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MANAGEMENT EDUCATION AND BRAIN: NEW DIRECTIONS IN THEORY AND RESEARCH

Синтезуються минулі та сучасні дослідження автора щодо здійснення нейропсихологічного підходу з розрізнення типів індивідуального менеджменту на базі особливостей мозку індивідуума. Даний підхід пропонує інноваційну і потенційно значиму концепцію поліпшення освіти і підготовки менеджерів.

The previous and current research of the author on the neuropsychological approach to distinguishing individual management styles on the basis of brain characteristics of the individual are synthesized. The given approach offers the innovative and potentially powerful concept of improving management education and training.

Now at the start of the 21st century, Ukraine, which gained its independence in 1991 faces a great number of organizational problems, namely in management education. Besides, many organizations are drastically reducing employees, levels of management which results in rapidly changing models of careers and organizational success. The issue which is of vital importance for management education is: how psychological theories and practice can be effectively applied to the process of managing and being managed?

The direction which received considerable attention in Ukraine is neuropsychological approach (L.Derkach,1996) to distinguishing individual management styles, managerial types on the basis of brain characteristics of the individual. Our research showed that differences in brain processing are manifested in ways managers perceive organize, process, evaluate information, establish interpersonal relations.

The paper hypothesizes that individual profile of brain organization of a manager might be used as the indicator of differences in psycho-neuro-logical organization and cognitive strategies choice in problem-solving, decision-making and communication.

The recognition that another person has a preferred style (way) of working can often be enough to defuse situations that may otherwise lead to disagreement. Knowing the other's style enables prediction of what they will or will not like, and hence, reduces uncertainty.

Over the past few years, recognition of the urgency of designing effective methods of management education which meet the requirements of modern neuropsychological attainments has caused a quantum leap in the attention paid to "brain functioning" issues. This concern is reflected, in our view, in a strong desire of theorists, organizational psychologists and educators to develop interdisciplinary links in order to understand interhemispheric basis of the capacity to process information. (Campion and McClelland, 1991). As a rule, the given phenomenon is inseparably connected with intelligence which is tested in different ways with the help of tests. (Blinkhorn and Johnson, 1990). What matters much, in our view, is the way in which we prefer to process the information (Hofstede, 1991; Mathews, 1993). In its turn, it may cause serious managerial problems in case it differs greatly from the colleagues or from the organizational culture. (Hofstede, 1991; Moskowitz, 1993).

It would appear self evident that interdisciplinarity is a desirable characteristic of the active, inquiry-based managerial learning which provides, in terms of John Dewey (1916), discovery learning for all students. Indeed, Virginia P.Collier (1998) suggests that "among the many changes taking place in the transformation from an industrial age to an information – driven, technological age is the demand for a well-educated workforce" in the 21-st century (P.63). In other words, as Carlos J. Ovando states "Virginia Collier defines the active, inquiry based, interdisciplinary teaching style... as a means to high student achievement, based on research on school effectiveness with culturally and linguistically diverse learners" (Ovando, 1998, P.XY). Similarly, Franco Fabbro (1999) stresses the importance of "knowledge of brain" that "can be useful not only to physicians, psychologists, and speech and language therapists, but also to teachers in general, irrespective of the level they teach. After all, every day they have to deal with one of the most typical features of the human brain, namely the ability to learn". (Fabbro, 1999, P.XIY)

In terms of defining the problem, it could be said that one of the most controversial areas of inquiry in organizational psychology of late has been the study of left and right brain functioning in the process of managing people at work. (Tett, Jackson, Rothstein, 1991; Derkach, 1998). Although very little is known so far how left and right brain integrate their processing capacities, investigators have begun recently to focus on more general neuropsychological and psychological mechanisms accounting for effective hemisphere interaction. In other words, "how psychological theories and practice can be effectively and usefully applied to the behavior of people within organizations, in particular to the process of managing and being managed (Makin et al., 1999, P.1)".

The current article presents a new approach to the personnel selection on the basis of the interdisciplinary study where the effects: neuropsychological (levels of information processing), psychological (models of communication, managerial styles and types) and methodological (organizational development) have been analyzed.

It is our purpose with the given paper, through the suggestion of innovative neuropsychological approach grounded on brain characteristics of the individual, to spark more interest among management specialists in the question of organizational success, namely: how to improve a managerial effectiveness knowing the peculiar and dominant traits of the left and right brain, as well as their combination.

I will now offer a speculative but empirically grounded set of hypotheses about individual hemisphere differences in information processing of a person:

1. The character of the hemispheric interaction in information processing depends on the individual asymmetry profile of the individual, which is defined as the combination of sensory and motor asymmetries typical of the person.
2. The character of the hemispheric interaction in a manager largely depends on the dominant way in which s/he prefers to carry out the processing.
3. The distinction between the two styles of adaptor and innovator (Kirton, 1984) accounting for the way in which management initiatives are taken, is relatively permanent and reflects asymmetry profile of a manager.
4. The knowledge of six managerial types, namely: the bureaucrat, autocrat, laissez-faire, wheeler-dealer, reluctant, open manager, from the focus of brain asymmetry, makes it possible to choose reasonable strategies to influence the boss and the organization as a whole.

NEUROLOGICAL CONSIDERATIONS

Before turning to the particulars of the cerebral asymmetries which are of great significance for information processing that we wish to highlight, we review briefly our basic assumptions about the neuroanatomy of language, because the language makes the thought possible (L.Vygotsky) and limit ourselves to the analysis of some burning problems of management education.

It is now generally accepted that the Broca's and Wernicke's zones of the left cerebral hemisphere for nearly all right-handed and most left-handed individuals are the, two brain regions most closely associated with individual linguistic ability (Chomskaya, 1998; Chernigovskaya, 1990; Zaidel, 1985 and others).

It is common knowledge that normal language comprehension requires the contribution of both left and right cerebral hemispheres. Until relatively recently this would have been a controversial statement. However, there is a considerable amount of empirical evidence on the right hemisphere language ability to support the notion that both hemispheres are called upon for a full complement of memory and language resources in monolinguals (Burgess and Chiarello, 1996). Remarkably few studies have investigated a possible right hemisphere role under bilingualism (Chiarello, Genesee,1982; Obler, 1981; Seliger, 1982; Derkach, 1999).

Moreover, it is common among psychologists that analytic, logical, intellectual functions are located in the left hemisphere while synthetic, emotional and intuitive – in the right one. Clearly, the idea of how, when and what way lateralization process affects bilingual education is intuitively appealing, it has face validity and is a term commonly used to denote the process of brain maturation under which certain functions are assigned or lateralized to the left or right brain.

In our view, understanding the complex relationship between the two cerebral hemispheres dealing with problem-solving, decision-making is a crucial component for understanding new ways of implementing brain functioning in management practices. The scientific study of hemispheric interaction both in East and West, in our view, could be summarized by glancing at major directions of the research which was aimed at the analysis of:

- the neural and cognitive bases of language comprehension, semantic memory and attention (Chiarello; 1982-1999);
- mathematical modelling of cerebral hemispheric functions, biological basis of the artificial intelligence; finding out the cerebral mechanisms of individual cognitive styles as a function of cerebral right-left asymmetry (Chernigovskaya, 1990);
- second language research on individual differences with implications for instructional practice (V. Galbraith and R.Gardner, 1988);
- definition of the individual profile of lateral organization of functions in a brain of the personality on the basis of a definite combination of sensor and motor asymmetries typical of him or her.

In spite of differences in theoretical focus (E.Chomskaya and C.Chiarello), methodology (Simpson and Chernigovskaya) and terminology (C.Chiarello and L.Derkach), a consensus is emerging for future research in the New Millennium, we hope. The field has passed through a period of professionalism which has resulted in promotion of the integration of education, psychology, neurolinguistics and new technologies by developing new paradigms, theories and practices through a series of approaches.

What are the consequences of neurological (brain) development that affect management success? In an attempt to highlight the complex nature of neurological considerations, in how the organization can positively change, moreover, under what conditions management initiatives could be effective enough, many scholars draw upon "lateralization" of the brain which is treated as a key answer to the issue. Brown sees lateralization as the process of brain maturation under which certain functions are assigned or lateralized to the left hemisphere of the brain and some to the right one (P.43).

In speculations on possible answers to the questions: what have we learned from neuropsychology and related psycho-methodological theoretical and empirical studies, one cannot note that all of them deal with the contribution of the left and right hemisphere to the information processing in a personality. But problems of levels processing and cognitive types of thinking, as well as managerial types has been relatively neglected area of investigation. Of particular interest for our hypotheses is the data obtained by Tett et al (1991) supporting the idea that personality measures as predictors, play the exclusive role in job performance.

We thus suggest that the knowledge of hemisphere processing differences will provide adequate conditions for individual approach in management education. Specifically the analyses seek to determine the contribution of each cerebral hemisphere to the process of entering the career of a manager and its successful development.

In light of this, we were interested in the pressing problems: what neurological issues got to do with the teaching managers? In other words, how one should take into consideration individual neuropsychological differences of the learners in management training? What is the most effective system of their diagnostics? What are the optimal neurological implications to successful management theory and practices?

We strongly believe that there are several good reasons for introducing the study of the hemispheric brain asymmetry to the management class as it makes also possible to supply answers to the following burning issues in the organizational psychology:

- What are peculiar features of right and left asymmetry profiles in shaping managerial styles: adaptors and innovators, in terms of Michael Kirton?
- How do they proceed through the organizational decision-making structure?
- Under what conditions do they succeed or fail?
- What are the typical managerial types singled out in our experimental work? What are their traits in communication and thinking?

All the above mentioned questions have been set in our previous and current publications (L.Derkach, 1996; 1997; 1998; 1999) and contributed greatly to our shaping of the approach under the analysis.

The hypotheses of the given research presuppose that differences in individual lateralization profile reflect differences in cognitive processing of a learner. We suggest that individual lateralization profile or pattern of the lateral organization might be coined as the complex, integrative index of the motor and sensory asymmetries typical of a subject at a definite period of his ontogenetic development.

In contrast to the traditional approaches we focus our attention on types of individual lateralization profiles of the brain in processing for the purpose of defining the individual managerial types.

For singling out the typology of profiles we have made use of several experimental techniques for measuring the profiles of subjects (in scores), namely: Questionnaire (M.Annet, 1970); Functional Probes (A.Luria, 1975); T. Dobrokhotova and Bragina, N, 1994, Test "Metagramma" (L.Derkach; J.Kovalenko, 1998); Association Coefficient (B.Kotik, 1990) aimed at defining levels of information processing. The given system of diagnostics proved to be the most effective as made it possible to differentiate between more than 22 individual lateralization subtypes.

With this summary material in mind, we can turn particular attention to the two individual lateralization profiles that we have singled out in management training of University fourth-fifth-year students on the basis of above mentioned procedures, namely:

- cognitive-linguistic managers;
- communicative managers.

It is relevant to ask why only the two types of profiles we focused on, but there are advantages. As with the discussion of the methodological problems of managerial types, careful analysis of more than 22 individual lateralization profiles, discovered by different scholars, would be inappropriate for our purposes here. In any system of categorization, according to P.Makin et al, (1999) the reduction in the number of categories used increases the generality of those categories. This makes them easier to work with, but reduces specificity (P.61). The implicit intention of our discussion is to suggest that the notion of innovative approaches and technologies in organizational psychology instruction underlies much recent thinking about current psychology and neuropsychology.

It is important to recall that management instructors should have the access to portable, objective, and valid techniques to work with and make use of in the classroom environment. This would mean that management teachers could easily benefit much from knowing more about their students' learning and cognitive styles, the levels of information processing and moreover, the factors that determine both semantic access, and retrieval which are crucially important components for management competency.

While we have presented this line of reasoning couched in the given paper on the hemispheric interaction the method of individual lateralization profile applied by us, was compared to the method suggested by M.Bryden "Handedness Inventory" (Bryden, 1982) and Self-assessment Test "Brain Works" in the research provided by J.Kovalenko (1998). The experimental data proved the validity of the results obtained in both procedures.

Thus, we have concluded that there are significant differences, evident in typical brain behaviors presented in communicative and cognitive-linguistic types of managers, according to our differentiation, due to their profound differences in information processing.

In light of this we state that left brain behaviors (or cognitive-linguistic learners) in various speech activities, namely, SPEAKING preferably respond to:

- processing information sequentially, mainly objectively
- have a comparatively great number of hesitation pauses
- possess a passive character of communication
- demonstrate a relatively poor level of communicative competence
- are capable of a relatively high level of solving verbal tasks
- prefer well-structured assignments
- as a rule, are independent in cooperative interaction.

Right brain behaviors (or communicative learners) in SPEAKING respond to:

- processing information in patterns and subjectively
- have a very high rate of speech production
- possess an active character of communication
- demonstrate a relatively high level of communicative competence but with a great number of errors
- are fond of playful problem-solving
- prefer open-ended assignments
- are sensitive to cooperative interaction

Referring READING AND WRITING cognitive-communicative learners possess:

- a comparatively large amount of lexical units (vocabulary)
- demonstrate a qualitative character of linguistic tasks solving and the language analysis
- prefer critical analytical reading and listening
- are easy at remembering through the language signs
- are sensitive to learning on the basis of written plans
- prefer outlining to summarizing
- do with problem-solving via categories of logic

- possess an elaborated character of self-control
- are persistent in use of verbal symbols in memorization and in intellectual actions
- pay attention to specific differences and certain regularities
- have preference to realistic stories in reading and writing
- enjoy reading for details and facts

In comparison with cognitive-linguistic learners (left-brained), communicative learners (right-brained) demonstrate:

- the lack of abilities in linguistic-solving tasks and singling out verbal regularities
- reading for identifying major ideas and overviews
- remembering with the help of pictures and emotional images
- learning through exploration
- preference to summarizing rather than outlining
- problem-solving through intuition
- the lack of self-control
- emotional support in memorization
- emotional responses
- attention to fantasy, poetry, myths
- preference to visual and kinesthetic instruction
- reference to emphasizing second person when writing

To sum it up, the peculiar character of information processing in cognitive-linguistic learners is manifested through: individualization of the object (e.g. My pencil), while communicative learners prefer categorization of the object (e.g. Pencil as a tool). In addition to that, attention which is directed to the "cause-effect" relationships dominates in cognitive-linguistic learners; at the same time communicative learners dominate in defining analogies, similarities and general peculiarities.

Regarding the specific conditions of managers' instruction we have obtained the following characteristics of the students in the problem-solving tasks, decision-making and utilization of the preferable strategies of coping with them:

Cognitive-Linguistic Type:

The given type of managerial students of Dnipropetrovsk National University, Department of Economics (N=169), who are usually called right-handed students and make extensive use of left-handed strategies (according to the functional asymmetry of the brain), prefer to deal with the problems which are solved in a logical way; they are rather active in searching of precise facts and enjoy constructive tasks. They are rather quick at summing up than at creating new, innovative ideas. Future managers are able to make some improvements to the product but they are not ready to invent something new.

Managers of the type prefer to work at problem-oriented organizations which have a firmly fixed organizational structure, well-established control and strictly defined duties and obligations.

Communicative Type:

This group of students (N=46), called left-handed, who process the information with the help of right-handed strategies, are easy at solving problems intuitively and, as a rule, possess a very strong imaginative thinking. They do enjoy inventions, searching for a principal idea, are extremely fond of the feeling of insight through the problem-solving situation. Contrary to the right-handed managers they prefer to work at organizations which put forward ideal goals, which makes it possible to demonstrate the personal initiative. They also enjoy flexible rules and a human-centered approach in communication.

There was one group of managers singled out more, which we called a mixed-type group, ambedexter-type (N=24). The specific feature of the described group is the usage of both left and right-handed strategies. These strategies are revealed in a quite specific way, namely: they are effective in expressing a manager's thoughts in writing while describing details of the chosen decision; right-handed strategies are applied in the process of communication.

Thus, the above mentioned three individual typical differences characterize three types of managers which are manifested in their individual general abilities and managerial styles (adaptors and innovators) and which represent their comfortable zone of management initiatives realization. A shorthand explanation of the difference between the two styles, according to P.Makin et al., is in the fact that the adaptor = cognitive-linguistic type, according to our classification, likes doing things better, the innovator = communicative type prefers to do things differently (P.74).

And finally I'd like to dwell on managerial types regarding socialization of the organization. The culture of the organization within which a manager works predetermines the type of power that the boss can bring and utilize. One could distinguish between the forms of power which generate various managerial types regarding functional asymmetry of the brain. The bureaucrat, for example, is generally slow and cautious in making decisions though pleasant-looking and mild mannered. Facing the problem a manager acts in accordance with established custom and practice. Possible needs of a bureaucrat, in Makin's view, is likely to have a high need for power, the main expression of this is a need to control others (P.318). The preferable style and sanction, as our experiments show, that of the adaptor demonstrating the powers before subordinates, when dealing with superiors – they will generally be complaint. Very easily they make use of their control of information as a source of power.

The next type – the autocrat from the neuropsychological point of view might be classified as a communicative learner who has his personal, strong views and convictions concerning what should be done. A manager is intolerant of those who make mistakes and people who misunderstand the task; regarding individual management style it is sooner of adaptor striving a high need for power differentials.

One more managerial type – wheeler-dealer is a complete picture of a communicative learner in our classification as he or she is very impatient, not successful in negotiations, they do not give much attention to the guidance of the organization, utilizes innovator style accompanied by a certain amount of chaos.

Very similar to the wheeler – dealer is the laisser-faire and the reluctant manager who have been promoted on the grounds of technical competence. The main difference between them is their models of behavior to the subordinates. Generally both types are in high need for achievements, in great need to be liked by subordinates, they are also likely to be innovators= communicative learners.

And lastly, the open manager combines the two styles together at a time: that means that both innovator and adaptor styles are used while spreading the ideas in the value participation and commitment to organizational success. Little need for power, high need for facilitating the organizational effectiveness, rather flexible, highly participative with the position and resource power (P.326).

As it is seen, all preference classifications of strategies for managerial problem-solving and decision-making have a definite pattern of action, managerial type which includes preference-evaluation, description-classification, sequence-pattern and cause-effect criteria and involves background knowledge of the learners. These data are in full accord with the typical brain behaviors that were singled out in our previous investigations. Approaching cognitive and management development from these perspectives requires students to use each of these forms of

neurolinguistic knowledge, on his or her individual lateralization profile in order to analyze and monitor oneself in the later stages. In this process the learners are involved in either deductive (left-brain dominant language learners or cognitive-linguistic managers) or inductive style of teaching (right-brain dominant or communicative managements).

Thus, the peculiar left asymmetry profile (cognitive-linguistic learners) features which are associated with intellectual, controlled, planned and well-structured, sequential verbal actions adopted by the learner and who relies on language in thinking and remembering, who easily sees cause and effect relationships, prefers multiple choice tests, very rarely uses metaphors, makes objective statements, prefers organized information and is an analytic reader.

On the contrary, right-hemisphere profile (communicative) characteristics differ from the left ones, being: intuitive, free of control and self-control, fluid and spontaneous in thinking, speaking, reading, looks at similarities, relies on images in thinking and remembering, acts by analogy, establishes resemblances, prefers questions, often uses metaphors, makes subjective statements, prefers to use pictures, images not words, relies on qualitative patterns, images, is a synthesizing reader.

We also suggest that a right hemisphere contribution in language use under communication is due to the modular representation of language functions in the left and right brain as each hemisphere represents an autonomous information-processing system. Consequently, in designing teaching aids, textbooks for University students a conscientious approach to management education, as our experiments proved, should be based on hemispheric differences of the students because they extremely need quite opposite strategies of information processing. On the basis of regularities fixed we created a special system of cerebral exercises aimed at optimizing management abilities of mangers and which are presented in our English textbook for Ukrainian University students (L.Derkach et al., 1999).

DISCUSSION

The designing effective means of teaching which are based on modern interdisciplinary attainments clearly indicate that management education on the basis of neuropsychological and linguistsic considerations makes a difference in the level of gains on different aspects of managing and being managed. This conclusion is further supported by the introspection data indicating that manager teachers could benefit from knowing more about their students' individual characteristics. In the given article we have discussed a wide range of factors that investigation indicates to be important in organizational psychology, from individual lateralization profiles peculiarities, individual managerial types (communicative=innovator type and cognitive-linguistic=adaptor type), as well as managerial types, their description and the role of the right hemisphere in the problem-solving, decision-making and communication tasks. We have also attempted to show how to use research findings in order to create psychologically substantiated programs of management training.

In addition, the approach which we suggest makes it easier the selection process, the approach is geared towards the manager who is not a specialist in selection. Therefore, it will concentrate on developing understanding of the work of a specialist, so that the manager can appreciate the right – and left handed techniques used in sophisticated selection process and how these techniques can add to organizational success.

The process of selection on the basis of neuropsychological approach is strongly influenced by the managerial nature of work, the notion of career and career progression. Taking into consideration the Hull's classification of the concept of career (1976) as career advancement, profession, a lifelong sequence of jobs, a sequence of role-related experiences, we made it possible to single out the career types with the focus on neuropsychological differences. Individuals can be classified into three major types: left-handed managers who are concerned with a safe work environment and who find promotion rewarding because it shows that the

organization values them and wants to keep them; right-handed managers who set out to climb the corporate ladder see themselves as generalists, who are able to manage others; ambedexter-type career managers who possess high autonomy needs, value freedom and will find ways to carve out their niche in an organization. Thus, organizational support for career planning on the basis of neuropsychological assessment is in the interest of any organization that its employees are experiencing career satisfaction.

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