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Physiological and psychological human peculiarities as inclination indicators of being an insider

The main aim of this work was researching of the basic psychological aspects of social engineering to identify insiders. The article also includes the method of recognizing human emotions by type of speech to check the results of research. Recommendations for selecting workers to work with confidential information are given.

Aspects of social engineering.

Social engineering (SE) is a technological method based on the use of the human factor deficiencies. In the context of security, SE is a criminal data mining.

One of the most important SE aspects is the transactional analysis created by Eric Bern. This theory allows us to define the socio-type of a person. Each person has three Self-states, normal state ratios of which are: Parent (P) – 12,5%, Child (C) – 12,5% and Adult (A) – 75%. Child is our desires and passions; Father is responsible for what we must do; Adult interprets the comprehension and decision-making.

A man with a blocked Adult state is constantly in conflict and often subjected to social hacking (e.g. alcoholics). Finding secret information from such an employee will not be too complicated.

A person who doesn`t have a Father, usually satisfies the desire only of his own Child. People of this type are also quite easily exposed to attacks of social hacking. They can take bribes without complaints of conscience. There are many people in the criminal world, who do not have this Self-state.

People who have been blocked by the Child can`t play, joke, have fun, since they are guided by the parent-controller's instructions. Many people with this type of lock are in the army, among the teachers and some middle managers.

In addition to blocking one of Self-states, people also experience another pathology – exclusivity, which is characterized by a very strong development of only one human personality incarnation. The exclusivity of the Child is obtained by self-taught people, which can be easily influenced by flattery and satisfaction of their desires. Rather depressed people, unable to satisfy the child's desire, obtain the exclusivity of the Father but their severity and determination to themselves and others will not allow the disclosure of secret data. Exclusivity of an Adult isn`t a positive feature for employee with an access to a secret information, because such employees sometimes need to follow strict rules, that this type do not always want to perform.

We can check own person socio-type in a following way: note during a certain chosen period of time, what a person is guided by when he does certain actions: gets up to work, works, rests, playing sports, etc. We need to ask why he does it. The answer "I need it" is the words of an adult, "I must" – the responsible Father, and "I want" – the child.

Socio-type is closely related to the psycho-type of a person, which can be determined by the second important aspect of SE – typical psychology. The psychological type of human rights is influenced by its physiological structure, which William Sheldon associated with temperament types. According to his theory, people are divided by physiological structures into 3 different types: endomorphs, mesomorphs and ectomorphs. **Endomorphs** are the most advanced digestive organs, their physical characteristics are: rounded body shapes; internal organs of large sizes; subcutaneous fat on the abdomen and thighs; soft body; relaxed hands and feet. **Mesomorphs** have developed muscles, bones and cartilage. These are people of athletic type with a large thoracic cell, straight posture, broad shoulders, muscular hands and feet, and low levels of hypodermic fat. **Ectomorphs** are thin, muscles are poorly developed, have long arms and legs; the chest is narrow, and the fatty layer is almost absent. They have a well-developed nervous system.

In pure form, each of these types is not infrequently found, so there is a quantitative scale for each of the three components of an individual, where 1 is an absolute minimum and 7 is an absolute maximum. Such a scale is called the human somatotype (Table 1).

Table 1.

Scale of somatotypes

Type name	Scale-somatotype
Endomorph	7-1-1
Mesomorph	1-7-1
Ectomorph	1-1-7

A similar scale is used to measure human temperament. According to psychological features, there are 3 types: viscerotonia (V), somatotonia (S), cerebrotonia (C) corresponding to the physical types of endomorph, mesomorph and ectomorph with an accuracy of 80% (Tabke 2).

Table 2.

Characteristics of psycho-types

Type	Likes	Doesn`t like	Features	The effect of alcohol
V	Food, comfort, peace, safety, communication.	Loneliness; indifferent to sport.	Calm, sociable, lazyness, self-confidence, slow reaction.	Become very talkative and
S	Different activities, especially in sport.	Competitors; indifferent to comfort.	Their competitive spirit rages; quite aggressive, jealous and impatient.	Become more aggressive.
C	Silence.	Loud companies.	Rapid mental responses, mild fatigability, sensuality to pain.	Persistent to alcohol.

Voice analysis.

In addition to the socio-type and physiological structure, the psychological type of person and his emotional state can be found out through the voice. In each team, in addition to intellectual interaction, there is a communication at the emotional level. Human emotions can be found out through speech: tone, speed of speech and concordance (Table 3).

The most negative indicators for a responsible employee are tension, cheating and excitement, which are characterized by the appearance of speech lacks, the main of which is trembling. To calculate the jitter in a person's voice, we need to use mathematical formulas and laws, which later will be presented in the form of psychological data.

Table 3.

Emotions of people by type of speech

Tone	Speech type	Emotions
Clearly high	Laconic and resolve language	Joy, interest, confidence
High	Intermittent language; appearance pauses in speech; use of words-parasites	Anger, fear, uncertainty
Too high (piercing)	Fast language; trivial sets of words number growth; talk more quickly than usual	Anxiety, a passionate desire to convince or persuade someone
Soft and muted	Slow speech	Sadness, tiredness
Forcing a sound	Stuttering, trembling, the appearance of speech lacks	Tension, cheating or excitement

Jitter affects mathematical variable Jitta, because Jitter (from Eng.) - jitter digital signal data. Using formula (1), the average variation of the wavelength of the main tone is calculated, where $P_0(n)$ is a values sequence of all sound waves duration; n - the number of waves of the main tone in the signal. Formula (2) calculates the percentage of tremors. Measurement is performed on the indicators of trembling common vowels of the Ukrainian language. The results are shown in the table 4.

$$Jitta = \frac{1}{N-1}\sum_{n=1}^{N-1}\left|P_0(n+1) - P_0(n)\right| \qquad (1)$$

$$Jitt = 100\frac{(1/(N-1))\sum_{n=1}^{N-1}\left|P_0(n+1) - P_0(n)\right|}{(1/N)\sum_{n=1}^{N}P_0(n)} \qquad (2)$$

To measure the Jitta variable and to identify the inclination of employees for insider trading, the structure of the system of recognition of the emotional state of the

speaker by voice can be used (Table 4). This should include an oscilloscope and a microphone.

Table 4.

Results of researches

Sound	*Jitta, mks*		*Jitt, %*	
	Without worrying	Worrying	Without worrying	Worrying
/a/	70	88	0,94	1,7
/o/	50,8	112,25	0,78	2,025
/e/	63,8	121	0,94	2,075
/i/	53,6	95	0,8	1,675

Conclusions

As a research result, the following recommendations may be given:

1. In the direction of transactional analysis:

For working with confidential data, one should not involve people with the following socio-types: the Father's blocking, the Child's difference, the blocking of the Adult. For working with classified data suitable types: the normal ratio between the three Self-states, the blocking of the Child, the difference of the Father. It is possible to determine the socio-type of a person by observing his actions and answering questions to these actions, which guide the subjects.

2. In the field of typical psychology:

To work with confidential data, ectomorphs-ceretotonics are best suited. Since they are rarely found in pure form, different variations of the somatotype with the presence of ectomorph in a larger number than endomorph and exomorph will fit.

3. To identify the stress resistance and truthfulness of the information provided by the employee, we must use the microphone, oscilloscope, and the formulas given in the article to identify the level of excitement. In the following papers, other aspects of the SE will be considered, as well as the two-step emotions recognition system by human voice will be detailed and improved.

References

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