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Single case studies as a means for developing psychological theories

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Abstract: The Socratic function of single case studies (SCSs) is described in its relation to the problem of scientific theory development. Contrary to the traditional point of view, the single case study is not a demonstration or verification of theoretical concepts, but a method of their generation and opportunity for analysis of their interrelations. Considering the case study from the perspective of the Socratic function brings to light important conclusions about the ecological validity of theory development. The essential features of the Socratic function are illustrated using the example of the famous Romantic Essays of Alexandr Luria.

Keywords: case study; ecological validity; Galilean mode of thought; Socratic function of experiment
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Single case studies (SCSs) can be used for different purposes in psychology. For example, they are a special feature of the ideographic methodological approach, which contrasts with the nomothetic one (Cone, 1986; Dilthey, 1996; Rickert, 1997; Thomae, 1999). The SCS is also employed widely in the field of applied research, wherein information about a single individual is more important than any theoretical generalizations. This type of SCS is described by Stake as intrinsic (Stake, 1994). Such situations are often sufficient in clinical or psychotherapeutic research.

At the same time, the SCS, known to be instrumental in Stake's terminology (1994), can also be used for theoretical needs. Several scholars have proposed that the SCS can be an instrument of theory falsification, comparable to an ordinary experiment in Popper's point of view (Popper, 1983). Data from a particular instance can be contradictory to the referent theory. Under such circumstances, the theory can be developed or rejected. This function of the SCS can be illustrated by the example of Lorber's SCS (Rolls, 2010, Chapter 18). He described a mathematician with an IQ of 126, but whose brain was ten times smaller than the average brain. This SCS strongly contradicted the generally accepted idea about a correspondence between brain mass and psychological functions, and can be used as a falsification of a common opinion.

Another group of scholars believe that an SCS is a useful tool for verification of a theory and its improvement (Dul & Hak, 2008). The story of little Hanse was one illustration and improved the theory of classic psychoanalysis, from Freud's point of view (Freud, 1909/1977).

Some authors consider that the SCS is a good instrument for demonstrating the ecological validity of a theory on a particular instance, taken in a real life context (Cohen, Manion, & Morrison, 2005; Gillham, 2000; Hancock & Algozzine, 2006; Pole & Burgess, 2000; Simons, 2009; Yin, 2003). They have tried to show that data obtained under laboratory conditions correspond with everyday conditions. This type of SCS is sometimes called explorative. The case

of policeman Kenneth Conley, who was "blind" to the crime of his colleagues, was described by Chabris and Simons (2010) to prove the ecological validity of the invisible gorilla experiment.

There is now an opinion that the SCS plays the role of facilitator for unexpected theoretical insights (McKenna & Warrington, 2009; Shallice, 2001). If a scientist is attentive enough to each and every case, he may discover unpredictable and unexplainable results. In this situation, the investigator should not deny these surprising data, but engage his or her entire theoretical and mental outlook to explain the phenomenon from a different and even completely new perspective. This kind of SCS is called confirmative or explanatory by some authors (Hancock & Algozzine, 2006; Yin, 2003). That is, the SCS has the function of inducing a new phenomenon that cannot be explained by existing theories. A number of such theoretical insights are described in works by Pöppel (Pöppel, Brinkmann, von Cramon, & Singer, 1978; Pöppel & Richards, 1974; Pöppel et al., 1987; Zaytseva et al., 2014). It also can be illustrated by the SCS of Catherine Genovese. This woman was killed in a crowded place in front of many witnesses who saw the crime but did not call the police. It was an SCS that was later considered an example of "diffusion of responsibility" (Rolls, 2010, Chapter 6).

The SCS of Sidney Breadford, who became blind at the age of 9 months and whose vision was restored when he was 52 years old, was considered important material in the classical debate of empiricism vs. nativism in the question of perception development. But the Breadford case represented a new and very narrow sphere of research after Gregory and Wallace on the basis of this SCS, which came to the conclusion that perception development in childhood and perception restitution in adults are quite different processes. It is worth noting that after his operation, Breadford faced a deep crisis of personality that ended with his suicide 2 years later. This SCS was therefore meaningful as well for the investigation of the importance of defect loss for the personality (Rolls, 2010, Chapter 3).

The unexpected relationship between episodic and semantic memory and the hippocampus was discovered after an operation on patient H. M., who suffered from epileptic attacks (Rolls, 2010, Chapter 2). As a result of the surgery, anterograde amnesia appeared. This SCS opened a wide field of investigations in the sphere of psychology of memory.

All of the SCSs mentioned above have contributed considerably to the development of existing theories and to the formulation of new ones. A brief overview of some of the above-mentioned issues about specific case studies is presented in the work by Bassey (1999). Thus, there are different opinions about the role of the SCS in contemporary psychology. These viewpoints will now be considered in order to reveal the general theoretical-experimental function of the SCS. The debate about the functions of the SCS becomes full of intrigue when considering the relation between the methodological traditions of Aristotle and Galileo (Akhutin, 1976; Lewin, 1931).

Socratic function of SCS

The functions of SCSs mentioned above have an intrinsic relationship with the so-called Aristotelian type of theorization. One of the main theses of this gnoseological tendency, which underwent a complicated history of modifications over the centuries, concerns regulations about the estimation of trustworthiness of a theory. The key concept is the following: Any theoretical assertion has to correspond with observable, sensible experience in the real world. For example, to verify a theory, a scientist should find empirical facts that illustrate it; likewise, to falsify a theory it is necessary to demonstrate phenomena that contradict the theoretical statement. During the 19th and 20th centuries, this empirical Aristotelian tradition gave birth to the doctrine of positivism.

Lakatos was one of those methodologists who strongly criticized the positivistic orthodoxy. He argued that a theory never stands contrary to a fact. When a theory is presented with any contradictory fact, the theory never stays passive to it. It always tries to reinterpret new data using its own conceptual core to deal with the uncomfortable fact. At worst, the theory cannot cooperate with a new fact and it rejects the explanation, hoping it will be possible in the future, but never giving up immediately. Analyzing the history of physics, Lakatos (1978) concludes that a theory cannot be falsified only by empirical findings. This statement was made in a very general sense, which is why we can apply it to the SCS as well. Trying to continue along this point of view, we can assume that the SCS, as any other empirical data, cannot falsify a theory directly. It is well known that when Copernicus and Galileo developed their theories, there were few facts that confirmed them, but many that contradicted them. There are many examples in which contradicting facts could not falsify a theory in psychology as well. The classical case in neuropsychology was when Hughlings-Jackson (1878–1879/2006), challenging the clas-

sical theory of brain centers, described a single case of a patient who could not repeat the word "no," but who could easily say the word in spontaneous speech. Despite the fact that this phenomenon contradicted the tradition of Broca and Wernicke (Broca, 1861/2006; Lichtheim, 1885), their followers did not reject the concept of brain centers, but developed it further. Hughlings-Jackson's ideas were not supported and were forgotten for many years until H. Head (1926) and K. Goldstein (1948, 1951) raised them from oblivion. So, the SCS in itself cannot be the only argument to falsify a theory.

A similar conclusion was drawn by Lakatos (1978) about the second function of the fact, mentioned above in the context of SCSs: the function of confirmation. From his point of view, a situation in which the scientist uses empirical data just to confirm his assumption has never been met at influential points of science history. Empirical findings are not only an instrument for confirming hypotheses, they are useful when confronting competing theories. Lakatos concludes that facts can be used to compare theories, or in other words facts can be considered as tools for theoretical debate, which serves to develop a particular research program.

This idea of the dialogical function of an empirical investigation was discussed in detail by Bibler (1990) and his followers. Akhutin (1976) analyzed the dispute between the approaches of Aristotle and Galileo in physics, and showed that astronomical observations can become an argument in this controversy only within theoretical frames. According to Akhutin, facts in the hands of Galileo had the function of Socratic dialogue, when the aim of scholars was not just to find support for their views and not only to prove the objectivity of their observations, but to transform ways of thinking. Galileo used his empirical data to introduce new concepts in the mind of his interlocutor and his own in order to make it possible to see for the first time new facts from a new point of view, to make these facts real for scientists, and to form "intellectual eyes." This transformation of thinking appears not in the form of straightforward persuasion. It is organized as a way of questioning, when, during the dialogue, both sides of the discussion discover insights on their own and make their own discovery of a new theoretical perspective. Moreover, this mental reorganization does not mean simply rejecting one position and shifting to a fundamentally new point of view in the way of Kuhn's (1962) conviction about scientific revolutions. A Socratic dialogue always starts from the imminent problem of the criticized theory and logically brings out a new viewpoint that is more general. The old theory becomes just a special case of the new one, like it was with Newton's and Einstein's physics.

In psychology, Freud became famous for his SCS observations. Night dreaming or mistakes of memory that are familiar to everyone from everyday experience were essentially reinterpreted by Freud through the lens of his new theory. He developed the concept of the unconscious mind with the help of his SCSs, and thereby created a mental transformation of the psychology community. After this intellectual transformation, Freud's facts became noticeable for many others and meaningful from a scientific point of view. He used these new observations not only to prove his own position, but to confront the traditional doctrine of identification of mind and consciousness. To reach this goal, Freud did not reject the achievements of traditional psychology; he agreed with the existence of consciousness in the Cartesian sense, but he embraced this concept in his more general system. There was a similar situation in the opposition of Hughlings-Jackson and the adepts of classical theory of brain centers, as mentioned above. Hughlings-Jackson's SCS with the word "no" was not just a gift, but an unexpected and surprising occasion. It made sense only in the context of his theoretical assumption of level structures of speech. Again, by this SCS he tried to bring the notions of evolution, dissolution, and level structure in psychology, which did not deny the clinical experience of Broca (1861/2006) and others, but reinterpreted it in accordance with the new, more general theory that describes not just a horizontal organization of mental processes and the brain, the object of Broca's and Wernicke's reflections, but also a hierarchical one. Hughlings-Jackson's SCS had meaning in the context of the debate with the theory of centers; it could be theoretically indifferent in the frame of any different controversy.

Thus, there are some intermediate conclusions about several key features of the SCS that reflect specific functions of the SCS in the development of theoretical knowledge. To begin with, the SCS (as well as any other empirical data) depends totally on theory. Second, this theoretical dependence appears in the fact that the SCS is used in the process of Socratic theoretical dialogue. Third, the dialogue is realized as a transformation of thinking by introducing new concepts and theoretical viewpoints, when the old ones are not falsified and rejected but logically developed to a more general theoretical frame. A single case can be noticed only when a scholar has in mind the general image of this SCS, an image based on a particular theoretical position in the

context of scientific debate. The scholar should seek it intensely and select it from other unique cases that are indifferent in the context of the discussion in order to use it as an instrument in a dispute between theories.

The position developed here differs from the opinion of some authors (Gillham, 2000) who suppose that the researcher can be free from theoretical limitations, but must be open-minded and more attentive to reality to notice an interesting SCS that will bring about new theoretical inferences. On the contrary, the viewpoints of Lakatos and Akhutin are not compatible with the image of a scientist such as Robison Crusoe, who stands tête-à-tête with the world; he is not a child who looks at things with naive astonishment. He is armed with the existing theoretical legacies of humankind, as a thinking professional. He does not passively perceive what nature demonstrates to him; rather, he uses his theoretical instruments to test nature in the way that he believes to be true and therefore goes further in theoretical competition.

A function of Galileo's experiment

One of the interesting questions generated by the previous content involves the particular method of introducing a new concept within a scientific discussion, a new theoretical framework and consequently the method of the researcher's mental transformation. One challenge of organizing a new way of thinking is that the direct observation of new empirical facts will not lead to a new way of reasoning; it is always easier to consider observations within the more habitual viewpoint. For example, there may be no obvious restrictions to considering night dreaming or memory mistakes as errors by an associating mechanism, but as a useful work of the unconscious. A simple indication of everyday life phenomena cannot be enough for theoretical development. What should be undertaken by the scholar?

Akhutin (1976) tried to reveal the method using the example of Galileo's investigations. He supposed that it is crucially not enough to pay attention to a regular fact of life that can be reasonable for the Aristotelian way of debating. Paradoxically, in order to transform thinking, it is necessary to destroy everyday experience. Routine facts appear as phenomena but not essence, and if phenomena and essence should coincide, there would be no need for any science (Vygotsky, 1997); it would be enough for the naive contemplator just to take a brief look at the environment and to implicitly comprehend the essence of nature. So, a pioneer in science, on the basis of his or her theoretical background, should change the ordinary conditions in such a manner as to make the new concept appear in its pure form in order to make it distinctly visible. Historically, the scientific experiment has been the main method of such nature-changing.

At the same time, it is important to realize that the experimental method was used in Aristotle's and Galileo's traditions in quite different manners and for different scientific goals. At first, the experiment had the function of classification or generalization. In Aristotelian eyes, the world is full of multifarious events. Some of them take place accidentally but others occur in accordance with the laws of nature and therefore can be predictable. What can be the criteria to distinguish these two types of events? The main method of such differentiation from the Aristotelian viewpoint is regularity. If happenings take place often, then this is apparently due to the nature of things, while rare events should be considered accidental. To make this distinction, the scholar should conduct the experiment in its Aristotelian sense. For instance, he should make careful and controlled observations to find out that some objects frequently fall (e.g., stones, apples, or spoons), but some frequently rise (e.g., fire or steam). Observations multiply, and well-controlled tests seem sufficient enough to prove that the obtained results are reliable. So, there is a strong argument to make for an inductive generalization of two classes of objects: the objects that fall and the objects that rise. During this kind of experiment, the Aristotelian scientist makes an abstraction from the accidental features of objects and tries to reveal some general rules that concern things integrated in different classes, so that the real regularities of the world come to light. As a result of this methodological approach, a host of independent rules that reflect the regular behavior of types of objects are formulated. The specification of the Aristotelian experiment peculiar to physics and psychology was described in detail by Lewin (1931) and it is the position shared by the majority of psychologists today, when statistical instruments of data adaptation are so widespread.

Galileo exposed the function of the experiment to fundamental revision. He supposed that there are no different classes of objects from the physical point of view, and thus it is not reasonable to expect to observe regularities that generalize these classes. All of them, even those which seem opposed, are guided by the same universal laws of nature. Of course, stones fall, fire rises, and birds fly, but all these apparently quite different phenomena act in accordance with the same law of gravity. The universality of the law does not

imply the concept of fortuitousness; there are no accidental events in the world, but all of them, even the most rare, are strongly determined by the law. In this case, the criterion of regularity loses its scientific sense. If a law of nature is universal and does not refer to particular classes of objects, then there is no possibility of revealing the law by observation. Guided by these conclusions, Galileo did not try to explain the behavior of stones, apples, feathers, planets, or any other type of object; that would be consistent with the Aristotelian type of science. On the contrary, he tried to abstract away from all particular types of objects, and to grasp the law in its universality. This universal form is fixed in the most ideal way by the mathematical formula that is absolutely refined from any kind of sensory matter. The law of nature in its ideal mathematical form can never be met in normal conditions. There are no objects that fall in precise accordance with the law of gravity; they all only approximate it, because of the presence of many different laws that interfere with each other. Thus, it is not possible to formulate the law of gravity in case of the maximum generalization via the method of induction, by the averaging of the data obtained from the observation of every class. To realize that these attempts have no prospects, it is useful to imagine the result of averaging a falling stone, rising steam, and a flying bird. Certainly, the law of gravity cannot be grasped in this manner. A clear and paradoxical slogan that summarizes this feature of Galileo's experiment is as follows: the farther from the everyday routine, the closer to the truth. A law does not copy the empirical regularity of normal conditions, but at the same time, all of the particular phenomena of the real world concerning all classes of objects can be explained by it; they can be deduced from the ideal form of the law.

In this context there arises a question about the specific organization of the experiment in Galileo's perspective. If the law was previously described as not referring to any single class of objects but to all of them, what kind of events should be used for it? Galileo's answer is quite paradoxical again. The experiment is not a registration of events that take place in a normal environment. The law in its universal form can appear in the experiment when it destroys the everyday conditions, and shifts from normal conditions to pure ones. It is the technique to provide a real abstraction from the non-essential conditions of the world to the relevant conditions in order to clarify the law of nature, whereas daily experience mostly hides the truth due to the interactions of different laws whose interference leaves no chance for them to be identified. Thus, the aim of the researcher is to create a mental idealization of nature, and to isolate the laws from each other by removing irrelevant conditions during the experiment. As a result of such idealization, the scientist takes a law in its ideal and general form that is free from any individual manifestations. Galileo's experiment is therefore used not to generalize the events in classes, nor to reproduce the particular regularities of the world, but to reconstruct the pure conditions whereby the law can be visible in its universal form. That is why nowadays, laboratories are so necessary for scientific work; these are the places where pure conditions can be created. The reconsideration of this method that was undertaken by Galileo can be summarized in the following slogan: not to generalize, but to destroy (Akhutin, 1976).

At the same time, it is important to remember that experimental work is not just about the clarification of theoretical statements, but mostly about the inducing of new points of view. Thus, it is not right to consider this destructive function of the experiment only as a purification of the object of interest from accidental conditions, when the object itself can be comprehended in the frame of the existing paradigm. Galileo's experiment is not a method to realize the object of the investigation better than before; it is a method to construct a new model of the object. So, in such kind of research the aim is not to distinguish relevant features of nature from irrelevant ones; that was acceptable in harmony with the Aristotelian tradition. The aim is to determine and synthesize in a particular way a new pattern of conditions that firstly can be considered as relevant in accordance with the new theoretical perspective. Thereby, the experiment in Galileo's sense destroys and refines everyday conditions, but especially due to this analytic function at the same time it purifies the opposite synthetic, constrictive function of creating a new understanding of the object. The experiment in Galileo's tradition is an instrument to create and flesh out a new synthetic concept for the first time.

The thesis of the imminent theoretical nature of empirical findings gets a substantial new aspect in this reasoning. The question of which conditions should be considered as relevant or not during the destroying of the everyday conditions completely depends on the theoretical statements, because different theories imply different idealizations, different laws and concepts. Here the Socratic mission of the experiment becomes clear. Galileo's experiment is the method by which this ideal law can be discovered by the scientist. It is during this dialogue of theories that the transformation of thinking takes place. By means of the experiment that reveals a new

concept in its crystallized form, a new theoretical perspective can appear to the scientist's mind. The experimental procedure of the condition's purification is the substance in which the concept can become operational (Akhutin, 1976).

These argumentations seriously compromise the role of direct, everyday experience in the process of intellectual transformation that was indisputable in the Aristotelian way of theorization. Thereby, if the experiment should not reconstruct the conditions of real life, but must destroy and synthesize them in another manner, then the results of the experiment will be dissimilar to the observations in the usual environment. In this situation, the question of the similarity between the data obtained in the laboratory and everyday experience is strongly rejected; there is no need for such a correspondence at all, because the experiment has a different function: not to classify the normal events, but to destroy and create a new theoretical object to make nature reveal its grounds.

This alternative, to destroy and synthesize or to classify, is very close to the problem of the ecological validity of the experiment that was briefly mentioned above, and to the so-called ecological approach in psychology in general (Bronfenbrenner, 1994; Gibson, 1979). The request for psychological research to be closer to real life can be heard quite often today. For the SCS, this has been discussed as well (Gillham, 2000). One solution to this problem suggested in some works is to equalize the experimental conditions and conditions of real life (Burmenskaya, 1985). It is clear that this type of solution has its direct origin in the Aristotelian tradition, where the final destination of the theoretical work is to produce a classification of empirical regularities of everyday events that correspond with different classes of environmental objects or situations. In this case, the scientist formulates a multitude of independent rules for independent types of happenings. Lewin (1931) demonstrated this result of Aristotelian logic when there were postulated a great number of objects' classes (for instance, objects that fly and objects that fall) and every class was explained independently. Statements of the same kind were presented by Lewin in psychology, when there were separate explanations for the behavior of children who were born in different parts of Germany. It is no secret that a similar type of theorizing is prevalent in contemporary psychology. On the contrary, in Galileo's tradition there is no need to postulate separate rules and elaborate classifications for every typical event of the environment, because Galileo's aspiration was that all of these events, situations, and objects could be considered as the same in essence, without rigid borders between them, since they are guided by one universal law that is different in its appearance only (Lewin, 1931).

Thus, the attempt to solve the problem of ecological validity by equalization of experimental and normal conditions does not seem perceptive from the viewpoint of Galileo's logic. As was argued above, the experiment should not categorize typical events, but destroy the normal conditions where these events take place and organize them differently in accordance with a particular hypothesis. In this way, the scholar is able to grasp the law, not the regularity. In the frame of Aristotelian thinking, the ecological validity of typical conditions will be obtained; in light of Galileo's ideas it would be the ecological validity of the law. In the latter case, it becomes possible not to classify all types of everyday events, but to deduce them theoretically from the refined form of the law and thereby to explain them.

The inability to categorize environmental events comes in Galileo's tradition to that extreme point when theoretical discussions begin to manipulate "empirical data" that never existed and never will. It becomes clear after a closer look that the requirement of pure experimental conditions is very hard (maybe even impossible) to fulfill in reality: The ideal flat and straight surface, or the ideal tough or elastic sphere do not exist and most likely will never exist in the future. That is why Galileo and the followers of the Aristotelian school often leave observable facts behind during their debates and move to the field of so-called mental experiments. Sometimes the movement to Plato's world of pure ideas is the only appropriate action to reveal the physical laws in their pure form. Paradoxically, it is by using the method of mental experiments that Galileo achieves the greatest results in the transformation of scientific thinking and overcoming the dogma of Aristotelian physics (Akhutin, 1976). This instance of the mental experiment is one more vivid demonstration of the superfluous demand for the experiment of direct empirical categorization of everyday events that take place more or less frequently with this or that level of statistical significance.

The example of the mental experiment illustrates how the empirical frequency of experimental results, their repeatability, and their correspondence with the regularity of environmental events are not at all connected with the probative value of the experiment. Statistical criteria make sense in the Aristotelian framework only, where the regularity of categorized events is under investigation. But it is absolutely indifferent in terms of Galileo's methodology how often the experimental

event takes place. The instance of the mental experiment shows that in some circumstances even a single appearance of the empirical fact can be excessive in the process of theoretical work.

Here an interesting question arises: Galileo's type of science yields its best results with the help of mental experiments, so what is the function of real experiments in this methodological school? Akhutin supposes that the real experiment is a method to organize real (versus ideal) conditions in such a manner as to give mental idealization a form of material existence. This possibility of materialization of a concept allows the scientist to verify and test this concept in a broader sense. In a real experiment, the scientist has a real, material, visible object that is resistant to influences and at the same time is a pure concept. In this material form, the concept-object can be tested in its connection with other materialized concepts. For example, in the real experiment there is a possibility of finding out the relation of the pure fundamental law of gravity and the concept of mass. This testing is the way to deduce and explain the diversity of real world phenomena (falling stones, flying leaves, rising steam and so on) from the starting point of an ideal concept.

Now it is possible to summarize the specifics of the Galilean experiment. First of all, this type of experiment has the Socratic function. In other words, it is a tool for dialog, where there is not just an empirical confirmation of a particular point of view and there is no falsification or rejection of the other statements. On the contrary, the followers of the first theoretical position totally agree with the achievements of their opponents; that is why they try to consider the internal contradictions of the opposite framework to develop it to a new universal perspective. As a result, this new theory embraces the old one just as a special case of a more general system. Galilean physics did not reject those of Aristotle and showed their reliability, but in special narrow conditions. There were two different worlds for Aristotelian physics: The first one was under the Moon and the second was above it. For Galileo these worlds are just different phenomena of the single nature, guided by the same universal laws.

The Socratic dialog is implemented by destroying the everyday experience and creating pure conditions, where the new universal concept can appear and reconstruct the old ones as its special cases. Of course, it is possible to assume that each experimenter destroys the obviousness of the everyday observation creating his own pure conditions. It is true with no doubt. Nevertheless, the specifics of the Galilean type of experiment are in its function. Conducting an experiment, a scholar can confront a particular viewpoint, trying to produce just an alternative explanation of a particular fact by confirmation of a different hypothesis or by falsifying previous viewpoints. Alternatively, one can also stay away from theoretical debates and use existing concepts to obtain new empirical findings. In all of these cases, without their Socratic function, the experiments cannot be called Galilean.

SCS as a Galilean experiment

Everything mentioned above about the functions of the experiment in Galileo's methodology is true for the SCS, but with several remarks. When conducting an experiment, the researcher has the opportunity to destroy normal conditions of real life and to abstract and synthesize a relevant situation totally anew, following only the logic of theoretical dialogue and in accordance with available technical resources. The SCS has exactly the same function with only one difference: This experiment is conducted not by a human but by nature, which produces these particular refined conditions itself and embodies them in the particular person in which the relevant aspects of psychological processes come to light. So the aim of the researcher in this situation is just to find this special SCS. It is a sort of scientific fortune to some degree, but at the same time largely a matter of theoretical intuition to detect the pure form of law already prepared. Certainly, the scientist is able to seek the required SCS on the basis of his or her theoretical background, which is utilized during the experimental work to create some kind of artificial situation where the relevant features of the object are separated from the nonrelevent ones and structured intentionally in a particular way. The same goal exists in the SCS. Scholars facing huge numbers of individual cases can pick out the particular one that fulfills the Socratic mission only by using their "intellectual eyes." The function of the SCS is to present for the first time a new concept during the theoretical discussion, and thus make it possible to transform the manner of scientific reasoning not by rejecting the old paradigm, but by including it as a particular case of a broader theoretical system. Therefore, the SCS that has scientific value cannot be met by chance by a naive, curious observer; it can be actively sought only by a thinker in light of a theoretical dialogue.

The case documented by Lewin (1931) of little Hanna, the girl who could not sit on a stone if she could not see it, would not arouse so great an interest if it did not corresponded with

the field theory. The author did not create the experimental conditions; he only observed nature and described the results. For any scientist who does not work in Lewin's theoretical framework, as well as for Hanna's parents, who saw the same phenomenon, it was just a funny incident of the child's behavior among many others. Only under Lewin's "intellectual gaze" was it a special SCS, when the central notions of his field theory appear in clear form through that girl's behavior.

Watching the video record of young Hanna nowadays, the question of whether the girl was mentally healthy can be heard quite often, because her behavior sometimes seems very atypical compared with that of other children. Aristotelian minds might ask whether this type of behavior is frequent among all children or among the children of any group, or perhaps pathological. In other words, issues of that kind originate from an attempt to categorize the events of the world, types of children's behavior and, thereby, to formulate different rules for different classes of children based on the regularity principle. From Lewin's point of view, following Galileo's legacy, these questions do not make sense at all. From this perspective it does not matter how often, in the statistical sense of the word, this kind of behavior can be observed and how many children demonstrate it. What really matters is that this SCS helped to reveal and test the key statements of the field theory. These statements could be used in the future as universal theoretical tools to deduce and explain every other manner of children's behavior, manners that on the surface could be quite unlike Hanna's but are directed by the same laws in the psychological field.

Some scholars (McIntosh & Brooks, 2011) describe attempts to decrease differences between single case and group studies in neuropsychology. Specific experimental procedures and statistical methods are developed for this purpose. This tendency is quite interesting and can be undoubtedly fruitful. However, the Galilean type of SCS is characterized by its non-statistical specificity, as Lewin mentioned. The opposition of the theoretical homogeneity of SCSs and the probabilistic nature of group statistical studies have been mentioned in neuropsychological works (Caramazza, 1986).

At this point, it becomes clear that Lewin's and Galileo's ways of using the SCS have the same relation to the problem of ecological validity as the use of an experiment. The SCS is not a method of directly comparing the results of an experiment and real-life events as it was in the works about Kenneth Conley. It is instead a procedure of observing nature in its pure form, which is not typical of everyday experience. This method of analysis and synthesis, along with the constructive talent of nature that can present a unique case, was stressed by clinicians many times (Ribot, 2001; Zeigarnik, 1986). Sometimes the scientist cannot, perhaps due to moral reasons, destroy the routine conditions and create his or her theoretically anticipated experimental situation. That is why there is no choice but to wait for nature to reveal it itself. For example, an investigator cannot cause brain damage in humans to satisfy theoretical needs. After a brief look at the most influential neuropsychological theories, it becomes clear that most were developed not due to a great amount of statistically verified data, but due to the significant single cases that appeared and led to the formation of new theoretical insights. The concepts of Broca and Wernicke, Hughlings-Jackson, Goldstein, Luria and so on were introduced into the minds of scholars by the SCSs that transformed the mentality of the neuropsychological community and made its members look at the same patients from a new intellectual point of view.

Luria's Romantic Essays as examples of SCSs

To illustrate some of the key ideas discussed above, it may be useful to consider in detail two SCSs described by Luria in his famous, so-called "Romantic Essays": *The mind of a mnemonist: A little book about a vast memory* and *The man with a shattered world: The history of a brain wound* (Luria, 1987a, 1987b). These studies are noteworthy for different reasons. First, their theoretical functions are not emphasized by the author, whereas other scholars interpret the theoretical value of their work almost in the opposite way (see the interpretation by Oliver Sacks below). Second, the theoretical function of the two studies can only be revealed in the context of their interrelations. Third, despite the dissimilarity of the studies, both of them are ecologically valid concerning the one universal law of psychological development worked out by Vygotsky: the law of system structure of the consciousness that explains the logic of normal psychological development in ontogenesis and anthropogenesis, and the phenomena of different kinds of psychological disorders.

To reveal the theoretical function of the SCS, it is necessary to set forth the theory in the framework in which it was used. It is not enough here to mention only Luria's theory of systemic and dynamic localization of high mental functions (Luria, 1962, 1973), because this theory itself was

only the way to establish the particular variant of cultural-historical conception developed by Vygotsky and Luria (1993) in *Studies on the history of behavior: Ape, primitive and child*. The main statements of that theory are the following: (1) psychological processes are organized in a system whereby one leading process mediates all the others; (2) in the initial, more primitive stages of psychological development, all processes are mediated by perception and memory; and (3) in the highest, final stage, all processes are mediated by verbal thinking.

This theory is consolidated in a famous statement by Vygotsky, that a child thinks by remembering but an adult memorizes by thinking. It was applied in the well-known investigation of thinking by Uzbek citizens (Luria, 1976). According to the study's conclusions, participants' argumentation based on visual-concrete features of situations was a sign that they were at a primitive stage of psychological development, when perception and memory mediate all the other processes. For example, they could not make an abstract logical decision of syllogisms, but preferred arguments based on personal experience (e.g., I cannot say anything about white bears, because I have never seen them). When other groups of participants made the argumentation based on conceptual knowledge, it was thought to be an indicator of a higher, so-called cultural stage of psychological development that was facilitated, for example, by education. This theory was worked out by Vygotsky in his famous book *Thought and language* (Vygotsky, 1962), and several years later its central statements were applied by Luria in his neuropsychological theory of systemic and dynamic localization of high mental functions (Akhutina & Pylaeva, 2011; Luria, 1962, 1973).

From this point of view, Luria's "Romantic Essays" appear in a special context. Shereshevsky, a character in *The mind of a mnemonist*, is a healthy and successful man with no apparent brain damage but an amazing memory, and this SCS demonstrates in pure form the primitive stage of psychological development. The character is a unique educated adult whose memory is the leading psychological process that mediates all the others. In Luria's opinion, this hypertrophied memory, unbelievable in its force, was a primitive form of memory known as eidetic memory, which is based on perceptional impressions that were accompanied by bright synesthesias. The dominance of that kind of memory and perceptional synesthesias were the main obstacles for the development of abstraction and idealization that are the foundation of higher cultural and psychological spheres, namely verbal thinking and personality. Shereshevsky's peculiarities hindered his understanding of poems. During the reading of words, the corresponding concrete perceptual images appeared in his consciousness automatically and allowed no opportunity for the grasping of abstract, metaphorical, "poetic" ideas. Shereshevsky's strengths, his extraordinary capacity for memory and perception, were therefore also his fateful weaknesses.

On the other hand, the analysis of Zasetsky, the hero of the second essay, brings Luria to an opposite conclusion. Zasetsky is a soldier with brain damage whose wound destroyed the majority of his perceptual capacities and in this way purified the same highest cultural psychological layers that were underdeveloped in Shereshevsky: verbal thinking and personality. The story of Zasetsky is totally devoted to the new cultural forms of recovering perceptual capacities by mediating them with thinking and personality, the forms that the character had been trying to apply all his life while struggling with his disease. Contrary to Shereshevsky's perceptual functions that were dominant in his psychological system, in the case of Zasetsky, perception and imagination were different in nature, being mediated by thinking and personality. That is why imagination was not an obstacle for Zasetsky, but rather a resource for the reconstruction of other cognitive functions. Thus, a paradox can be detected: A man with brain damage, severely disabled, is a pure form of the more cultural, highly developed psychological system, while a healthy and widely famous person is put forth as a refined example of more primitive stages of psychological development.

The difference between mental and real experiments has been previously discussed. Whereas the mental experiment constructs a new concept in its pure form, the real experiment is a method to investigate the concept that appeared materially in its interrelation with other notions. In this context, Luria's case studies illustrate the concept of the system structure of consciousness and reveal the connection of this concept to those of imagination and personality. When analyzing the characters of Shereshevsky and Zasetsky, Luria stresses the importance of the process of imagination. The consideration of this fact out of the frame of the system structure of consciousness can lead to the conclusion that the role of imagination is equal in both cases. As these two studies represent the poles of two stages of psychological development, they are equal on the surface but opposite in essence. This opposition is caused by the different relations of imagination with personality. Shereshevsky's

imagination, in Luria's opinion, is an unsuccessful way to hide from the real world. Sometimes Luria calls this kind of imagination fantasy. At the same time, the vivid imagination of Zasetsky (dreaming) is some sort of relief from the everyday struggle with the consequences of his disability. This form of imagination invigorates Zasetsky to continue his personal fight for his own future as a full-fledged man.

This consideration of imagination does not result directly from the theory of the system structure of consciousness (and the corresponding mental experiments). One might expect imagination to be important for only one particular stage of psychological development. But as shown by Luria's real SCSs, imagination acquires different levels of importance in the two examples due to the different estimation of the heroes' personalities. This estimation is not related to success with everyday activities: Shereshevsky is much more effective in this respect than the disabled Zasetsky, but the serious consequences of Zasetsky's trauma highlight the strength of his mind and personality. He is obliged to struggle with his disabilities throughout his life, but because of his personal traits he never surrenders. On the other hand, Shereshevsky's story depicts a man "disabled" by a weak personality, a man who sees the real world through a haze, whose fantasy world is more real to him.

Attempts to consider these case studies without comparing them with each other and in a different theoretical framework can lead to quite different conclusions. A typical instance of such interpretation is described by Oliver Sacks (1986). Sacks mostly discusses the SCS of Zasetsky without comparing it with the second essay, and arrives at the conclusion that the theoretical issue of the SCS is a demonstration of interhemispheric asymmetry of the brain. As Zasetsky's left hemisphere was disrupted by his wound, it was a good example, in Sacks's opinion, for demonstrating the specific role of the brain's right hemisphere. The famous SCS of Professor P., described by Sacks himself, follows the same logic and illustrates the opposite phenomenon: the loss of right hemisphere functions, which are thought to be more emotional, pictorial, and concrete, contrast with the hypertrophied functions of the abstract and logical left hemisphere. Using these formal and unemotional "left" strategies, the patient described by Sacks "mistook his wife for a hat." Surprisingly, the interpretation by Sacks seems almost directly opposed to Luria's opinion, due to their different theoretical positions. From Sacks' point of view, Zasetsky's left-side damage decreased his higher abstract capacities and forced him to use the functions of the right hemisphere (imagination). Contrary to this opinion, Luria's viewpoint was that Zasetsky's wound refined his higher cultural functions (verbal thinking, writing, and personality) to help him overcome his deficits of perception.

Thus, as mentioned above, both of these unique cases depict pure forms of the same universal law of systemic psychological development. Paradoxically, the healthy and successful person with a great memory became, from this perspective, a refined representation of the primitive stages of psychological development, whereas the man with severe brain damage demonstrated the highest developmental stages. SCSs, therefore, should not be typical examples of everyday phenomena: They are useful in the function of dissimilarity with routine events, in the destruction of ordinary conditions to reveal the universal law in its pure form. Determining which conditions of the SCS are relevant is possible only in the frame of a particular theory. This total theoretical dependence of the SCS is quite obvious in the example of Sacks's interpretation of Luria's essay.

Conclusions

The SCS can be used in its special function of the so-called Galilean experiment. This is a function of theory development and is characterized by the following features.

1. The SCS is not a method of theoretical verification or falsification, but a method to introduce new concepts by organizing the discussion of theories (Socratic function), when one theory reinterprets another as a particular case.
2. The meaning of this type of SCS has strong theoretical dependence. The same case can be considered in quite different ways within different theories.
3. The SCS of this type is used for the revelation of universal laws of nature, but not with particular regularity. Thus, the SCS does not classify everyday events, but destroys the normal conditions of these events, to reject the relevant theoretical model of reality and thereby to formulate a new one.
4. Such an SCS is not ecologically valid in terms of regularity or similarity to everyday conditions or events, but is ecologically valid in terms of natural laws.

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