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Article

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IDENTIFICATION OF PREFERRED REPRESENTATIONAL SENSORY SYSTEM IN NEURO-LINGUISTIC PROGRAMMING

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Abstract: *The paper highlights the scientific debate on the Neurolinguistic programming (NLP) issue. NLP is a collection of approaches, communication tools, techniques, and perspectives that determine how individuals think and communicate through language. NLP is used to recognize and modify patterns of human behavior. The sensory representational system, or the method for recognizing representational systems, which is made up of five main senses, influences this process. Systematization literary sources and approaches to this issue indicate that three sensory representational systems exist in the NLP approach: visual, auditory, and kinesthetic (VAK), and that the individual's preferred representational sensory system could explain manifested behavior and characteristics in the managerial and marketing sphere. The central purpose of the research and the significance of choice made about this area of interest is to determine each individual's preferred representational sensory system (VAK) utilizing the original PRSS-VAK methodology. The methodological research tool was the PRSS-VAK methodology which contains nine statements, which are assessed on a scale from 1 (the least describes me) to 4 (the most describes me). The PRSS-VAK methodology would help to comprehend patterns of an individual's behavior and allied cognitive or emotional processes. EFA (Exploratory Factor Analysis) with Varimax rotation was used to verify the methodology on a sample of 214 respondents from the Slovak Republic, and CFA (Confirmatory Factor Analysis) was used to validate the structure on a sample of 268 respondents from the Slovak Republic. This research empirically and theoretically confirms that one of the preferred representational sensory systems may be dominant. However, this may change regarding the current situation (stimulus, impulse). The research results could be beneficial as a springboard not only for researchers concerning this issue. It also indicates that quantitative research does not determine exactly to which category (visual, auditory, or kinesthetic) a certain individual belongs. Using the identification of a preferred representational sensory system could help to facilitate both management and marketing communications.*
Keywords: neurolinguistic programming, human senses, PRSS-VAK methodology, sensory systems.
JEL Classification: M1, M2, M3.

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Introduction. The success of a company is often attributed to effective communication. A manager or other leader who is good at communicating could motivate their team members. A great manager must have neurolinguistic programming skills, particularly in negotiation, problem-solving, stress management, influencing, persuasion, conflict resolution, and individual growth. NLP abilities help managers develop their soft skills and leadership qualities (Joey and Yazdanifard, 2015).

Neurolinguistic programming (NLP) is a widespread method of developing interpersonal skills and communication (Roderique-Davies, 2009; Tosey and Mathison, 2003). NLP technique originates in the 1970s and contains specific claims about how individual processes the world. It has positioned itself not just as a communication aid but also as a distinct sort of psychotherapy. The original NLP developers, Richard Bandler and John Grinder (1975), studied mathematics and linguistics (Carter, 2001). The NLP is a popular technique that includes a variety of training courses, personal development programs, and educational and therapeutic treatments based on NLP concepts (Roderique-Davies, 2009). NLP is about embracing a humanistic constructivist approach that incorporates cooperation, asking specific questions, focusing on solutions, removing oneself from a problem, feedback, and determining what works and what does not, according to Linder-Pelz and Hall (2007). Maisenbacher (2014) characterizes NLP as the science and art of perfection.

The concept of neurolinguistic programming consists of three elements. The word «neuro» (from the Greek for nerve, neuron) stands for the fundamental idea that neurological processes underlie behavior. Linguistics, which gets its name from the Latin word lingua, or «language», contends that our language and communication systems display, arrange, and structure neurological activities. In order to produce certain results, a system's components are organized through a process known as programming. In this case, the system's components are sensory representations (Dimmick, 2017).

This paper aims to verify a tool (methodology) for identifying an individual's preferred representational sensory system. This methodology could help to understand differences in the perception of communication, make communication more effective, and eliminate communication misunderstandings. The theoretical part of the contribution contains a literature review, which concerns the definitions of NLP, the explanation of VAK, and their validity in management and marketing practice. The methodological and research part deals with the description of the research sample, the description of the methodology, and its verification through EFA (Exploratory Factor Analysis) and CFA (Confirmatory Factor Analysis). The conclusion offers the application of the obtained results in practice.

Literature review. Ilyas (2017) concisely defines neurolinguistic programming as a collection of methods that reveal details about people, their cognitive processes (neuro), their language use while speaking to others and to themselves, and how these interactions influence their behavior (programming). Tastan (2014) stated that neurolinguistic programming is brain reprogramming – a nerve language. NLP helps to achieve effective language use and successful behavior and provides programs and techniques for organizing the nervous system to achieve goals.

NLP focuses on how humans make sense of their experiences and interactions with others (Pollitt, 2010). It offers communication tools, techniques, attitudes, and approaches that assist individuals and organizations in reaching their management and personal development objectives (Lazarus, 2010). The study of motivation and language patterns, the development of relationships, and how people encode data are all topics covered by NLP techniques (Thompson et al., 2002).

Three sensory representational systems – visual, auditory, and kinesthetic – are included in the NLP approach (VAK) (Davis and Davis, 1991; Peker, 2010). According to Grinder and Bandler (1976), each person has a preferred representational system. Two persons who view the world via two different representational systems would have very different experiences. NLP provides the idea of matching to produce the most effective communication, in which the person may identify with his representational system and perspective by matching the verbal and nonverbal behavior of another.

According to Peker (2010), those who think primarily visually often recall images and visual experiences, those who think primarily auditorily focus on sounds, and those who think primarily kinesthetically focus on feelings. According to Tosey and Mathison (2003), each person's internal use of senses and the sorts of inner representations they form is unique. According to Bandler and Grinder (1975), the individual's narrative style reflects the system used at the time. A person who thinks visually is more likely to predict phrases with visually linked terms, such as: «To me, it seems like... or I see that ...».

Ellerton (2015) defined VAK as a neurolinguistic programming model in terms of representation, processing, information, and storing codes in the individual's mind. The main domain of this model is a sensory representation of experiences in the human mind. Furthermore, a person observes his surroundings through his five senses: auditory, visual, gustatory, kinesthetic, and olfactory. Every person employs all of these senses constantly. However, depending on the situation, he may concentrate on just onone or on some of them. Generally, one sensory representational system is not superior to the other. Nevertheless, depending on the context or task we do, one sensory representational system may be more efficacious than the other.

The visual system contains both outward visuals and inward mental representations that have been learned or generated. The auditory system comprises both remembered and made-up internal sounds and inner speech (i.e., a person who talks to himself internally). The kinesthetic system includes tactile sensations produced by external stresses on the body as well as emotional responses (Sadowski and Stanney, 2002).

Fleming (1995) described sensory modalities in the VAK model in its three main categories:

- visual: transmission of information through the observation of things, including pictures, diagrams, films, demonstrations, displays, leaflets, etc.;
- auditory: transmission of information by listening (spoken word, self, or other sounds);
- kinesthetic: physical experience (touching, feeling, holding, doing, practical experience).

One of the methods in NLP is the recognition of predicates, which are words that correspond to one of the modalities of VAK (Mohl, 1992; Tosey and Mathison, 2010): visual (see, sight, blurred, bright, shine, colored, size, distance, frame, perspective, brighten, visibly, appears, etc.), auditory (listen, speak, listen, shout, sound false, ask questions, understand, inform, tune, tempo, rhythm, intensity, etc.), kinesthetic (feel, heat, pressure, intensity, touch, sensitive, tense, wet, movement, rough, take to heart, feel in bones, feet on the ground, cold, etc.). Language is widely accepted as a primary indicator of sensory dependency. Understanding sensory concepts that are used as predicates in language could reveal the use of a related sensory modality, indicating a preferred system of individual use (Amirhosseini and Kazemian, 2019). It will help to understand what the individual wants to communicate. Every sensory representational system is related to unique traits and inclinations. Visual thinkers typically remember by looking at images and envisioning what the issue appears to be like. Noise doesn't bother them much, and they have trouble remembering extensive oral instructions (McAfee, 2014). Auditory learners acquire and remember information through hearing, and the voice tone might be crucial. They enjoy music and can quickly recall information (Bensted, 2014). People with kinesthetic tendencies recall doing or experiencing something. They are more fascinated by a program that induces them with an inner sensation or a sense that something is correct (McAfee, 2014). They react well to tactile incentives and touch (Bensted, 2014).

In practice, this means that the method of communication could affect the level of understanding and reactivity of the communicators, which could be well used in managerial communication (negotiations, assigning tasks to employees, etc.) as well as in marketing communication (creating advertising campaigns, communicating with the client, etc.). According to Bartkowiak (2012), the human perception of the world differs from that of the respondents who form our target audience. Visual responders would excel at working with visual materials and find delight in collective creativity. Discussions will be enjoyable for auditory responders, and practical tasks will be enjoyable for kinesthetic respondents. According to Nompo et al. (2021), NLP could enhance knowledge, skills, attitudes, communication abilities, self-control, mental health, and managing stress at work. The authors also emphasize the significance of combining verbal conversation with body language since it facilitates two-way communication and helps the communicator comprehend it more quickly. The literature analysis showed several attempts to automate the selection of preferred sensory representational systems (Amirhosseini and Kazemian, 2019). The method involves a questionnaire for self-evaluation, with responses based on people's perceptions and opinions. In the research, the authors focus on verifying the PSSR-VAK methodology to identify preferred sensory representational systems.

Methodology and research methods. By utilizing the original PSSR-VAK method, this research seeks to determine people's preferred representational sensory systems (VAK). The main aim of the research was to develop and verify the original PSSR-VAK methodology, which consists of three factors, each of which explains three questionnaire items. A questionnaire designed and verified by authors focused on the preferred representational sensory system and was inspired by the eponymous theory of preferences of the NLP representation system (Stevenson, 2015). This methodology is based on the meta-model language patterns described by Tosey and Mathison (2010). Through carefully chosen questions that are tailored to each pattern or syntactic structure, the meta-model offers ways to investigate human constructions. The questionnaire contained 9 questions equally divided between the 3 investigated factors (visual, auditory, and kinesthetic). This structure design is based on theory and other research (Nurjanah et al., 2022; Une, 2022; Saputri et al., 2022; Hendel, 2022; Bartkowiak, 2012; Kong, 2012).

Since the EFA requires a different sample than the CFA, two separate samples were used for the analysis. This assumption was also used in other research studies, such as Kyriazos, 2018; Willmer et al., 2019; John et al., 2014; Harrington, 2009. The first research sample included 214 participants (10 (51.40%) women and

104 (48.60%) men). Respondents varied in age from 30 to 50 years (average age of 39.0 years). Data collection was carried out on a sample of respondents from the Slovak Republic from January to March 2022. Quantitative ad-hoc research was conducted via an online panel with controlled access using a special platform with a random selection of respondents and a predetermined age category. The statistics data was processed in IBM SPSS 26 and IBM AMOS 24 in combination with Excel and JAM software. The questionnaire was rated on a scale from 1 – the least describes me to 4 – the most describes me. There were 268 respondents in our second research sample, of whom 150 (55.97%) were women, and 118 (44.03%) were men. The responses ranged in age from 22 to 64. (average age of 34.46 years). Between April and May 2022, information was gathered from a sample of Slovak respondents.

Results. Exploratory Factor Analysis (EFA) with Varimax rotation was used to determine the framework of the PSSR-VAK methodology. The proposed three-factor structure with five components was not confirmed. After adjustments regarding the reliability indicators of Cronbach's Alpha, a structure with three factors was extracted. Each of them was explained by three questionnaire items with sufficient saturation. The Scree Plot also confirms this structure (Figure 1) and Eigenvalues (Table 2), where the first three factors reach a value above 1. The factors were named based on the VAK theory: V (Visual), A (Auditory), and K (Kinesthetic). The suitability of the EFA application was verified by the Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequacy and Bartlett's Test of Sphericity (Table 1).

Table 1. Exploratory Factor Analysis's suitability

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**0,774**
Bartlett's Test of Sphericity	Approx. Chi-Square	562,499
	df	36
	Sig.	0,000

Sources: developed by the authors.

The Kaiser-Meyer-Olkin test is considered to be satisfactory above 0.7, and Bartlett's test is statistically significant, supporting EFA's suitability. Anti-Image Matrices for pairwise correlations were also assessed, where values above 0.6 (recommended at least 0.5) were achieved.

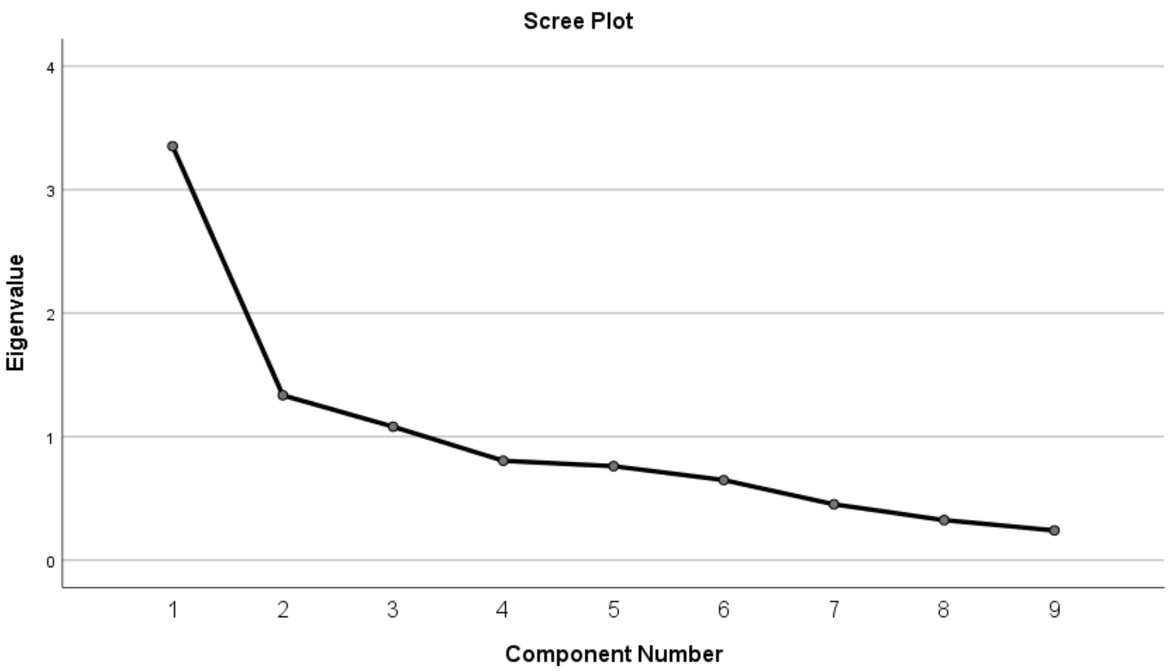

Figure 1. Scree plot of extracted figures

Sources: developed by the authors.

Cattell's Index Chart – Scree Plot confirms three factors with an Eigenvalue above 1. The extracted factors explain 64.08% of the variance.

Table 2. Variance Table

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3,352	37,242	37,242
2	1,335	14,833	52,075
3	1,181	12,012	64,087

Sources: developed by the authors.

Table 2 points to three factors that have an Eigenvalue above 1. In social research, the result of the extracted factors, which explain 64.08% of the variance, is excellent, even though three items per factor is methodologically marginal but sufficient.

Table 3. Extracted structure with Varimax rotation

	V	A	K
V1	**0,651**	0,267	0,089
V2	**0,804**	-0,043	0,086
V3	**0,841**	0,208	0,209
A4	0,033	**0,665**	0,279
A5	0,088	**0,873**	0,047
A6	0,275	**0,712**	0,200
K7	0,048	0,051	**0,804**
K8	0,192	0,236	**0,653**
K9	0,187	0,101	**0,886**

Note: V – visual, A – auditory, K – kinesthetic.

Sources: developed by the authors.

Table 3 presents the extracted factor structure with items above 0.6, which is considered acceptable (required min 0.5). The legend describes the terminology of each item.

Legend of items:

V1: I make crucial decisions established on what I see as best.

V2: What usually affects me during an argument is how I look and what clothes I wear.

V3: I tend to react to the colors and general look of the room.

A4: The most effortless way to communicate what is happening to me is through the terms I choose.

A5: I'm remarkably attuned to the surrounding sounds.

A6: It is truly effortless for me to find the ideal tuning and volume on a stereo system.

K7: I trust my gut when making a crucial conclusion.

K8: It is effortless for me to find the comfiest furniture.

K9: I am acute to how I feel clothes on my body.

Cronbach's Alpha, whose coefficient shows the degree of internal consistency of the items, was used to confirm the instrument's reliability (Table 4).

Table 4. The instrument's reliability

	Cronbach's Alpha
V	0,707
A	0,755
K	0,701

Note: V – visual, A – auditory, K – kinesthetic.

Sources: developed by the authors.

The reliability results of Cronbach's Alpha are satisfactory. All values are above 0.7, which is a positive result. Cronbach's Alpha values are above 0.5, respectively 0.6. The following test examines the null hypothesis that it is impossible to describe the three extracted components using Friedman's Two-Way Analysis of Variance (Table 5).

At a significance level of 0.05, Friedman's test rejects the null hypothesis, thus confirming that three factors of the instrument can be specified individually. Similarly, it is confirmed by the intercorrelations between the individual factors (Table 6).

Table 5. Differences are the assessment of factors

Total N	**214**
Test Statistic	35,291
Degree of Freedom	2
Asymptotic Sig. (2-sided test)	0,000

Sources: developed by the authors.

Table 6. Intercorrelations of the instrument

		V	K
A	Pearson's Correlation	0,377**	0,424**
	Sig. (2-tailed)	0,000	0,000
K	Pearson's Correlation	0,342**	
	Sig. (2-tailed)	0,000	

Note: V – visual, A – auditory, K – kinesthetic.

Sources: developed by the authors.

The results of the intercorrelations of these factors show that the respondent who achieved a higher score in one factor also achieved a higher score in the other two (positive statistically significant correlation at the significance level of 0.05). However, this interpretation is not substantive but indicates that it is not possible to include the individual in one group exactly. With this result, we confirm theories and research that speak of the dominance of one factor of VAK, but to the process enters situational adaptation of the individual by the stimulus. In different situations, an individual can change what is important to him in terms of sight, hearing, and touch. In this context, we can determine interpretations only based on the dominance of one factor. It also confirms the theories of learning styles, where the goal of an effective educational process is to use all aspects that cover the VAK representation system (Aslaksen et al., 2020; Fahim et al., 2021; Koohestani and Baghcheghi, 2020; Leite et al., 2010; Newton, 2015).

Table 7 describes a descriptive analysis of each factor (Mean, Std. Deviation). It also points to the normal distribution of data by assessing the results of Skewness and Kurtosis, which allows additional statistical processes in terms of parametric tests.

Table 7. Descriptive statistics (214 respondents)

	Min	**Max**	**Mean**	**St. Deviation**	**Skewness**	**Kurtosis**
V	1,00	4,00	2,894	0,626	-0,331	0,054
A	1,00	4,00	3,047	0,582	-0,313	0,061
K	1,00	4,00	2,721	0,707	-0,037	-0,022

Note: V – visual, A – auditory, K – kinesthetic.

Sources: developed by the authors.

Given Table 7, we could consider Auditory (Mean 3,047) as a dominant preferred system of sensory representation of a randomly selected research sample. The second is Visual (Mean 2,894), and the third is kinesthetic (Mean 2,721).

Confirmatory Factor Analysis (CFA) was performed on a new sample of respondents to confirm this structure. There were 268 respondents in the second research sample, of whom 150 (55.97%) were women and 118 (44.03%) were men. The respondents' ages ranged from 22 to 64. (average age of 34.46 years). Between April and May 2022, data collecting was performed on a sample of respondents from the Slovak Republic. Three manifested variables explain each latent factor. After examining Modification Indices (M.I.), Mahalanobis Distance, and data match determinants to improve the model indices, 3 residue covariances were added (Table 8).

Table 8. Determinants of data agreement and proposed model

	CMIN/DF	**GFI**	**AGFI**	**CFI**	**RMSEA**	**PCLOSE**
Tested model	1,633	0,967	0,929	0,975	0,045	0,522
Threshold values	<3	≥0,90	≥0,90	≥0,95	≤0,05	≥0,50

Note: CMIN/DF – minimum Discrepancy divided by its degrees of Freedom; GFI/AGFI – the (adjusted) Goodness of Fit; CFI – the Comparative Fit Index; RMSEA – the Root Mean Square Error of Approximation; PCLOSE – close a pipe stream to or from a process.

Sources: developed by the authors.

Table 8 shows a tested model's achieved values and the model suitability's limit values. In each of these cases, the model meets the requirements. More about the concordance indices of the tested model (McNeish and Wolf, 2022; Stone, 2021; Savalei, 2020; Peugh and Feldon, 2020; Shi et al., 2019). Figure 2 displays the factor structure of the CFA.

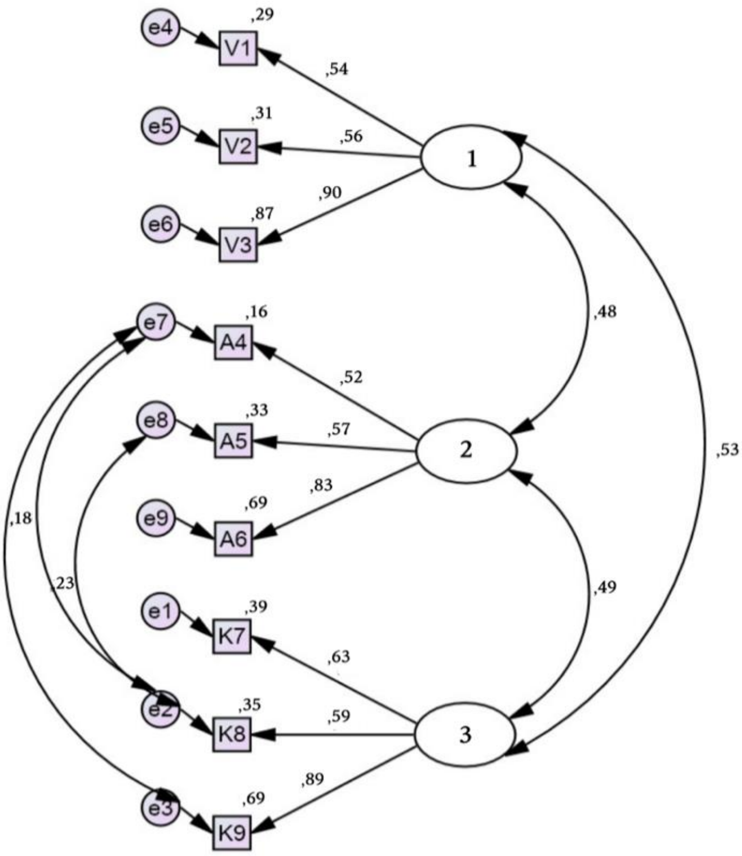

Figure 2. CFA Factor Structure

Sources: developed by the authors.

The above factor structure presents a model with three interrelated factors (Latent Variable), where each factor is explained by three items (Manifest Variable.) The Higher-Order Factor model and various other combinations that did not comply with the Fits of Model were also tested. These results can be considered as a completely verified original PSSR-VAK methodology on a sample of Slovak respondents.

Conclusions. Steinbach (1984) states that neurolinguistic programming is used in various areas of life, such as business, to promote sales, education, law, medicine, psychotherapy, psychology, personal development, and the like. It changes people's responses to stimuli so that they are better at regulating their surroundings and themselves. It is a set of practical methods, various techniques, and communication models, thanks to which the individual will learn to increase his work performance and creative mental potential. For example, it concerns rapport, re-framing, anchoring, physiology, personal history and strategies change, etc. In the article, we concentrated on identifying preferred sensory representational systems from an NLP perspective. The study sought to validate the original PSSR-VAK approach (preferred sensory representational system-VAK), which consists of three components, each of which explains the three questionnaire items. The study proved the applicability of this structure for characterizing three sensory representational systems: visual, auditory, and kinesthetic, using EFA and CFA. Two different samples of Slovak respondents were used for verification. We validated the methodology with EFA and Varimax rotation on a sample of 214 Slovak respondents. To establish this structure, a CFA was performed on a sample of 268 respondents from the Slovak Republic.

Based on the theory and the results, it could be stated that one of the sensory representational systems may be dominant. However, this may change regarding the current situation, respectively stimulus (impulse) (Lajcin et al., 2012). The result indicates that quantitative research does not make it possible to determine to which category (visual, auditory, kinesthetic) the individual belongs.

Using NLP in management practice can assist team members in gaining abilities, information, and self-assurance that enhance both their work and personal lives (Lavan, 2002). Students and trained instructors could use various tools and approaches in both formal and informal learning because it is an area of practice and innovation (Tosey and Mathison, 2008). The following findings are drawn from NLP research conducted in a business context (El-Ashry, 2021): businesses, sales, marketing, team development, and time management all benefit significantly from NLP; NLP facilitates communication in the workplace by identifying preferred VAK systems for communication; businesses that employ NLP in their customer communications experience increased revenues and can deliver better customer service.

Acknowledgement: The obtained results serve as a springboard for further research for the team of authors who work at the Faculty of Management and Business of the University of Presov in Presov. They aspire to evaluate the ability of the original PSSR-VAK methodology (preferred sensory representational system-VAK) according to the theory of neurolinguistic programming (NLP) to predict the evaluation of neuromarketing stimuli. It includes, for example, the evaluation of advertisement texts compiled based on verbal predicates evoking individual sensory representation systems. They reflect on studies by Skinner and Stephens (2003); Mainwaring and Skinner (2009), who found a connection between the preferred representational system and how individuals perceive and evaluate advertising. The issue of planned research through the verified PSSR-VAK methodology is to determine the existence of associations with the personality characteristics of respondents also. The authors aim to enrich knowledge in marketing, communication, coaching, and management from an economic and managerial point of view.

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Ідентифікація сенсорної репрезентативної системи у нейролінгвістичному програмуванні

У статті систематизовано аргументи та контраргументи у рамках наукової дискусії щодо проблеми нейролінгвістичного програмування. Автори зазначили, що нейролінгвістичне програмування це набір підходів та інструментів комунікації, технік і точок зору, які визначають хід думок та методи спілкування за допомогою мови. Нейролінгвістичне програмування використовується для розпізнавання та зміни моделей людської поведінки. Сенсорна репрезентативна система, або метод розпізнавання репрезентативних систем, який складається з п'яти основних органів чуття, впливає на цей процес. Систематизація літературних джерел та підходів до означеного питання вказує на те, що підхід нейролінгвістичного програмування включає три типи сенсорних репрезентативних систем (візуальну, аудіальну та кінестетичну). Наголошено, що домінуючий тип сенсорної репрезентативної системи індивіда може пояснити особливості його поведінки в управлінській та маркетинговій сферах. Головною метою дослідження є визначення бажаного типу сенсорної репрезентативної системи індивіду. Відповідно до мети дослідження авторами застосовано методику PRSS-VAK, яка складається із дев'яти тверджень, що оцінюються за шкалою від 1 (найменш характерно) до 4 (найбільш характерно). Вибір методології PRSS-VAK ґрунтується на можливості зрозуміти моделі поведінки індивіда та пов'язані з ним когнітивні чи емоційні процеси. У ході дослідження застосовано дослідницький факторний аналіз з ротацією Varimax для перевірки основних взаємозв'язків між вимірюваними змінними на вибірці з 214 респондентів зі Словацької Республіки. До того, було проведено підтверджуючий факторний аналіз для валідації відповідності даних гіпотетичній моделі на вибірці з 268 респондентів зі Словацької Республіки. Отримані результати мають практичне та теоретичне значення та можуть бути корисними широкому колу зацікавлених сторін. За результатами дослідження емпірично та теоретично підтверджено, що одна з бажаних сенсорних репрезентативних систем може бути домінантною та змінюватись відповідно до поточних умов (стимул, імпульс). При цьому кількісне дослідження не дозволяє встановити точну приналежність особи до певного типу сенсорної репрезентативної системи (візуальної, аудіальної чи кінестетичної). Результати дослідження дають підстави стверджувати, що ідентифікація бажаної сенсорної репрезентативної системи може покращити управлінські та маркетингові комунікації.

Ключові слова: нейролінгвістичне програмування, органи чуття людини, методологія PRSS-VAK, сенсорні системи.