impotence of empirical (experimental) psychology as a whole. It is true, these psychologists also acknowledge the futility of the purely objective method. These psychologists put forward a functional and integrative point of view. For them the conscious processes 'are only part-processes of larger wholes' [Koffka, 1924, p. 160], and therefore we may subject our ideas to a functional verification by the objective facts by following 'the conscious part of a larger process-whole beyond its conscious limits' [Koffka, 1924, p. 160]. A psychology, which accepts that self-observation is not the main, most important method of psychology, speaks only about real, about reliable self-observation, which is tested by the consequences that functionally follow from it and is confirmed by the facts.

Thus we see that while on the one hand Russian reflexology and American behaviourism attempt to find 'objective self-observation' the best representatives of empirical psychology seek for 'real, reliable self-observation' as well.

In order to answer the question of what it involves it is necessary to systematize all forms of self-observation and to consider each one separately. We can distinguish five main forms.

- 1 The instruction to the subject. This is, of course, partially introspection for it presupposes the internal conscious organization of the subject's behaviour. He who attempts to avoid it in experiments with man is in error, for he changes the manifest and accountable instruction for the self-instruction of the subject, an instruction which is suggested by the circumstances of the experiment, etc. Hardly anyone will now dispute the necessity of instruction.
- 2 The utterances of the subject concerning the external object. Two circles are shown: 'this one is blue, that one is white'. Such a form of introspection, in particular when it is verified by the functional change of a series of stimuli and a series of utterances (not one blue circle, but a series of blue circles that become gradually darker or lighter), can also be reliable.
- 3 The utterances of the subject concerning his own internal reactions: I have pain, I like it, etc. This is a less reliable form of introspection; however, it can be objectively verified and can be accepted.
- 4 The disclosure of a hidden reaction. The subject mentions a number he has thought of; tells how his tongue lies in his mouth; repeats a word he has thought of, etc. This is that form of indirect disclosure of a reaction which we defended in this article.
- 5 Finally, the detailed descriptions of his internal states by the subject (the Würzburg method). This is the type of introspection that is most unreliable and most difficult to verify. Here the subject is put in the position of an observer; he is the observer ('observer' as the English psychologists say), the subject, and not

the object of the experiment; the experimenter only observes and records what happens. Here, instead of facts we get ready-made theories.

It seems to me that the question of the scientific reliability of self-observation can only be solved in a way similar to the practical value of the testimonies given by the victim and the culprit in an inquest. Both are partial, we know that *a priori*, and therefore they include elements of deception, maybe they are completely false. Therefore it would be madness to rely on them. But does this mean that in a lawsuit we do not have to listen to them at all and only have to interrogate the witnesses? This would be madness as well. We listen to the accused and the victim, verify, compare, turn to the material evidence, documents, traces, testimonies of the witnesses (here too we may have false evidence) – and that is how we establish a fact.

We should not forget that there are whole sciences that cannot study their subject through direct observation.¹⁴ The historian and the geologist reconstruct the facts (which already do not exist) indirectly, and nevertheless in the end *they study the facts that have been*, not the traces or documents that remained and were preserved. Similarly, the psychologist is often in the position of the historian and the geologist. Then he acts like a detective who brings to light a crime he never witnessed.

Notes

The paper is based on a talk presented at the combined session of the psychological and reflexological sections of the 2nd All-Russian congress on psychoneurology in Leningrad, 6 January, 1924 [original footnote]. The paper was first published as Vygotsky, L. S. 1926: *Metodika refleksologicheskogo i psikhologicheskogo issledovanija*. In K. N. Kornilov (ed.), *Problemy sovremennoj psikhologii* (pp. 26–46). Leningrad: Gosudarstvennoe Izdatel'stvo. The background of this paper can be found on pp. 39–43 of Van der Veer, R. and Valsiner, J. 1991: *Understanding Vygotsky: a quest for synthesis*. Oxford: Blackwell Publishers.

- 1 'Correlative activity' ('sootnositel'naja dejatel'nost') was a term introduced by Bekhterev to designate any activities bound up with the establishment of the relation of an organism to its environment and which replaced such 'subjective' terms as 'psychical' or 'neuro-psychical' functions. See Bekhterev's explanation of the term in Bekhterev, V. M. 1932: *General Principles of Human Reflexology*. New York: International Publishers; p. 17.
- 2 Protopopov, V. P. (1880–1957). Soviet psychiatrist.
- 3 Bekhterev, V. M. (1867–1927). Russian physiologist, neurologist and psychologist. Founder of reflexology. The fourth edition of the book was translated into English as Bekhterev, V. M. 1932: *General Principles of Human Reflexology*. New York: International Publishers. The page numbers refer to this edition.
- 4 Sechenov, I. M. (1829–1905). Russian physiologist and psychologist. See Sechenov, I. 1866/1965: *Reflexes of the Brain*, p. 86. Cambridge, MA: MIT Press.
- 5 Krol', M. B. (1869–1939), Soviet neurologist.
- 6 Zalkind, A. B. (1888–1936). Soviet pedagogue and psychologist.

- 7 Here and in the following page numbers refer to Pavlov, I. P. 1928/1963: *Lectures on Conditioned Reflexes*. New York: International Publishers.
- 8 In the report about the conference, published in the volume *Recent Developments in Reflexology* (Gosudarstvennoe Izdatel'stvo, 1925), in the commentary to my talk it is said with respect to this idea that the author 'again attempted to erase the border between the reflexological and psychological approach, even making some remarks concerning reflexology which has fallen into intrinsic contradictions' (p. 359). Instead of refuting this idea the reviewer refers to the fact that 'the speaker is a psychologist who, apart from that, also attempts to assimilate the reflexological approach. The results speak for themselves'. A very eloquent passing over in silence! Although an accurate statement of my error would have been more appropriate, and needed [original footnote].
- 9 'Does consciousness exist?' See Burkhardt, F. H. (ed.) 1976: *The Works of William James: essays in radical empiricism* (pp. 3-19). Cambridge, MA: Harvard University Press. In contradistinction to Vygotsky, James did not refer to the reflex concept in his analysis.
- 10 Lange, N. N. (1858-1921), Russian psychologist.
- 11 Bekhterev was inclined to equate consciousness with the subjective states that accompany the inculcation of an association reflex. It followed that wherever the formation of association reflexes proved possible (e.g. in protozoa) one had to accept the existence of subjective processes. He also said that the irritability of tissue in general is associated with subjective processes, which led to the same result, that is, the hypothesis that unicellular organisms manifest a subjective aspect (cf. Bekhterev, V. M. 1932: *General Principles of Human Reflexology*. New York: International Publishers; pp. 70-5).
- 12 Weiss, A. (1879-1931), American psychologist.
- 13 Koffka, K. 1924: Introspection and the method of psychology. *The British Journal of Psychology*, 15, [149-161] [original footnote].
- 14 Cf. V. Ivanovsky, 'Methodological introduction into science and philosophy', 1923, pp. 199-200. The author points out that some psychologists objected to the introduction of the unconscious into psychology on the grounds that it cannot be directly observed. The psychologist-objectivist studies the phenomena of consciousness as indirectly as the previous psychologists studied the unconscious, by its traces, its manifestations, influences, etc. [original footnote]. Ivanovsky, V. N. (1867-1931), Russian philosopher and psychologist.