

## LA CONTRIBUCION DE RICHARD SEMON A LA PSICOLOGIA DE LA MEMORIA

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### RESUMEN

R. Semon (1859-1918), formado en el campo de la Medicina y de la Biología, desarrolló una teoría conocida como Mneme. Él define Mneme como un principio de conservación inherente a todos los procesos de memoria, herencia, regeneración y regulación dentro de los organismos. Especialmente, desde el punto de vista psicológico, sus consideraciones sobre los procesos de memoria son dignas de mencionar. Incluso, aunque la teoría del Mneme desarrollada por Semon está solamente basada en unos pocos supuestos generales, su teoría explica muchos de los resultados empíricos hallados sobre la memoria. En principio, el presente artículo explica los conceptos y los supuestos teóricos más importantes de Semon como "engraphy", "ecphory" y "homophony". Los aspectos asociativos y holísticos incluidos en la teoría del Mneme son otro tema central recogidos aquí. Además, este artículo trata sobre las relaciones entre la teoría de Semon y las aproximaciones psicológicas contemporáneas sobre la memoria (modelos de esquemas, aproximaciones conexionistas). Finalmente, se discuten algunas deficiencias de los supuestos de la teoría del Mneme.

### ABSTRACT

R. Semon (1859-1918), who was educated in Medicine and Biology, developed a theory of the so-called Mneme. He defines Mneme as a conservation principle which is found in all processes of memory, heredity, regeneration, and regulation within organisms. From the psychological point of view, especially his considerations about the processes of memory are worth mentioning. Even though the theory of Mneme developed by Semon is based on only a few general assumptions, his theory explains many empirical results about memory. First of all this article explains Semon's most important concepts and theoretical assumptions such as engraphy, ecphory, and homophony. The associative and holistic aspects included by the theory of Mneme are another central theme picked out here. Furthermore

this article deals with some relationships between Semon's theory and contemporary psychological approaches about memory (schema-models, connectionist approaches). Finally, some deficiencies of the assumptions about Mneme are discussed.

## 1. KEY TERMS AND ASSUMPTIONS ABOUT SEMON'S MNEME-THEORY

Richard Semon (1859-1918) was born in Berlin. After his education in Biology (Dr. phil. 1883) and Medicine (Dr. med. 1886), he received an associate professorship at Jena in 1891. From 1891-1893 he led a very successful biological expedition to Australia. For personal reasons he moved to Munich in 1897 where he established himself as a private scholar. During the following two decades he developed his theory of the so-called Mneme. In his work he was influenced by the philosophical standpoint of monism that was advocated in particular by E. Mach and E. Haeckel. In 1918 Semon committed suicide.

Semon's first book about the Mneme was published in 1904 "*Die Mneme als erhaltendes Prinzip im Wechsel des organischen Geschehens*" (The Mneme as a Preserving Principle in the Changing of Organic Processes). There he analyzed processes of memory in close relationship to processes of perception. He defined "*stimulus*" as effects upon living organisms which produce an excitation. Semon called this excitation "*synchronical*" as long as the stimulus still exists. It is followed by the continuously decreasing and finally disappearing acolutic excitation. Semon assumed that each stimulus leaves a durable trace (engram) in the irritable substance of organisms and he described influences activating latent engrams as "*ecphoric*". The result of ecphory-processes is the so-called mnemonic excitation. A mnemonic sensation is a sensation which results from a mnemonic excitation.

Against this terminological and theoretical background, Semon (1909, p.146, pp.173f.) developed the following two laws which are the core of his theory of Mneme: 1) All simultaneous excitations within organisms form a connected simultaneous complex of excitation which, as such, acts engraphically; in other words, a unified and connected engram-complex. 2) The partial return of an energetic situation which has fixed itself engraphically acts in an ecphoric sense upon a simultaneous engram-complex. Both original and mnemonic excitation can activate engrams by ecphory. Semon supposed that mnemonic excitations are less vivid than original excitations.

Also worth mentioning is the principle of homophony. In Semon's (1920a [1904], p.209) terminology, „homophony“ means the simultaneous existence of mnemonic excitations, original excitations or original and mnemonic excitations together. These components are not a single indissoluble blend of excitation, but a unisonant chorus, in which the single components of an apparently uniform combination may be individually discerned. Homophony can be discovered especially by processes of recognition, but homophoneous processes are not always conscious. For

example, a person working intensively may not hear music which is being played simultaneously until there is a mistake in the piece of music being played. It is the incongruity between the original and mnemonic excitation which causes the person to suddenly be aware of the music.

In addition to the engrams arising from experiences of the individual organisms, Semon also takes inherited engrams into consideration. He calls all the phenomena of living organisms which result from the existence of engrams mnemonic phenomena. The essence of the mnemonic abilities of an organism is the so-called Mneme (Semon, 1920a [1904], p.209) which can be found in each organism. Mnemonic phenomena include processes of memory, heredity, regeneration and regulation. In this article we regard only the processes of memory in a closely psychological sense.

## 2. HOLISTIC AND ASSOCIATIVE ASPECTS OF SEMON'S THEORY

Semon was developing his theory of Mneme at a time when theoretical conceptions directed against associative psychology and its mental elements were gaining in popularity. Chr. v. Ehrenfels published an article in 1890 about his criteria of Gestalt (Übersummativität, Transponierbarkeit) and the Würzburg School came into being at the turn of the century. In 1912 the Frankfurt School, later the Berlin School of Gestaltpsychology, began to establish itself. According to the Gestaltpsychology the units of mental phenomena are holistic. Because of the great theoretical differences, K. Bühler (1927) spoke about a crisis in psychology. In this difficult situation, the theory of Mneme represented a general theoretical frame which partly rendered the integration of associative and holistic conceptions of perception and memory. This position of mediation will now be explained.

Semon stressed the holistic nature of sensation-complexes. It is not single sensations which exist, but only coherent sensation-complexes; in other words, only the total content of the respective moment. Therefore Schacter, Eich and Tulving (1978, p.728) emphasized that Semon had anticipated Gestalt analyses of perception. It is true that differences exist within such a complex, but they build a holistic unity like the organs of the human body constituting a coherent unity which is not homogenous. An anatomist normally looks at the isolated organs to analyze the body. From this perspective, the organs are artificial but not natural units (Semon, 1909, pp.14f.). In analogy to this Semon assumed, that the analysis of the content of consciousness produces arbitrary boundaries between the isolated components. Furthermore, he claimed that it is impossible to find a criteria which would divide mental states into elements without some degree of arbitrariness. Therefore the classification of sensations, representations, and emotions includes arbitrary boundaries. Semon used sensations as the sole psychological elements for analyzing mental states. But he emphasized that even the classification of criteria such as modality or the locus of the origin of sensations doesn't allow for the division of a simultaneous excitation complex into elements without arbitrariness.

Despite of the holism of simultaneous excitation-complexes, we often remember only some fragments of an experienced situation. Semon supposed that these fragments are not merely isolated fragments of an association which is not intact. Rather, in this case, only some peaks of the simultaneous sensation-complex actually break the threshold of consciousness and appear as associated bits of consciousness. In an analogy to this, for example, the highest peaks of the Alps would appear as disconnected bits if the level of surrounding seas would rise 3000 meters. But the ostensible single elements in reality are parts of a whole (Semon, 1909, pp.151ff.). Semon claimed that there were three factors which determine the contents of an engram-complex becoming conscious by ephory: 1.) When attention is directed towards definite points of the engram-complex during the process of ephory. 2.) Through homophony of the ephoric stimulus and particular components of the retrieved engram-complex, some fragments are accentuated at the expense of the rest of the engram-complex. 3.) Because it is natural that mnemonic sensations are less vivid than original sensations, Semon compares the consciously remembered contents with a bad copy of a sharply outlined negative. On this copy we see only the most striking characteristics of the negative. According to this analogy, only a few striking sensations may ever become conscious.

Another holistic aspect elucidated by Semon is the reproduction of melodies in different pitches, tempos or volumes and the reproduction of visual patterns in different sizes. For this Semon (1909, p.254) assumed that only the relationships of their extensive values (spatial extension, duration) and the relationships of their intensities are stored. The absolute values, however, are not stored. The similarity to Chr. v. Ehrenfels' concept of transposability is quite apparent.

In spite of this holistic view, Semon also used the concept of association. He assumed that simultaneous ephorized engram-complexes are associated. In Semon's opinion, a good memory is based on both the ease and durability of engraving as well as the quick retrievability of engrams. In contrast to other psychological publications of the time, Semon picked out the processes of retrieval as a central theme (see also Schacter et al., 1978, p.725), especially in his second law of Mneme about ephory and in his observations about homophony. In accordance with Semon, two engrams are associated if the ephory of the one produces the ephory of the other. Because of this close connection between associations and ephory, many psychologists used these terms as equivalent. Semon illustrated this difference by an example of two dogs standing connected (with a yoke) to each other and one is hit by a thrown stone, but both dogs are disturbed. Nevertheless we have to distinguish between the disturbance and the connection of the two dogs. For this Semon introduced the special term of ephory which is the first term distinguishing exactly between association and retrieval. In addition to this, he assumed that simultaneity is the only associative principle (Semon, 1909, p.197). The concept of association by similarity becomes unnecessary, because the partial return of an excitation-complex already includes the aspect of similarity (Semon, 1909, p.186). Associations between engram-complexes of original excitation-complexes which had followed each other

immediately can also be explained by the principle of simultaneity because the acolutic effect of an original excitation-complex still exists while the engram of the following original excitation-complex is being created (Semon, 1909, p.180). Semon (1909, p.188) explained the so-called association-by-contrast by the existence of associated engrams. In this respect, simultaneity plays the central role, too.

### 3. THE THEORY OF MNEME FROM A CONTEMPORARY POINT OF VIEW

It is worth mentioning that Semon developed a special terminology of memory psychology. Some of his terms like engram or ecphory are still used. In fact, some contemporary theories of memory still include ideas of the Mneme theory, which shows the heuristic value of Semon's considerations. For example, Schmidt (1996, p.209) writes that Semon's law of engrapy may be the basis of schema-models of memory. The development of schemata could be explained particularly by Semon's assumptions about generalization (see below).

The relationship between the theory of Mneme and connectionist approaches is especially evident with regard to the simultaneity of information processing and the explanation of processes of generalization. Semon postulated that an excitation-complex simultaneously activates other excitation complexes by ecphory. Both the theory of Mneme and connectionist approaches do not assume serial search processes. Therefore, in both cases, the information-processing occurs simultaneously. Processes of generalization play an important role in connectionist approaches as well. If several stimuli have some characteristics in common, then the accompanying vectors of the connectionist model show the number one at the corresponding place. The addition of the weighted matrices of all vectors results in a matrix, which shows very high weights in definite cells. A vector corresponds to these cells which shows the generalization of the initial stimulus. In Semon's (1909, p.265, pp.306f.) opinion, generalization results from a non-differentiated homophony of thousands of single engrams. For instance, the existing engrams of different races of dogs could be combined by homophony to an abstract picture with the general characteristics of dogs. In a certain sense, Semon compared such general products of homophony to photographs of different faces which are projected one upon another whereby a general image of the pictures appears.

But despite such relationships to modern theories of memory, the theory of Mneme remains mostly unknown among experts. The reason for this might be some deficiencies of the theory of Mneme. In particular Semon's Lamarckian standpoint which he advocated in support of E. Hering (1969; [1870]) is criticized. But later publications (1909, 1920b) supplementing the first book about Mneme don't include Lamarckian thoughts. Aside from that, a theory of memory should not only render an explanation of storage but also of forgetting processes. The latter, however, are scarcely considered by Semon. He intended to deal with this

theme in a book about the pathology of the Mneme. This is a reason to believe that Semon saw processes of forgetting as a disturbance but not as an important selective factor of memory functions. Because of his untimely death, the book about the pathology of Mneme was never realized. Semon also didn't conduct any experimental studies to support his theory. Many assumptions of Semon's theory are based on introspection, but in developing his thoughts he also regarded relevant psychological publications of other authors like H. Ebbinghaus, G.E. Müller, A. Pilzecker, A. Jost, O. Lipmann and H. Höffding. Finally, it has to be emphasized positively that Semon's theory can explain a lot of empirical results in only a few assumptions.

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