

An FCA-Based Approach to the Study of Socialization Definitions¹

Sergey Vinkov

National Research University Higher School of Economics, Social and Economic Systems
and Social Policy, Pokrovsky Boulevard, 11, Building "1", Room 628,
109028 Moscow, Russia
svinkov@hse.ru

Abstract. The most typical definitions of socialization used in Russian academic and educational literature are considered in this article. To make a typological analysis of definitions and construct their taxonomy, a mathematical method of formal concepts analysis is applied.

Key words: formal concept analysis, typological analysis, socialization, type

1. Problem statement

Any scientific discipline has a special conceptual and categorical apparatus. Social sciences and humanities, as well as natural sciences, have their own narrow lexical units. Unlike branches of the exact sciences, social and humanitarian sciences frequently have some ambiguity, or lack a uniform definition for one or another concept, despite its wide and frequent use².

«Socialization» is a base category in a number of disciplinary areas: philosophy, sociology, psychology, pedagogics. It is obvious that there is a general understanding of this process, but a conventional definition is not available.

The retrospective analysis of defining "socialization" shows that initially this concept was used in the common sense in the middle of the previous century by J. Dollard in the context of researching «social learning» and formation of an individual [1, p.14]. The etymology of the concept "socialization" leads to the German language when two words «Sozialisierung» and «Vergesellschaftung» were borrowed by the Anglo-Saxon language system for the description of absolutely new social phenomena and processes [1, p.12-13]:

1) «Sozialisierung» – transition of private property to public one (or state one);

¹ This paper is a translation of the Russian version published in Journal of Orel University

² For example, cf. Discussion about social issues. Seminars in the State Educational Establishment – High School of Economics/Polit.ru, URL: http://www.polit.ru/dossie/2010/03/23/social_2.html (reference date: 12.03.2011).

2) «Vergesellschaftung» – as «cooperation of persons in a mental unity of group life» and as «the central process in social evolution»³.

V.G.Nikolaev underlines that «we have transition of the borrowed from German "tradition" (particularly from Zimmel) concept of "nationalization" as a dynamic process of making a society, formation by a society, transformation of independent individuals into a society by means of interaction, to the concept of "socialization" focused on «developmental aspects of individual behavior, revealed in interaction — or directly integrated into the interaction — with one or more persons, i.e. in a social context» [1, p.15].

The “socialization” polysemy is supplemented by other contexts of scientific literature, different from the ones mentioned above, pertaining, for example, to «socialization of needs» [2, p.24], gender socialization, emotional competence, cognition etc. [3, pp.561-691]. This usage of the word “socialization” emphasizes its historical nature, shows the formation trajectory, time perspective of the subject. But along with that, the subjects/objects are always connected and correlate with a specific person, whether a single representative of the mankind or of a social group or of a society as a whole.

This research is further devoted to considering the definitions of socialization in view of certain subject-object and subject-subject interactions where, on the one hand, a human (an individual, a person) will act as an object of social environment or public group efforts, and on the other hand – as an independent creator of the course of life who forms the social reality.

The problem of concept formation in social and humanitarian sciences, and its subsequent ways of application, pointed out the purpose of the research which is to make a typology of some definitions of "socialization", to detect similarities and differences in various descriptions of this social phenomenon.

In this work, logical outlines of the concept "socialization" are found out and proved by means of formal concept analysis. Certainly, it is also necessary to take into consideration the bases of the social phenomenon that are not logical. [4, p.14].

2. Methodology

The typological analysis is a meta-technique of making socially significant, internally homogeneous, qualitatively different from each other groups of empirical objects [5, p.75].

The research practice used in this work implies analyzing semistructured data made into a set of definitions for the concept "socialization". The general strategy of such analysis is ascending and is based on constructing a pyramid out of all generalized answers to the question: «What is socialization?»

With the support on this meta-technique, the research potential of a quite young scientific technique and method is used. This method is called formal concept analysis

³ Ref. [1, p.13].

and is widely developed and actively used in Russia and abroad⁴. Preconditions to the appearance of formal concept analysis date back to the middle of the XX century to the works on the theory of lattices; the French works on Galois lattices became a major landmark in its formation. Ultimately, formal concept analysis became a scientific method due to the works of the German scientist and mathematician Rudolf Wille. On the whole, it is possible to tell that formal concept analysis is a mathematical method of researching construction of subject domain taxonomies [11]. It opens wide possibilities for studying family, professional interactions, structures of values, social networks and so on [12].

This research includes three stages:

1st stage. Primary gathering of text matter⁵. For the purpose of forming the matter it was necessary to select one sentence in Russian as a definition of socialization published in hard-copy form. Both national and foreign (translated into Russian) literature was included into the research: textbooks and manuals, monographs, the dictionaries which help fully understand the essence and the content of the concept "socialization". Sampling was random because of the difficulty to establish the whole scope of all possible definitions in Russian and the limited availability of all the editions that contain such definitions. Selecting definitions from books defining "socialization" continued till there was a significant difference between one definition and the one considered before. Only one was selected from the wordings having the same number of words and phrases.

A table with three columns is made up to record the definitions: the first is the number of a definition, the second has the definition itself, the third contains a full bibliographic description of a source, from where the definition was taken. The text matter has been formed by means of Excel Microsoft Office 2003.

2nd stage. Creation of a formal context. A binary matrix presented in a tabular format (Table 1)⁶ is generated from the text matter received at the preliminary stage.

The rows of the table contain some objects – the set of definitions, and the columns contain meanings of the characteristics derived from each object. The presence of a characteristic in a matrix is designated as 1 and its absence as 0. For the subsequent analytical work, the final element of a column is an indicating figure which is the total number of characteristics in an object, and the final element of a row is the frequency of a characteristic occurrence, calculated as follows: the number of objects with the characteristic divided by the total number of objects.

⁴ Theoretical basis and ways of application of the method are to be found in the following works [6, 7, 8, 9, 10].

⁵ All the materials serving as the basis for this research are available on the author's personal webpage: <http://www.hse.ru/org/persons/12435171> (in Russian).

⁶ Sources: 1 – Kulikov L.M. Basic sociology and politology: manual. – Finances and statistics, 2008. – p. 336 – p.117.; 2 – Lapin N.I. General Sociology: manual for universities / Lapin N.I. – 2-nd rev., enlarged. – M.:High School., 2009. – p. 452: pic. – p.59.; 3 – Masionis J. Sociology. – 9-th ed. – St.P.: Piter, 2004. – p. 752: pic. – p.170; 4 – Zborovsky G.E., Orlov G.P. Sociology. Textbook for humanitarian establishments of higher education. Inter-praks. 1995p. – 320p. – p.309, 289.; 5 – Dobrenkov V.I., Kravchenko A.I. Sociology: textbook. – M.: INFRA-M, 2009. – 624p. – p.575.; 6 – General sociology: Manual/ edited by prof. A.G. Efendiev. – M.: INFRA-M, 2005. – 654p. – p.492.

In « the area of social methodology one of the fundamental scientific problems is polysemy of interpretations and contextual conditionality of articulated theoretical propositions» [13, p.3] which complicates deriving characteristics from a formal context, therefore it is necessary to explain this procedure.

The basic principle of deriving characteristics from definitions was dividing definitions into 2 groups according to the content.

The first group designated the object of a subject's activity, and the second group described a type of a subject's activity, directed to an object or procedurally describing the condition of the subject. The first group of characteristics answers the question: «What is the ultimate goal of the activity, the continuous action contained in a definition? What is the subject of the activity?» And the second group answers the question: «What does the individual do or what happens to one?»

As a rule, characteristics were derived as soon as mentioned by the author and were not made excessive. Only some of the characteristics were united into one: I have included the following phrases into the column "Behaviour": «examples of behaviour», «behaviour characteristics», «behaviour patterns», because the author made frequent references to the behavioural aspects of an individual. When the author used the phrase «behaviour rules» when defining "socialization", it was included in the column "Rules".

The problem of accurate demarcation of values and value preferences caused these words to be ascribed to one characteristic of "Values".

Synonymic words "training", "studying", «learning» were also grouped in one column called "Education".

"Adaptation" and "adjustment", "reproduction" and "propagation", «mastering» and «assimilation» are united due to their explicit homogeneous semantics.

The logic of selection can be clarified by the example of the definition number 3 from table 1.

1. Fixing an activity type. It is necessary to remark that the definition is worded in an extremely non-standard way, and certain subjectivity in this procedure is inevitable. However, asking a question: «What happens to an individual?» and answering it, it is easy to deduce "development" and "assimilation".

2. Definition of the subject of the activity. And again a question: what are "development" and "assimilation" directed to? The answer is: «human potential» and "culture".

Appreciable similarity can be found between objects № 3 and 6. In both rows there is some indirectness, "instrument" (comes from the phrase "due to"), but the latter, when expanding on the content, lacks the «activity-object» link, therefore the second part of the definition was not considered. In most of the objects (definitions) this link is obvious and quite frequent.

The formal context, in form of a binary matrix, is mathematically described by three variables: $K: = (G, M, I)$, where G is a set of objects (some total number of definitions); M — a set of characteristics, and the incidence relation $I \subseteq G \times M$ shows which objects possess which characteristics. For the arbitrary, $A \subseteq G$ and $B \subseteq M$ the Galois operators are deduced:

$$\begin{aligned} A' &= \{m \in M \mid \forall g \in A (g I m)\}; \\ B' &= \{g \in G \mid \forall m \in B (g I m)\}. \end{aligned} \tag{1}$$

Table 1. An example of a formal context

Object , G	Object of activity													Activity type				Total number of characteristics	
	Characteristic , M	Values and values preferences	Norms	Culture	Knowledge, system of knowledge	Skills	Human potential	Social qualities, features	Roles	Human potential	Guidelines	Behaviour	Introduction	Training, learning, studying	Mastering, assimilation	Formulation	Internalization		Development
1. Socialization is a process of how an individual is introduced into a society.		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
2. Socialization is training and assimilation, internalization by a person of values, norms, guidelines, rules of behavior characteristic of a society, a social group or a community.		1	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	7
3. Socialization is understood as the social experience gained throughout life due to which individuals develop their human potential and assimilate culture.		0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	5
4. Socialization is a process where a person assimilates examples of behavior in a society and a group, their values, norms, guidelines.		1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	5

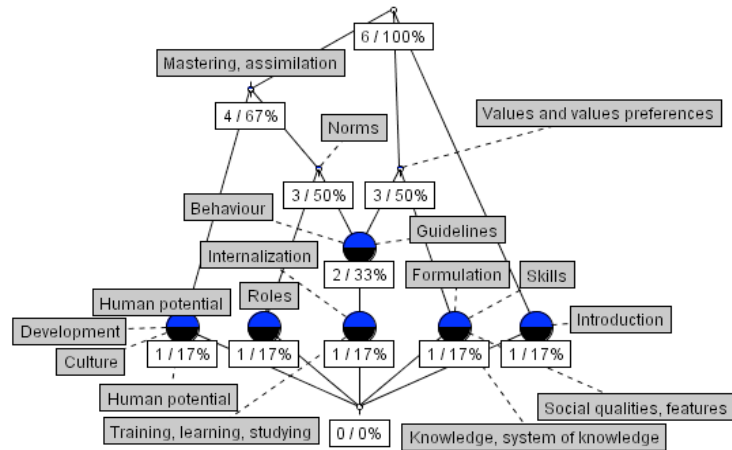
5. Socialization is a lifelong process (from infancy till the old age) of assimilating cultural norms and mastering social roles.	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	3
6. Socialization is formation of social qualities, properties, values, knowledge and abilities due to which a person becomes a capable participant in social communications, institutions and communities.	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	5
Characteristic occurrence frequency	0,059	0,059	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,039	0,039	0,020	0,020	0,078	0,020	0,020	0,020	

In that case, the pair (A, B), obeying conditions: $A \subseteq G$, $B \subseteq M$, $A' = G$, $B' = A$, is called a formal concept of the context $K = (G, M, I)$. The set of objects A constitutes the concept scope, and the set of all characteristics B which the objects possess constitutes the concept content. Each object $a \in A$ possesses all characteristics from the subset B. Consequently the formal concept corresponds to a set of objects from a specific area, which possesses all the characteristics from some subset. The set of all formal concepts of a context are partially ordered by the relation «more than ...». A poset of concepts form a lattice. The concept lattice is used to visualize formal concepts.

3rd stage. Construction of a concept lattice. So-called Hasse diagrams are used to visualize a lattice. In the diagrams two adjacent concepts (i.e. there are no other concepts in-between them) are connected by a link, and a more general concept always lies above a less general one. In this research the visualization is executed by means of freely available software Concept Explorer 1.3⁷.

⁷ <http://conexp.sourceforge.net/>.

Picture 1. Diagram of a concept lattice for 6 definitions



A formal concepts lattice (Picture 1) allows to structurally classify definitions of socialization and to find the most similar ones by means of the derived characteristics.

Let us start reading the diagram of a concept lattice from the top. In the diagram based on Table 1, the top formal concept makes it clear that there is a lack of at least one characteristic referring to the whole set (not a single object includes all characteristics). Lower there is a formal concept uniting 4 objects that have "Assimilation" in them. One of these objects differs from the other three because apart from "Assimilation" it has "Development", "Culture" and "Human potential" and thus forms a separate formal concept at another level of the diagram. It is obvious from the diagram that there is a formal concept, different from all the rest except the top and the bottom ones; it is the definition (object) containing the characteristic of "Introduction". The formal concept lattice allows deducing the greatest number of objects constituting the concept as well as the total set of characteristics.

In a formal context the connection $A \rightarrow B$ is implied, if all objects with the set of characteristics A also have the set of characteristics B. Thus in our case it was concluded that:

1. All definitions with the characteristic of "Norms", have the characteristic of "Assimilation";
2. The characteristics of "Value" and "Assimilation" are included in definitions only when there are "Norms" in them.

The advantage of concept lattices is optimization (simplification) of research procedures on deducing connections i.e. essential interrelations of objects and characteristics, whereas the direct search of such connections and interrelations is quite inconvenient even with rather small, as in the investigated case, data array.

3. Results

1. The first investigation stage resulted in a tabular data array of 51 definitions of "socialization" taken from 50 sources. Chronologically, the literature which got into the research field, ranges from 1994 to 2010. The sampling did not exceed the number of 51 definitions, because on the one hand, new definitions did not have any new characteristics, and on the other hand, the available scope allowed searching for the most typical definitions.

The array included the definitions of the socialization developing the phenomenon through the following:

- The subject-object approach where an individual has the role of an object in the course of interaction of the society with the social environment, which is close to G.Tarde's imitation theories, W.James' socialization theory, interactional socialization theories, M.Weber's theory of socialization and the ones by P.Sorokin, R.Merton;

- The subject-subject approach represented in the theories of «symbolical interactionism», «looking-glass self», works by W.Thomas and F.Znanetsky who considered an individual not just as a passive agent, but also as an active participant of his own formation;

- the inter-subject approach describing socialization solely as introduction or interaction of an individual with the social environment (a social group or a society); that explains the objects (definitions) with one characteristic ("Interaction", "Introduction", "Transmission", "Influence") at the further research stage.

2. Transition from semistructured data to the structured ones opens additional possibilities to search for the regularities, typical definitions, not on the basis of the verbal content of a definition, but on its characteristic description in the formal context represented in a binary matrix⁸.

As a result of deducing characteristics the object-characteristic table (a formal context) contains 51 definition (object) for each of which there is one or more characteristic out of 61, frequency of a characteristic occurrence and the total number of characteristics for each object are calculated.

Frequency of a characteristic occurrence led to 38 less informative characteristics which were then removed from the formal context, and thus only 23 most informative characteristics have been left. Less informative characteristics were considered to be those with less than 0.1 and more than 0.9 occurrence frequency ratio. Such method is often called entropic, as entropy H (measure of uncertainty) of a random object with frequencies p_1, \dots, p_M equals to

$$H = p_1 \log(1/p_1) + \dots + p_M \log(1/p_M) \quad (2)$$

⁸ The binary matrix as well as Hasse diagram of concept lattices, constructed on basis of the matrix, can be found in xls-format on the author's personal webpage: <http://www.hse.ru/org/persons/12435171> (in Russian).

and hence the rejection of «margin» outcomes (i.e. either hardly occurring, or occurring almost always) only insignificantly changes the amount of the information constituting an object [14, p.236].

All objects have been grouped according to their “weight” from 0 to 8, i.e. how often the informative characteristics were used, and within each weight lexicographic ordering is used.

An object with a zero weight corresponds to the following definition:

«Socialization is an inseparable element of constant everyday process of interaction of an individual with the surrounding social environment.» [15, p.49]. All the objects with a zero weight, having no similarities to the other objects, have been excluded from the further work.

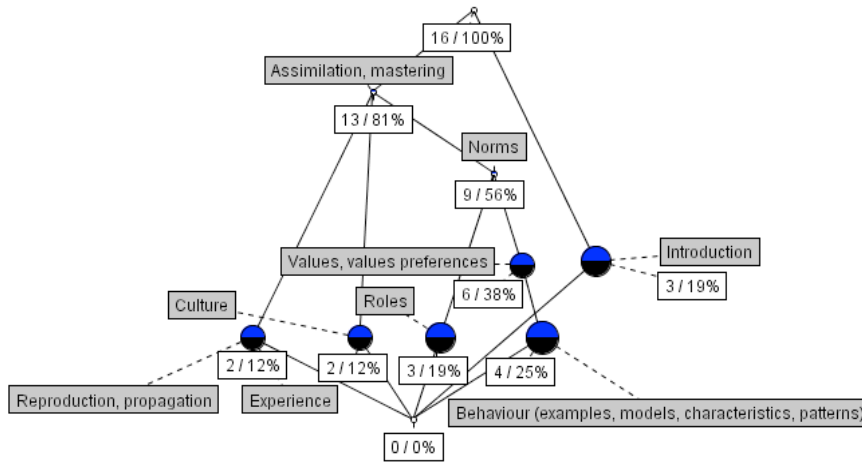
As a result of «matching», i.e. coincidence of two or more most informative characteristics in definitions, 6 groups of 16 objects have been formed with the weight ranging from 1 to 4, different in wording, but identical in the chosen informative characteristics (Table 2). It is natural to consider such definitions as the most typical.

Table 2. Characteristics of typical definitions

Group	Number of objects	Weight	Characteristic
I.	3	1	«Introduction»
II.	2	2	«Assimilation», «Culture»
III.	2	3	«Assimilation», «Norms», «Values»
IV.	3	3	«Assimilation», «Roles», «Norms»
V.	2	3	«Reproduction», «Assimilation», «Experience»
VI.	4	4	«Assimilation», «Behaviour», «Norms», «Values»

Thus, the informative quality of the characteristics "Culture", "Experience", "Reproduction" has gone down, which obviously indicates of the existence of a certain kernel in socialization definitions which includes: "Introduction", "Assimilation", "Behaviour", "Norms", "Values".

Picture 2. Diagram of concept lattice for 16 definitions



It follows from the concept lattice diagram that there is only one formal concept uniting 3 objects and independent of any group of definitions characterized by "Introduction". For similar definitions, the interconnection "who-where"- «process of an individual's introduction into a society» is typical. [16, p.117]. All the other formal concepts include all the definitions united by the characteristic "Assimilation". The further distinctions between socialization definitions are in a set of certain characteristics. The greatest number of characteristics was formed in the formal concept with the characteristic "Behaviour"; one of them defined socialization as «a process of assimilation by an individual of examples of behavior, social norms and values necessary for a successful functioning in the society» [17, p.102].

4. Conclusion

This work deals with the problem of creating a typology for various definitions of "socialization" in order to find similarities and differences in ways to describe the concept. The applied method of formal concept analysis combined with the subsequent content analysis has allowed deriving the most typical definitions of "socialization" and the most informative characteristics used in the analyzed definitions of "socialization". Undoubtedly, it is interesting how the methods and results of this research will influence the definitions of "socialization" which exist in the English literature.

References

1. Nikolaev V.G. Sociological concepts in social and cultural contexts: experience of reflective knowledge sociology / Full texts of selected publications of teachers, department of the general sociology of the Research Institute, High School of Economics, URL: http://soc.hse.ru/gsoc/full_text. (Reference date: 3/12/2011). (in Russian)
2. Zdravomyslov A.G. Needs. Interests. Values/A.G.Zdravomyslov M: Politizdat, 1986 – 221p.
3. Joan E. Grusec and Paul D. Hastings (eds), Handbook of Socialization: Theory and Research. New York/London: The Guilford Press, 2007. 737p. (in Russian)
4. Kachanov Y.L. Polyparadigm approach, logic and sociological concepts//Sociological researches. 2010. No. 8. p. 12-19. (in Russian)
5. Tatarova G.G. Basis of the typological analysis in sociological researches: the manual / G.G.Tatarova. – M: publishing house «Novy Uchebnik», 2004. – 206p. (in Russian)
6. Kuznetsov S.O., About some questions of concept analysis, STI. Ser.2. 1999. No. 1-2, pp. 57-61. (in Russian)
7. Kedrov S.A., Kuznetsov S.O., Research of groups of Internet users by methods of formal concept analysis and Data Mining//Business Informatics. 2007. No.1, pp. 45-51. (in Russian)
8. Emelyanov G. M, Mihaylov D.V. Semantic clustering of textual and subject languages (morphology and syntax)//Computer optics. 2009. Vol.33, No. 4, pp. 473-480. (in Russian)
9. du Boucher-Ryan, P., Bridge, D., Collaborative Recommending using Formal Concept Analysis//Knowledge-Based Systems. 2006. Vol. 19, No.5. pp. 309-315.
10. Cimiano, P., Hotho, A., Staab, S., Learning concept hierarchies from text corpora using formal concept analysis//Journal of Artificial Intelligence Research, 2005. Vol. 24, No.1. pp. 305-339.
11. Wille, Rudolf, Concept lattices and conceptual knowledge systems//Computers and Mathematics with Applications, March 1992, Vol.23, Issue 6-9, pp.493-515.
12. Martin J.L. Jointness and Duality in Algebraic Approaches to Dichotomous Data//Sociological Methods and Research 2006 Vol. 35, No.2. pp. 159 – 192.
13. Kanygin G.B. Contextually-focused analysis of qualitative data//author's abstract. Doctor of sociology, St.P., 2001. 32p. (in Russian)
14. Yaglom A.M., Yaglom I.M. Probability and information. vol. 5, stereotypic. – M: KomKniga, 2007. 512p. (in Russian)
15. Houston M. Introduction to social psychology. The European approach: Textbook for university students / M. Houston, V.Schroebe; translation from English edited by prof. T.J.Bazarov; [translated by G.J.Ljubimova]. – M.: Yuniti-Dana, 2004. – 622 p. (in Russian)
16. Kulikov L.M. Basic sociology and political science: manual. – Finance and statistics, 2008. – 336 p. (in Russian)
17. Radugin A.A. Sociology. M.Tsentr, 1996. – 206 p. (in Russian)