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**REGON: 364954217**

**e-mail: [fundacja@promovendi.pl](mailto:fundacja@promovendi.pl)**

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## THE INFLUENCE OF PHYSICAL ACTIVITY ON SELF-EMPLOYMENT AND SELF-ASSESSMENT OF STUDENTS AND LICEALISTS FROM RZESZÓW AND KOLBUSZOWA

Katarzyna Dudzińska \*, Diana Mazek, Karolina Łoś, Marcin Franczyk

Studenckie Koło Naukowe Podróżników, Wydział Wychowania Fizycznego,

Uniwersytet Rzeszowski, Rzeszów

\* corresponding author: kasia0911@onet.pl

### Abstract

Physical activity (movement) accompanies man from the youngest years of his life and it is then that he is most shaped. It is an indispensable factor affecting the physical and psychological well-being of a human being. The main purpose of the work was to determine how physical activity affects the well-being and self-esteem of students and high school students from Rzeszów and Kolbuszowa. The method of diagnostic survey was used in the work. The tool used was a questionnaire independently prepared by the authors of this work. The research technique used in the work was a questionnaire. The role of physical activity is quite high in the respondent's opinion. Self-assessment for 68% of respondents is on the average level. In turn, obstacles that most restrict the group of respondents in undertaking physical activity are lack of time, laziness and learning. The main motives for undertaking physical activity of the subjects are mainly better well-being and maintaining better condition.

### Key words:

*physical activity, well-being, self-esteem, Rzeszów, Kolbuszowa*

### Introduction

Physical activity (movement) accompanies man from the youngest years of his life and it is then that he is most shaped. It is an indispensable factor affecting the physical and psychological well-being of a human being. It occurs in various forms. From everyday household duties such as cleaning, mowing the lawn or raking leaves to physical exercise classes, gym exercises, competition and sporting competitions, and many more.

Aerobics, running, gymnastics, various types of physical exercises and sports are associated most people with hours of tiring physical effort to improve their appearance. There is a grain of truth in this, although it does not have to be that way. Physical activity is primarily a stepping stone from everyday life. Forgets about the worries and problems of the world around us.

This can be expressed in such a way that the person then "turns off", and despite the fact that he performs physical effort, however, rests, because he focuses on the activities performed without thinking about what is bothering him. Movement not only affects our health and fitness, but also for a better mood and well-being. Endorphins, which are secreted during activity, make a person feel

happy, full of energy and wants more. Despite the fatigue, bliss and self-satisfaction are felt. People who undertake different exercises do it in most cases to improve their appearance, the desire to lose extra kilos. However, with time it becomes a routine, because seeing the effects you want more and more. When we hear from someone that our appearance has improved automatically, our self-esteem climbs up, which also affects well-being and greater self-confidence.

## **Physical activity**

Human life is full of various forms of physical activity. So let's think about what physical activity is and explain the basic concepts associated with it, because they play a very important role in our lives. It is physical fitness, physical culture, physical activity and physical (physical) recreation.

Physical activity is a concept that is used interchangeably with physical activity. J. Drabik [1] writes that "physical activity is more than physical activity" because "physical activity is a planned and repeated work of muscles characterized by a purposefully directed to the body's health needs over rest energy expenditure or expenditure resulting in fatigue". Such understanding of physical activity includes, for example, walking, running, playing football, clearing snow or chopping wood. It can therefore be concluded that physical activity has a specific purpose. It requires commitment, awareness and is related to health or sports achievement. However, physical activity - not necessarily, because they can be involuntary, thoughtless motor activities.

I. Kielbasiewicz - Drozdowska [2] believes that "physical activity is indispensable for a man at every stage of his life and in every age group. The importance of movement changes and evolves with the age of man, but it always remains one of the main factors conditioning the health field "[...]" Human health is shaped in all phases and stages of its life ".

## **Motives for undertaking physical activity**

Human temperament is important for choosing the form of physical activity. This is influenced by: interests, personality, skills and needs, not just physiological features. The basic element deciding on the final selection of forms of physical activity are emotions and motivations.

Z. Czajkowski [3] believes that motivation is "a set of motives, or those various factors that stimulate and direct our aspirations and stimulate specific activities. This activity is aimed at satisfying our often different and sometimes unrealized needs. These needs may be innate or acquired, and may have a physiological and socio-psychological basis. "

Another, also very important, motives are the improvement of the appearance, the possibility of success, interesting spending of free time, interpersonal contacts and the joy that flows from the exercises [4].

We can distinguish internal motivation in which the motif lies in ourselves. The activities we do give us satisfaction and pleasure. A person who chooses a form of physical activity should pay attention to enriching his internal motivation because it results in many benefits, such as the pleasure of doing something and happiness, and the motivation is made in the man himself.

External motivation, however, is when we act to win the prize. The motivation process is complex, because activities that are easy to boredom and reduce the level of motivation are often difficult, and too difficult tasks demobilize, because they require high skills that exceed the

predispositions of players, and this in turn has a negative impact, in particular on participants who they are ambitious.

## **The role of physical activity in human life**

As everyone knows, physical activity plays a very important role in human life. It has a positive effect on the whole body, the body, prevents many diseases of civilization, shapes personality, character and contributes to the improvement of self-esteem and well-being.

Active recreation and physical activity in free time is becoming more and more popular not only among young people but also older people. Very often you can meet people who are not afraid to take this kind of rest. It is a better alternative to the management of free time than passive sitting in front of the screen of a computer or TV.

Popular forms of physical activity are: Nordic Walking, fitness, swimming, yoga, cycling, jogging, roller skating, team games (volleyball, basketball, football, handball), tennis, and in winter, ice skating, skiing snowboarding. The benefits of taking physical activity

When we undertake physical activity, we do not even realize how beneficial it affects our body and health. What is health really like? It's worth considering it. According to the World Health Organization (WHO), health is not only a lack of disability or illness, but also a state of full, physical, mental and social well-being (well-being) [5].

For the body to function properly it is necessary to practice physical activity. Through physical effort the muscles get stronger, stronger, which allows them to work long-term and without fatigue. The correct state of muscle tension translates into a firm and resilient figure. The movement delays the aging process of the skin and gives it a younger appearance through better blood circulation. Being physically active, a person has a higher oxygen demand, which contributes to a better use of lung capacity, strengthening of respiratory muscles and improving bronchial purification. Movement activity undoubtedly also plays a very important role in controlling body weight. The important thing is that exercise and diet support weight loss better than the diet itself. Losing unnecessary kilograms by an obese person is very important for the body, especially for the circulatory system. Physical effort also has a positive effect on our bones and metabolism as a result of which the level of body fat decreases. Systematic physical activity gives the opportunity to improve physical fitness and fitness.

## **The impact of physical activity on improving self-esteem and well-being**

Well-being is undoubtedly related to physical activity. During the movement and actively spent time, our body secretes endorphins, the so-called happiness hormones that make us have more enthusiasm and willingness to act, we perceive ourselves in a better light, and thus we are simply happy and optimistic about life. Satisfaction with yourself, your appearance and your own health is directly related to creating an image of yourself. People with a more attractive appearance, greater physical fitness are better assessed and treated, from less attractive people [6].

It is worth noting that various types of physical activity, from games and movement games to physical exercises and other forms of activity, allow children and adolescents to survive, to discharge excess energy or bad emotions. All movement develops imagination, affects the psyche,



shapes character and develops other features that are useful at every stage of human life. Self-esteem and its types

Practicing physical activity involves improving self-esteem. Self-esteem is a statement about one's own person (interchangeably described as "self-esteem"), which is descriptive and evaluative. We can distinguish two self-assessments: general and detailed.

The first - it is a permanent assessment of yourself as a human being, while the second refers to functioning in everyday life, assessment of your social and intellectual abilities or physical fitness. Between the general and specific self-assessment there appear dependencies that take place in both directions [7].

According to L. Niebrzydowski [8], "individuals with unstable self-esteem are under a strong influence of the situation. If the situation is beneficial for them, their self-esteem takes on an excessive form, and when the situation takes on a disadvantageous form, self-esteem is subject to rapid under-reporting. "

## **The purpose of the research**

The main goal that the authors wanted to focus on was how physical activity affects the well-being and self-esteem of students and high school students around Rzeszów and Kolbuszowa. The detailed objectives of the study are:

- 1) determining the frequency of undertaking physical activity,
- 2) definition of the most frequently chosen forms of physical activity,
- 3) determining the level of current activity,
- 4) determining with whom the tested persons most often play sports,
- 5) specification of favorite exercise places,
- 6) determining the motives of physical activity,
- 7) determination of the situation that affected physical activity,
- 8) determine the reasons why students and high school students are not active.

On the basis of the above-mentioned goals, a research hypothesis has been formulated, which reads as follows: physical activity has a high impact on the well-being and self-esteem of students and high school students from Rzeszów and Kolbuszowa. The method of diagnostic survey was used in the work. The tool used was a questionnaire independently prepared by the authors of this work. The survey technique used in the work was a questionnaire. The questionnaire contained 17 single-choice or multiple-choice questions, including three open-ended questions, completely anonymous. 300 respondents took part in the survey. The results and analysis of the conducted tests were presented using diagrams and descriptions.

## **Findings**

One of the detailed objectives of the study was to determine the frequency of physical activity among respondents. More than half of the respondents - 60% are active three to five times a week. 20% practice sports 1-2 times a week, up to 13% are people who exercise more than 5 times a week, only 7% of respondents use less than once a week. The results are shown in Fig. 1.



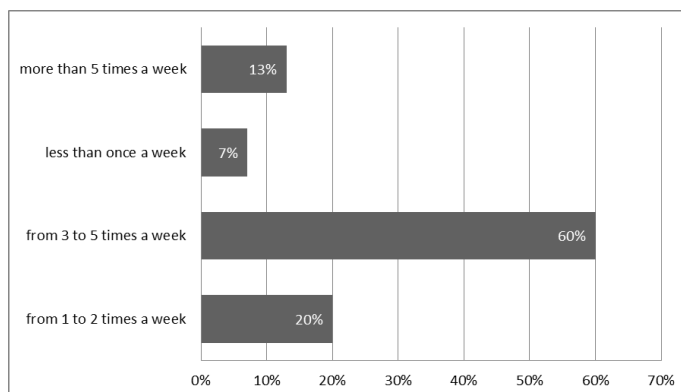


Fig. 1. Frequency of practicing physical activity by the respondents  
Source: Based on own research

Physical activity among students and students lasts in 49% of cases 60-90 min. 41% of the respondents answered that they are practicing from 30 to 40 minutes, while 10% of the respondents practice 2 hours. The results are illustrated in Fig. 2.

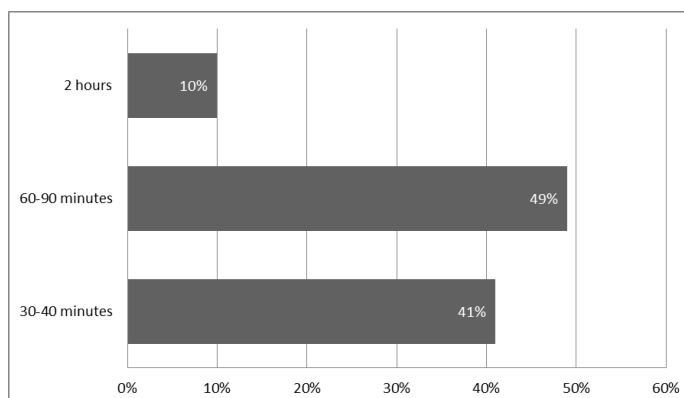


Fig. 2. Duration of physical activity of respondents  
Source: Based on own research

In Fig. 3. you can see that slightly less than half of the respondents, because 44% think that they are practicing enough. 27% think that their activity is high, and 29% said they are not physically active.

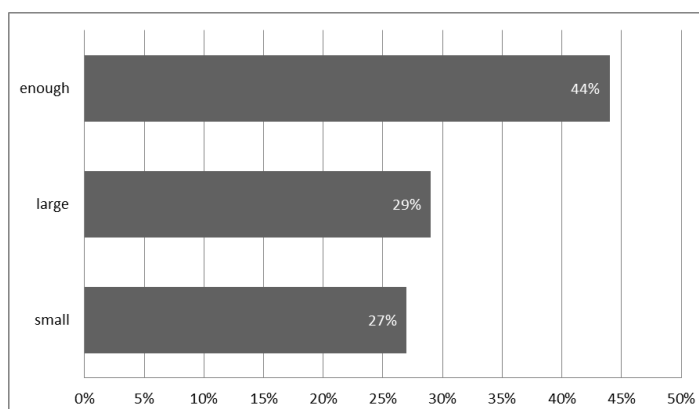


Fig. 3. Level of physical activity of the respondents  
Source: Based on own research

Another specific objective was to determine with whom the most-often respondents engage in physical activity. It was a multiple-choice question, where each of the respondents could select a maximum of two responses. Most people are active alone, 106 people also train in the company of friends, 74 votes fell on the organized group, 56 interviewed in the exercises are accompanied by husband / wife / boy / girl, and 31 people chose the family. The results are presented in Fig. 4.

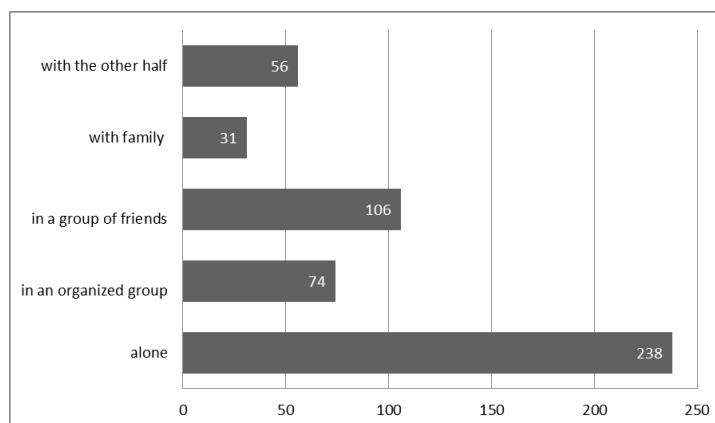


Fig. 4. Society for practicing physical activity  
Source: Based on own research

The next detailed goal, which the authors wanted to know was the determination of the most frequently chosen forms of physical activity among the group of subjects. In this question, it was possible to choose up to 5 answers, depending on which form of the movement the respondent chose the most. The most popular among respondents was the answer: running (168 votes) and exercises at home from materials that can be found on the Internet (159 votes). This could be due to the fact that there is no need for a cash contribution to these forms of physical activity, such as gym or swimming. Everyone who wants to run and do exercises at home can do it. The results of the remaining answers are presented in Fig. 5.

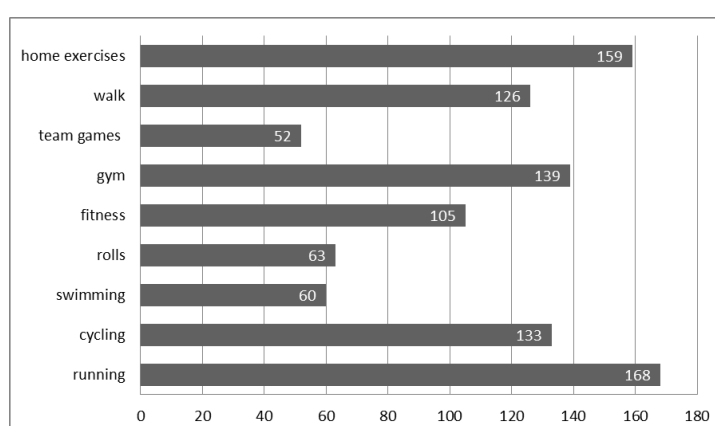


Fig. 5. Popular forms of physical activity among respondents  
Source: Based on own research

Three open questions that were included in the questionnaire concerned whether the respondents noticed positive effects of practicing physical activity, whether their well-being and self-esteem improved, and if so how. Only 15 people said that physical activity did not affect their

mood at all, while other responses, which were 23, and which were the most common: better mood, more energy, willingness to live, better sleep, less susceptibility to all kinds of diseases, improvement of condition and better organization, in other words, only pros.

When asked about improving self-esteem, only 29 subjects did not notice improvement, while the other 210 answers that appeared most often were: I feel more attractive / y, I feel better in my body, I am more confident myself, I like myself.

Another of the specific objectives of the work was to determine the motives of physical activity among students and high school students from Rzeszów and Kolbuszowa (Fig. 6). The respondents had a choice of 6 answers, from which they could choose a maximum of 4. Most respondents (233 people) engage in physical activity for a better mood and that is what motivates them most. Also a big one - 227 votes received the answer: maintaining good condition, in the next place, motivating the examined people is the loss of unnecessary kilograms and improvement of self-esteem. 87 people for physical activity motivate to achieve sports goals, and for 33 people the motivation is to meet new people.

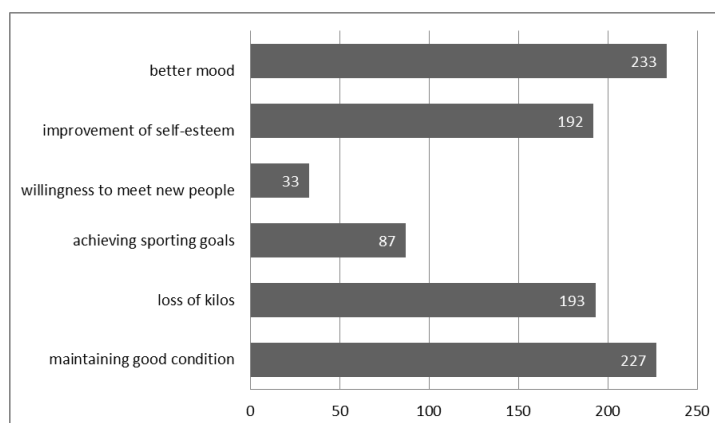


Fig. 6. Motives for physical activity in the subjects  
Source: Based on own research

The next goal the author wanted to focus on was to identify the obstacles that most restrict the group of respondents in undertaking physical activity. In this question, the respondents were able to select a maximum of 4 responses out of the 6 options. The results are as follows: Most people give up because of lack of time, laziness and learning. The state of health does not allow 61 respondents to be active, while as many as 41 people are afraid of ridiculing themselves from other people encountered while practicing physical activity. Answers are illustrated in Fig. 7.

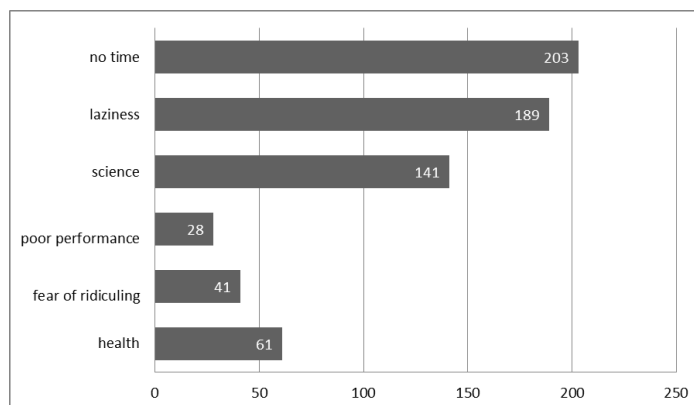


Fig. 7. Obstacles limiting respondents to undertake physical activity  
Source: Based on own research

One of the main goals was to determine the self-esteem of the survey participants (chart 10). The results are as follows: the average level of self-esteem is 68% of respondents, 17% of respondents are characterized by high self-esteem, while 15% are low.

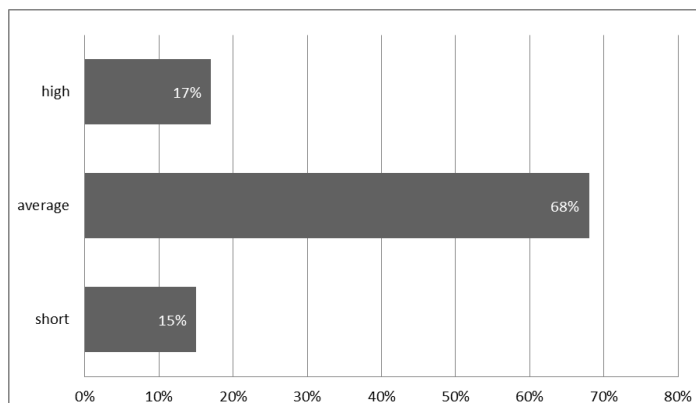


Fig. 8. Self-assessment level of respondents  
Source: Based on own research

In 52% of cases, physical activity plays a big role in their lives, 38% of respondents answered that they were average, 8% - small, and for 2% of the subjects they play no role. The results are presented in Fig. 9.

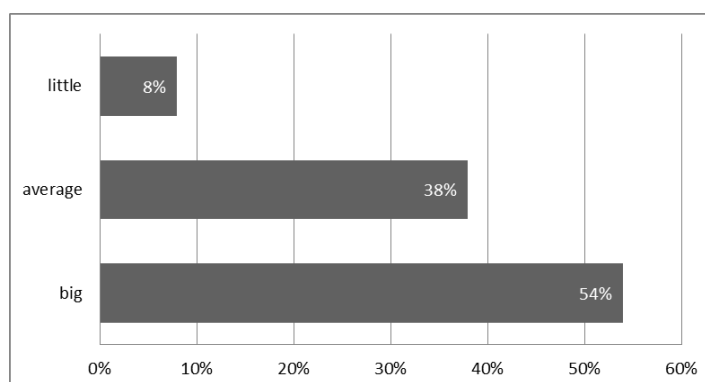


Fig. 9. The role of physical activity in the life of the subjects  
Source: Based on own research

The largest number of respondents, as many as 38% were aged 20-22, another, but slightly less numerous, group that participated in the study were people aged 18-19

- their percentage was 31. The next place was a group aged 23-25, 16%, while the last was the youngest participants in the survey, who made up 15%. In summary, and taking into account students and students, the group of students was 46% and the students 54%, so their number was slightly different. The percentage share of five age groups is presented in Fig. 10.

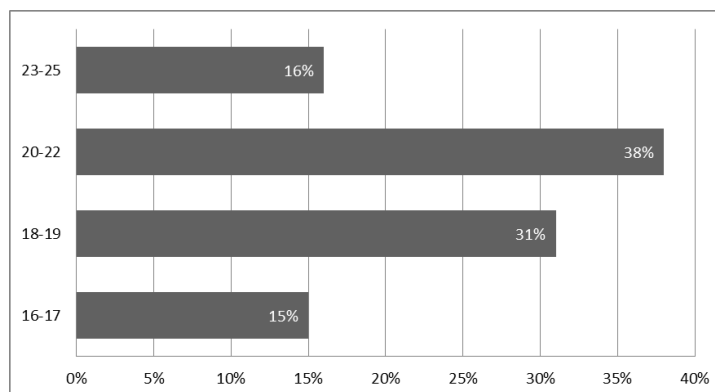


Fig. 10. Age of respondents  
Source: Based on own research

## Summary

In recent years, a very large increase in the number of people interested in various physical activities can be noticed. Undoubtedly, they are affected by their own interests, but also by the media, in which there are more and more people promoting an active and healthy lifestyle, among others people like Ewa Chodakowska and Anna Lewandowska who infected thousands of Poles with their approach to traffic and people. Surrounding the circle of friends who do not avoid an active lifestyle, on the contrary, seeing the effects of their actions, this makes and encourages the decision to undertake physical activity. Fitness clubs, gyms and other sports facilities are created, which encourage young people and their activities not only to exercise.

In sports stores, as well as in various chains, you can find the equipment needed for training for more and more learning prices. The motive is usually the improvement of well-being and self-esteem and the desire to lose unnecessary kilograms. Nice, slim and muscular body nowadays plays an increasingly important role. Young people set a goal, which is to have a figure such as the common known canons from the world of sport, etc. and strive to meet it. On the shelves of the bookstore, you can find a lot of books and articles that provide information on exercise, nutrition, and everything to provide people with the information they need and encourage more readers.

Summing up the physical activity manifested by running, exercises, gymnastics and more, from year to year is getting bigger. The implementation of various sporting events, marathons, open trainings, and those for which you can sign up, with known people and not only (including also racing and charity events), brings together an increasing number of interested people. The author of the work focused mainly on the impact of physical activity on the well-being and self-esteem of high school students and students from Rzeszów and Kolbuszowa. The hypothesis presented in the second chapter about the significant impact of the movement on people has been confirmed to

a very large extent. Better mood, which manifests itself in a good mood, the will to live, better condition, greater immunity and higher self-esteem and better self-perception - these are the very positive effects of an active lifestyle.

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## **AYAHUASCA TOURISM IN THE AMAZON REGION**

**Marcin Franczyk\*, Diana Mazek, Dominik Łoboda, Magdalena Wróbel**

Studenckie Koło Naukowe Podróżników, Wydział Wychowania Fizycznego, Uniwersytet Rzeszowski, Rzeszów

\* corresponding author: mmarcin9808@gmail.com

### **Abstract:**

Availability in communication helps people discover the world. An example of such a place is Amazon and new kind of tourism – ayahuasca tourism, because many people who choose Amazon as the destination of the expedition connect this with recognize interesting plant decoction ayahuasca.

The main purpose of the work is to check why people decides to know the secret of ayahuasca and in connection with this fly to the other end of the globe. To get this information we created an electronic questionnaire consisting of 9 questions. Respondents were found on Facebook and internet forums. The questionnaire was completed by 108 people of different sex, age and education. For some answers, results were surprising. For example, in question about the consumption of Ayahuasca as the main motive of the trip to Amazon almost half of the respondents answered affirmative.

Ayahuasca tourism, even though it is more and more disseminated, it is still not very popular. It is hard to say whether it carries more positive or negative aspects, but sure is that we should remember about respect to ceremony of eating ayahuasca. The problem can be in the future also with too big environment degradation in order to obtain necessary ingredients.

### **Keywords:**

*tourism, ayahuasca, Amazon, travels, ceremony*

### **Introduction**

In the era of socio-economic progress and the increase in the average wealth of middle and high developed countries, we can observe an increase in the development of various areas of tourism and related forms of spending free time. Easier access, but mainly cheaper air transport and interesting offers of travel agencies that meet expectations and do all the formalities cause that people are more likely to travel to far-flung corners of the world in search of impressions, contact with new culture, food, nature and often in typical entertainment purposes.

According to the definition formulated by the World Tourism Organization (UNWTO) "tourist" is defined as a person who, in the country of temporary stay, spent at least one night in hotel accommodation for purposes of leisure, curative, sightseeing, sports, religious, social, business, family, political, etc. [1].

Selected types of tourism according to W. Gaworecki [2]: sightseeing tourism, qualified tourism, health tourism, incentive tourism, business tourism, cultural tourism, local tourism, rural tourism, weekend tourism. It is impossible to assign ayahuasca tourism to any of the above options,



however, it is possible to partially link it thanks some common features with three options: health tourism, alternative tourism and cultural tourism.

### **What is ayahuasca?**

Ayahuasca is a plant decoction, sanctified and used by indigenous inhabitants of the Amazon. L. E. Luna [3] identified 42 names of the same drink e.g.: caapi, huasca, yagé, natema. The most popular name is ayahuasca and comes from the Quechua language used today by Indians in the western Amazon and the Andes. We can translate this term into Polish as "creeper of the soul" or "creeper of ghosts" [4].

Ayahuasca tea is a bitter decoction prepared by cooking ingredients for several hours. The most popular composition is a combination of the *Banisteriopsis Caapi* climbers and the leaves of the *Psychotria Viridis* shrub that contain DMT (Dimethyltryptamine), a substance naturally occurring in the organism that is responsible for visual impressions, perceptual changes and having a huge impact on human consciousness. The second component is the MAO inhibitor contained in the *Banisteriopsis Caapi* climber, which prevents too dynamic degradation of DMT and allows the conscious action to change. The MAO inhibitor is also known for its serotonin-increasing properties, which means that people drinking tea are usually less susceptible to anxiety caused by frightening visions [5].

„The divine decoction” has a predisposition to hyperactivation of the brain throughout its entire area, which stores and modifies emotional memory, sometimes leading to the reproduction of distant or forgotten memories. This hyperactivity allows you to look again from a completely new perspective on issues that have already been assessed. The reason for this is the effect on the amygdala of the brain, which is the storehouse of emotional memories, especially those traumatic and significant for our life. Ayahuasca also has a large impact on the insular lobe, which combines our emotionality with the ability to make decisions. It makes us look again at the situation and analyze it again. For example, if someone in the past took part in a tragic car accident, and consequently suffered a mental injury manifested by the fear of traveling by car, he has a chance to control of his trauma [5].



Fig. 1. Leaves of the *Psychotria viridis* shrub used to prepare decoction

Source: [6]



Fig. 2. Banisteriopsis caapi climber used to prepare decoction

Source: [7]

## History of ayahuasca

It is difficult to say when it started to use ayahuasca. Archaeological evidence in the form of vessels and drawings, found in the city of Valdivia in Ecuador, says that the use of psychoactive plants took place probably more than 2,000 years BC. Oral messages from indigenous people suggest an even earlier tradition of applying this practice [8].

When the Portuguese and Spanish arrived in South America in the 16th century, the use of the "divine plant" was already widespread. The consumption of Ayahuasca was condemned by the Holy Inquisition in 1616, and the decoction was considered a "diabolical concoction", but this did not stop the Amazonians to continue the tradition. The ceremonies were still used, however they were hidden from the European authorities [9].

In Europe, information about the brew was prepared and published in the 1850s by Richard Spruce [10] - a British doctor and botanist. During his stay in Brazil, he was invited by the Tukanoan Indians to attend ayahuasca consumption ceremony. Spruce took a small dose, but did not realize the depth of effects he brought. The Tukanoans gave the botanist the plant from which they make a drink, and he examined it and named *Banisteria caapi*.

In 1993, the private association, Botanical Dimensions, made it possible to conduct research as a result of which the positive effect of consuming Ayahuasca on physical and mental health was recorded.

Plants with hallucinogenic properties have been used for centuries in mystical and religious purposes in many primitive cultures. Plants with hallucinogenic properties have been used for many centuries in mystical and religious purposes in many primitive cultures. The tribes inhabiting the Amazon basin perceive Ayahuasca as a magical mixture of divine origin that allows the soul to detach itself from the body and then return to it as it wishes [3].

The natives use Ayahuasca for various purposes - religious, healing and as a means of preventing evil spirits and attacks of "jungle monsters", as well as planning hunting. It is concluded that the magical decoction was widely used for spells, religious rituals, healing and contacts with supernatural forces [11].

The use of the decoction survived the attacks of an unfavorable culture of colonists from Europe and escaped from the jungle to the towns of the Amazon region. In these towns, the aim of the drink has changed. Shamans help people from poor rural areas who have physical and mental health problems [2]. Ayahuasca has become popular among residents of larger cities. It has ceased

to be used only as a medical remedy. In Brazil, it is now used in Ayahuasca church rituals, and the government accepts Ayahuasca religions and beliefs.

## **Ceremony**

The traditional Indian ceremony of Ayahuasca is conducted by a shaman called curandero, which means "healer" in Spanish. He is a person connected with nature and plant spirits, thanks to which he heals the body and soul of a sick person. The bather can be admitted for a few days, weeks or months. During this time, the shaman - through conversation, cleansing and a special diet - prepares the person who is ill to take a decoction and performs rituals.

During the ritual, the shamans incense the place and the patient with smoke from the Palo Santo tree or herbs for the purification of the aura and energy. The most important elements of the ceremony are icaros, healing songs and melodies created by singing and playing on traditional instruments in order to bring into a state of trance and deep healing. During the ceremony, the curandero also eats Ayahuasca to reach the state of "mareado", meaning being connected with other participants.

So far, there is no definition of the term "narcotic". The most legitimate definition of this word is proposed by Wikipedia. it says that it is a term for some psychoactive substances that act on the central nervous system. These are substances whose regular intake leads to physical addiction, for example, morphine and heroin, as well as all psychoactive substances that are currently illegal (so they are illegal according to the law) [12]. Based on the above definition and the fact that Ayahuasca is a psychoactive substance and also contains illegal substances in most countries, it is referred to as a drug.

## **Drug tourism**

N. Uriely and Y. Belhassen define drug tourism as "a phenomenon in which tourist experiences include fully conscious consumption and the use of illegal drugs in the place they visit or in the country they come from" [13]. So, trips on which tourists eat Ayahuasca are those that are classified as drug tourism. Ayahuasca is generally considered a drug in Europe or the United States. it is illegal and prohibited by law. In the indigenous cultural circles, ayahuasca is a medicine and a gift of nature, not a degrading drug.

Calling Ayahuasca a drug and creating a new type of tourism called drug is a paradox. However, looking at the motivations of the majority of people taking part in such trips and rules of law, such classification seems to be the most accurate one. the fact that Ayahuasca is used to treat addiction to cigarettes, alcohol and hard drugs is ridiculous, because using a drug we want to be cured of addiction to other drugs. Many people go to the Amazon Jungle with severe diseases, often with the last hope in Ayahuasca. So the trips on which the tourist consumes Ayahuasca can also be referred to as health tourism.

## **Methods and results**

The study was conducted in April and May 2018. A total of 108 people of different sex and level of education, age, religion and profession were examined. The questionnaire was addressed to

Europeans, and it was a necessary condition to complete it. Research on the practice of Ayahuasca tourism by Europeans was carried out using the analysis of an electronic questionnaire. The sheet consisted of 10 closed questions. Respondents were members of the following thematic groups in social media (Facebook) and forum: „Ayahuasca” [14], “Ayahuasca the spirit vine” [15], “Ayahuasca Social Club” [16], „European Ayahuasca Forum” [17], „Ayahuasca forum” [18].

The first question concerned the division of respondents by gender. Proportion was not very varied – 57,4% of respondents are man, whereas 42,6% are women.

In the second question they were asked to indicate if Ayahuasca consumption was the main reason for their trip to the Amazon region and till 44,4% respondents answered affirmative.

Third question was to assess the age of responders. They had 4 options to choose from: between 18 and 26 years old, between 27 and 39 years old, between 40 and 50 years old and 51 years old or more. Structure was varied, but most of the people chose 27-39 age range, and it is 51,9% respondents. Interest respondents from 18-26 and 40-50 is similar and it is analogously 16,7% and 22,2% (Fig. 3).

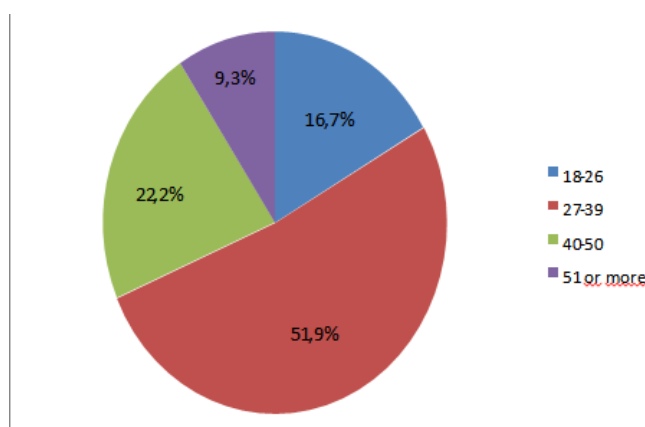


Fig. 3. Division respondents due to age  
 Source: Own research

The majority (41.7%) of people in the fourth question indicated Peru as the country in which they stayed during the ceremony. The next ones are Bolivia (19%), Colombia (13%), Brazil (12%), Ecuador (9.3%) and Venezuela (1.9%). Other countries were marked by 4.6% of respondents (Fig. 4).

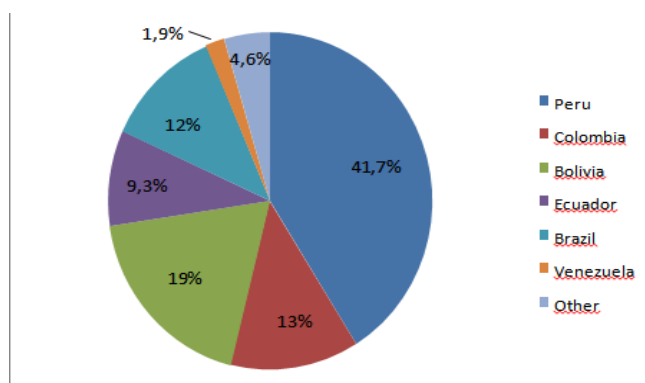


Fig. 4. Division respondents due to the visited country  
 Source: Own research

In the fifth question, respondents were asked to define their attitude to religion. Most of the respondents gave an answer „other” (42,6%). Another big group are people who marked answer that they are irreligious (31,5%). Little more than 1 in 5 respondents are Christians (21,3%). Only 4,6% of respondents are Buddhists, however, none of the respondents defined their religion as Islam, Judaism or Hinduism (Fig. 5).

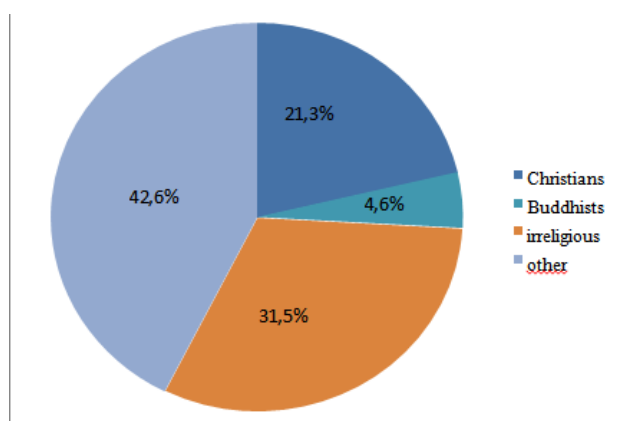


Fig. 5. Division respondents due to their religion

Source: Own research

Sixth question in questionnaire had many options to choose. It asked about the reason for joining the ceremony. 39,8% respondents chose option „journey into yourself”. Many people chose also options „take part in ceremony treating it as a tourist attraction” and „out of curiosity”(both 14,8%) and „in order to heal the soul” (13%). Almost 1 in 10 respondents wanted heal own body. Other options like „accidentally” or „in order to daze” were chose rarely (Fig. 6).

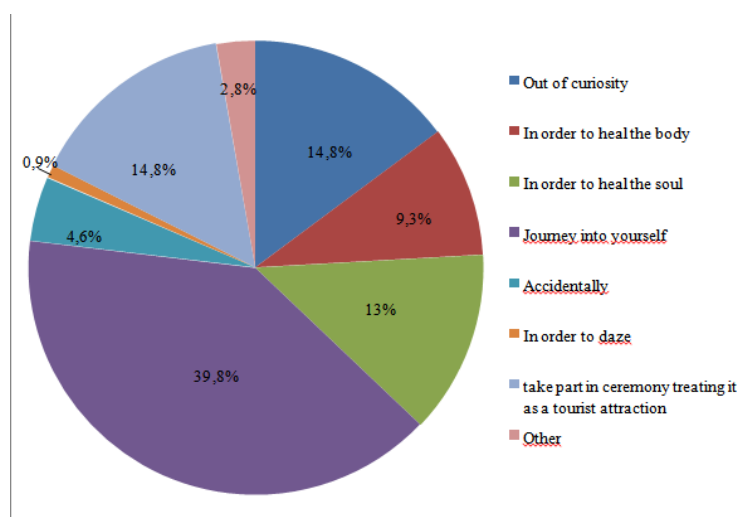


Fig. 6. Division respondents due to the reason for joining the ceremony

Source: Own research

In seventh question, nearly 3 out of 5 people marked that the level of information about ayahuasca before take part in ceremony is high. Answer that „medium” marked 30,6%, „low” 6,5% and only 4,6% of people described themselves as a person without knowledge about ayahuasca (Fig. 7).

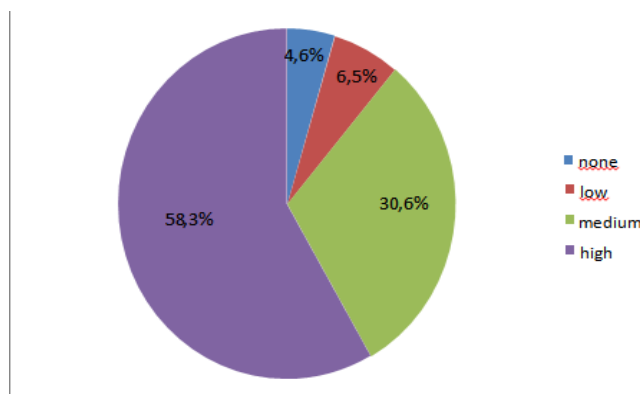


Fig. 7. Division respondents due to level of information about ayahuasca before take part in ceremony  
Source: Own research

In question eight respondents were to indicate the cost of participation in the ceremony. The majority of respondents spent 200€ or more on it. Two times less, so about 100€, spent 25,9% people. Respondents who spent 50€ and 20€ were analogously 19,4% and 9,3% of all. 2,8% of people took part in the ceremony for free (Fig. 8).

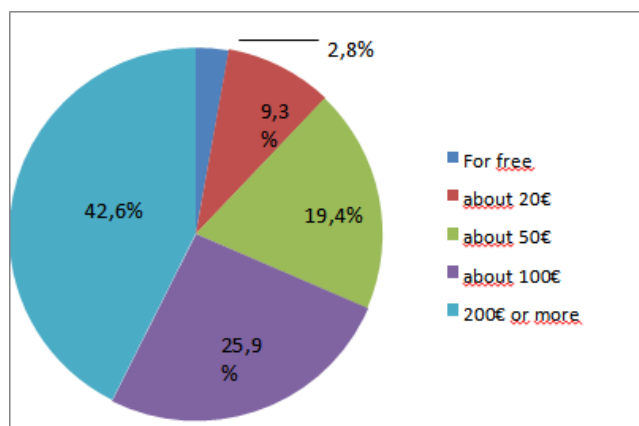


Fig. 8. Division respondents due to cost of take part in ceremony  
Source: Own research

In question nine, respondents were asked if the time spent attending the ceremony was satisfying for them. Almost all people responded positively, because as much as 92,6%. Only 7,4% were dissatisfied. And in the question that completes this questionnaire, only 7,3% of people would not travel to Ayahuasca again. So we can tell that practically everyone who was satisfied the course of the ceremony is going to take part in eating ayahuasca again.



## Summary

Ayahuasca has been attracting tourists from around the world for over a dozen years to the Amazon region, where there has been an increase in the number of resorts offering stays combined with ceremonies during which ayahuasca is being received. The main task of this work was to investigate the phenomenon of "ayahuasca tourism" among Europeans who visited the Amazon region in the past and used the services of local centers. It is impossible to deny or confirm that Ayahuasca was the main destination of the respondents' journey. The difference of 11.2% is not significant with the proportion of 108 questionnaires. Peru was the most-often-chosen country. It is probably related to the widest tourist offer regarding stays connected with the use of Ayahuasca and the best connections from Europe. Almost everyone participating in the survey was satisfied with this form of spending time, which can predict the growing interest and development of this branch of tourism.

Ayahuasca tourism brings both advantages and disadvantages. Positive aspects for us, Europeans - it is an opportunity to treat body and spirit diseases, learn about culture and tradition of the tribes or the region, or discover our own true interior. Another positive aspect of this phenomenon is economic growth and the opportunity to earn a living for the local population. Tourists spend considerable money not only on participation in the ceremony, but also on accommodation, food, transport, souvenirs and this causes the demand for new jobs.

Negative aspects may result, for example, from a badly conducted ceremony. It is also dangerous to eat Ayahuasca on your own. It can worsen the person's mental and physical state. Another disadvantage of Ayahuasca tourism is the danger of environmental degradation through the process of overexploitation of plants necessary to prepare the decoction. The last significant disadvantage is the probability of desecrating the decoction and rituals associated with it, caused by the lack of respect for visitors to the indigenous culture. It is very difficult to say whether it is a positive or negative phenomenon.

Due to the small interest in this topic in our country, it is difficult to reach people who have traveled to the Amazon for this purpose. In addition, literature and difficult access to foreign publications are very poor. research on ayahuasca is not very widespread or often carried out. Of course, this makes it difficult to collect information about it, but also leaves a broad, unexplored field for scientists.

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# INVESTIGATIONS OF MICROSTRUCTURE AND CORROSION BEHAVIOUR OF TIN BABBITT IN H<sub>2</sub>SO<sub>4</sub> AQUEOUS SOLUTION

Joanna Hrabia-Wiśnios<sup>1\*</sup>, Beata Leszczyńska-Madej<sup>1</sup>, Remigiusz Kowalik<sup>2</sup>,  
Anna Kwiecińska<sup>2</sup>

<sup>1</sup> Department of Materials Science and Non – Ferrous Metals Engineering, Faculty of Non-Ferrous Metals, AGH University of Science and Technology, Mickiewicza 30 Av., Cracow 30059, Poland,

<sup>2</sup> Department of Physical Chemistry and Metallurgy of Non-Ferrous Metals, Faculty of Non-Ferrous Metals, AGH University of Science and Technology, Mickiewicza 30 Av., Cracow 30059, Poland,

\* corresponding author: hrabia@agh.edu.pl

## Abstract:

One of the important properties of bearing alloys is corrosion resistance. Electrochemical corrosion can contribute to acceleration of bearing wear and consequent bearing damage. In this study the results of microstructure and the electrochemical corrosion behavior of two bearing alloys: SnSb11Cu6 (B83) and SnSb8Cu4 (B89) used for pouring bearing bushings are presents. The electrochemical corrosion of these alloys has been investigated in 0.1M H<sub>2</sub>SO<sub>4</sub> solution using electrochemical technique Open Circuit Potential (OCP) measurement and mass loss test. Microscopic observations were made using scanning electron microscopy. The obtained results indicate better corrosion resistance of alloy B89, which has the lower content of the SnSb phase in microstructure, than B83 alloy. In addition, it was found that the dominant mechanism of corrosion degradation in H<sub>2</sub>SO<sub>4</sub> solution is selective corrosion which is a particularly undesirable type of corrosion because it involves the loss of one alloying component.

## Keywords:

*Bearing alloys, tin Babbitt, corrosion behavior, corrosion resistance, microstructure*

## Introduction

Tin babbitts are classified as casting alloys and usually are used to cast the bushings of full bearings and multilayer bearings cast on steel, cast iron or bronze. They are applied, e.g., in diesel car engines, railway carriages, compressors, steam and gas turbines, and as sliding surfaces in various mechanical elements [1, 2].

The microstructure of these alloys is multiphase, usually three-phase:  $\alpha$ ,  $\beta$ ,  $\eta$  or  $\alpha$ ,  $\beta$ ,  $\varepsilon$ , where  $\alpha$  – solution of antimony and copper in tin, constitutes a soft and ductile matrix  $\beta$  – irregular crystals of compound SnSb,  $\eta$  – acicular precipitates of compound Cu<sub>6</sub>Sn<sub>5</sub>,  $\varepsilon$  – precipitates of compound Cu<sub>3</sub>Sn [3-5].

According to the literature, attack of metal surfaces by electrolytes results either in the pitting of the surface or in the oxidation of the alloy [3,6,7]. Corrosion resistance of tin babbitt alloys is good except under conditions of water contamination of the oil [3, 6] and sulfur compounds, originating from inadvertent contamination or from some oil additives [7]. The tin matrix can to converse to tin oxide in electrochemical process and form layer on the bearing surface. This

formation generates hard regions on the babbitt surface which may build in thickness up to 100  $\mu\text{m}$ , to cause abrasive damage. Consequently, it can lead to bearing failure. Aging stagnant oil and some acids may lead to selective corrosion of the tin, copper, lead or antimony components and leaving a rough and weakened the babbitt surface. Selective removal of the microconstituents of a bearing will generally embrittle the structure so that it finally fails by cracking. In a less common type of corrosion, the copper phase of the tin-rich babbitt is attacked. As a result is the formation of copper sulfates, from the copper in the Babbitt and sulfur present in the oil or atmosphere. The damage results in the etching away of the tin matrix leaving tin-antimony cuboids on the surface [3,6,7].

The results presented herein show the microstructure and corrosive behaviour of tin babbitts in  $\text{H}_2\text{SO}_4$  aqueous solution. Due to different chemical composition, the investigated alloys have different microstructure and properties, which has a direct impact on the corrosion resistance of these materials. The solution used in research is not a natural working environment of the bearing, however it allows to explain the corrosion behavior of tin babbitts due to contaminants of oil lubricant.

## Material and Methods

### Chemical composition

The tests concerned two tin-based casting alloys: SnSb8Cu4 (B89) and SnSb11Cu6 (B83). The alloys were cast into cast iron chills, then cooled in ambient air. Table 1 presents the chemical composition of the tested alloys.

Tab 1. Chemical composition of investigated alloys, wt%

Alloy name		Chemical composition, wt%				
Grade mark	Designation	Sn	Pb	Sb	Cu	As
SnSb11Cu6*	B83	balance	0.35	10÷12	5.5÷6.5	0.1
SnSb8Cu4	B89	balance	0.35	7÷8	3÷4	0.1

Source: PN-ISO 4381: 1997, PN-82/H-87111\*

### Material characterization

The microstructure of the samples, before and after corrosion test was investigated using scanning electron microscopy, along with an analysis of the chemical composition in the micro-areas (microscope Hitachi SU 70).

### Electrochemical measurement

The corrosion resistance of the thin babbitt samples was evaluated in 0.1M  $\text{H}_2\text{SO}_4$  aqueous solution using electrochemical technique Open Circuit Potential (OCP) measurement. Samples of 4  $\text{cm}^2$  of surface area were exposed to the solution. The OCP measurement system is shown schematically in Fig. 1. B83 and B89 samples were used as working electrodes. The reference electrode was saturated calomel electrode and the auxiliary electrode was a platinum. The corrosion potential vs. time was measured for 24 hours in 0.1M  $\text{H}_2\text{SO}_4$  solution.

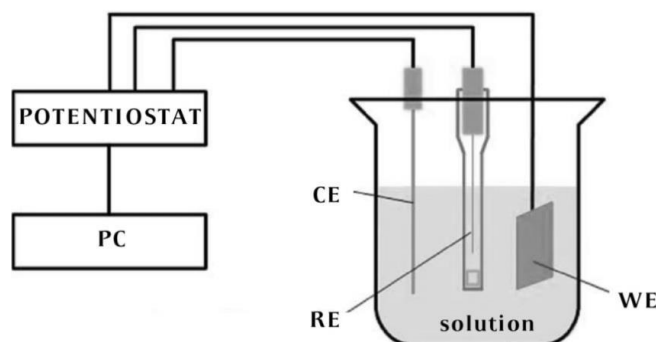


Fig. 1. Schematic view of the basic design OCP measurement system;  
WE - working electrode; RE - reference electrode; CE – counter electrode  
Source: own study

## Weight loss measurements

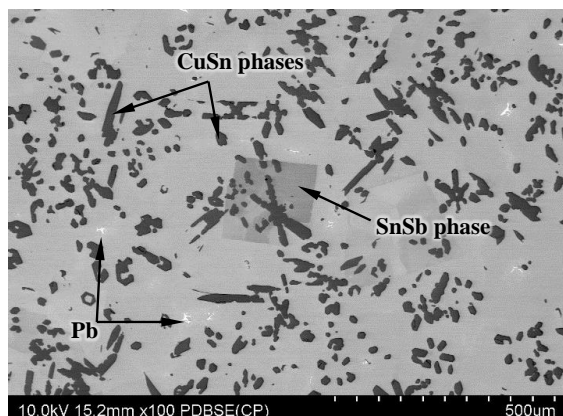
Corrosion resistance was determined by measuring weight change in 0.1M  $H_2SO_4$  solution, for 5 days, at room temperature. During corrosion test, the samples were placed in laboratory shaker type 357 (Elpin+). Every 24 hours, samples were extracted, cleaned in distilled water, dried with cold air and weighed.

## Results and Discussion

### Microstructure

Select photographs of the microstructure of tin-based casting bearing alloys made using a scanning electron microscope are shown in Fig. 2 -3. The investigated alloys are characterised by multiphase microstructure, consisting of large hard precipitates of the SnSb phases (Fig. 2a, 3a) and numerous precipitates of the CuSn phases, both needle-shaped and nearly globular-shaped. The matrix is a solution of antimony and copper in tin [3-5]. Lead in the alloys is arranged uniformly and visible in the photographs of the microstructure as bright, dispersion precipitates, located mostly inside the tin-rich matrix grains or as larger clusters on the grain boundaries (Fig. 2, 3b).

a)



b)

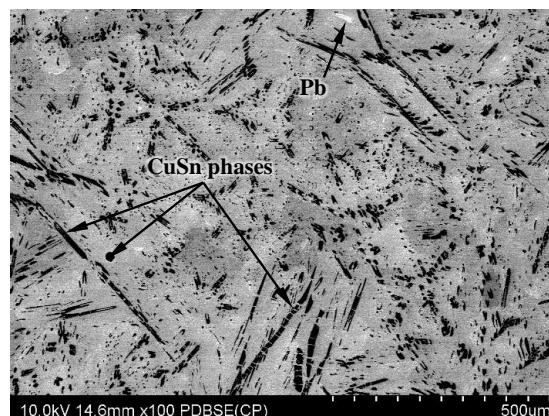
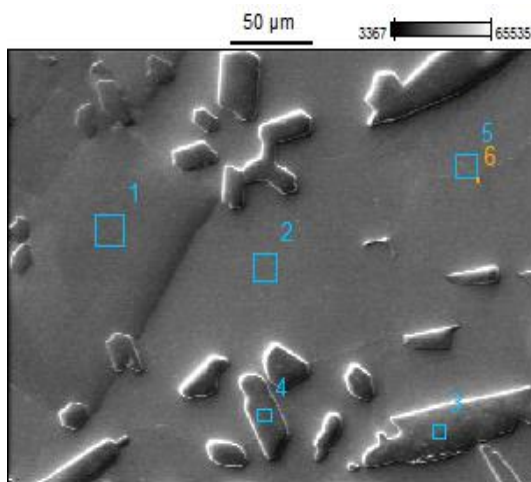


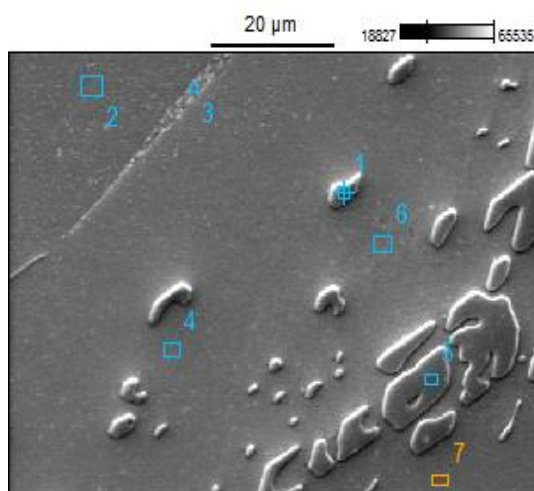
Fig. 2. Microstructure of the tin babbitt alloys: a) B83, b) B89; magnification 100x; SEM  
Source: own study

a)



	Cu-K	Sn-L	Sb-L	Pb-M
1	0.09	55.05	44.84	0.02
2	0.02	94.51	5.11	0.32
3	38.62	57.89	3.45	0.01
4	38.67	57.21	4.03	0.03
5	0.00	92.03	7.05	0.92
6	0.00	94.98	4.25	0.73

b)



	Cu-K	Sn-L	Sb-L	Pb-M
1	36.61	62.09	1.18	0.03
2	0.00	92.57	5.18	2.26
3	0.57	68.45	0.89	30.09
4	0.00	91.82	7.88	0.25
5	37.97	59.94	2.02	0.05
6	0.31	90.86	8.68	0.16
7	0.72	88.30	10.50	0.44

Fig. 3. Microstructure with the analysis of the chemical composition in the micro-areas of the tin babbitt:

a) B83, b) B89; SEM

Source: own study

## Electrochemical results (OCP)

The corrosion resistance of the samples was evaluated in 0.1M  $H_2SO_4$  aqueous solution using electrochemical technique Open Circuit Potential (OCP) measurement. The open circuit potential is a parameter which indicates the thermodynamically tendency of a material to electrochemical oxidation in a corrosive medium. Results from the electrochemical tests are presented in Fig. 4. The OCP curves showed slight differences in the corrosion resistance of the investigated alloys and exhibited excellent chemical stability. After a period of immersion the potential  $E_{corr}$  stabilised around a stationary value for both alloys and, on average, come to about -0.51 V. The shape of the OCP curves indicates rather corrosion occurs evenly. However, increases slowly can suggest the growth of the film onto the B89 sample surface.

According to the literature, tin has the ability to passivate in aqueous environments over a wide pH range (below pH 1 to above pH 12). The oxide film consists mainly of  $Sn(OH)_4$  or more stable  $SnO_2$ , which is one of the reasons for the excellent corrosion resistance of a tin-based alloy [8].

On the other hand, this passive layer is very hard and can damage the cooperating steel surface the shaft journal [9].

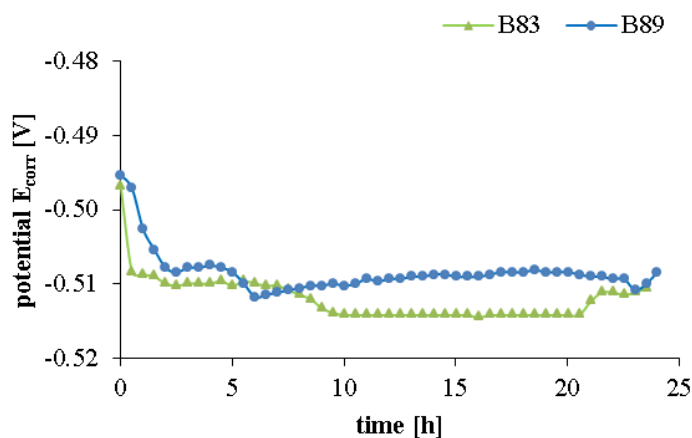


Fig. 4. Variation of the corrosion potential ( $E_{\text{corr}}$ ) with immersion time for tin babbitt samples in 0.1M  $\text{H}_2\text{SO}_4$  solution  
Source: own study

### Corrosion Rate (weight loss)

One of the measures of material corrosion resistance is weight loss measurement. Fig. 5 showed variation of the corrosion rate (weight loss) with immersion time for tin babbitt samples in 0.1M  $\text{H}_2\text{SO}_4$  solution. Determined corrosion rates, show longer the lifespan of B89 alloy than B83 alloy. The weight losses determined for 0.1M  $\text{H}_2\text{SO}_4$  solution for tested alloys showed higher corrosion rate and the upward trend of corrosion rate in B83 alloy (from 0.6 %/day after 1 day to 0.8 %/day after 5 days). In B89 alloy the value of corrosion rate was constant and was at about 0.5 %/day.

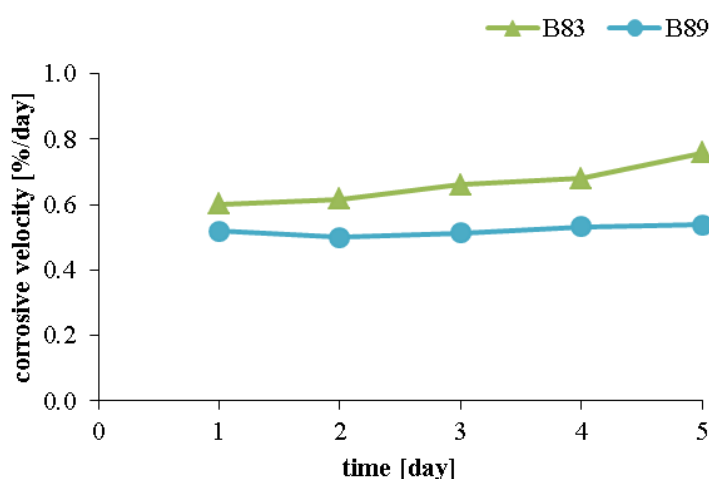


Fig. 5. Variation of the corrosion rate (weight loss) with immersion time for tin babbitt samples in 0.1M  $\text{H}_2\text{SO}_4$  solution  
Source: own study

### Surface after corrosion

Characteristic surfaces of the investigated alloys after 24 hours corrosion test are shown in Fig. 6-7. Selective corrosion of the tin-matrix and leaving SnSb cuboids (Fig. 6) and CuSn both needle-



shaped and nearly globular-shaped on the surface (Fig. 6,7) are observed. Also, this releases may fall out of a porous, a rough and weakened surface leaving holes (Fig. 6b and 7b).

This type of galvanic corrosion can occur when two electrochemically different metals and electrolyte form a galvanic cell. The cell is corrosive to one metal at the expense of the other. According the galvanic series tin is less noble ( $\text{Sn}/\text{Sn}^{2+}$   $E_0 = -0.14$  V) than lead ( $\text{Pb}/\text{Pb}^{2+}$   $E_0 = -0.13$  V), copper ( $\text{Cu}/\text{Cu}^{2+}$   $E_0 = +0.34$  V) and antimony ( $\text{Sb}/\text{Sb}^{3+}$   $E_0 = +0.20$  V) [10]. Therefore precipitates of the CuSn phases and precipitates of the SnSb phases have a higher reduction potential than tin-rich matrix and create a corrosive microcell in electrolyte solution. The tin-rich matrix contacting with this more noble phases increases the number and intensity of pits.

This indicated that the occurrence of cubic SnSb in microstructure B83 alloy could be a significant impact to corrosive wear (weight loss). This precipitates may fall out of a porous, a rough and weakened surface leaving holes and resulting faster weight loss (Fig. 5).

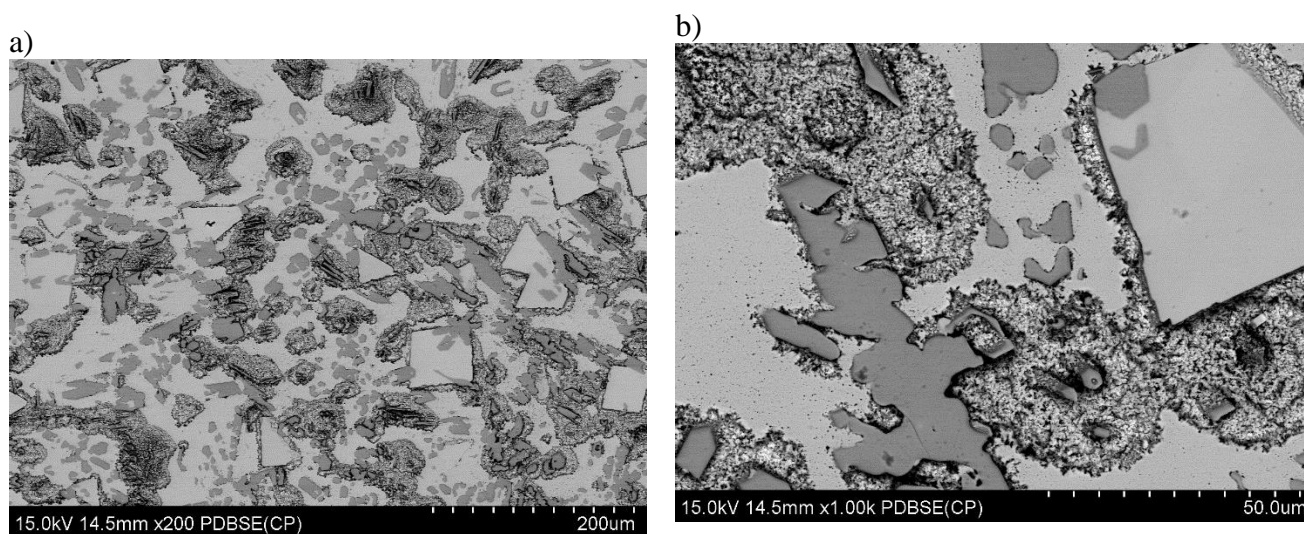


Fig. 6. Microstructure and characteristic sample surface of B83 after 24 h corrosion test in 0,1M H<sub>2</sub>SO<sub>4</sub> solution; magnification a) 200x, b) 1000x; SEM

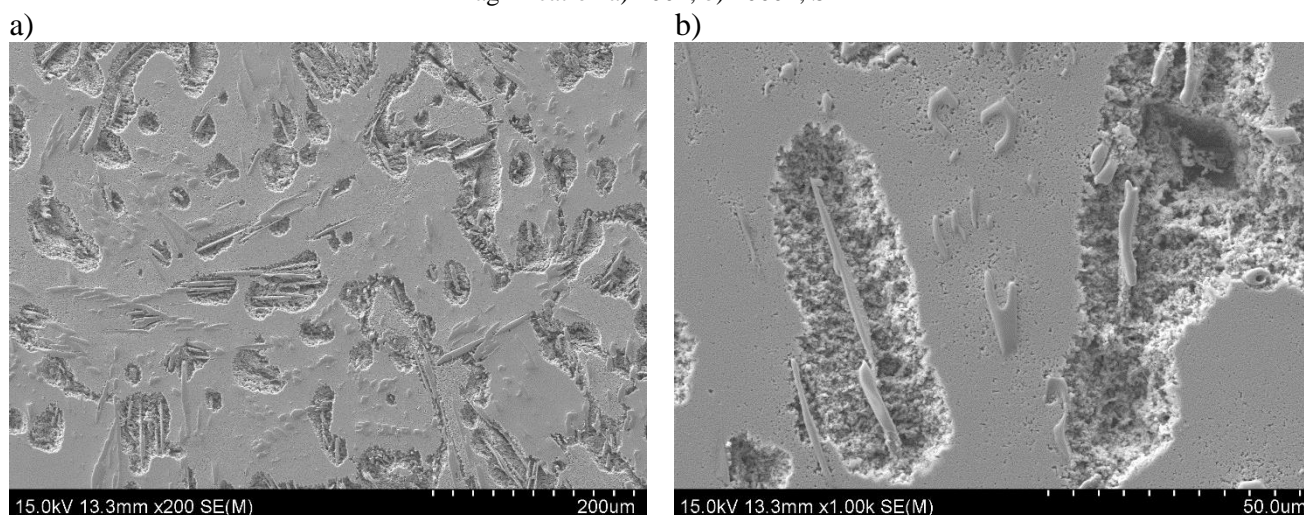


Fig. 7. Microstructure and characteristic sample surface of B89 after 24 h corrosion test in 0,1M H<sub>2</sub>SO<sub>4</sub> solution; magnification a) 200x, b) 1000x; SEM



## Conclusions

The following conclusions can be drawn from the above study:

1. The investigated alloys are characterised by multiphase microstructure consisting of precipitates of CuSn phases (in B89 and B83) and SnSb phases (in B83), as well as a tin-rich matrix. Lead is arranged uniformly in the matrix, forming local clusters at grain boundaries.
2. The OCP curves showed similar the corrosion resistance of the investigated alloys.  $E_{\text{corr}}$  stabilised around a stationary value for both alloys and amounts of about -0.51 V.
3. The higher corrosion rate of B83 alloy than B89 alloy was determined for 0.1M  $\text{H}_2\text{SO}_4$  solution. In B89 alloy the value of corrosion rate was constant and was at about 0.5 %/day, in B83 alloy have the upward trend and amounts to 0.8 %/day after 5 days.
4. The dominant mechanism of corrosion degradation of investigated alloys in  $\text{H}_2\text{SO}_4$  aqueous solution is selective corrosion of the tin-matrix and leaving SnSb cuboids and CuSn both needle-shaped and nearly globular-shaped on the surface. This precipitates may fall out of a porous surface leaving holes and resulting in faster weight loss.

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## HARDINESS AS A MEDIATOR OF HEALTH

Mirosława Spaleniak-Jurkowska<sup>1\*</sup>, Daria Pizuńska<sup>2</sup>

<sup>1</sup> Powiatowe Centrum Zdrowia Sp. z o.o. NZOZ im. dr Aleksandra Majkowskiego w Kartuzach

<sup>2</sup> Instytut Psychologii, Wydział Nauk Społecznych, Uniwersytet Gdański, Gdańsk

\* corresponding author: mirka@psycholog-dlaciebie.pl

### Abstract:

The aim of the article is to present hardiness as one of the mediators of health. Hardiness is not a common variable in Polish studies, especially in the field of health psychology. The article points to several views in the literature on the construct of hardiness and its relationship to two other psychological constructs - a sense of coherence and resilience. The article points out the dependencies between the constructs as well as the similarities and differences resulting from the perspectives adopted by the researchers. The article also presents a description of hardiness testing methods and presents the psychometric values of the questionnaires indicated.

### Keywords:

*Hardiness, sence of coherence, resilience*

### Introduction

For many years stress has been treated as a natural part of life, affecting directly or indirectly various aspects of human functioning, health, cognitive functioning, motivational and volitional processes. In the relationship between health and illness, where stress is active, particular attention is attributed to resources [1]. Resources relate not only to the individual, but to the wider social group and all purposeful human activity. People with larger resources are less susceptible to their loss and are more able to acquire new ones, while those with smaller resources are more likely to lose them. Definitions of the concept of resources are presented by researchers in an inconsistent way, but they always mean complex psychological properties that create constellations allowing people to affect the processes of coping with the requirements of life [2, 3]. They include individual characteristics (biological, psychological and interpersonal), social network properties (relation types, reference groups), social, environmental and civilizational characteristics, and broadly defined cultural traits [4]. Hardiness is one of these properties.

### The concept of hardiness

This concept was first described in 1979 by Suzane C. Kobasa. Its creation followed the author's conclusions from the analysis of the outcome of longitudinal research conducted in the group of managers of the American Illinois Bell Telephone Corporation (IBT), which is part of the American Telephone and Telegraph (AT & T). The research began in 1975 and lasted for many years. It included, among others, level of perceived stress, personality variables, evaluation of work results and findings of medical tests. In 1981, the company was restructured and one year later the IBT reduced the number of employees by almost 50%. This was a situation of a serious crisis for

the organization as the responsibility for carrying out the necessary changes (including dismissing employees), as well as the continuous introduction of new technologies and providing professional customer service had to be taken over by other employees and the managers. Over 60% of people in the sample, as a result of experiencing severe stress, revealed deterioration of their health (heart attack, cancer, mental disorders). Behavioral disorders and other negative consequences, such as aggressive behavior, absenteeism or divorce were also reported. However, the health condition of the remaining individuals remained intact (subjectively - in their own judgment and objectively - in the results of medical tests). What is more, these people had various personal benefits (e.g. promotion, starting own business after losing a job). The analysis of the research showed that the people from the first group were distinguished by a strong commitment to work, internal location of control and a task-oriented approach to emerging problems and changes. The author referred to this constellation of properties as the hardiness, describing three variables as: commitment, control and challenge [5].

Since 1979, many studies have been conducted around the world that confirmed the buffering effect of mental hardiness on health in a crisis or severe stress situation [6], but they also raised many doubts [7]. Over the past 40 years, the hardiness model and its application have also been transformed, i.e. from the initial research on organizational, military and social psychology to health psychology.

## **Model of hardiness**

Hardiness is most often referred to as a cognitive-emotional set of three traits that determine personal resistance to stress, but the literature also includes strong advocates of hardiness as a style of functioning or coping style [8]. Hardiness buffers the effect of experiencing stress on health probably through the tendency to perceive different circumstances as less stressful, to take effective coping methods and to take more care of one's own health [9]. Hardiness conditions the activation of three mechanisms. First, the assessment of the stressful situation: with a high level of hardiness as less threatening, possible to cope with [10] or stress perceived as milder [8]. Second: choosing a coping strategy. People with a high level of hardiness more often use task rather than emotions or avoidance oriented strategies [10]. Thirdly: the choice of forms of activity, which from the individual point of view is attractive (important, clear, constituting a kind of challenge) [11]. The current hardiness model takes into account both variable and constant factors, and it is presented as follows:

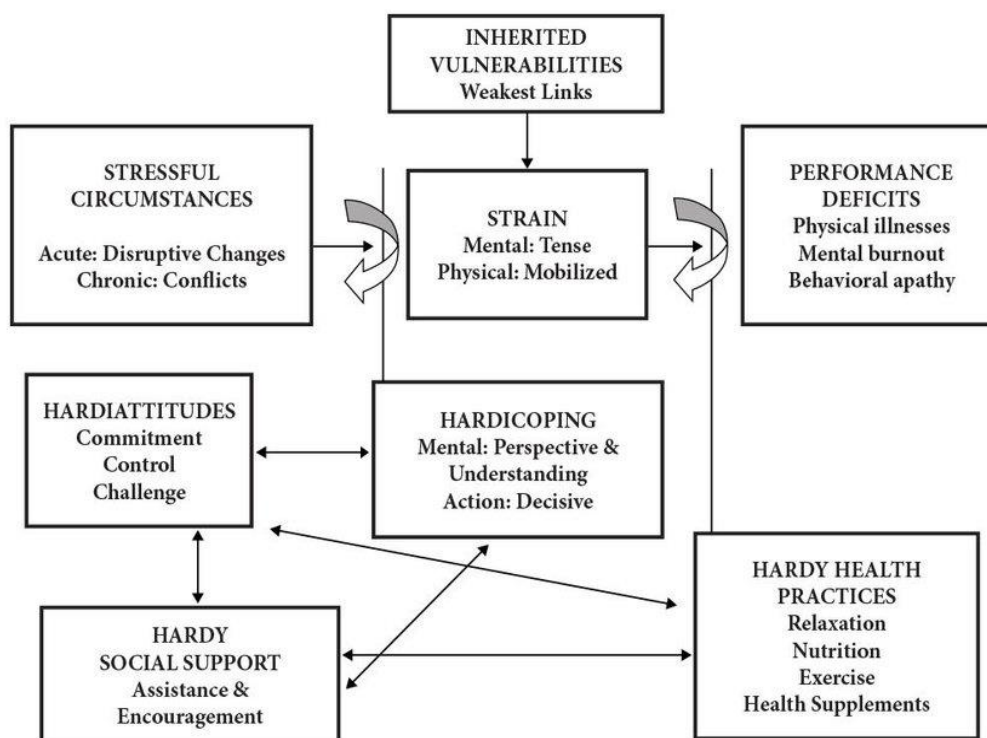


Fig 1. Modal of hardiness.  
Source: [12].

The authors explain this model as follows. Situations of acute as well as chronic stress are the cause of stimulation of the body at the mental and physical level. When the tension increases or lasts too long, then the health (well-being) of the individual is endangered. The breakdown of health appears along the individual line, inherited susceptibility to diseases and disorders. The buffering effect of mental hardiness in people with a high level of commitment, sense of control and openness to challenges consists in launching "hard response models", i.e. using social support, dealing with a problem-focused and self-care commitment. In this process, stress and tension are reduced, which has a positive effect on maintaining psychophysical well-being. The authors of the model point out that the existence of a favorable constellation creates a specific "set of courage and motivation", which is necessary for a protective effect, as transformative (focused on solving the problem) coping, making it possible to re-evaluate the situation and change the threat into the chance for development is much more difficult than the strategies of denying and avoiding or focusing on emotions. The aspects of growth and development characteristic of hardiness include: effectiveness in dealing with difficult tasks, taking a leadership role, being creative, raising awareness and developing life wisdom, avoiding breaking the accepted rules. In relation to health, high mental hardiness leads to a sense of contentment and enthusiasm, reducing the likelihood of physiological (wear and tear) disorders such as hypertension, obesity, cancer, Alzheimer's and psychiatric disorders (depression, anxiety disorders) [12].

## **Scales measuring hardiness - Polish versions: Norwegian Revised Dispositional Resilience Scale DRS- 15 R and HRHS**

### **Norwegian Revised Dispositional Resilience Scale DRS- 15 R**

The lack of unambiguity in the methodological determination and definition of its index and the determination of its measurement method is one of the frequently quoted doubts related to hardiness. However, the researchers most often use the Dispositional Resilience Scale 15 (DRS-15) tool [13]. The theoretical structural model underpinning the structure of the hardiness questionnaire is presented in a dual way. The revision of the DRS scale resulted from the necessity of not only adapting the linguistic tool that was made, but also adjusting claims to cultural differences. Due to the lack of these adjustments, the first version of the tool had low reliability indicators in non-English speaking countries [14]. Eventually, factor analysis allowed for the identification of both: one-dimensional and multidimensional structure, determined by the three factors. Some researchers currently use one hardiness indicator, which is the sum of respondents' answers to individual questions / items included in the scale, based on the belief that hardiness is a one-dimensional construct [7]. On the other hand, some scientists use three dimensions, which together constitute a variable hardiness - commitment, control and challenge [10]. The DRS-15R scale is based on the revised Norwegian 15-item dispositional resilience / hardiness scale [14]. On the basis of a targeted sample of 1,525 prisoners, basic psychometric characteristics were determined. Analysis of the reliability of the identified factors allowed to achieve moderately satisfactory levels of Cronbach's coefficient  $\alpha$ . For scale 1 - involvement  $\alpha = 0.556$ , for scale 2 - challenge  $\alpha = 0.563$ , while for scale 3 - control  $\alpha = 0.582$ . Analysis of the reliability of the whole hardiness scale showed Cronbach's coefficient  $\alpha$  at the level of 0.569. The discriminatory power of a tool measured by the strength of correlation of individual items with appropriate subscales was in the range 0.3-0.6. The inter-correlation measurement of individual subscales with the general hardiness scale understood as the sum of factors was also analyzed. The obtained results indicate a significant and directly proportional dependence of individual components of the DRS-15R questionnaire with the overall result. The presence of significant correlations of factors with the general hardiness result indicates that the assumption of the 3-factor hardiness structure is justified in the collected research material. The collected data also allowed the development of temporary standards for the DRS-15R questionnaire. A centile scale was used due to the fact that the distribution of the analyzed variables did not meet the conditions of normal distribution [8].

### **Health Related Hardiness Scale - HRHS**

The Health Related Hardiness Scale (HRHS) was in the original version developed by Suzan E. Pollock in 1986. The pre-scale, 51-item scale in three dimensions of hardiness was revised by Pollock in 1989. The scale has been shortened to 34 items with a 6-point Likert scale with two subscales: control and commitment and challenges. The Polish adaptation was carried out by Dymecka et al in 2017. The HRHS scale has been developed to measure mental hardiness in people with health problems. The scale includes 34 test items. The examined person assesses the given statement on a six-level Likert scale, where 1 means - I strongly disagree, 6 - I definitely agree. The maximum number of points to get is 204, and the minimum is 34. The higher the score, the higher is

the mental hardiness associated with health. In addition, the scale measures three elements of mental hardiness: commitment (7 items), control (14 items), challenge (13 items). Cronbach  $\alpha$  for the entire scale is 0.89 [15].

## **Psychological constructs associated with hardiness**

### **Sense of coherence (SOC) and hardiness as constructs explaining the salutogenetic model**

The theory of salutogenesis and the sense of coherence construct (SOC) arose at the same time as the hardiness construct. The theory of Aron Antonovsky, like the theory of Suzanne Kobas, concerns the genesis of health. The assumption is the same: the way of constructing reality has a decisive influence on the effectiveness of coping with this reality and the state of health. The theory of the sense of coherence is a model regarding dispositional orientation. SOC is a global, complex human orientation, expressing the degree of belief that the stimuli (information) that reach the individual from the external and internal environment are structured, predictable and understandable; resources are available to meet the demands of these stimuli, and these requirements are worth engaging and taking action. The SOC consists of three components: intelligibility (this is the cognitive aspect of the situation; reality is likely to be elaborated and explained), resourcefulness (instrumental component, sense of resources to cope with requirements) and meaningfulness (emotional-motivational component; the feeling that is worth getting involved in the activity). There is a strong relationship between the sense of coherence and the quality of behavior, but not behavior in specific situations [16]. In Poland, the SOC-29 scale is used in numerous studies.

Kobas's "challenge" factor puts emphasis on change, treating the state of instability as a normal, regular state. Questions in the questionnaires refer to the perception of change as an opportunity, aversion to unambiguous and closed situations. Antonovsky, in his sense of intelligibility, emphasizes the perception of the world as something orderly, predictable and understandable. A definite difference is clear in both approaches.

Differences also apply to the sense of resourcefulness corresponding only to part of the "control" in the psychological hardiness model. The control according to Kobas is dichotomous, based on the Rotter model, while Antonovsky points to the cultural context, the possibility of acquiring a sense of resourcefulness [16].

On the other hand, "commitment" according to Kobas and the sense of coherence according to Antonovsky are the same. They are a driving and motivating component. Antonovsky devotes a lot of attention to the sources and determinants of the sense of coherence, Kobas only emphasizes the commitment to one's own "self" and life commitment.

### **Hardiness versus resilience as a feature and as a process**

The resilience model is still a model widely understood in psychology. The historical background of describing the resilience by many authors [17, 18] reaches 50/60's. This would mean that this construct is primary to both hardiness and sense of coherence. Two concepts can be found in the literature: resilience and resiliency. The concept of resilience means both the process and the characteristics of the individual, thanks to which, they cope with adversities of life in a flexible and creative way [3]. Resiliency means the personality or relatively permanent resource of an individual and is referred to as mental property. Here, it refers to Block's ego-resiliency theory [19, 20], which



treats it as a relatively permanent disposition, determining the process of flexible adaptation to the ever-changing life requirements. He describes it as a personality trait, important in the process of dealing with life events. Resiliency means both control and flexibility that enables an individual's ability to adjust the level of control to his/her own abilities and experienced situations. High resiliency also means optimal mobilization, adapted to the actions taken, while saving the resources involved. The authors believe [20] that the higher the ego's resiliency, the greater the ability to modulate the level of self-control so that it is adequate and optimal to the possibilities and stimulatory needs. The resilience as a trait is also recognized by other authors [21-23] This approach to resilience has also received research methods, including Questionnaire of security and resilience Z. Uchnasta (KPB-PO). It seems, however, that resilience is a broader construct that plays a superior role over other individual resources [24].

Resilience understood as a self-regulating mechanism, including both cognitive, emotional and behavioral elements, has become a permanent part of the explanatory psychological construct, especially since it has a psychometric scale SPP-25 [24]. The elements of this construct are: 1) perseverance and determination in action, 2) openness to new experiences and sense of humor, 3) personal competences to cope with the situation and tolerance of negative emotions, 4) tolerating failures and treating life as a challenge, and 5) optimistic attitude towards life and the ability to mobilize in difficult situations.

Many studies have shown the importance of psychic resilience for the functioning of people in different situations, especially those experiencing negative, traumatic life events [25-34]. The role of resilience as a factor protecting against negative consequences of experienced occupational stress or reducing the risk of food addiction was also demonstrated [33].

The three hardiness variables already mentioned, i.e.: commitment, control and challenge only partly fit into the wider metaresource, which resilience seems to be. Making more detailed characteristics of a resilient person [35], one can indicate the following predispositions: tendency to perceive the surrounding world as friendly, expect positive rather than negative events, agreeableness, tendency to interpret stressful events in terms of the challenge, ability to accept deterioration, treating failure as a natural situation that does not have to arise from the lack of own competences or the actions of a hostile environment, a sense of influence on one's own life, emotional stability, treating difficulties as an opportunity to gain new experiences and skills, and self-development. Hardiness as a construct does not include variables such as emotional stability, persistence, agreeableness, optimism or humor.

However, the authors investigating the resilience see strong relationships and the impact of hardiness as a personality variable on resilience, which is multidimensional [36]. In modern theories, resilience as a multidimensional construct contains in itself temperament, personality traits and special abilities, e.g. active problem solving. The response to the process of resilience in Poland is made primarily by the Survey of Resistance Assessment (KOP-26) by the authors K. Gąsior, J. Chodkiewicz, and W. Cechowski [37]. The concept on which the construction of the tool is based refers to the model created by Haase [38]. Although it has been developed for a specific group (young people with cancer), it contains ample universal content. It is an example of the concept of resilience based on a positive approach to mental health. Joan E. Haase distinguished three groups of protective factors that make up the psychological resilience. The first group includes individual



factors referring to the strategy of effective cognitive and emotional coping in problem / stress situations. These include: hope, courage, faith, a positive self-image, the ability to deal with stress, and openness to other people. The second group contains family factors that focus on the family atmosphere, family support and security provided by the family (e.g. support, good, friendly contacts between family members). The third group includes social / environmental factors that are related to coping with the peers and receiving support from them - for example, having close friends, the opportunity to ask for help. Both this model and other studies indicate that the processes of resilience are formed throughout life, especially in individual, family and social dimensions [37, 39]. Hardiness together with other mediators takes part in the resilience process, which is manifested through risk factors and protective factors in the process of positive adaptation. The risk reflects the type, level of health threat and factors that protect the potential of behaviors leading to overcoming difficulties. Many authors [40-42] note that the processes of resilience are based on different models of interaction of protective factors and risk factors. The result of these interactions is not predetermined because it depends on the coincidence and strength of many factors.

Three models are best known, i.e.: (1) compensatory model, (2) an immunity or protective model, and (3) a challenge model. There are also new variants in the literature [43] describing the protective model. In the first variant, the so-called protective stabilizing model, the presence of a protective factor reduces the outflow of risk and maintains the frequency of undesirable behavior at a constant low level (stabilizes it). On the other hand, in a different variant (protective-reactive model), the presence of a protective factor reduces the frequency of undesirable behavior, but it is not able to keep it at a constant low level.

### **Interest in the construct of mental hardiness in health psychology**

Bearing in mind the multitude of concepts and many problems with determining and studying the variables, it is not easy to find one's own way. Mental hardiness is definitely a variable less common and less frequently used in research than compared earlier sense of coherence or resilience. While it seems that the resilience as a process of interaction of many variables affecting health is superior and other buffering or mediating variables can be relied upon, hardiness is one of them, Antonovsky's concept is in fact apparently quite convergent with the concept of S. C. Kobasa and S.R. Maddi, however, it is differentiated by the approach to one's own constructs as orientating traits or instructions. Aron Antonovsky strongly emphasizes the role of cultural context and environmental balance as an aspect to which each individual tries to return. For Kobasa, Maddi and the continuators of the hardiness concept, a permanent change is the most natural and constant element of functioning. Hardiness should be taken into account in the study and its correlations should be checked for different groups of subjects and the obtained results should be compared with other researchers.

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