

PERCEPTION OF COLOURS BY MENTALLY-HANDICAPPED PUPILS

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The following article attempts to utilize general knowledge of colours in the sphere of physical culture and applies it to physical education in special schools. It is based on the precondition that education of mentally-handicapped pupils should proceed under conditions evoking pleasurable feelings in them. And such conditions also include colours.

The article presents the results of an examination of colour preference in probands with slight to moderate mental handicaps. The results show that probands with a slight mental handicap tend to be sensitive in relation to colours, even in their abstract form. They prefer blue, respectively green and red, and they have difficulties with perception of black and violet. The favourite colour preference in probands with a more serious mental handicap is more variable than in probands with a slight mental handicap.

Keywords: Colour, physical education, mental handicap, pupil.

INTRODUCTION

During the perception of objective reality that surrounds us the most important thing is the visual analyser with the help of which we receive approximately 84% of all information (Cibulka, 1980; Bohony, 1984). Visually we perceive not only the shape and movement of objects but also colours in all the spectrum. Perception of colours is innate to the human eye. Perception of colours is allowed by the ability of the human eye to distinguish different wave-lengths of light. In colours we perceive nature as well as the products of civilization. Colours influence our mood and state of mind. Some colours provide energy to us, stimulate us, some are repelling. There are pleasant colours and there are irritating colours, and according to C. G. Jung "emotional" individuals react to them strongly (Pleskotová, 1987). There really exists a special relationship between colours and our feelings, as researched by psychology and psychiatry (Veverková, 2002). At the same time psychology researches also the psycho-physical aspects of colour perception and the symbolic value of colours.

Dr. Max Lüscher (Swiss psychologist, born 1923) defined the following basic colours: blue, green, red and yellow. Their combination creates a number of other colours. Interpretation of primary and derived colours appears to be significant for our intentions on the level of presentation of research results allowing eventual comparison with results of other research projects. Lüscher (1990) has determined the following colour perception:

Blue – retards and balances neural processes, sedates skeletal muscles. It develops ease because it reduces blood pressure, pulse and respiratory rate, and the regeneration mechanisms bring energy to the body. This colour presents appurtenance, aims towards empathy and meditative consciousness.

Green – stimulates parasympathetic division and therefore smooth muscles. It develops tension. The physiological condition of the organism is alert to resistance. Preference of this colour denotes the expression of strength and resistance against changes. It is indicative of uniformity of opinion and emphasis on "myself". In relation to emotional content, it is primarily about pride and a sense of power and superiority.

Red – stimulates parasympathetic division and activates skeletal muscles. It represents the physiological condition of the expenditure of energy, accelerates the pulse, increases both blood pressure and the pulse rate. It is related to all forms of vitality and power, its emotional content is desire and passion.

Yellow – relieves and affects both subsystems of nervous system. It expresses undampened expansiveness, develops relaxation, increases blood pressure, as well as pulse and respiratory rate, but this process is unstable. Its emotional content is "volatility full of hope".

If we use another criterion, we can divide the colours into primary: red, yellow, blue; and secondary: orange, green and violet. Tertiary colours are mixtures of primary and secondary – green-blue, etc. Pleskotová (1987) treats the following colours as primary: blue, red, green, yellow, orange, violet, brown, black, white. The fact is that the English Dictionary of Colours (1955) contains

7500 separate colours and states their unique definition (<http://aitie.scssoft.com/colours/colours.html>). This frequency is caused by the fact that colours can be differentiated not only as to their tint (shade) but also value and saturation (Veverková, 2002).

Perhaps the best known classification of colours is from the point of view of their effect on physiological functions (the effect can be proven by measurement) (Pleskotová, 1987). This classifies colours into warm/hot and cool/cold colours.

Warm colours – yellow, orange, red – evoke one's temper and orient it to life and motion. They incite activity, stimulate the function of the vegetative nervous system, and increase blood pressure.

Cool/cold colours – violet, blue, green – are rather sedative, they damp physiological functions.

Colours are significant even in the sphere of physical culture. Based on experience, let us try to outline the characteristics of the function of colours in the sphere of physical culture:

- Colour serves as a group-uniting attribute, which consolidates the consciousness of appurtenance (colour of sports uniforms, etc.).
- Colour has an emphasizing function (lines on the playing-field, colour of the playing-field, referee's outfit, cards and flags, etc.).
- Colour represents tradition (e.g. club colours).
- The colour of sportswear influences the environment as well as the wearers themselves, who lose anonymity and are differentiated from others. For example, during the Olympic Games in Athens (2004) the matches in boxing, Greek-Roman wrestling and free-style wrestling, without a known favourite, were usually won by sportsmen in red sports clothing. Similar results were found by anthropologists also in football games during the World Cup where five teams won more often if they were wearing red uniforms rather than blue or white uniforms (Vinař, 2005).
- Colour has a motivational function. The colour of equipment, requisites, or of the sports area catches or distracts the attention of the gymnast, motivating or dissuading the gymnast from his or her activities. It is obvious that a pleasant, colour-balanced environment tunes one's spirit to pleasant ease.
- Colour carries an aesthetic function as most processes and phenomena realized within physical education, sports and recreation are accompanied by aesthetic aspects (Chlup, 1963; Hohler, 1981). It is possible to mention as an example the choreography of mass appearances with the use of colours of clothing. In some sports disciplines, aesthetic impression is part of the ranking and naturally the factor of colours chosen is important.

In physical education at school the situation is quite different. It looks like the dignity of the educational facilities – schools – excludes sharp colouring of the respective areas and instruments. Typical colours of most old gymnasiums and playgrounds have been brown and grey. According to Lüscher (1990), brown evokes the need for safety and physical comfort, and grey is preferred by persons longing for standing aside, separated from bonds. The above indicates that brown and grey go against sports activities and respective experiences.

However, in recent years there is a tendency towards more colourful choices even in physical education at school. In our opinion, the introduction of diverse colours to gymnasiums is a lawful requirement. But on the other hand, a strict application of the theory of colours to the environment of physical education at school may be fancy but not efficient. This implication holds the more true the more we concentrate on physical education of pupils with mental handicaps. In the case of such pupils, it is predominantly the emotional aspect of their personality that governs their attitudes and behaviour. Experiences with a biological basis in the feeling of pleasure and excitement are very important motivational factors for mentally-handicapped pupils. The above implies that the pupils are captivated by and bear relation to matters evoking in them pleasurable feelings, and vice versa. In the case of mentally-handicapped pupils, there is another important factor at play, the primary controlled conformity (grass is always green, the sky is a symbol of blue, yellow is identified with the sun). Therefore we believe that together with the functionality of colours in the sphere of physical education, also the notions of the pupils should be respected, i.e. which colours they prefer and which they hate.

RESEARCH OBJECTIVE

The research project, the results of which are presented here, was oriented to ascertaining preference of colours in relation to experiences and feelings of pupils with mental handicaps.

We put the following research question:

How do mentally-handicapped pupils perceive particular colours in the environment of physical education?

- a) The first research project was carried out in a group of 72 boys with a slight mental handicap, pupils of special schools (13–15 years). The research was carried out using questionnaires administered under the direct supervision of a researcher. Each question had nine possible answers: a range of nine colours differentiated by tint, while keeping approximately the same saturation and value of colour (Fig. 1). The range of colours consisted of the basic range of colours according to Pleskotová (1987).

- b) The second research project was carried out with the participation of 153 probands, boys with moderate mental handicaps (18–50 years). The research in this group of probands was focused only on ascertaining their preferred colour. The method was as follows: the probands could choose from clothes pins in nine colours of the basic colours range (Pleskotová, 1987). The probands were asked to choose the pin they liked the most. Clothes pins were chosen because the probands know them as a training instrument from the psycho-motoric program. The said method was used because the probands cannot read and write and they do not know the names of the colours.

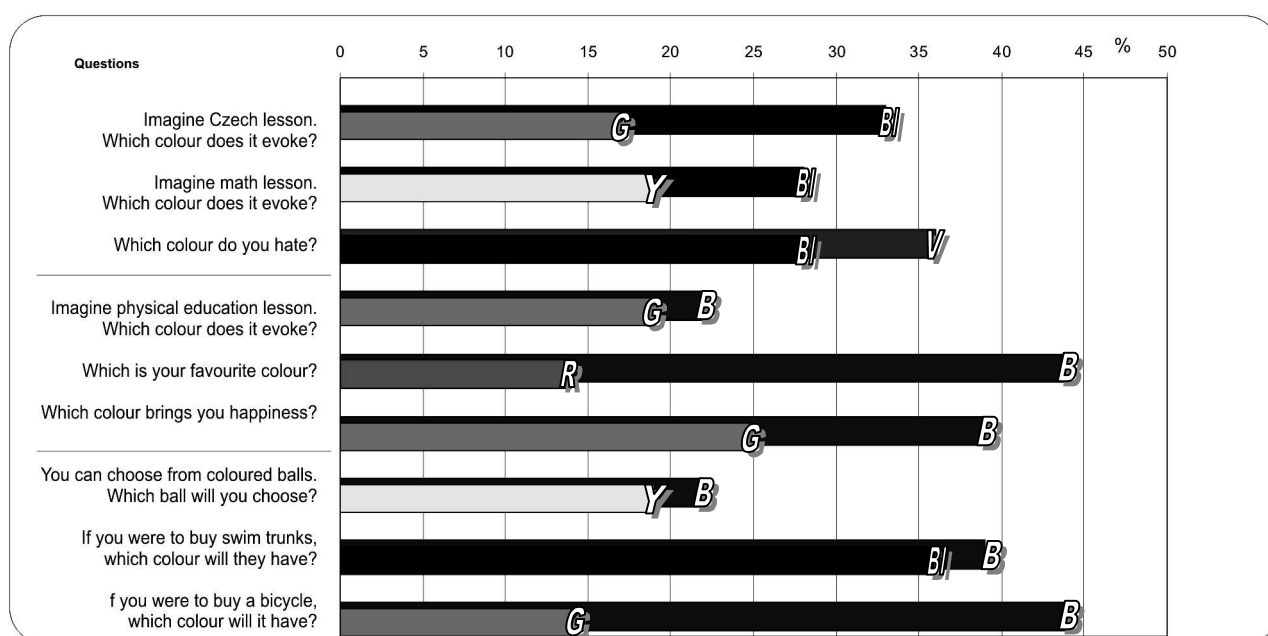
RESULTS AND ARGUMENTATION

Results and argumentation about the research in probands with a slight mental handicap

We chose answers to nine questions from the questionnaire applied in the first research group. The answers of the probands to the separate questions in percentage formulation are presented in Fig. 1. We present two colours, which were the most frequent in the answers.

Fig. 1

Percentage of answers in probands with a light mental handicap



Legend:

B - blue
R - red
G - green
Y - yellow
V - violet
Bl - black

The first three questions are oriented to ascertaining nonfavoured colours of the probands, based on the expectation that lessons in Czech language and mathematics are not their favourite ones. At the same time the questions are aimed at the sphere of abstract colour perception. The fact that perception of colours in the intact population is influenced by the associations and experiences of each individual, and vice versa, has been proven by several researchers (Wexner, 1954 and Lawler & Lawler, 1965 in Veverková, 2002). Our research implies that pupils with a slight mental handicap perceive

colours, even in their abstract form. After expressing a concrete phenomenon known to them, they are able to assign to it emotionally-evoked colour meaning. Mathematics and Czech lessons (Fig. 1) are connected in their minds mostly with the colour black. Pogády (1993) and Šicková-Fabrice (2002) call attention to the fact that black in this context signals problems and sadness. It is therefore very probable that mathematics and Czech language are lessons, in which pupils with a slight mental handicap experience feelings of failure. Generally it is possible to state that the colour black relates to a pro-

test against the given conditions, and individuals under the affective influence of the colour black tend to revolt and act in haste. According to the conception of the probands, black evokes darkness, death, "I am afraid", "it brings worse luck", "I can't see in darkness", etc. In connection with mathematics, also the colour yellow is mentioned. This finding is in line with Šicková-Fabrice (2002), stating that yellow is the colour of thinkers and supports one's intellectual capacity. Unfavourable colours are dominated by black and violet. The colour violet is justified by the probands as follows: it is too rich, it is annoying, and it is worn by women. This finding is the absolute opposite of Lüscher's statement (1990) that violet is preferred by mentally and emotionally immature persons.

The next three questions in the questionnaire are aimed at favourite colours, on condition that lessons of physical education belong among students' favourite school subjects. It is evident (Fig. 1) that probands clearly prefer the colour blue. This finding differs from the results of research in boys above 10 years of age of the intact population (Pogády, 1993) where the colour blue ranks fourth in the order of popularity (red, green, yellow and blue). Blue is a colour of peace and harmony but also of cold, feelings of solitude, being in the dumps and distance. If blue is preferred and if it does not indicate the compensatory mechanism within the meaning of peace, then it indicates, according to Lüscher (1990), inner balance or the wish to reach such a condition. Another favourite colour is green. Green is comforting, refreshes mind and soul, and provides strength and resistance against external effects. In Lüscher's test (1990) persons preferring this colour need to attain a feeling of self-esteem by self-assertiveness or acknowledgment by others. It is selected by stubborn and less adaptable persons (Pleskotová, 1987; Puchnarová, 2005). Less than 15% of probands prefer the colour red. Red gives strength to a person, as well as dynamics and an appetite for life. Red is preferred by hyper-active and aggressive children (Šicková-Fabrice, 2002).

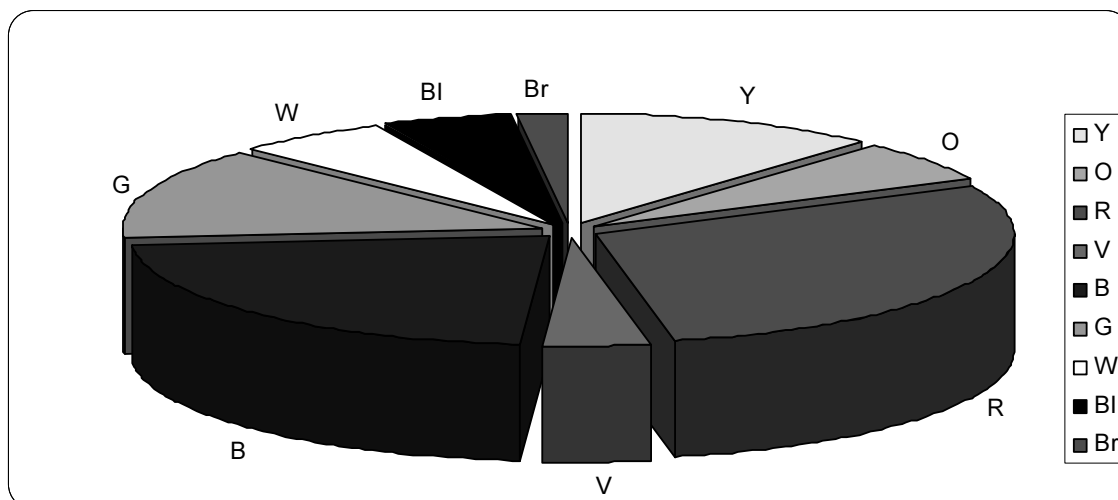
The last three questions ascertain the preference of colours by probands in the context of sports instruments and sportswear (Fig. 1). This part is also dominated by the colour blue, most probands wanted a blue ball, a blue swim suit as well as a blue bicycle. According to Puchnarová (2005) blue is preferred by the credulous, complaisant and helpful, it is a valuable source of help in the life of stressed and restless people. Approximately 30% of probands would select a black swim suit. A number of mentally-handicapped pupils cannot swim (Karásková, 2001), and the selection of the colour black can implicitly signal a fear of staying in the water. The possibility of the influence of fashion trends is irrelevant in the probands.

Results and argumentation about the research in probands with a moderate mental handicap

The results of research in the area of preferred colours in the second group of probands with a moderate mental handicap is presented in Fig. 2. It is not possible to state an unambiguous preference of cool or warm colours in this group of probands. The ascertained quantitative representation of colour preference shows higher inter-individual variability than in probands in the first group. In contrast to probands with a slight mental handicap, the individual preference of colours is divided between all colours of the basic range. This huge lack of homogeneity in the preference of colours in the probands is probably the factor complicating innovation activities of physical education teachers in this field. Even if probands from this group prefer blue, even more of them, almost 30%, like red the most. However, we suppose this finding is caused by the fact that red draws the attention of the proband with a moderate mental handicap the most. Red has a shorter wavelength and travels to the human eye faster than blue, for example (Vinař, 2005; Puchnarová, 2005). In pupils with a moderate mental handicap this can be the reason for conformity with objects evoking pleasant feelings (red as an apple, strawberry, etc.).

Fig. 2

Favourite colours in probands with medium-heavy mental handicap



Legend:

B - blue colour O - orange
 R - red V - violet
 G - green Bl - black
 Y - yellow Br - brown

CONCLUSION

We are aware of the fact that the results of this research cannot be generalized, because of: the low number of probands in the research groups, non-standard experimental conditions, dependence of experiencing the colours on the proband's personality, e.g. if they relate yellow to the sun, they will have pleasant feelings, if they relate this colour to jaundice, they will have unpleasant feelings (Pleskotová, 1987). Therefore we take a critically-confidential approach to the findings, and our opinion is formulated within the meaning of the following tendencies:

- Probands with a slight mental handicap tend to perceive colours sensitively, even in their abstract form.
- It is not possible to state if warm or cool colours are of different importance in mentally-handicapped probands.
- It seems that probands with a slight mental handicap connect the affective content in the context of identical colour similarly to intact population individuals.
- Mentally-handicapped probands prefer most commonly blue, green, and red, and they have difficulty accepting black and violet.
- The preference of favourite colours is more variable in probands with a moderate mental handicap than in probands with a slight mental handicap.

The education of mentally-handicapped pupils should proceed under conditions evoking pleasurable feelings in them. Such conditions also involve colouring. The concept that pupils are primarily captivated by the content of physical education is not true. If we know the preference tendencies in pupils within the sphere of colours, let us try and respect this fact. Its use will support especially pedagogical objectives, not only within physical training but also within the whole educational effort.

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VNÍMÁNÍ BAREV ŽÁKEM S MENTÁLNÍM POSTIŽENÍM (Souhrn anglického textu)

Předložená stať se pokouší o využití obecných poznatků o barvách v oblasti tělesné kultury a aplikuje je na tělesnou výchovu v podmínkách speciálních škol. Vychází z předpokladu, že vzdělávání žáků s mentálním postižením by mělo probíhat za podmínek, které v nich evokují libé pocity. A k těmto podmínkám patří i barevnost.

Jsou prezentovány výsledky šetření preference barev probandy s lehkým a středně těžkým mentálním postižením. Výsledky naznačují, že probandi s lehkým mentálním postižením mají tendenci citlivě vnímat barvy, a to i v abstraktní podobě. Preferují modrou, případně zelenou a červenou barvu a hůře přijímají černou a fialovou. Preference oblíbené barvy je u probandů s těžším mentálním postižením více variabilní než u probandů s lehkým mentálním postižením.

Klíčová slova: barva, tělesná výchova, mentální postižení, žák.

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