

Łukasz Plesnar

INTRODUCTION TO THE SEMIOTICS OF ACTING

Originally published as "Wprowadzenie do semiotyki gry aktorskiej," *Studia Semiotyczne* 16–17 (1990), 93–108. Translated by Agnieszka Ostaszewska.

1. DIFFERENCES IN THE STATUS OF ACTING IN THEATRE AND FILM

According to a wide-spread conviction, theatre and film acting systems are two relatively independent phenomena, differentiating from each other both with respect to their internal structure, as well as their function. Attempts have been made to indicate the various sources of this dissimilarity, M. Ciaureli, for example, wrote that:

in theatre [...] real live people – the actors – move and act in a real three-dimensional environment. The final result of a cinematographic realisation is, instead, the film on which are imprinted the reproductions of men and of objects; these, although arranged in perspective, are in the last analysis fixed on a flat surface. They are photographed in such a succession that, reproduced on screen, they seem to move, but always within the limits of a flat surface. (after Bettetini 1973: 81)

One might risk an opinion that the basic differences between theatre and film acting styles result from dissimilar positions, which these systems have in the theatre and in film. In the first case acting is an element of the so-called presenting stratum, whereas in the latter, it is an element of the so-called registered stratum. The above assertion is based on the assumption that from a semantic point of view, each work of art is a complex object, containing at least three strata (a) the presenting stratum, (b) the presented stratum, and (c) the communicated stratum. With respect to films, one

should add one more factor, i.e. the registered stratum (cf. e.g. Plesnar 1980: 27).

The presenting stratum may be described as what we see on stage or on screen, or – to be more precise – as an idealised, schematized material object with the character of a sign (or a collection of such objects). This stratum constitutes the most important element of a work of art, making all other elements of the work of art dependant on it. The remaining strata are not directly present in the work, but are merely a kind of theoretical construct.

In the case of film, the presenting stratum is tantamount to the dynamic system of colourful or black-and-white spots and lines, as well as verbal and non-verbal sounds (rustle, music). In theatre the presenting entities are i.a. the actors, their actions, utterances, props, stage design, etc.

The registered stratum (appearing only in films, photography and television) constitutes the reconstructed (on the basis of the prerequisites provided by the presenting stratum) actual (physical) reality, recorded on a film, photographic or television tape. This reality comprises all kinds of existing physical objects, phenomena and processes, which such objects and phenomena are subject to.

The presented stratum, being an equivalent of Ingarden's stratum of presented objects and their faith (Ingarden 1960: 52-53, 281-349) contains the characters played by the actors, words uttered by these characters, all of their gestures and actions, the objects "played" by the props, decorations, etc. This stratum covers also such components of a work of art as the story and the plot; with respect to this stratum it is possible to speak of the so-called content of the work of art (within a certain special meaning of the term, discussed by Roman Ingarden in §4 of his work titled *O formie i treści dzieła sztuki literackiej* (Ingarden 1966: 379-394)). In a few words, this stratum covers what is in the classic study of literature, and therefore also in film and theatre study, and has become known as the represented world, which is understood as heterogeneous intentional reality, brought to life by the author and reconstructed by the recipient.

The communicated stratum on the other hand covers the essence or the idea of the work, i.e. a certain state of affairs (or a complex state of affairs) communicated by the abovementioned strata, in particular by the presented stratum.

The fact that the acting systems in theatre and film are factors belonging to different strata of the work of art results in a series of consequences. Since these consequences are, above all, of an ontological character, we will not look into them in detail. From the point of view of semiotics, any and all

actual dissimilarities between theatre and film acting will prove relatively insignificant, if we assume that apart from the communicated stratum, the remaining strata of the work of art are constructed of signs. Therefore, we may claim that both the theatre acting system and the film acting system use signs, or to be more precise, meaningful actions. Such actions constitute and/or represent relevant qualities within the presented stratum, and indirectly also in the communicated stratum. There are however two contradictory ways of such constitution and representation, depending on the fact of whether we are considering the presented or the communicated stratum. The relation between the presenting stratum (in the case of the theatre) or the registered stratum (in the case of the film) and the presented stratum may be treated as isomorphic (cf. Plesnar 1980), whereas the relation between these two first strata and the communicative stratum is of totally different character.

A few examples will allow us to explain the essence of the issue. Let us imagine the following actor's behaviours: "crying," "laughing," "raising a hat," "saying *I love you*," "shooting someone," etc. In the realm of presented reality they represent analogous behaviours of a character, i.e. "crying," "laughter," "raising a hat," "saying *I love you*," "shooting someone," etc., in the realm of the communicated stratum they constitute special units of meaning: "despair," "joy," "greeting," "love," "aggression," etc.

Obviously, units of meaning from the communicated stratum cannot always be unambiguously ascribed to the particular actions of an actor. In my opinion, such a state is caused by two things. Firstly, the relations between the actions of an actor and the relevant units of meaning are in majority the so-called fuzzy functions (this notion will be discussed later on). Secondly, some of the actions of an actor do not have their equivalents in the communicated stratum, but only in the presented stratum. This pertains for example to such actions as: "hammering a nail into a wall," "getting dressed," "cooking" or "sleeping," although these actions as well may denote (in special circumstances) specific units of meaning from the communicated stratum, e.g. "impatience," "irritation," "hunger," or "drowsiness" (this happens only if the analysed actions have certain special features). One may however adopt a rule that in the above cases, these acting actions characterise only the presented characters, and do not denote anything in the communicated stratum.

2. FORMAL MODEL OF ACTING AS A COMMUNICATION SYSTEM

The principal purpose of this study is to construct a formal model of

the acting system (with respect to both theatre and film acting). We will thereby refer to the theory of fuzzy sets developed by L. A. Zadeh (1965, 1971, 1978), R. E. Bellman (Bellman, Zadeh 1970), J. Goguen (1976), H. W. Gottinger (1974) and others, as well as to the theory of actions formulated by M. Nowakowska (1973a, 1973b, 1973c, 1980), and also the papers of the latter author pertaining to the so-called multidimensional language of communication (1979, 1980).

According to our first assumption, acting constitutes a complex communication system, containing several sub-systems, i.e. using M. Nowakowska's terminology, using several media of communication. The system of acting defined in the above way, may be described as the following structure:

$$\langle M, V, \#, L, S, f \rangle,$$

where the symbols have the following meaning: $M = \{m_1, \dots, m_k\}$ is a set of communication subsystems constituting the acting system, i.e. a set of communication media applied by this system; V is the "alphabet" of the actions, $\#$ is a pause, L is a multidimensional language of communication; S is a set of meanings, f is the membership function representing the fuzzy semantics of language L (in the communicated stratum, since within the presented stratum the membership function is not of fuzzy character).

Usually M is a five-element set, i.e. it is divided into five different subsystems (media) of communication: utterances, intonation, facial expressions, gesticulation, and certain *quasi*-natural actions, such as crying, weeping, laughter, granting, etc. We need to understand that the notion of "gesticulation" should be understood very broadly, referring to the entire motor activity of the actors.

In case of particularly conventionalised theatrical forms (certain types of traditional Chinese and Japanese theatre), it is convenient to extend the M set, either by dividing its categories into subclasses (e.g. by splitting the class of gesticulation into separate subclasses – gestures of the head, arms, hands, fingers, etc.), or by introducing new elements – face painting, masks, etc.

Set V includes all actions performed with the use of various communication subsystems, and moreover contains both utterances, as well as intonation, facial expressions, gesticulation and certain *quasi*-natural actions. In order to simplify our deliberations, we do not take into account the t function ascribed to each action from set V , expressing the duration of such action. Such an operation is admissible, on the assumption that each element of set V lasts for a unit of time, and longer actions are treated as concatenations of the actions.

The pause, marked with “#” is considered to be one of the actions from set V , and is interpreted depending on the context in the following manner: with respect to an utterance it is interpreted as silence, with respect to intonation it is interpreted as “neutral” voice timbre, with respect to facial expressions it is interpreted as a lack of such expressions, with respect to gesticulation it is interpreted as the neutral position of arms, legs and other parts of the body, and with respect to *quasi*-natural actions it is interpreted as a lack of such. As M. Nowakowska rightly observed, designation of various actions with the use of the same symbol does not result in misunderstandings, since the form of notation is always decisive for the type of communication subsystem, to which a given symbol pertains.

From the formal point of view, L , i.e. a multidimensional language of communication, constitutes a subset of class of parallel sequences of actions performed on various media. It may also be described slightly differently, as a structure of special communication units constituting a set of simultaneously performed actions. Such units are called by M. Nowakowska *gestuowords* and defined as function $h: M \rightarrow V$, i.e. a function ascribing an action from the V set to each medium. Thus, h is a set of actions $v_1 = h(m_1)$, $v_2 = h(m_2)$, $v_k = h(m_k)$, interpreted as simultaneous performance of action v_1 on medium m_1 , performance of action v_2 on medium m_2 , . . . and action v_k on medium m_k .

The set of all *gestuowords* shall be marked with the symbol H .

Set H contains a plurality of various elements. Only a part of them is acceptable in view of the requirements of the theatre and film communication, the remaining H -components cannot serve as communication units of the acting system. It seems that there are two reasons for this. Firstly, H includes many nonsensical *gestuowords*, ascribing given actions to inadequate media, e.g. the utterance *farewell* to the medium of gesticulation or the action “bow” to the medium of facial expressions. Secondly, some *gestuowords* are inadmissible in view of the acting conventions applicable in particular theatre and film forms. And thus, for example, the Kabuki theatre does not permit “spontaneous” gesticulation, traditional theatre excludes the gestures present in the pantomime, and contemporary film acting does not allow the use of suggestive facial expressions, as were present in the expressionistic cinema.

In connection with the signalled circumstances, one needs to eliminate from H *gestuowords*, which are inadmissible and to specify the sets of actions relevant for the particular media. For this purpose one needs to employ the notion of multidimensional language of communication L . We

therefore need to consider class H^+ of all finite sequences $u = h_1 h_2 \dots h_n$ created from set H elements. Such sequences have the form of the following matrix:

$$u = h_1 h_2 \dots h_n = \begin{bmatrix} v_{11} v_{12} \dots v_{1n} \\ v_{21} v_{22} \dots v_{2n} \\ \dots \\ v_{r1} v_{r2} \dots v_{rn} \end{bmatrix}$$

where v_{ij} means an action on medium m_i performed by gestuoword h_j , i.e. $v_{ij} = h_j(m_i)$.

Formally speaking, L is a subset of H^+ , i.e. it is a set of matrixes of actions of the above shape. The components of L are interpreted as admissible sequences of gestuowords, i.e. admissible communication actions.

The proposed procedure is, of course, not aimed at the creation of an algorithm, which would enable the determination of which sequences of gestuowords, as admissible, belong to L . This would be a truly unfeasible task, which is understandable, in particular, if we realize that it is impossible to construct a similar algorithm in a much simpler situation, i.e., when L is a natural language.

In consequence, the admissibility of sequences of gestuowords should be specified in a descriptive way. We will therefore say that a sequence is admissible if: (1) it may be physically performed and (2) it is tolerated in a particular acting convention. As a result, one is bound to state that in different theatrical and film forms different sequences of gestuowords are admissible.

Let us now define the set of all admissible gestuowords (marked with letter G), i.e., in other words, a set of all units which may appear in the matrixes of actions belonging to L :

(D1) $G = \{h \in H: \text{there is such } u = h_1 \dots h_n \in L \text{ for which } h = h_1 \text{ by a certain } j\}$.

Let us also introduce a definition of set L_i , of all i verses belonging to the matrix from L , i.e. a set of sequences of action which may appear in the i medium:

(D2) $L_i = \{v_i \dots v_n: \text{there is such } u = h_1 \dots h_n \in L \text{ for which } h_1(m_i) = v_1 \dots h_n(m_i) = v_n\}$.

Now, let us specify set V_1 for all actions which may appear in sequences from L_i i.e. a set of actions performable on medium m_i :

(D3) $V_i = \{v = V: \text{there is such } u = h_1 \dots h_n \in L \text{ for which } h_j(m_i) = v \text{ by a certain } j\}$

The definitions presented above bring the two most important con-

sequences determining that an admissible sequence of gestuorwords may include only the admissible gestuorwords and that an admissible gestuorword must in each medium have an action admissible for such a medium. Formally, these theorems may be expressed in the following manner:

- (1) if $u = h_1 h_2 \dots h_n \in L$, then $h_i \in H$ ($i = 1 \dots n$);
- (2) if $h \in G$ and $h(m_i) = v$, then $v \in V_i$ ($i = 1 \dots n$).

It needs to be emphasized that the reciprocals of the above implications are not true. The reasons seem obvious. In the first case, even if each of the gestuorwords is admissible, a sequence of such gestuorwords may be inadmissible. For example, it is possible to greet someone by saying: *Good morning, Hello, Cheers, How do you do, Hi*, yet saying all of these expressions in a row will render them an inadmissible sequence. In the second case, a gestuorword may include actions, which – each individually – are admissible, but together are impossible to perform simultaneously. It is for example impossible to utter several different sentences at the same time.

Since acting communication is a multidimensional system, one needs to introduce notions describing syntactic relations between various media. These relations – called forcing and exclusion – refer to situations when certain actions performed on a given medium are implied, and others are excluded by the fact that a given action is performed on another medium.

Firstly, let us define set $B_i(v)$ of all admissible gestuorwords, which have action v on medium m_i :

$$(D4) \quad B_i(v) = \{h \in G : h(m_i) = v\}$$

Further, let us determine the relations of forcing (R) and exclusion (P):

The definition of relation R is as follows:

$$(D5) \quad uR_{ij}v \equiv [h \in B_i(v) \rightarrow h(m_j) = u].$$

The definition of relation P is as follows:

$$(D6) \quad uP_{ij}v \equiv [h \in B_i(v) \rightarrow h(m_j) \neq u].$$

According to definition (D5) action u forces action v , if and only if each of the gestuorwords which have action v on medium m_i , also have action u on medium m_j . Further, according to definition (D6) action u excludes action v , if and only if a gestuorword having an action v on medium m_i , cannot have action u on medium m_j .

From the formal point of view, the relation of forcing is transitory, although not necessarily symmetrical (e.g. in certain film forms the sentence *I'm afraid* requires relevant gestures and facial expressions, however an opposite relation does not need to take place). On the other hand, the relation of exclusion is symmetrical, although not necessarily transitory (e.g. the sentence *I'm afraid* usually excludes smiling, and smiling excludes

shaky hands but the sentence *I'm afraid* and shaky hands may appear simultaneously).

It is easy to notice that the relation of forcing is much less common than the relation of exclusion. This frequency may be reversed in case of highly conventionalised theatrical or film forms (Kabuki spectacles, medieval mysteries, burlesques from 1920s, traditional westerns, etc.), yet the general trend is invariable.

3. SEMANTICS OF THE ACTING SYSTEM

As we have already mentioned, the last two elements of the acting system are the set of meanings of particular actions from language $L(S)$ and membership function f , describing how the meanings are ascribed to language L elements.

Neither set S , nor function f are homogeneous. Within S it is possible to distinguish two sub-sets: the set of meanings – elements of the presented stratum (marked with symbol S_p) and the set of meanings – elements of the communicated stratum (marked with symbol S_k).

Analogically, we need to speak not of one, but of two membership functions. The first function (let us call it the presentation function and mark it with the symbol f_p) ascribes S_p elements to L components. The second function (let us call it the communication function and mark it with the symbol f_k) ascribes elements of S_k to L components. The principal difference between the presentation function and the communication function consists in the fact that f_k unlike f_p is a fuzzy function.

We now need to explain the notion of fuzziness.

Although the idea of fuzziness may appear somewhat elusive, it is a perfectly tractable mathematical concept. The fuzzy sets theory can be thought as a mathematical model for imprecise concepts. A fuzzy set is a membership function which describes the gradual transition from membership to nonmembership. Of course the relationship fuzzy set-membership function is a subjective one. It is plain that this assignment is governed at his turn by another membership function. Odd enough, the model seems to be imprecise. However, the process can be carried out. More exactly to each fuzzy subset of a set X we can assign any membership function from the set of all membership functions, denotes $F(X)$. Thus, a deeper insight can be gained considering $F^2(X)$, etc. This fuzzification process leads to an universal object. The major premise of this approach is that it is often possible to understand and to express inexactness in mathematical terms. (Negoitǎ, Ralescu 1975: 10).

Using a more precise notation, we may ascertain that the following

function is a fuzzy subset from set X :

$$(D7) \quad g: X \rightarrow [0,1].$$

Within $F(X)$, i.e. in the set of all membership functions, the following operations are defined:

$$(D8) \text{ sum: } \quad (g \vee g')(x) = \max(g(x), g'(x))$$

$$(D9) \text{ product: } \quad (g \wedge g')(x) = \min(g(x), g'(x))$$

$$(D10) \text{ complement: } \quad \bar{g} = 1 - g(x)$$

(D11) Two fuzzy sets g and $g' \in F(X)$ are identical if and only if

$$g = g' \equiv g(x) = g'(x). \quad \forall x \in X$$

We may now consider the notion of a fuzzy function. There are two methods of defining this function.

According to the first definition, a fuzzy function specified on elements of set x and of values from set y , marked with symbol $f_f: X \sim Y$, is the following projection:

$$(D12) \quad f_f: F(X) \rightarrow F(Y)$$

Therefore, f_f binds each fuzzy subset from set Y with each fuzzy subset from set X .

In order to formulate an alternative definition of a fuzzy function, we need to resort to the notion of relation, understood as subset R of the Cartesian product $X \times Y$ of two spaces, X and Y , having, respectively, elements x and y . A characteristic feature of the function is that it is one-dimensional, i.e. the fact that each element x from set X is assigned one, and only one element y from set Y . Therefore, a fuzzy function described by the elements of set X and of the value of set Y , may be found identical to the fuzzy subset of the Cartesian product $X \times Y$.

$$(D13) \text{ Therefore } f_f: X \times Y \rightarrow [0,1] \text{ or } f_f \subset F(X \times Y).$$

Please note that function $f_f(x, y)$ may be treated as a degree of membership of y in image x in accordance with f_f , or as the intensity of the relation between x and y .

The notion of a fuzzy function is of great importance for us, since function f_k assigns meanings to the elements of the multidimensional language of acting communications meanings – components of the communicated stratum, is exactly of a fuzzy character.

From the formal point of view, f_k is a function projecting the $L \times S$ set in the $[0,1]$ range:

$$(D14) \quad f_k: L \times S \rightarrow [0,1],$$

i.e. assigning to each pair $(u, s) \in L \times S$ a number designated by $f_k(u, s)$.

This number represents the degree to which the sequence of gestuowords denotes $s \in S_k$.

Set S_k (within the field of the communicated stratum) contains two types of meaning: the meanings of the utterances and the meanings conveyed by the non-verbal media. The meanings of the latter kind are identical to the already mentioned units of meaning such as “excitement,” “impatience,” “fear,” “weariness,” “contempt,” etc. What is peculiar about these units is that they may be manifested in various modalities. Set S_k covers such elements as “slight excitement,” “excitement,” “extreme excitement,” etc. Therefore, the S_k elements, represent various intensities of meaning s , and constitute a linear scale, i.e. are ordered on a certain continuum.

By the analysis of function f_k , we need to make three material remarks. Firstly, f_k , assigns meanings not only to sequences of gestuowords, but also to single gestuowords. Secondly, gestuowords cannot be presented as too small units; in particular no fragment of a gesture can be treated as a whole gesture, i.e. an element of set V . Thirdly, the fuzziness of function f_k , i.e. the fact that the extent to which gestuoword h expresses meaning s , is equal to p] (in symbols: $f_k(h, s) = p$), may be interpreted in many different ways. M. Nowakowska presents four such interpretations.

According to the first interpretation p is the fraction of people who, when asked about meaning h , answered that it is identical to s .

The second interpretation assumes that s is one of the possible meanings of gestuoword h , and p is the frequency of situations, when h is used to designate s .

According to the third interpretation, p is the level of certainty (manifested by a given person in specific circumstances) that gestuoword h has been used to express s .

Finally, the fourth interpretation is connected with the following conceptualisation of the notion of the gestuoword:

Generally, h consists of an utterance, i.e. an action in the verbal medium, and of a certain number of actions in other media, concerning gestures, facial expressions, etc. With respect to the latter, there is a certain freedom of the use thereof, within the limits of the human body and the surrounding space. One may attempt to describe this formally, by application of a relevant parameterisation of h , i.e. by treating h as an entire family of gestuowords h_z , where z is a kind of a parameter. Various h_z , differ with respect to the extent to which particular gestures and intonations, etc. are emphasized. As z changes so does gestuoword h_z , as well as its meaning. As a typical example, we may mention here the change of the meaning by exaggeration

of certain moves and/or intonations, i.e. the case when z assumes extreme values. By this interpretation function f represents a fraction of those values of z , for which z is the meaning of h_z . (Nowakowska, 1979: 187).

Let us now consider the role played by particular actions in the process of construction of the meaning of a given gestuoword. The most efficient method consists of the comparison of two gestuowords differing only on the level of one medium. By marking gestuoword h with symbols h_i^v and h_i^w , when it is modified in such a manner that actions v and w are performed in medium m_i , then, provided that all other actions remain the same, we may ascertain that:

(D15) action v expresses meaning s to a larger degree than action w , if and only if

$$f_e(h_i^v, s) > f_e(h_i^w, s);$$

(D16) action v expresses meaning s to a smaller degree than action w , if and only if

$$f_e(h_i^v, s) < f_e(h_i^w, s);$$

(D17) action v expresses meaning s to an analogous degree as action w , if and only if

$$f_e(h_i^v, s) = f_e(h_i^w, s);$$

One needs to bear in mind that the relations of expression to a larger degree than..., to a smaller degree than..., and to an analogous degree as..., are relative, and depend both on gestuoword h , as well as on meaning s . It is easy to imagine a situation when v expresses s to a greater extent than w in context h' , but to a smaller extent in context h ." On the other hand in the same context h , v may express meaning s_1 to a larger extent than w , and meaning s_2 to a smaller extent than w . We are dealing with such an instance when, for example, h = "greeting," v = "hug," x = "bow," s_1 = "cordiality" and s_2 = "respect."

Assuming that action w is tantamount to a pause, we may introduce further definitions (for the sake of clarity we will limit ourselves to verbal definitions, moving the symbolic formulas to the footnotes). We will namely say that in context h :

(D18) action v sustains meaning s , if replacing v with a pause lessens the degree to which s is being expressed;

(D19) action v generates meaning s , if replacing v with a pause totally excludes the possibility to express s ;

(D20) action v impedes meaning s , if replacing v with a pause increases the degree to which s is expressed;

(D21) action v frustrates meaning s , if replacing v with a pause results in creating of s , which would not appear in different circumstances;

(D22) action v is neutral towards meaning s , if replacing v with a pause does not change the degree to which s is expressed;

(D23) action v is immaterial for meaning s , if the above condition is met, and additionally the degree of expression of s is equal to zero.¹

And here is a bunch of examples:

Sustaining: Crying or laughter accompanying other actions sustain such meanings as, respectively, “despair” or “happiness.”

Generating: In highly conventionalised films from the 1920s, an actor curling up a moustache or stroking a pointy beard generated the meaning of “meanness,” “promiscuity” or “debauchery.”

Impeding: In traditional western films the sharp facial expressions of an actor usually impeded such meanings as “manliness” or “courage,” whereby keeping a straight face, i.e. an almost total lack of any facial expressions was considered to be a synonym of manliness, bravery and valour.

Frustrating: Obscene behaviours, rude statements and vulgar gestures frustrate such meanings as “good manners,” “courtesy” and “refinement.”

Neutrality: The following sentences: “I’m angry with you” or “You annoy me” and a reproachful silence are neutral with respect to such meanings as “outrage,” “discord” or “grudge.”

Immateriality: A smile or lack thereof are immaterial for such meanings as “wisdom,” “nobleness” or “elegance,” since they do not affect the generation of these meanings.

Let us now consider a situation when the meaning is a result of simultaneous co-operation between two different actions on two different media. Let us say that in context h :

(D24) actions u and v are positively associated by sustaining meaning s , if both u as well as v sustain s , but both of them together sustain s to a larger extent than each of them separately;

(D25) actions u and v are positively associated by impeding meaning s , if both u as well as v impede s , however both of them together express s to a smaller extent than each of them separately;

(D26) actions u and v are negatively associated by sustaining meaning s , if both u as well as v sustain s , however both of them together express s to a smaller extent than each of them separately;

(D27) actions u and v are negatively associated by impeding meaning s , if both u as well as v impede s , but both together express s to a greater extent than each of them separately;

(D28) action u catalyses action v , if v does not express s at all, unless it is accompanied by u .²

Certainly, one may consider more complex situations, when meaning is the effect of the joint operation of three, four, five, . . . , n various actions performed, respectively, on three, four, five, . . . , n various media. We will however leave this issue on the side.

The next question pertains to the role played by particular gestuowords by expressing the meaning of a sequence of gestuowords. At the beginning one needs to determine the notion of a standard gestuoword. For this purpose we will take into consideration the established meaning s , as well as its modifications, both positive and negative. According to M. Nowakowska's suggestions: "One may imagine this in the form of a scale, whereon the considered meaning (s) together with its modifications is located" (Nowakowska 1979: 190). For example if s = "cheerfulness," then it will have the following modifications: "despair," "sadness," "moderate cheerfulness," "great cheerfulness," "extreme cheerfulness," etc.

A standard gestuoword, used to express meaning s is a unit meeting two requirements: (1) it does not, to any degree, express negation of meaning s ; (2) amongst the gestuowords meeting the first requirement, it expresses meaning s to the highest degree.³

Having the notion of a standard gestuoword at our disposal, we may introduce several further definitions:

(D29) Gestuoword h expresses meaning s to a higher degree than gestuoword h' , if and only if, the sequence of gestuowords u , wherein at place i there appears gestuoword h , expresses s to a higher degree than the sequence of gestuowords u , where at place i there appears gestuoword h' .

(D30) Gestuoword h expresses meaning s to a lower degree than gestuoword h' , if and only if, the sequence of gestuowords u , wherein at place i there appears gestuoword h , expresses s to a lower degree than the sequence of gestuowords u , where at place i there appears gestuoword h' .

(D31) Gestuoword h expresses meaning s at an analogous level as gestuoword h' , if and only if, the sequence of gestuowords u , wherein at place i there appears gestuoword h , expresses s at an analogous level as the sequence of gestuowords u , where at place i there appears gestuoword h' .

(D32) Gestuoword h sustains meaning s , if and only if, substitution of h by a standard gestuoword in sequence of gestuowords u reduces the degree to which s is expressed by u .

(D33) Gestuoword h generates meaning s , if and only if substitution of h by a standard gestuoword in sequence of gestuowords u excludes the

capability of u to express s .

(D34) Gestuoword h impedes meaning s , if and only if substitution of h by a standard gestuoword in sequence of gestuowords u increases the degree to which s is expressed by u .

(D35) Gestuoword h frustrates meaning s , if and only if substitution of h by a standard gestuoword in sequence of gestuowords u results in an s , which would not appear in other circumstances.

(D36) Gestuoword h is neutral towards meaning s , if and only if substitution of h by a standard gestuoword in sequence of gestuowords u does not change the degree to which s is expressed by u .

(D37) Gestuoword h is immaterial for meaning s , if and only if the preceding condition is met, and the degree to which s is expressed by u is equal to zero.

(D38) Gestuowords h and h' are positively associated by sustaining meaning s , if and only if both h and h' sustain s , however both of them together express s to a higher degree than each of them individually.

(D39) Gestuowords h and h' are positively associated by impeding meaning s , if and only if both h and h' impede s , however both of them together express s to a lower degree than each of them individually.

(D40) Gestuowords h and h' are negatively associated by sustaining meaning s , if and only if both h and h' sustain s , however both of them together express s to a lower degree than each of them individually.

(D41) Gestuowords h and h' are negatively associated by impeding meaning s , if and only if both h and h' impede s , however both of them together express s to a higher degree than each of them individually.

(D42) Gestuoword h catalyses gestuoword h' , if and only if h' does not express s at all, unless accompanied by gestuoword h .⁴

Now is the time to consider the cases when the actor's expression is limited to one or several (but not all) communication media. We are dealing with such situations in certain theatrical or film forms, e.g. in ballet, pantomime or silent movies, which exclude the spoken medium. Therefore, the problem arises of the possibility of expressing certain meanings and differentiating between them only with the use of admissible media of communication.

In order to describe the above state of affairs, we need to distinguish set L' of language of communication L . For a given meaning s we may define two subsets L' : $L^+(s)$ – a set of sequences of gestuowords from L' expressing meaning s to a positive degree and $L^0(s)$ – a set of sequences of gestuowords which do not express s at all:

(D43) $L^+(s) = \{u \in L: f_k(u, s) > 0\}$;

(D44) $L^0(s) = \{u \in L: f_k(u, s) = 0\}$.

Using $L^+(s)$ and $L^0(s)$ we may say that for two given meanings $s, t \in S_k$:

(D45) s is contained in t if and only if

$$L^+(s) \subset L^+(t);$$

(D46) s and t are inseparable if and only if

$$L^+(s) = L^+(t);$$

(D47) s and t are inconsistent (impossible to reconcile) if and only if

$$L^+(s) \subset L^0(t) \text{ or } L^+(t) \subset L^0(s);$$

(D48) s and t are independent (orthogonal) if and only if

$$L^+(s) \cap L^+(t) \neq \emptyset \neq L^+(s) \cap L^0(t)$$

One needs to remember that the above notions are relative with respect to L ; i.e. the selected set of the media of communication.

The notion of inclusion, inseparability, inconsistency and independence use only a part of the information contained in function $f_k(u, s)$, i.e. they depend on the fact whether the value of this function is equal to zero or not. One could however introduce notions which would be based on entirely different information contained in function $f_k(u, s)$.

For this purpose, let us mark with the symbol $L_a(s)$ a set of all actions expressing meaning s to a degree equal at least to a , i.e.

$$(D49) L_a(s) = \{u \in L: f_f(u, s) \geq a\}.$$

We may then claim that meanings s and t are synonymous, if and only if for each u

$$(D50) f_k(u, s) = f_k(u, t), \text{ i.e. } L_a(s) = L_a(t)$$

and that meaning t a -sustains meaning s , if and only if

$$(D51) (\exists a_0) (\pi a > a_0) L_a(s) \subset L^+(t).$$

Summing up, we need to remind ourselves that the principle objective of this paper was to construct a formal model of acting communication and to provide several detailed definitions. This objective – for obvious reasons – could be achieved only partially. A lack of space does not allow us to discuss succinctly all issues coming to mind. Therefore, the present study should be treated only as a starting point for further thorough deliberations, as a proposal probably requiring many additions and modifications.

FOOTNOTES

¹ The presented definitions may be presented formally in the following manner:

action v sustains meaning s , if and only if

$$f_k(h_i^v, s) > f_k(h_i^\#, s);$$

action v generates meaning s , if and only if

$f_k(h_i^v, s) > f_k(h_i^\#, s) = 0$;
 action v impedes meaning s , if and only if
 $f_k(h_i^v, s) < f_k(h_i^\#, s)$;
 action v frustrates meaning s , if and only if
 $0 = f_k(h_i^v, s) < f_k(h_i^\#, s)$;
 action v is neutral towards meaning s , if and only if
 $f_k(h_i^v, s) = f_k(h_i^\#, s)$;
 action v is immaterial for meaning s , if and only if
 $f_k(h_i^v, s) = 0 = f_k(h_i^\#, s)$.

² By marking gestuorword h with symbol h_{ij}^{uv} , wherein action on media m_i and m_j have been replaced by u and v , and gestuorword h with relevant actions and pauses has been replaced by symbols $h_{ij}^{u\#}$, $h_{ij}^{\#v}$ and $h_{ij}^{\#\#}$, the above definitions may be presented in the following manner:

u and v are positively associated by sustaining meaning s , if and only if

$$f_k(h_{ij}^{\#\#}, s) < \min[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] \text{ and}$$

$$\max[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] < f_k(h_{ij}^{uv}, s);$$

u and v are positively associated by impeding meaning s , if and only if

$$f_k(h_{ij}^{\#\#}, s) > \max[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] \text{ and}$$

$$\min[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] > f_k(h_{ij}^{uv}, s);$$

u and v are negatively associated by sustaining meaning s , if and only if

$$f_k(h_{ij}^{\#\#}, s) < \min[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] \text{ and}$$

$$\min[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] > f_k(h_{ij}^{uv}, s);$$

u and v are negatively associated by impeding meaning s , if and only if

$$f_k(h_{ij}^{\#\#}, s) > \max[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] \text{ and}$$

$$\max[f_k(h_{ij}^{u\#}, s), f_k(h_{ij}^{\#v}, s)] < f_k(h_{ij}^{uv}, s);$$

u catalyses action v , if and only if

$$0 = f_k(h_{ij}^{\#\#}, s) = f_k(h_{ij}^{\#v}, s) = f_k(h_{ij}^{uv}, s).$$

³ Formally h^+ is a standard gestuorword for meaning s , if and only if:

(1) $f_k(h^+, -s) = 0$;

(2) $f_k(h^+, s) = \max\{f_k(h, s) : f_k(h, -s) = 0\}$.

⁴ By marking with symbol h^+ a standard gestuorword, and with symbol u_i^h a sequence of u , wherein gestuorword h is at place i , the above definitions may be noted in the following manner:

Gestuorword h expresses meaning s to a higher degree than gestuorword h' , if and only if

$$f_k(u_i^h, s) > f_k(u_i^{h'}, s)$$

Gestuorword h expresses meaning s to a lower degree than gestuorword h' , if and only if

$$f_k(u_i^h, s) < f_k(u_i^{h'}, s)$$

gestuorword h expresses meaning s at an analogous level as gestuorword h' , if and only if

$$f_k(u_i^h, s) = f_k(u_i^{h'}, s)$$

gestuorword h sustains meaning s , if and only if

$$f_k(u_i^h, s) > f_k(u_i^{h^+}, s)$$

gestuorword h generates meaning s , if and only if

$$f_k(u_i^h, s) > f_k(u_i^{h^+}, s) = 0$$

gestuorword h impedes meaning s , if and only if

$$f_k(u_i^h, s) < f_k(u_i^{h^+}, s)$$

gestuorword h frustrates meaning s , if and only if

$$0 = f_k(u_i^h, s) < f_k(u_i^{h^+}, s)$$

gestuorword h is neutral towards meaning s

$$f_k(u_i^h, s) = f_k(u_i^{h^+}, s)$$

gestuorword h is immaterial for meaning s , if and only if

$$f_k(u_i^h, s) = 0 = f_k(u_i^{h^+}, s)$$

gestuorwords h and h' are positively associated by sustaining meaning s , if and only if

$$f_k(u_i^{h^+h^+}, s) < \min[f_k(u_i^{hh^+}, s), f_k(u_i^{h^+h'}, s)], \text{ and}$$

$$\max[f_k(u_i^{hh^+}, s), f_k(u_i^{h^+h'}, s)] < f_k(u_i^{hh'}, s).$$

gestuorwords h and h' are positively associated by impeding meaning s , if and only if

$$f_k(u_i^{h^+h^+}, s) > \max[f_k(u_i^{hh^+}, s), f_k(u_i^{h^+h'}, s)], \text{ and}$$

$$\min[f_k(u_i^{hh^+}, s), f_k(u_i^{h^+h'}, s)] > f_k(u_i^{hh'}, s).$$

gestuowords h and h' are negatively associated by sustaining meaning s , if and only if

$$f_k(u_i^{h+h^+}, s) < \min[f_k(u_i^{hh^+}, s), f_k(u_i^{h+h'}, s)], \text{ and}$$

$$\min[f_k(u_i^{hh^+}, s), f_k(u_i^{h+h'}, s)] > f_k(u_i^{hh'}, s).$$

gestuowords h and h' are negatively associated by impeding meaning s , if and only if

$$f_k(u_i^{h+h^+}, s) > \max[f_k(u_i^{hh^+}, s), f_k(u_i^{h+h'}, s)], \text{ and}$$

$$\max[f_k(u_i^{hh^+}, s), f_k(u_i^{h+h'}, s)] < f_k(u_i^{hh'}, s).$$

gestuoword h catalyses gestuoword h' , if and only if

$$0 = f_k(u_i^{h+h^+}, s) = f_k(u_i^{h+h'}, s) < f_k(u_i^{hh'}, s).$$

Bibliography

1. Bellman, Richard and Lotfi A. Zadeh (1970) "Decision-making in a Fuzzy Environment." *Management Science* XVII/4.
2. Bettetini, Gianfranco (1973) *The Language and the Technique of the Film*. The Hague-Paris.
3. Goguen, Joseph (1976) "L-fuzzy Sets." *Journal of Mathematical Analysis and Applications* 18[1]: 145-174.
4. Gottinger, H. W. (1974) "Towards Fuzzy Reasoning in the Behavioral Science." In: *Developments in the Methodology of Social Science*, Werner Leinfellner, Eckehart Köhler (eds.). Dordrecht: D. Reidel.
5. Ingarden, Roman (1960) *O dziele literackim*, Warszawa: PWN.
6. Ingarden, Roman (1966) "O formie i treści dzieła sztuki literackiej." In: *Studia z eseistyki*, vol. II, Warszawa.
7. Negoită Constantin V. and Dan A. Ralescu (1975) *Applications of Fuzzy Sets to System Analysis*. Stuttgart.
8. Nowakowska, Maria (1973a) *Language of Motivation and Language of Actions*. The Hague: Mouton.

9. Nowakowska, Maria (1973b) *Teoria działania. Próba formalizacji*. Warszawa: PWN.
10. Nowakowska, Maria (1973c) "A Formal Theory of Actions." *Behavioral Science* 18[6]: 393-416.
11. Nowakowska, Maria (1979) "Komunikacja werbalna i niewerbalna jako język wielowymiarowy." *Studia Semiotyczne* 9: 181-196.
12. Nowakowska, Maria (1980) *Nowe idee w naukach społecznych*. Warszawa: Ossolineum.
13. Plesnar, Łukasz (1980) "Język filmu a język logiki." In: *Problemy semiotyczne filmu*, Alicja Helman, Eugeniusz Wilk (eds.). Katowice: Uniwersytet Śląski.
14. Zadeh, Lotfi A. (1965) "Fuzzy Sets." *Information and Control* 8: 333-353.
15. Zadeh, Lotfi A. (1971) "Towards a Theory of Fuzzy Systems." In: *Aspects of Network and System Theory*, Rudolf Emil Kalman, Nicholas DeClaris (eds.). New York: Holt, Rinehart and Winston.
16. Zadeh, Lotfi A. (1978) "Fuzzy Sets as a Basis for a Theory of Possibility." *International Journal Fuzzy Sets and Systems* 1: 3-28.