The impact of mental processes on the physiology and mental state is not a new topic among scientists. Many well-known classic Western psychologists drew inspiration from Eastern philosophy: William James², Carl Gustav Jung³, Abraham Maslow⁴ or Erich Fromm⁵. Nowadays, researchers have empirically demonstrated the impact of concentration techniques on personality, behavior, emotions, motivation, cognition and mental state⁶.

Especially, the process of meditation was deeply explored. So far, a number of studies on the effects of meditation on psychological and physiological processes were conducted. The most important findings show that regular meditation: influences the emotional state, health and stress reduction⁷; helps reduce anxiety

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and depression and contribute to the decline in mortality\(^8\); increases resistance to chronic pain\(^9\); acute pain and migraine headaches\(^{10}\). Some effects of meditation on chronic diseases were also found\(^{11}\) as well as effects in reducing fear, curbing drug abuse, increasing empathy in counselors\(^{12}\), decreasing generalized anxiety\(^{13}\), decreasing test anxiety and reducing blood pressure and hypertension\(^{14}\).

In contrast to the Western psychology, the Eastern philosophy denies the existence of independent personality or ego. According to the psychology of the East there is only the infinite set of processes that arise and pass away, where only the illusion of the existence of personality grows out of mutual movement and pools these impersonal processes. “Human personality is like a river, which retains the shape and apparent permanent identity, although even a single drop is not the same as it was before”\(^{15}\). Therefore, Eastern psychology allows the possibility of mental influence on all types of physiological processes.

The key to understand this mental influence is additional energetic system in human body, described many years ago in Eastern medicine. Some Western scientists from Necker Hospital in Paris proved the existence of energetic system in human body. The authors investigated the pathways of acupuncture meridians in the human body through the injection of radioactive tracers \textit{technetium} (isotopes) at acupuncture points\(^{16}\). Morphological studies found those tracers migrations from acupoints in both 250 healthy and 80 sick patients (but not dead body) followed the same identical pathway with those described as meridians in Asian traditional medicine. The migration speed and patterns of a radioactive tracer along pathways which coincide with the Asian acupuncture meridians show

that these routes are different from vascular and lymphatic pathways described in modern medicine.

Psychology and Zen

The term *zen* comes from the Sanskrit *dhyana* which is translated as meditation. Zen meditation is defined as the practice of mental concentration in which the reasoning process of the intellect is interrupted and consciousness is heightened by the exclusion of extraneous thoughts, except for thoughts that are the subject of meditation. The publication, “Psychology of Zen Sect” by Inoue is probably the first article concerning zen and psychology17. Kuroda was the first who started making experiments for investigating physical reactions, particularly respiratory movement and other body movements, after the administration of some stimuli during zen meditation. Kato18 pointed out five approaches to the study of zen and psychology. The first is the phenomenological approach to the experiences of zen. This approach includes the study of processes for attaining enlightenment, and the study of one’s experiences after realizing the “true self.” The second approach is the study of the behavior and personality of zen masters or martial artists. The third is the general semantics approach, which is the study of zen practice. The fourth is the psycho-physiological approach using EEG, or the concept of autonomic balance. The fifth is the psychotherapeutic approach.

In modern science, the most interesting field for psychologists is psycho-physiological approach. Bagchi and Wenger19 were the first to examine the effect of yoga exercises on the human brain through the use of the physiological equipment that measure brain waves. The most achievements in the study of zen and psychology were accomplished in the 1960s through the use of physiological approaches such as the EEG, electromyography, galvanic skin response, respiration and pulse rate. Hirai found many changes in electroencephalogram (EEG) during zen meditation20. It was found that alpha and theta waves almost always appeared in the electroencephalograms even when the subjects kept their eyes open. Hirai described four stages of zen meditation: appearance of alpha waves at the initial phase of meditation with open eyes; increase in alpha amplitude; decrease in alpha frequency; appearance of rhythmical theta trains in the final stage of meditation. Moreover, no habituation occurs to single or repeated noise stimuli. Each time the

18 Ibidem.
stimulus is given, approximately the same alteration in brain waves occurs. This indicates ability to respond accurately and moderately to stimuli both from within and without. There also has been an attempt to introduce neuroscientific approaches to the study of zen. Arita believed in the hypothesis that the changes in body and mind while practicing zen were explained by the activation of serotonin, a biogenic amino acid, released during breathing while doing zen. Austin, a neuroscientist and zen practitioner, used zen Buddhism as the opening wedge for an extraordinarily wide-ranging exploration of consciousness. Austin tries to establish links between the neurological working of the human brain and meditation, also describes mechanisms by which meditation induces changes in the activity of the brain. He employs the distinction between altered and alternate states of consciousness. Austin’s point is that states other than our ordinary waking one are not altered forms of the latter but alternate networking configurations of the brain. Austin discusses the more usual alternate states as: sleep, dreaming, conditioning, hibernation, changes due to biological clocks, emotions, positive feelings, pain, suffering, and the effects of brain laterality. Focus throughout is on the unstable condition that occurs when the brain changes from any state (ordinary or alternate) to another, in order to find clues to how enlightenment arises. Because Austin presents evidence from EEG scans that deep relaxed breathing reduces brain activity, we also wanted experience such process through zen meditation as a self-regulation technique.

Fromm and Suzuki claims that the aim of psychology and zen is the same: total awareness and self-control: “If we would try to express enlightenment in psychological terms, I would say that it is a state in which the person is completely tuned to the reality outside and inside, a state in which one is fully aware of it and grasps it. One is aware of it – that is, not his/her brain, nor any other part of his/her organism, but he/she, the whole person”.

Self-regulation Processes

Self-regulation (or self-control) is the capacity to override one’s thoughts, emotions, and habitual patterns of behavior. It is the process by which people attempt to constrain unwanted urges in order to gain control of the incipient response. Regulation means change, especially change to bring behavior (or other states) into line with some standard such as an idea or goal. Changing one’s behavior so as to follow rules, match ideals, or pursue goals is thus a (very useful) form of self-regulation.

21 H. Kato, Zen and Psychology…
Self-regulation is one of the most important and beneficial processes in the human psychological functioning.\(^{24}\)

Self-regulation seems to be very important phenomenon because its desirable outcomes as healthier interpersonal relationships, better mental health, more effective coping skills, reduced aggression, less susceptibility to drug and alcohol abuse, criminality and eating disorders.\(^{25}\) Even though self-regulation processes are so important for psychological functioning, people cannot use self-regulation efficiently. Western psychologist claims that self-control seems to rely on a limited energy or strength\(^{26}\) and those regulatory resources are rooted in physical energy stores. Because of limited nature of self-control strength and limited energy system, people try to manage it or conserve self-control strength\(^{27}\). But sometimes such strategies do not work and some self-regulation failure happens\(^{28}\). To find the explanation of self-regulation failures, Baumeister\(^{29}\) claims that self-regulation is a vital function of the agentic self, which relies on glucose as a limited energy source, even the precise nature of the energy source of self-control has remained still unspecified.

So, for nowadays what we know is that self-regulation failure happens, but we still cannot explain the nature of the energy source used in self-control processes. To find some answers, together with students we went to Vietnamese Zen Truc Lam monastery.

### Self-regulation Techniques in Truc Lam Monastery

There are four basic practicing methods to guide practitioners, developed by zen Master Thich Thanh Tu, the rector of Truc Lam monastery.\(^{30}\) The application of

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\(^{30}\) The Vietnamese Zen Truc Lam (bamboo grove) was created by the king Tran Nhan Tong (1258–1308), who was a well-known emperor in Vietnam for his ruling, life, and meditation
this practicing method varies in the level of attainment of practitioners: a) being aware of false thoughts but not following them (because false thoughts are not real); b) dealing with forms with empty mind (because they are false forms, which are comprised by different factors); c) not making any differentiation (because differentiation is unreal); d) always lives with true nature and not follow false phenomenon (because whatever false is impermanent and whatever real is liberation). The main Truc Lam philosophy could be concluded in two sentences: nothing is stable and everything is impermanent. The aim of Vietnamese zen self-regulation technique is to pacify the mind and emotions, through the breath counting and monitoring the thoughts (sitting in lotus position). What is interesting, Akishige and his colleagues compared muscle tensions in the lotus position with other relaxed forms of sitting and found that muscle tensions in the lotus position are lower than in any other posture except that of lying down. In this way, practitioners learn how to tame the mind and the body progressively (and then the mind gradually becomes empty mind).

Truc Lam self-regulation technique can be divided into basic and advanced. The first is the strategy for beginners and is called counting breaths. On this basic level, one should keep position (lotus position is the best one) and count the breath until 10, being aware of inhalation and exhalation. At the end of each exhalation, person increment the count by one. Person reset the counting to one after 10 is reached. At any time one loses track of the sequence, must reset to 1. It is happening because mind is not concentrating on the observation. The mind cannot think of two things at once. If one remembers the counting, he would not be able to remember other things. Therefore, when it happens, practitioner should discipline the mind by recounting and focusing on the breaths. The method of remembering the breaths from each cycle of inhalation and exhalation in conjunction with the counting from 1 to 10 accommodates two tasks: remembering the breaths and the count. When the mind is better controlled, practitioner only remembers the practice. During twenty years of ruling, he had engaged and defeated Mongolian invasions twice in 1285 and 1288. At the age of 41, he passed his throne to his son and became a monastic monk. He went to Yen Tu mountain, where surrounded by bamboo forest, has focused on ascetic virtues. Later he established temples, meditation center and has been teaching other monks and the public. He continued the path that the prince Siddhartha had discovered – both came from the royal families, but had courage to liberate from the luxuries with no regret. After 10 years of meditation on Yen Tu Mountain, King attained enlightenment. In this time, he compiled the principles of all popular branches as Vinitaruci sects, Wu Yen Tong and Thao Duong to establish a new zen branch called Truc Lam Yen Tu. The main zen Truc Lam monastery is located in Da Lat, south of Vietnam where also master Thich Thanh Tu reside. Monastery is divided into two parts: outer part is open for public but the inner part is closed to people from outside. Until nowadays, there are about 20 Truc Lam monasteries built in Vietnam, USA, Canada, Australia and France.

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32 T. Hirai, *Zen meditation…*
counts, not other temporal matters. For 30 minutes of meditation, if the mind is in control and remembers only the count, then the first step of practicing is achieved. The next strategy is following breaths. In this strategy practitioner does not count breaths, only follows them (when you breathe in, you know that you are breathing in; when you breathe out, you know that you are breathing out). If practitioner constantly remembers the breaths in those 30 minutes, he has achieved the third step concentrating the mind. At this point, more experienced practitioner is no longer required to remember the breaths. With each breath, his mind observes the existence of arising thoughts. When thoughts arise, practitioner knows their existence but not follow them. When there are no arising thoughts, one should be aware that there are no arising thoughts.

This Truc Lam self-regulation technique is quite consistent with theoretical model of process of zen meditation (a behavioral analysis) described by Shapiro and Zifferblatt, where person has learned to observe his or her breathing without a reactive effect and without habituation. This meditative process serves the dual function: of desensitizing the individual to the thoughts (i.e. detached observation of thoughts) and eventually removing those thoughts by the continued focus on the competing response of breathing. In this way, the person feels relaxed, calm and with a “mind emptied of internal chatter”.

The practicing is not limited to sitting tie position, but applied in each moment of every life activities: cooking, cleaning, grounding and walking. The instruction is as following: “Be aware and mindful of whatever you do, physically or verbally, during the daily routine of work in your life. Whether you walk, stand, sit, lie down, or sleep, whether you stretch or bend your legs, whether you look around, whether you put your clothes on, whether you talk or keep silent, whether you eat or drink, whether you answer the calls of nature – in these and other activities you should be fully aware and mindful of the act performed at the moment, that is to say, that you should live in the present moment, in the present action. That is the idea of zen: whenever a thought arises, let it go." Such self-regulation process has many psychological and healthy consequences.

Under the Roof of Truc Lam Monastery

Knowledge about how people can use and manage their limited energy sources can be useful and important for understanding self-control and self-regulation processes, especially in Western science. Thereby, we focus on answering some crucial questions: Is it possible for human being to self-regulate his mind and body using

35 Thich Thanh Tu, The carefree leaves…
other source of energy than glucose? If yes, how we can activate a new source of energy and how to change the process of „conserve energy” into „concentrate energy”? In other words: how to make self-regulation more effective without depleting resources?

Some important answers can be found in the Eastern culture, where we can observe quite successful self-regulation techniques, for example meditation technique of the Buddhist monks or martial art fighters. All of them gained excellent effects in self-regulation, and seem working with the same energy. There is only one difference in motivation between that groups: the monk use a spiritual aspect of self-regulation (spiritual aim of self-development) to develop their spiritual power, whereas martial art fighter are more focused on concentration techniques (concentration on vitality power) as more practical aspects of effective functioning. In both cases, such spiritual or vital concentration attitude can generate incredible self-regulation potential driven by higher meta-processes, which cannot be scientifically explained by present Western science.

To find some answers in self-regulation field, we were living and meditating together with Vietnamese monks and nuns. We came to Vietnamese Truc Lam zen monastery together with eleven people, mainly students of psychology from Gdansk University. We stayed three weeks in monastery, and were the first European group, which received the permission from local state administration to stay in closed part of monastery, only used by monks and nuns to practice meditation and living. We got special clothes, special lessons of meditation and the basic outline of the philosophy of science.

Our aim was to experience some concentration techniques (meditation) and to observe how our behavior (all of the participants) will be changed during the meditation. We tried to settle what happens with the psychological processes in our mind and body in case of regular meditation. Together with the nuns and the monks we woke up about 3.30 a.m., meditated three times a day (two hours each time) and consumed two meals a day: breakfast and lunch (light dinner at 17.00 was pudding on request). Every day, at early morning, we walked around monastery’s garden together with zen master Thich Thanh Tu, with whom we had some conversations. Most of us practiced a basic level of meditation.

Every day we followed the processes occurring in our thoughts and emotions, according to cognitive, emotional, social and physiological consequences. Also, we

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36 Patrycja Dominik, Ewa Pawłowska, Michał Piasecki, Małgorzata Chudzik, Arkadiusz Ruchomski, Katarzyna Klonowska and also Alicja Mojko; 2008.

37 The film titled Under the roof of vietnamese zen monks was presented on KOLOSY, XIII Polish Meetings of Travelers, Seamen and Climbers in Gdynia, 2011.

were talking with other monks and nuns about changes under the influence of meditation, during their long stay in the monastery.

During our observations and experiences of psychological changes, we found that something was going on with our metabolism. Everybody was eating only two light vegetarian meals a day (for us it was about 3–4 times less than usually) and nobody felt hungry. Some monks do not eat many days or eat only one small bowl of rice per day. Also, our sleeping time was reduced, we slept only five hours a day. Everybody from our group declared more energy in body, better immunity and no disease. All members from our group declared many psychological changes as: a) better concentration and memory, b) emotional stability and empathy (also with flowers and animals); c) crossing the false convictions and mental limitations, d) bright thinking while making decision, e) creativity, f) being here and now in reality (not somewhere in the mind), g) feeling calm and peace, h) better relationship between people.

Most of our experiences, are similar with findings of other researchers. Sugi and Akutsu found that the frequency of respiration rapidly decreased during zen meditation. The amount of ventilation and the consumption of oxygen also decreased. These results suggest that zen meditation makes practitioners relax and feel fresh in any surroundings through avoiding habituation and can explain metabolism reduction. Galin argued that zen meditation may primarily involve the right side of the brain (i.e., nonrational, nonanalytic, simultaneous integration of material), while behavioral self-control strategies may primarily involve the left side of the brain (i.e., analytical, rational, sequential processing of information). Also Hirai found that alpha waves during the zen meditation appear in the frontal lobe, which is responsible for creative thought, memory, and intellectual operations, and the parietal area, which governs emotions, and gradually extends over the entire brain, what could explain our findings described in items a) – e). Kanfer and Karoly pointed out, that self-observation appears to be intimately linked with self-evaluation and self-reinforcement, what could explain our positive well-being, self-confident and findings in f) – h).

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41 T. Hirai, *Zen meditation…*
43 T. Hirai, *Zen meditation…*
Our observations are similar also with another data gathered in Thien Mon Dao Martial Arts School, collected one year later. We decided to get some data from Thien Mon Dao because we wanted to get the data from different (not monks) group, to find out if secular people can also use self-regulation techniques efficiently. We noticed, that almost every person from Thien Mon Dao group could have performed difficult kung-fu exercises as: breaking a block weighing 80 kilos on a bending human body; resisting and bending an iron rod at such key nerve-points as the navel and the pharynx and smashing a pile of bricks placed on one hand with the other hand; strike nails into muscles without bleeding and pulled a 2.5-tone van by a rope tied to the nail. During every exercise, pupils were focusing their vital inner force on mustering strength. Practicing exactly the same exercises and in due course, they attained the standard of performance with similar capabilities. Self-training and self-drilling in this school is the main thing, to the extent that the disciple’s physical condition can re-adjust and adapt itself to the impacts of the objective circumstances, popularly known as tu khi (concentration of vitality) during the meditation, when some of muscles are supposed to be awake for activity, while the others are temporarily dormant. In order to study influence of mental processes on self-regulation, we conducted some practical research on adepts of Thien Mon Dao group. We used automatic blood pressure monitors to measure the pulse and heart rate, before and after short 10 seconds breath technique. After 5 seconds of concentration, almost everybody from the group stopped their heart beating or could increase and decrease heart rate efficiently.

We can conclude, that self-regulation can be very efficient through concentration and breath techniques in two dimension: psychological (as: stress reduction, creative thinking, better memory and intellectual operations, more positive self-evaluation and self-reinforcement) and physiological (as: treating illness, more power in muscles, decreased consumption of oxygen and metabolism, possibility of heart beating and pulse regulation). These processes can happen both in the body and mind of spiritual oriented people the same as in secular ones.

If we can learn more about what self-regulation really is, and understand how to use the mental energy and also some concentration techniques, perhaps we can help people endure stress better. We might even help to save the human lives by making

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45 Thien Mon Dao is traditional Vietnamese Martial Arts School, directed by Nguyen Khac Phan, descendant belonging to the 5th generation of the Nguyen Khac family that had founded the Thien Mon Dao in the 18th century. Nowadays, Thien Mon Dao has more than 2,000 regular disciples. Although the group exercises 2–3 times a week mainly in Hanoi, the homeland of this school is in Hoa Nam Village, Ung Hoa District, Ha Tay Province.


people more aware of their own psychological and physiological well-being. In our head are still some questions: How can we use our mental processes to influence our physiology in case to treat our body? What are exactly the processes underlying these techniques? What kind of illness can be treated by such techniques?

Nowadays, psychology conceptualizes the healthy person as an individual who can lead his or her own existential fate in the here-and-now environment, and who can have self-regulatory control over his or her own body. Together with this new paradigm is an attempt to develop and improve techniques by which people can self-observe their behavior, change it (if desired), and then continually modify and monitor it according to their real needs.

Described findings suggest that Eastern self-regulation techniques can help in effective self-directed attempts to control one’s everyday life, thoughts, and feelings. What’s more, we noticed in our investigations that self-regulation techniques can be used efficiently not only by monks but also by secular people. But we still need more research to fully answer our questions.

STRESZCZENIE

TECHNIKI SAMOREGULACJI
W WIEJTAMSKIM KLASZTORZE ZEN TRUC LAM

Artykuł jest relacją z pobytu w wietnamskim klasztorze zen Truc Lam w miejscowości Da Lat, gdzie razem ze studentami Uniwersytetu Gdańskiego mieszkaliśmy prawie miesiąc. Interesował nas wpływ technik oddechowych i koncentracyjnych, stosowanych regularnie w klasztorze, na procesy samoregulacyjne. Mimo wieloletnich badań na gruncie psychologii zachodniej natura i mechanizmy leżące u podstaw procesów samoregulacyjnych wciąż nie są dokładnie poznane. Podczas pobytu w klasztorze zaobserwowaliśmy i doświadczaliśmy wielu zmian psychologicznych pod wpływem regularnej medytacji. Nasze obserwacje i doświadczenia wskazują na istotną rolę technik oddechowych i koncentracji mentalnej w efektywnych procesach samoregulacji.