The importance of the quality of information and the methods of its distribution in the process of promoting a healthy lifestyle

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Abstract: Each piece of information is distributed in the form of a message. Its character takes various forms, it can be expressed by words or in images. It is the visual form which is the most effective tool of influence. Graphic signs are often used to convey or exchange thoughts. The signs have an informative function but they are also meant to force a specific behavior. Such a change in expectations and beliefs of a specific regulator is called the social impact. The intensity of interpersonal relationships is deliberately stimulated through an appropriate form of communication. The more expressive and emotional is its character, the greater the benefits for the quality of communication in the process of promoting healthy behaviors.

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Verbal communication

According to Noah Webster's dictionary, communication is an ability to transmit or exchange thoughts and opinions through words and signs. It is a broad process and it would be rather inadequate to narrow it down to verbal dimension only. Albert Mehrabian believes that as much as 93% of effective communication is conveyed through body language, and only 7% of intentions are expressed in words [1]. Although words contain the essence of information, the way it is articulated together with accompanying circumstances can often distort true intentions, and thus disrupt the effectiveness of communication. Language is used to externalize a specific concept, often in the form of a message. The exchange of intentions by words requires several processing steps

(e.g. lexical selection, semantic search), each of them may be located in a different area of the brain. Its left hemisphere is responsible for linguistic functions, while the right one supervises visual-spatial predispositions. However, numerous neuroimaging studies have revealed compensatory capacity of the right hemisphere in terms of language when the left hemisphere is impaired as a result of a stroke [2]. The content describing reality is built on the basis of conceptual selection, phonological retrieval and articulation. The ability to select words properly makes the process of communication effective, allows to reach a wider audience with arguments. The capacity to create a language by searching for and correlating adequate words stored in long-term memory resources is an extremely efficient procedure. In the case of healthy adults it allows to create from two to four words per second, selected from among 50,000–100,000 found in the mental lexicon. Words have a large impact on individual cognition, they affect memory and perception of time and space. The activation of specialized areas of the brain responsible for distinguishing categories of semantic meanings is a challenge for describing and understanding the processes accompanying it. For this purpose many studies in the field of neuroscience have sought answers by examining specific neuronal connections. Graves *et al.* studied brain structures in the context of data processing by distinguishing words from linguistic constructs. Scientists concluded that they stimulate the activity of similar areas of the brain but differ in the way they are diagnosed. Only words find their place in imprinted memory traces, while pseudo-words are omitted in this process [3]. Due to activation of an appropriate lexical store and effective selection, only the necessary words are selected which suit the input sensory data best. Lexical activation is believed to be associated with the left temporal regions, while lexical selection is associated with the left, lateral and medial frontal regions. Despite their different locations, they are dependent on one another. Lexical selection is only possible as a result of an earlier activation. Rare words trigger greater and faster reaction of the brain, as opposed to more frequently used ones. More of its areas are stimulated by blunt, emphatic and legible words than abstract ones, which is reflected in everyday practice, e.g. incorporating foreign words in order to increase interest and concentration of the listener. Moreover, the frequency of occurrence translates into modulation of different categories of words on an individual basis. This phenomenon is characteristic of the lexical-semantic processing operation. In a psychological sense, words acquire meaning based on the systems used to interact with the environment. Although each verbal message is expressed with their help, understanding its meaning sometimes goes beyond words.

Functionality of an image in communication process

The models developed so far describing the way information is processed by the brain prove that visual representation is revealed at its initial phase, followed by conceptual and phonological representation. People often recognize a face in the photo, but

they hardly remember the person by his name. Although the image was stored in memory, due to low frequency of repetitions of projections, no information connections were preserved at each of the three coding levels. People have a great ability to store objects in episodic long-term memory, even those seen for the first time. Specific elements of the picture determine how long it will remain in the mind of the observer. These are not only internal but also external factors which play an important role in the process of remembering. Many studies put forward the thesis that regardless of individual predispositions, some visualizations are absorbed more effectively while others rather poorly. Borkin *et al.* linked the quality of remembering with the nature of the message. It is easier to assimilate extraordinary images with many distinguishing elements than common, banal sketches [4]. In the case of facial images, it has been shown that the more unusual the features, the more likely they are to be remembered. Moreover, in this process it is important to maintain a close correlation between the visualization and the concept of the message, which in daily practice is used by advertising agencies preparing campaigns for new products, including centers introducing symbols and warning signs. Nowadays, for better understanding, during the exchange of information, we constantly use graphic signs (emoticons), thanks to which we can better emphasize the emotional state accompanying communication. Positive and negative moods are transferred from one person to another as emotional contagion. In one of the German federal states local authorities, fighting the widespread speeding on the roads, placed emoticons on digital speed readers. A driver driving correctly will see a "smiley face", and if he exceeds the speed, a "sad face" will appear. The simplest signs found in this group reveal basic emotions, e.g. joy - smile ":-)" or sadness ": - (". A study by Van Dam *et al.* confirms the possibility of using emoticons to identify positive and negative feelings among adolescents with mental health problems. The current state is assessed by a patient himself by means of an appropriate emoji (a form of an emoticon) using natural pictograms of faces, objects or symbols [5]. They are also used to control diet and monitor growth, treat autism, dyslexia, and attention deficit hyperactivity disorder in children. In palliative care the signs are used among patients with communication impairment [6]. In hospitals emoticons were used to prevent infection by encouraging good hand hygiene through a feedback system. Electronic monitoring devices recorded each exit and entry into the ward. The fact of using or not using the disinfecting liquid in a dispenser was reflected in the form of an appropriate sign (appropriate facial expression) on the monitor screen. Ajzen's theory of planned behavior was intentionally used, which states that behavior (hand hygiene) is a consequence of the intention to perform this activity. This intention is predicted by three factors:

— attitudes (knowledge and beliefs about hand hygiene and its effects),
— subjectivity of the norm (how others think about hand hygiene),
— perception of behavior control (beliefs about how easy or difficult hand hygiene is) [7].

Positive or negative emoticons were successfully used in case of a change in behavior in the context of wasting food, water or speeding in road traffic. The influence of symbols on adolescent consumers of various food products has been studied many times. The signs have changed, e.g. preferences on purchasing in the case of chocolate milk, in favor of regular non-fat milk [8]. It often becomes that these symbols and signs take the form of an order or prohibition and may also expose the benefits or possible losses resulting from non-compliance. Some of the studies emphasize superiority of an imperative sign over a prohibition sign. This thesis was also confirmed by Updegraffa *et al.* who examined the influence of the form of a sign (order, prohibition) in relation to hand hygiene about what an individual may gain or what loss may he suffer. The ordering message (wash your hands and be healthy) encouraged to wash one's hands in the age of influenza, which was supposed to protect from infection, while the message expressed in the form of a ban (do not wash your hands and get sick) stated that one could have fallen ill by not washing his hands [9]. There is a well-known saying "one picture is worth a thousand words" — the old adage is still gaining momentum in promoting specific content of a message. In the teaching process info-graphics have gained considerable popularity — they present knowledge expressed in words in a simpler, pictorial form. Visualization is applicable not only in educational field but also in areas requiring presentation of various intricate concepts in an accessible and attractive way for the recipient. For example, the insurance company Ergo Hestia regularly uses visuals when publishing its financial statements. It is not without significance that a large part of the human brain is involved in the processing of a visual signal. Each hemisphere has a visual cortex for receiving, segmenting and integrating visual information from the contralateral eye [10]. The process goes on at a great speed. It takes only 100 milliseconds to recognize an object once seen. By their very nature, brain structures are specialized to react more quickly to bright colors. Therefore, they are more often used to create various graphic forms, especially warnings. They have the natural property of attracting attention — an expressive text or background of the visualization automatically arouses greater interest in the message. People exposed to the orange-red color showed an elevated pulse, an increase in blood pressure and rapid breathing. Such changes were not observed in the case of the dark blue color and on the contrary, the nervous system was muted. Everyday life attacks our senses with numerous stimuli — in order to receive them everyone looks for the simplest solutions to assimilate, accept and learn. Reading is a slow and time consuming process. The analysis of the visual message takes much less time than mastering the text being an analogy in the sense of its substantive content, which clearly confirms people's unfamiliarity with long and usually written in small letters warnings and greater attachment to even little-known warning signs. Descriptive information, especially concerning substances posing a threat to life and health, is difficult for an average person to understand.

There is a natural tendency to communicate with pictograms. These characters have a specific meaning and contain a certain amount of useful information. They are eye-catching and act as an optical indication of the procedure. Using them significantly improved understanding of the topic presented on the labels or information leaflets. Each visual message hides a significant amount of detail. Both emotions and motivation influence the way it is perceived so that we can identify more of the relevant content in it. It is precisely these details of individual signs that are of great importance. Perhaps that is why in some studies on the issue of placing a short written text, in addition to the graphic form, was of great value. Not everyone can analyze thoroughly what they see, some prefer to read. Although there are situations when the illustrative-verbal form is more desirable, both due to the possibility of reaching recipients with a low level of understanding of the text, as well as being universal in the global sense — the recipient' native language does not affect the assimilation of the content of the information. To enhance the visual effect and deprive the packaging of its aesthetic value, drastic, unambiguous messages are often used. Their uncompromising attitude and directness is supposed to arouse fear, acting as a "strong blow" [11]. Despite this, similar schemes used over a long period of time lose their power of influence. The recipient gets used to the label and gradually starts to treat it as an unattractive addition to the content. In order to avoid such a situation, it is recommended to change periodically the graphic layout of the posted messages. The main goal of such an action is to create self-reflection in the consumer, the effect of which will be to force a specific behavior. This is carried out based on adequate psychological processes — understanding them may be of great importance. The use of Geller's theory will be extremely helpful in this aspect. It states, inter alia, that the effectiveness of warnings increases with their proximity to the expected place of behavior change. The information should be presented in a simple way that clearly defines the intention and does not raise doubts for the recipient. This solution makes it more acceptable and thus more effective [12]. However, some studies show no cause-and-effect relationship between the knowledge of a sign, clarity of the purpose of its placement and expected effectiveness [13].

Graphic warnings in the process of health promotion

Graphic symbols presenting harmful results of smoking, at its initial stage of implementation, were contested by American courts as controversial, arousing emotions and limiting the rights of an individual by exerting unjustified pressure. However, the so-called playing on emotions often helps to choose the right direction and avoid problems. An affective action allows to better calculate the potential risk and directs in decision-making processes. Peters assigned the functions of a reflector to an affect in a two-step process. Emotional arousal, triggered by a graphic warning, prompts the

potential recipient to take a deeper interest in the topic by calculating the risk. New information obtained in this way, and not the information resulting from the initial feeling, becomes the basis for drawing constructive conclusions and making right decisions [14]. The fact is that such information carries a greater dose of knowledge rather than a short slogan about the harmfulness of a product. An image of advanced oral cancer on a cigarette packet is more eloquent than a short slogan that says "cigarettes cause cancer." This is to trigger self-reflection and harm an addict is doing to his body. In addition, emotional arousal broadens the memory with regard to related topics. When a person notices a warning sign of a specific hazard, he automatically arouses an individual sensitivity to his health. The intention of the message is to influence the environment in such way as to achieve the intended effect. Each medium (image, word, sound) becoming the form of information does not hit the vacuum, some particle will always reach the recipient, causing specific behavior. These behaviors are the respond to the message. The consequence of such an action is either to act in accordance with the intention or to ignore the content of the message. The lack of a positive answer most often occurs in a situation of problems with the correct understanding of the message, failure to notice it, the belief that failure to comply with the sign will bring greater individual benefit or to be in opposition to the content of the sign. Undisputed effectiveness of the impact of graphic warnings was the basis for issuing a recommendation by the WHO (World Health Organization) in 2008 as to the need for their implementation. It is estimated that approximately 50% of the world's population has been encompassed with labels concerning harmful effects of smoking [15]. Health warnings on packaging are among the most direct and important means of communication with smokers. Larger photo formats with an exceptionally expressive message are preferred. In some countries (Australia, UK), labels are designed to highlight the seemingly invisible effects of smoking. Images of distorted lungs, eyes or reproductive organs are placed on them. One of the Australian visualizations shows a human eye in preparation for surgery. This is to make smokers aware of all internal defects in the body that result from nicotine abuse, in this case impending blindness. The Canadian label, in turn, shows the heart of a deceased smoker after an autopsy. Its aim is to show smokers not only the current internal problems of their bodies but also what will happen in the future (disfigurement, premature death). Another visualisation, which concerns the problem of bladder cancer, shows a toilet bowl covered with bloody discharge [16]. Harmful labels are not as widely used on alcohol packaging as they can be found on tobacco products. This form of communication with consumers, considered by many to be a threat to their freedom, causes anger as well as rejection, which can significantly reduce effectiveness of the interaction. An effective way to attract attention to the content is an in-depth analysis of the prospect of achieving the assumed effects. The process of implementing alerts should be preceded by estimating the scale of passive resistance among potential recipients.

Some visual or verbal constructions in specific groups may be perceived extremely unfavorably which will certainly affect their effectiveness. Research has shown that pictorial warnings on cigarette packets result in a higher level of passive resistance than their verbal counterparts. However, for this reason, one should not draw direct conclusions. Numerous analyzes undoubtedly emphasize their superiority in each of the examined aspects. They are more effective both in the case of people declaring their intention to quit smoking [17], attempts to quit smoking [18], knowledge about the risks associated with nicotine and quitting the addiction [19]. In addition, they reduce the amount of cigarettes smoked and contribute to reducing popularity of smoking in some countries, and thus improving well-being of the population and future generations, as new pro-health habits are mostly preserved and passed on by parents to children.

Quality of relationship in the context of achieving a positive educational goal

Various external influences aimed at a change which in line with expectations and beliefs of the environment are called social influences. They can be observed in direct and indirect form. The former, most often, is done with the use of coercion or persuasion. Indirect is more subtle psychological process. Transformation of opinions and behaviors is based on a wide availability of information about the actions of others in a specific situation. Cialdini recognized that effectiveness of social interaction is influenced by several rules:
   — reciprocity
   — commitment and consequence
   — authority — universality (social proof of rightness)
   — liking and fondness
   — unavailability.

For example, the like-and-fondness rule states that people are more susceptible to the influences of those they know and like. According to the rule of inaccessibility, the hard-to-reach options are assigned a greater value [20]. Social influence theories provide clues for predicting, estimating and explaining the essence of a new quality derived from these influences. The theory of the social impact network holds the thesis that the change of a view is the result of opinions presented by everyone with whom an individual is related in a different way. Latane identified three main factors that had a direct impact on behavior in a group:
   — the power of people putting pressure on certain behavior (social status, level of feelings, family bonds, frequent positive interactions)
   — closeness (e.g. physical, psychological)
   — number of people in a group.

The strength of the impact of the above-mentioned factors theoretically interact in such way that their effects are multiplicative, i.e. proportional to the scale of the phenomenon. Therefore, it is possible to transfer the level of discussion on socially important topics to a higher level of interpersonal relations [21]. Intentions, changes in action are built through personal associations, attitudes (persistence to avoid smoking) and expectations towards oneself (abstinence), in relation to one's own autonomy. Gilligan *et al.* demonstrated the existence of different views about alcohol depending on individual cases, however, the intentions of most parents regarding their children were consistent. Despite the fact that they theoretically identify the issue and take appropriate preventive measures, they practically require effective methods of support [22]. The nature of the interactions should be multidirectional. The scope of interpersonal relations at various levels should be intensified in order to form an appropriate structure of norms, behaviors and attitudes. According to Cialdini these norms have been defined as the relation of an individual to what the majority in the group does (descriptive norms) and what it approves or rejects (prescriptive norms) [20]. Interference with social norms was used for the first time to reduce alcohol consumption in the 1980s in American universities, where there was a tendency to relate own consumption to the average for a given place. The action was supposed to correct the inflated statistics. Their influence on many health-related behaviors including alcohol consumption, drug use and cigarette smoking was successfully demonstrated [23]. Several reasons have been identified why individuals accept and want to uphold established social rules of behavior. This is due to willingness to correlate actions towards achieving a certain goal, fear of sanctions (social pressure), signaling membership by accepting the rules. An important element that can be modified is the living environment. Two social variables: social networks and social support are of particular interest when describing environmental relationships. Social networks are nothing but social connections focused on people. Their assessment includes structural aspects of social relations such as: size (number of members), cohesiveness (strength of bonds between individuals), limitation (degree of reliance on group structures, e.g. work, neighborhood) and homogeneity (degree of similarity between individuals) [24]. The relationship between social networks, social support and health is two-dimensional. Firstly, major diseases (depression, HIV, COVID-19) can be a powerful factor of changes in both social variables. Depression usually causes social withdrawal while newly diagnosed HIV patients may experience either avoidance (due to a stigma) or active support. Secondly, both variables can have a positive and negative impact on health outcomes (aggressive partner or parent) at the same time. In most cases, alcohol abuse by a closest friend is a sufficient reason for self-consumption. Interference in the environment involves scrupulous enforcement of all legal restrictions in the context of under-aged. A positive effect of such a concept is a slight decrease in the demand for tobacco products as a consequence of the introduction of

age-related purchasing restrictions [25]. The power of impact is enhanced when many factors are combined and directed towards a clearly defined goal. This is confirmed by the research conducted by Pentz *et al.* in relation to underage consumers of various harmful products. For example, in the group of nicotine supporters there was a significant drop in the percentage of smokers after just 6 months of exposure to a harmonized action of many entities [26]. Interpersonal interactions implemented with the use of the above-mentioned model of social influence are often additionally supported by appropriate form of media communication. It should be noted that Bandura's social learning theory recognizes smoking as a possible consequence of the process of modeling behavior by other people significant in their environment. This concept leads to the thesis that addictions of parents, siblings or the peer group are becoming a serious risk for undecided people [27]. It was proved that children of smoker parents were more tolerant of the addiction than in comparable group of children whose parents restrained from smoking. Maternal smoking has an equal effect on their offspring while a paternal or a male colleague's addiction has a greater effect on boys. Addiction which is based on pattern acquisition is especially typical for communities with a low socio-economic status. According to the theory of social control the tendency to deviate i.e. to act inconsistently with the obligatory behaviors is something natural, but only in a situation of weakened external supervision. According to Durkhiem this happens only in the case of disintegration of social groups which should provide such control to each individual [28]. Many studies reveal an increase in susceptibility among under-aged to all kinds of acts, resulting in threat to their health, along with the scale of their social life intensity [29]. A teenager's brain is extremely flexible. During this period he undergoes the so-called "social reorientation" which makes him submissive to all kinds of influences [30]. Not all the children of smokers will be in favor of smoking in the future, although it depends to a large extent on many circumstances. The most aggravating factor is the degree of parental dependence. In this case personality traits or early education seem to be ineffective. In the socio-ecological model of Bronfenbrenner the degree of action implementation depends on several factors (individual, social, institutional, macroeconomic) which alltogether have an impact on the pace and its course. The model was used to study the scope of health practices and in the process of preparing preventive programs, based on social norms characteristic for a given population [31].

The influence of pictorial warnings on intensity of interpersonal relations

Pictorial warnings concerning harmful effects of cigarette smoking create social response to the addressees themselves and the content that is the essence of the message. Hall *et al.* report state that in two parallel analyzes almost all of the smokers (97%/96%) who had contact with the graphic alert exchanged their opinions about it with others

and these were most often friends (67%/87%) [32]. Other forms of warning messages about the products, the use of which may be associated with a certain risk to health, did not arose so many emotions which transferred into an increase in the level of relations between the examined. Expectations are far-reaching and they do not stop at distributing knowledge through verbal communication. Other ways of interaction (non-verbal, virtual) seem to be no less important. Interpersonal interactions are important in spreading the idea of anti-smoking actions — smoking is a social behavior, strongly related to the influence of peer and cultural groups. However, it should be remembered that in the group of older smokers this relationship is less pronounced. In the analysis conducted by Dunlop *et al.*, it was noted that these people exchanged views on the labeling of tobacco products with much less frequency. Such an attitude may be the result of failures in the fight against addiction at an earlier stage, which discouraged many of them from further activity in this regard [33]. Fighting against an addiction is not easy at all as evidenced by the fact that in the US 55% of smokers in 2015 attempted nicotine withdrawal and only one in ten was successful [34]. Other researchers find a real correlation between the message and the lively post-exposed communication, pointed at the exchange of impressions and observations. Some analyzes of the effectiveness of anti-drug and anti-smoking activities highlight the intensity and strength of the relationship. They arouse much more emotions than the direct impact of the action itself. Each awareness campaign which is aimed at raising in particular the problem of addictions, forces the audience to increase their attention. A good example to illustrate that can be the study carried out in Australia which found clear synergy of image warnings and TV commercials in enhancing the effect of discussion and reflection on health issues [35]. Hall *et al.* showed that messages shown on cigarette packets became the basis for conversations among smokers, not only in the context of information itself, but they also provoked deeper thoughts on smoking health effects and the need to quit the habit [32]. Similarly the observed interactions were found in the groups of nicotine abstainers. In order to make a proof of this is the success of the US Tips from Former Smokers' anti-smoking campaign. It triggered a release of positive energy among non-smokers which translated into their activity in promoting healthy lifestyle without cigarettes [36]. An extremely significant influence on effectiveness of communication is the scope of intensity and variety of the content. Australian studies of children aged 7–12 showed a relationship directly proportional to frequency and richness of messages in relation to the intention of smoking [37]. A similar conclusion was reached by Thrasher *et al.* analyzing smoking populations (1,000 people in each country) in Australia, Canada and Mexico. Each of these countries had previously introduced smoking warnings on packaging at different times: Canada in 2001, Australia in 2006, Mexico in 2010. In the letter country pictorial warnings are characterized by the fastest in the world rate of creating new patterns that change every 6 months. Those comprised graphical impact indications of nicotine harmfulness on society, interpersonal commu-

nication and attempts to quit smoking which were further analyzed. The data was collected every four months (September 2012 — January 2014). The frequency of discussions about the dangers of smoking after the introduction of the new labeling on packaging gradually decreased in Canada (48–36%), in Australia there was an increase in discussions on the subject (30–58%) at the beginning, and then its intensity stabilized at one level, while in Mexico the frequency of exchanges of views remained fairly high, keeping the rank constant. Despite lower frequency of conversations recorded over time, multiple changes to the graphic layout of messages may sustain the exchange of views and discussion. It was found that regardless of political and cultural conditions of a given country, the relationship between the intensity of relations in the scope of general social exchange of views and the scale of reaction to it which were manifested by attempts to quit the addiction is at comparable level [38, 39]. A significant link was found between the presence of children in their adult environment, their level of education, warning graphics and human activity in terms of need to intensify relationships within social networks. Smoking parents, who are concerned about the health of their children, will take all measures to protect their offspring from active and passive exposure to tobacco smoke. In that case, low level of education of caregivers should not be a significant obstacle in reaching their awareness.

Summary

In order to stimulate social interactions, tension is intentionally increased through the appropriate form of communication. Research shows that visualizations with a more provocative, drastic and emotional nature become more effective in maintaining interpersonal communication and supporting health-promoting behaviors. Knowledge in this aspect is the key issue and it can be gained on the basis of thought and opinion exchange. This seems to be particularly important in relation to the young generation, which is still unaware of many health risks stemming from the nature of human weakness.

Conflict of interest

None declared.

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