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NOTION OF MEDIATORS IN HUMAN INTERACTION*

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SUMMARY

Many types of human interaction are mediated processes. However, regarding the details of human description, the mediating unit structure and dynamics is not developed appropriately. The explicit concentration on mediators contributes to understanding of interplay between value sets governing interaction, interaction roles in regular activities and interaction design for purpose. This article is a contribution to development of a concept of mediated human interaction through structuring of mediated elements.

The origin of mediators is the environment, here interpreted as a collection of excitations. Among the excitations, the extracted subgroups are elementary environment excitations (EEE) - which have recognised functions in a local value set, and exchangeable EEEs or mediators - which are used regularly in human interaction. The collection of relations of a human and an EEE is called a vertex. The vertex combines initial and final human states with the EEE. The vertex formally expresses probability that a particular combination of a human state and an EEE brings about a given final human state. Combination of vertices brings about general human-environment and human-human interaction.

KEY WORDS

environment, excitations, human-environment interaction, mediator, vertex

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1. INTRODUCTION

Human systems belong to complex systems. They are characterised with relatively large number of non-linearly interacting humans and significant memory effects. Interactions among these elements depend on the individual psychophysical sets, social context and technological level. Memory effects cover region from short-term individual memory, to long-term individual memory, to long-term collective memory like history, sets of customs, habits, norms and values. Conducted reductions of the manifest complexity of human systems resulted in social sciences and results in interdisciplinary, socio-natural disciplines.

The scope of this article is microscopic, i.e. individually centred, description of human interaction. It is argued that human interaction is a set of explicitly mediated processes. The mediators are recognised as structural units of environment with attributed functions. The notion of the mediators and interaction between humans and mediators are considered in some detail. The mediators are not emphasised in order to substitute other approaches to human interaction, but to clarify their influence on the interaction. Therefore, the approach of mediated human interaction (MHI) is a part of the human interaction descriptions, with all the approaches in the set contributing to the overall understanding.

Blocks in MHI are

(i) humans,
(ii) mediators,
(iii) relations of humans and mediators, and
(iv) ways of combining individual human dynamics into system quantities.

It is appropriate to briefly sketch these blocks. Regarding block (i), only human characteristics relevant to some human interaction are used, while other are unspecified. This focusing on some of human characteristics does not tend to reduce humans to predictive agents, but only to gain the most efficient description. Set of relevant human characteristics is called a value set. Value sets are individually determined. However, different value sets overlap. The emphasising of an individual in block (i) brings about a similarity with several theories: with the force field theory from psychology, symbolic interactionism and ethno-methodology from sociology, and the approach of praxeology here considered in its applications to economic processes description. In K. Lewin's notion of the force field, the role of the individual interpretation of the environment is emphasised. Interpretation links influence of the environment on the individual with the actions of that individual toward the environment. In symbolic interactionism, social actions of an individual are consequences of his or her interpretation of the local environment. In ethno-methodology, a more specific situation is covered, in which a life of an average individual in the local environment is analysed. Basis of the praxeological approach is that total dynamics of human systems is obtained with perpetual and simultaneous individuals' actions.

Block (ii) is the essence of environment description in MHI. Generally, analysis of human environment leads to structures, both natural and artificial, and relations among these. Within MHI all structures are interpreted at least as environment excitations (EE). However, the existence of an excitation does not imply its relevance to humans. An energetic quantity is attributed to excitations. It is

amount of work, as physical quantity, needed in order to obtain the excitation from some initial, referent state. In addition, excitations are attributed the value quantity, as well as the set of attributes which uniquely determines them. Overall, the interaction of humans with environment excitations brings about the screening of humans, as well as mediated interaction among humans. Mediators are environment excitations, to be described in detail later in the article, which are used regularly in human-human interaction, e.g. communication.

Differences from approaches with which MHI shares some moments regarding the description of humans, is in the clearest way seen in the block (ii). In particular, in the force field approach, the environment is represented through several generally interfering forces, which are not bounded to a particular object, process or idea. Contrary to that, in MHI the emphasis is put on the realisation of a functional unit of environment, to be recognised later as a specific type of elementary environment excitations (EEE), which is related to changes of states of some individual. In MHI, it is argued how the EEE attributes are related to environment interpretation and subsequent individual actions. In symbolic interactionism, the individual set of values brings about the symbolic meaning of the parts of the environment. Primary, environment is represented through the symbolic meaning, while realisations of the environment are of secondary importance. One of the consequences is that the link between meaning of a symbol and a particular environment structure is missing. Contrary to that, in MHI both realisations of structures of the environment and its symbolic representation are important. For example in economy, money and non-monetary means of exchange are interpreted as mediators. It may be argued that the more intense the economic dynamics, the more stringent the requirements imposed on the appropriate means of exchange resulting in a more specific realisation, which is as a rule an artefact, still an environment excitation.

Presently, there are several parts of environment well established as reduced environments, e.g. music [1] and computer systems [2]. Constantly developed computer systems with the underlying cyberspace form a significant part of rapidly changing environment of an average employee.

Relations in block (iii) are interpretations of material or abstract structures provided by individual value sets. Relevant characteristics and interpretation of mediators mutually influence each other. In case when many individuals share value set, hence some relations, the later are termed vertices.

Block (iv) provides a way of combining actions of different individuals in the system, establishing thereby the connection with the aggregated descriptions. It is out of the scope of this article and is listed because of completeness.

There are several more similar models relevant for description of specific complex phenomena. The active walker model [3, 4] is a developed model describing the formation of patterns comparable with a whole system, the patterns developed as a consequence of correlated actions of agents in the system. The correlations are consequence of a mediated interaction between the agents, humans or other living species. Mediators of the interaction are the environment modes. This approach was shown fruitful in understanding the short-time and long-time pedestrian dynamics. In it, the environment modes do not serve as the means for explicit, thorough communication of humans, but serve as the means for relating human action during walking, i.e. relate pedestrians to each other [3]. Another model deals with the

complexities in the information transport in non-linear channel [5]. In the regime of weak non-linearity, a perturbative treatment of dynamics is possible. Additional applications include examples from description of correlated behaviour of bacteria [3], human-computer interaction [2], individual humans [6], two humans in a triad, other groups of humans, animals. Realisations of mediators in different, yet similar, descriptions of economic phenomena are given elsewhere [7].

The notion of environment units as used in MHI follows closely the notion of mediators in theoretical physics description of fundamental interactions [8]. From the physical description of mediated interactions, the requirement for ultimate quantitative representation of the structures and relations introduced is taken. A significant difference between the physical approach and MHI is that in physics the notion of mediators was developed after the mathematical formalism of particle interactions was set. In that way, mediators are in physics often considered the mnemonic devices. That is especially valid for their graphical representation, the Feynmann's diagrams. On the contrary, in MHI the notion of mediators is introduced without the rigorously quantified line of thought. Beside conceptual similarity, there are no other similarities with the physics, especially regarding the existing level of quantification.

In this article the mediators and relations, i.e., MHI blocks (ii) and (iii), are analysed. Differentiation of mediators, definition of characteristic quantities, time changes description and possible realisations are conceptualised, providing a basis for further, quantitative development.

The article is organised as follows. In the second section a basic structure of environment in terms of its excitations is given. In particular, in the first subsection of the second section the existence of interpretation of environment excitation (EE) in a given value set and notion of elementary environment excitations (EEEs) are illustrated and in a somewhat more formal manner described. The last subsection ends with a representative description of processes including EEEs. In the second section, within the set of EEEs, the subset of exchangeable elementary environment excitations – the mediators, is recognised and related to the local value set and technological level reached. In the third section vertices are introduced. Some conclusions are derived after analysing the asymptotic vertex properties. Conclusions regarding the MHI approach are given in the fourth section.

2. CLASSES OF ENVIRONMENT EXCITATIONS

2.1. BASICS OF ENVIRONMENT EXCITATIONS

2.1.1. Examples

Environment excitations are structural units of environment. In order to illustrate that notion, three examples of environment excitations; a tree, a wheel and an e-mail message, are considered in this subsection. Their further meaning is discussed afterwards. Examples of a tree and a wheel emphasises the point that not all recognised environment structures are useful in human interaction.

A tree is considered a natural structure in physical space. There is large number of types of trees on Earth, differing in dimensions and duration, leafs, yield etc., but still all these are trees. Despite their final characteristics, trees are formed through

a number of biological, chemical and physical processes out of existing environment resources like are Solar radiation, water, minerals and other materials, specific animal activities, etc. Trees are adapted to local soil composition and water content, climate and local flora and fauna. There exists, therefore, the energy equivalent of resources needed to form a tree. Dynamics of a tree includes its development and final natural degradation or technological transformation. During a life of a tree, a finite rate of energy and substances is transferred from a tree environment into a tree. The usually considered functions of trees include providing the oxygen, food, building material, shelter, or aesthetical functions. To summarise, trees are environment excitations, furthermore recognised by humans.

A wheel is an object the function of which is to transform translatory motion into rotating motion. The wheels have been recognised by the transforming function since ages by most of societies (the Inca's empire being a striking example of a converse case). This function is found in activities as different as manufacturing, game playing and transport. During epochs, a tremendously large number of different types of wheels were manufactured. Wheels were made from woods, stones, metals, polymers, and other materials, usually containing several material types. Their dimensions and durability differ, the underlying manufacturing practices differ, e.g., their parts can be glued, welded, riveted or connected with nails. For their manufacturing, a number of tools and machines are needed. Despite the variety of materials in wheels, and the variety of processes through which the wheel is formed from initial materials, all the materials used originate in the environment. In other words, wheels as physical objects are formed within the environment. Its initial materials are parts of the environment, and the wheels in the final form are again environment parts. Furthermore, wheels are excitations of the environment because the work has to be done on the initial materials to obtain a wheel. Regarding the wheels' function, a part of a wheel is not sufficient to perform the transformation of motion types. Hence, functionally a wheel is the unit of motion transformation. As a consequence of its interaction with environment, wheels degrade during time, e.g. they are broken, or eaten away. The content of a notion of a wheel contains all wheel characteristics. Formally, it can be represented using the index α.

An e-mail message is a recently established structure, a cyberspace unit. The cyberspace is a space reciprocal to physical space, made possible with combined development of technology and culture, constructed by humans in order to contribute to human communication. E-mails were not until recently been recognised as a common communication unit. Nowadays, they form significant communication channel and the prevalent reason to connect to Internet [8]. Nevertheless, the physical basis for e-mail mediated communication has existed in environment, and the efforts regarding e-mail establishing are formulated in how to excite that basis in order to obtain e-mail required structure and interpretation. E-mail messages have physical counterparts found within magnetic memories in computers, and electric or optical impulses in cables. However, structuring of physical environment solely does not form e-mail messages. Use of e-mail messages requires appropriate parts of environment, i.e., a hardware and a software which enables a human to visualise a message and a broad enough value set in which e-mails have determined and adopted functions. Each e-mail message is accompanied with some energy equivalent, a physical amount of work needed for

its construction and transfer. Construction of e-mail messages is done using hardware (computers, transmitters and receivers) and software (e-mail editors) components. E-mail messages can be saved or printed, thus existing much longer then the communication during which they were created. Despite the variety of hardware and software, writing styles, content, attachments, encrypting, the e-mails share its fundamental function – to transfer some information from a sender to a receiver, two generally different entities. In a particular case, a receiver is the sender and e-mails serve as memos with list of task to be done.

Elaboration of e-mail mediated communication suits several purposes. Firstly, because it is mediated its elaboration contributes to MHI development. Secondly, its context, the cyberspace, is rather reduced if compared with other communication channels yet complex enough to preserve individual differences. Thirdly, it is actual task as the scholar analysis of the cyberspace is still in the beginning [10].

There are several similarities (S) of listed examples:

(S1) they are all formed out of materials existing in environment,
(S2) their formation requires some amount of specifically conducted work,
(S3) they have some unique characteristics,
(S4) their duration is finite, and in the end they are transformed into still other parts of environment,
(S5) in some time interval they are well differentiated despite the fact that in their formation different objects were needed, and that their dynamics includes interaction with other structures.

Along with the similarities, there are also some differences (D) in the examples:

(D1) they have different level of recognition by humans, i.e., some but not all are included in the local value set,
(D2) they differ in the number of attributed functions,
(D3) some exists spontaneously in environment, while some are artefacts.

These statements are applicable generally. According to (S1) the environment is *a collection* of objects which are all excitations regarding the state of environment without them. Thus, environment decomposes into a set of environment excitations. Saying that the environment is a set of environment excitations is a bit awkward. However, emphasising environment character of excitations points that these excitations are in its essence separated sufficiently from agents. To summarise, there are humans and environment excitations (EEs). EEs are attributed amount of work needed to form them from some initial state (S2), and have other unique attributes (S3). The EEs are dynamic structures in constant mutual interaction, one consequence of which is its degradation (S4). For a particular EE, the interaction with other EEs includes its very formation (S5).

EEs which for humans have well defined functions are called elementary EEs (EEEs). Elementarity here does not mean that these EEs are irreducible physically. On the contrary, as a rule they are composed of other objects. Elementarity means that there exists a function, or several functions for which that particular EE is required, or important in such a way that a large enough group of humans is aware of it and partially depends on it during regular activities. According to (D1), environment excitations are in a given human system always separated into EEEs and non-EEEs. However, the existence of non-EEEs is for a human system provable only if other human systems are considered. For example, e-mails were not before

recently the EEEs, and still there is significant number of societies in which e-mails are not EEEs.

The functions are long-lasting structures, the time span of which is rather large compared to characteristic duration of human activities. It then follows that when considering regular human activities, the functions, importance and values of EEEs' attributes are generally constant. Therefore, set of states achievable to EEEs is constant in time. But that enables one to consider the EEEs dynamics not as a sequence of time changes, but as a distribution of achievable states. For example, if in a society the e-mail mediated communication is known for its functioning to a majority of humans, there is implicit assumption that large enough time interval was needed to achieve that state of a system. During that time a number of e-mails was created, sent and received, with a number of underlying software and hardware developed and exploited. Thus, in such a system there are e-mails being written, sent, received, completely or partially replied and forwarded, printed, saved, completely deleted, forgotten etc. E-mails constantly enter and exit the listed categories, so that one can speak about e-mail distribution within categories. Within set of e-mails, there is no some marked event that would serve as a time-axis origin and it can be therefore found within some broader system, hence only time difference between two events is important. In physics, non-existence of absolute time means that there exists a reciprocal variable to time, and it is energy equivalent variable. That fact is assumed true for the system of EEEs. The variable reciprocal to time, in the context of human systems, is a value of an EEE. The value is considered continuously variable number. It is then opportune to consider the distribution of e-mails within categories as a function of values. That is certainly not useful in case of an individual EEE with a particular owner. However, in the whole system there will always be large number of EEEs with similar, yet different values, reflecting their dynamics. Because of that, an average representation of that type of EEE should include all these variations, which brings about the distribution of EEEs as a function of value.

Similar consideration is valid for a space variable. The meaning of elementarity is that people in one region of physical space share the interpretation of its function(s). In other words, throughout the region in physical space included in some human system, the function(s) of EEEs of that system are constant. As a consequence, there is no some emphasised, i.e. absolute point in space regarding the functions of EEEs. That does not mean that EEEs throughout the system have same states, but that changes do not depend on the distance from some absolute point. It is useful, then, to form a basis of possible space dependencies of EEEs values, in such a way so that combinations of basis' elements enable one to reproduce all possible space dependencies. In physics, the space invariance brings about the variable reciprocal to space, called wave vector, which name is adopted in this context. A wave vector determines the space span of functions of EEEs. The larger the dimensions of regions in which a particular EEE's function is adopted, the smaller the wave vector. In the presented introduction of value and wave vector, nothing was stated about their relation, which is left for future work [9].

To summarise, elementarity implies time and space invariance, i.e., constancy of interpretation of EEEs' states. Because of that, instead of time and space variables dependence the value, set of attributes and wave vectors are used to represent EEEs. Set of attributes accounts for variability of types of EEEs. All stated is appropriate for averaged description.

2.1.2. Formal representation of elementary environment excitations

Formal representing of EEEs has mathematical and graphical part. Mathematically, one starts with the value ω and degradation rate γ of a type α of EEE. Using these quantities, a representation of EEE to start with is the following

$$\omega_\alpha(k) + i\gamma_\alpha(k). \tag{1}$$

The mathematically reciprocal quantity to degradation rate γ is the duration τ, $\gamma = \tau^{-1}$. The dependence of value and degradation rate on wave vector and attributes is emphasised in (1). The imaginary unit points to a substantial difference between a value and a degradation rate, which will be in more detail discussed later. However, all elements of EEEs are not included explicitly in (1). Relative durability of EEEs means that degradation rate is negligible in comparison with the value. The wide acceptance of EEEs means that their wave vectors are approximately equal and relatively small. Therefore, for EEEs (1) is approximately equal to

$$\omega_\alpha. \tag{2}$$

The value of an EEE, as introduced in (1) and (2) reflects its objective character – it is a value accepted throughout the system during longer period. Whether it can be determined from first principles or estimated from collected data is out of the scope of this article. However, that value is rarely known correctly in each of the myriad of processes in which humans use EEEs. The approximate, instantaneous value which figures in human processes involving EEEs, e.g., bargaining and negotiation, is denoted as ω. The closer the ω and ω_α the larger the probability of a process.

2.1.3. Dynamics of elementary excitations

The Hamiltonian notation from physics is adopted, in which total value of isolated EEEs is:

$$\sum_\alpha \omega_\alpha n_\alpha, \tag{3}$$

where n_α is a number of EEEs in a state α. Mutual interactions of EEEs contribute to (3) with the general form

$$\sum_{i+j=3}^{\infty} \left(\prod_{k=1}^{i} b_k^+ \right) \left(\prod_{l=1}^{j} b_l \right), \tag{4}$$

in which a particular summand represents annihilation of j EEEs accompanied with creation of i EEEs. Here b_α is a symbol for annihilation of an EEE in a state α. Similarly, b^+_α is a symbol for creation of an EEE in a state α. For example, a term $b^+_\alpha \cdot b_\beta$ means annihilation of an EEE in a state β and creation of an EEE in a state α. This term does not figure in (4) as it contradicts the notion of EEEs, and the simplest two terms in (4) are

$$b^+_\alpha \cdot b^+_\beta \cdot b_\gamma \tag{5a}$$

and

$$b^+_\alpha \cdot b_\beta \cdot b_\gamma. \tag{5b}$$

The process (5a) represents simultaneous annihilation of two EEEs with creation of one EEE, while (5b) represents the annihilation of one EEE followed with creation of two EEEs. Processes included in (4), the simplest of which are written

in (5a, b) include a variety of processes with EEEs. For example, connecting of two wooden pieces (described as EEEs using sets α and β) with a nail (with corresponding set γ) into one object, denoted using set δ, is represented as

$$b^{+}{}_{\delta} \cdot b_{\alpha} \cdot b_{\beta} \cdot b_{\gamma}. \tag{5c}$$

Note that here the order of annihilations is not important. However, creation occurs after these, which is represented by putting it farthest on the left. In other case, consider that a car is bought. Money exchange, described as $b^{+}{}_{\alpha} \cdot b_{\beta}$, is accompanied with the car ownership exchange, described as $b^{+}{}_{\delta} \cdot b_{\gamma}$, hence the overall process is a combination of expression

$$b^{+}{}_{\delta} \cdot b_{\gamma} \cdot b^{+}{}_{\alpha} \cdot b_{\beta}, \tag{5d}$$

and other differing from it in sequence of events. Writing and sending one e-mail on a computer could be described as

$$b^{+}{}_{\beta} \cdot b^{+}{}_{\alpha} \cdot b_{\alpha}. \tag{5e}$$

Here, computer is in a state α, and is assumed intact by sending of e-mail β, as an e-mail requires several orders of magnitude smaller amount of memory than average used software.

From the description of EEEs and the corresponding notation it follows that environment is composed of mutually interacting structures, without what there is an object vacuum. That is precisely what is meant. However, because of the gravitational field which determines significantly our lives, and large duration of a majority of EEEs, we usually consider a number of EEEs to be static objects, defining our absolute space.

The presented description includes all details of EEE interaction, which is generally tremendously complex. However, for the moment some observable simplifications have not been introduced. The very recognition of EEEs points that majority of interactions brings about minute changes in set of EEE attributes α. Starting from α, after some time EEE is in the state α' which is rather close to α. Therefore, instead of a complex interaction (4), one takes as a description of EEEs the form

$$\sum_{\alpha} (\omega_{\alpha} + i\gamma_{\alpha}) n_{\alpha} \ . \tag{6}$$

The finite duration is a consequence of constant interactions of an EEE with other EEEs. It represents gradual-in-time diminution of probability that an EEE, initially observed in state α will be in that and not in some other state in later moments. The duration of a number of different types of EEEs is well described using Weibull distribution. The functioning of γ in relation with Weibull's distribution is not clear at this stage, as is the case with the way how γ is derived during aggregation of interactions, hence these problems are left for future work.

Interaction with environment brings about the mediator inertia. Inertia is a relative measure comparing the efforts needed in order to change states of EEEs. Between two EEEs, the one requiring larger amount of efforts for the equivalent state change is attributed larger inertia. The origins of mediator inertia are in the existing formal (environmentally and socially constructed, e.g., laws and norms) and informal rules (e.g., customs).

2.2. MEDIATORS - EXCHANGEABLE ELEMENTARY ENVIRONMENT EXCITATIONS

Human dynamics takes place in a dynamic environment composed of some non-stationary distributions of EEEs. The EEEs which are regularly used for human interaction, e.g., communication, are called mediators. In that sense a human interaction is the aggregate of correlated human-mediator interactions.

Choice of mediators depends on the combined social and technological context. Nowadays, e-mails are used for a significant portion of business and private communications. Still, a significant part belongs also to other communication types, e.g. face-to-face communication. There are observed regularities in use of different communication channels. In that way, e-mails, telephone and voice messages, letters - to name just a few of mediator types - belong to regularly used set of mediators. In different communities exist other, from the point of view of informatic society rather exotic, communication ways, e.g. use of drums and smoke. Each communication channel, i.e. usage of a particular mediator type, transfers finite number of types of pieces of information.

Previously described interpretation of environment as a collection of EEEs can be applied on a subset relevant for a particular communication channel. On the one hand that channel is a part of environment or a medium, and on the other hand it is a collection of mediators which forms a subset of all mediators, or more generally of EEEs. Meaning of EEEs includes existence of their interpretation. During interpretation, some information or a message is extracted. Therefore, a medium contains a message. On the other hand, without a message there are no EEEs, hence there is no a medium as a part of the environment. Therefore, messages span a medium. Summarily, the medium is the message.

The MHI presented insofar resembles severe reductionism, in that all elementary interactions are analysed on equal footing. However, often each of exchanged EEEs contributes infinitesimally to a state change, thus only averaged changes are observable. From averaged mediators one may argue that fields are formed, hence in the aggregated description a human is influenced with a social field.

3. VERTICES

A vertex is a combination of statements regarding human-environment interaction. A vertex expresses the relative intensity of a process in which a human in *initial* state is transferred into another, *final* state because of interaction with the environment excitation. This explicit time-ordering may be suppressed from interpretation, in case of which a vertex becomes a measure of intensity of connection between two human states and one environment excitation.

After introduction of vertices, the graphical representation of human-environment interaction is easily formulated, using elements as in Figure 1. Time flow is assumed from left to right. Therefore, part of a full line left (right) to the vertex represents initial (final) state. The additional indices referring to states are suppressed for the sake of simplicity.

Figure 1. Elementary processes of agent-EEE interaction: a) emission and b) absorption of an EEE. Full (dashed) lines denote human states (mediators), and circles vertices.

Processes shown on Figure 1 have a myriad of different realisations. As an illustration, consider a situation in which a human says or hears a fact. Case in Figure 1a corresponds to a human who in initial state knows the fact, says it, because of what comes into the final state. Initial and final states are separated formally with saying of the fact, which additionally can be accompanied with the complex internal changes of the human's state (the human may feel relaxed after saying some secret, helpful if some fact important for listeners is stated, etc.). The fact said is released as acoustic excitation of environment. Its further dynamics (attenuation, recording) is not considered in Figure 1. Case in Figure 1b denotes the case in which a human hears some fact, because of what his or her state is changed, the probability of what is described with the appropriate vertex. The fact heard could be missing information about some destination, a part of classroom teaching, etc. It is generally the EEE, interpretable acoustic excitation of environment.

Complex interactions are combinations of elementary interactions. The graphical representation of the simplest interaction between two humans is shown in Figure 2a, and refers to, e.g., a part of a conversation, borrowing or lending, generally of exchange. In Figure 2b, the process with two vertices, one mediator and one human, who is generally in three states, not necessarily all different, is described. Such a process corresponds, e.g. to a human putting the memo notes about work to be conducted tomorrow, etc. Processes as that in Figure 2b contribute to screening. A screening is a part of influence of mediators on humans. A human is in a screened state when he or she has absorbed and owns the mediators. Every human is screened, with knowledge, clothes, money, assets, etc.

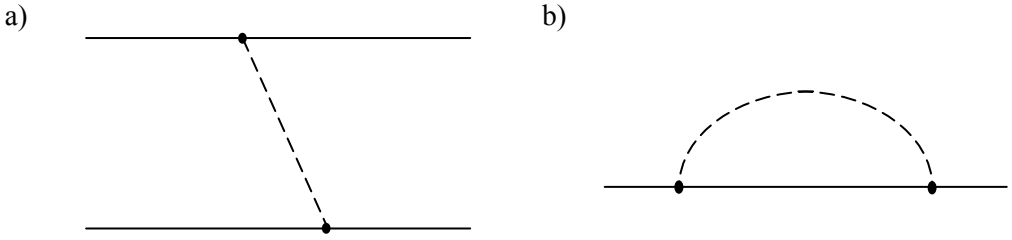

Figure 2. Elementary processes with two vertices: a) interaction, b) screening.

The vertex alone is not sufficient for determining the relative frequency of some connection in a given social system, as there are other influencing factors like distribution of human states and environment excitations. In principle, there are no restrictions in coupling of different EEEs and human states. However, probability of

the interaction is larger if the final human state is closer to a desired one. Formally, this is included through introduction of a utility function. One example of the utility function which brings about augmenting the probability of some mediated processes is given elsewhere [7].

4. CONCLUSIONS AND LINES OF FUTURE DEVELOPMENT

The mediated character of human interactions is elaborated. Units of mediation are related to elementary environment excitations. Such an approach contributes to better understanding of the role the environment has on the overall quality and quantity of human interactions, in particular through its smaller units.

Mediators have well-defined characteristics, which partially influence the overal human interaction. In order to contribute to a quantitative estimate of such an influence, the mediators and human-mediator relations are considered in some detail. Presented notion of mediators in the context of human systems is an attempt toward formulating quantitative mediated human interaction. That concept is interdiscinplinar for it aims to interpret some elements and elementary processes of complex systems, using notions the original meaning of which is defined within theoretical physics, in such a way as to establish individually-centred models with improved descriptive and predictive characteristics.

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POJAM MEDIJATORA U LJUDSKOM MEĐUDJELOVANJU

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SAŽETAK

Mnogo vrsta ljudskog međudjelovanja su preneseni procesi. Međutim, obzirom na detaljnost ljudskog međudjelovanja, struktura i dinamika jedinica prenašanja, medijatora, nije odgovarajuće razvijena. Koncentriranje na medijatore doprinosi razumijevanju prožimanja između vrijednosnog sklopa koji određuje međudjelovanje, ulogu međudjelovanja u regularnim aktivnostima i svrhovito oblikovanje međudjelovanja. Ovaj je članak doprinos razvoju koncepta prenesenog ljudskog međudjelovanja kroz strukturiranje medijatora.

Porijeklo medijatora je u okolini, ovdje opisanoj kao skupu pobuđenja. Među pobuđenjima izdvojene podgrupe su elementarna pobuđenja okoline – raspoznatih funkcija u lokalnom vrijednosnom sklopu, i izmjenjiva elementarna pobuđenja okoline ili medijatori – koji se redovito rabe u ljudskom međudjelovanju. Skup relacija čovjeka i elementarnog pobuđenja okoline naziva se verteks. Verteks povezuje početno i završno stanje čovjeka s elementarnim pobuđenjem okoline. Verteks formalno iskazuje vjerojatnost da određena kombinacija stanja čovjeka i nekog elementarnog pobuđenja okoline dovodi do određenog završnog stanja čovjeka. Kombinacija verteksa dovodi do općeg međudjelovanja između čovjeka i okoline, odnosno između ljudi.

KLJUČNE RIJEČI

okolina, pobuđenja, međudjelovanje čovjeka i okoline, medijator, verteks