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Sborník prací Filozofické fakulty brněnské univerzity. I, Řada pedagogicko-psychologická. 1966, vol. 15, iss. I1, pp. [7]-12

Stable URL (handle): <https://hdl.handle.net/11222.digilib/112921>

Access Date: 30. 11. 2024

Version: 20220831

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THE DIFFERENCE IN EMOTIONAL IRRITABILITY BETWEEN ASTHMATIC AND NORMAL CHILDREN

Asthma bronchiale is a very frequent condition in childhood. The frequency of this disease keeps on increasing, and in many cases we fail to notice improvement. For this reason the affected child should be taught to live even with this handicap in such a way as to keep its normal psychic development unimpaired. Thus the asthmatic child presents not only a medical problem, but also a psychological and a social one.

It was McDermott, Cobb, Rogersonn, Harcastle and Duguide who stressed the part played by emotion in calling forth asthmatic fits. By analyzing anamnestic material McDermott and Gobb determined the connection between emotional factors and occurring fits with 30 of 50 observed asthmatic patients. Twenty of these patients stated that their very first asthmatic fit was brought about by emotional disturbance (agitation, anxiety and the like).

We therefore find emotionality at the basis of starting mechanisms letting loose a series of asthmatic fits, and this emotionality may at the same time serve as a criterion of the health of the child in question. Besides, an increased emotionality of the child which co-exists with the asthmatic process may of itself be the cause of failure in medical treatment.

It is a well-known fact that one's relations to other people and to one's environment in general have always an emotional background, the latter predetermining whether the relation will assume a more positive or a more negative character. Judging from this point of view we find in emotionality the key to understanding and estimating the peculiarities in the behaviour of asthmatic children as well.

The asthmatic children display emotional unstableness, greater irritability, and excessive sensitiveness. They often react impulsively, feel offended, are touchy, believe to be wronged, which induces them to weep, intrigue, and join with others in rebellion. Their typical features, as can be observed, are egocentrism, the habit of exacting love from others, infantilism, dominer, lack of adaptability, the desire for superiority, envy, simulation, and poor ability of solving personal conflicts.

The very character of their illness makes asthmatic children call forth abnormal situations in the family, at school, and in intercourse with other children, which again after boomerang fashion results in new disturbing reactions in the asthmatic children, due to insufficient adaptability and increased emotional irritability.

These reactions become fixed when such situations recur, they may even get aggravated and through time assume the character of constant qualities.

Summing up we may say that the significance of emotional peculiarities in asthmatic children consists in the fact that they represent a basic component of the development of negative features in the child's character, and that there is an immediate connection between them and the disease, which makes of them an important factor in the diagnosis and treatment of asthma bronchiale.

For these reasons we have selected from the different psychical peculiarities of asthmatic children just the emotional disposition for the subject of our investigation.

For all the emotional peculiarities in the mental clinical picture of an asthmatic child we may find one common denominator, i. e. excessive emotional irritability in response to impulses, and primarily to unpleasant impulses.

This fact led us to choose such an experimental situation as would serve as a simple model of provoking negative emotional reactions by unpleasant impulses, enabling us at the same time to find in the experimental individual the degree of spontaneous inhibition of the reaction on unpleasant impulses, or — taking the problem from the opposite point of view — to find the degree of emotional activation, of emotional incitement, which at a certain limit changes into a reaction endeavouring to get rid of the unpleasant impulse. We conceived this experimental situation on the basis of Lindsley's theory of emotional activation.

We have therefore chosen the following experimental situation:

We fixed to the lobe of the child's auricle electrodes of an electrodermal stimulator, by means of which we could switch on and regulate the supply of the electric current in the electrodes. Thus we were able to pass electric current of 1—25 V through the ear-lobe of the child. For the child it was possible to break off at will the electric circuit by pressing a small lever in any phase of the growing intensity of the electric impulse and thus get rid of the creepy sensation or pain.

The child was given the following instructions:

"As soon as you start feeling in the outer ear creepy sensation, no matter how mild, say "now", and when you have the impression that the sensation is becoming unbearable, press the lever." This procedure was performed five times, and in each case the upper limit of tolerance was marked. From these five values there was subsequently calculated the average value. This investigation was carried out with a group of 44 asthmatic children kept in a sanatorium at Štrbské Pleso (these children had already passed the stage of acute fits) and with a control group of equal number of normal children attending a lower secondary school in Brno. Both groups were subjected to the same procedures, and the results obtained were compared.

RESULTS EXPRESSED IN NUMBERS

The results, expressed in numbers, present the following picture:

To determine the influence of investigated factors (i. e. the unit of tension at a given intensity) a mathematical model of dispersion analysis was chosen for two factors operating on two levels:

$$y_{ijr} = \mu + \xi_i + \eta_j + \theta_{i\mu} + e_{ijr}$$

- y_{ijv} the number of units (mV. and mA.)
 $i = 1$ the asthmatic group
 $i = 2$ the control group
 $j = 1$ boys
 $j = 2$ girls
 $v = 1, 2 \dots 22$ serial number of experimental individuals
 μ = total mean value
 ξ_i = the effect of illness (asthma) or of normal health
 η_j = the effect of sex, boys or girls
 ϑ_{ij} = the effect of interaction whether asthma or good health affects differently boys than girls
 e_{ijv} = a random component of the results, which is not included in the preceding parameters

We assume that stochastically these are independent random quantities with a normal distribution, the mean value being 0 and the characteristic σ being the same in all four groups.

An analysis of dispersion was made, and the significance of the parameters of our model was tested on the basis of the obtained data. First we have subjected to a test the hypothesis that the effects of illness and sex are simply added, that is to say, that the interaction is equal to 0:

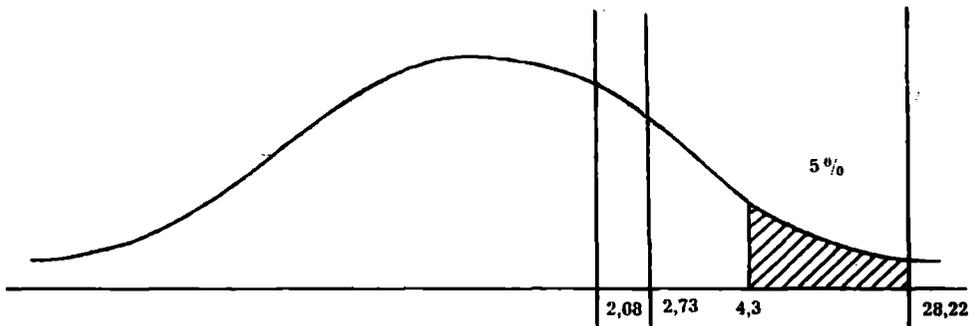
$$\vartheta_{11} = \vartheta_{12} = \vartheta_{21} = \vartheta_{22} = 0$$

The respective values of the Fisher-Snedekor criterion F is to be calculated by employing the formula

$$F = \frac{S_2^2}{S_1^2} = \frac{3195}{1167} = 2,73$$

This observed value of the statistic F does not belong to the 5% critical region, because the respective 95% quantile is according to the tables equal to

$$F_{0,95}(1; 84) = 4,3$$



Thus the interaction was found to be insignificant on the 5 % significance level and the tested hypothesis was corroborated. Neither asthma nor good health affects boys differently than girls.

Next we have subjected to a test the influence of the sex. We started with the hypothesis that the sex has no effect on the results

$$\eta_1 = \eta_2 = 0 \quad F = \frac{S_3^2}{S_1^2} = \frac{2344}{1167} = 2,08$$

This observed value of the statistic F neither belongs to the 5 % critical region, because the respective 95 % quantile is according to the tables equal to

$$F_{0,95}(1; 84) = 4,3$$

The influence of the sex proved to be insignificant on the 5 % significance level and the hypothesis got corroborated.

Our next object of testing was the influence of asthma and that of normality. Also here we assumed that this factor does not affect the results, that is to say, we accepted the hypothesis

$$\xi_1 = \xi_2 = 0 \quad F = \frac{S_4^2}{S_1^2} = \frac{32841}{1167} = 28,22$$

This time the observed value had to be inserted in the dextral 5 % critical region, while the hypothesis was not corroborated and therefore must be rejected. The effect of this factor on the 5 % significance level was proved to exist.

The effect of age was estimated in each of the four groups extra on the basis of the model

$$y_{ij\nu} = \alpha_{ij} + \beta_{ij}x_{ij\nu} + e_{ij\nu}$$

$x_{ij\nu}$	age ν of an individual in the group ij ($i = 1,2; j = 1,2$) = 1,2 .. 22
α_{ij}	systematic component of the results, independent of the age limit in the group ij
β_{ij}	theoretical regression coefficient in the group ij β_{ij} indicates the regression line, that is to say if the age progresses by one year, the average tolerance increases by β_{ij}
$e_{ij\nu}$	random component of the results with ν an individual in the group ij

In reference to each group we have tested the hypothesis that the age has no effect on the results, in other words, that we have to accept the validity of

$$\beta_{ij} = 0$$

We employed Student's test t . The respective values of these statistics we derive from the formula

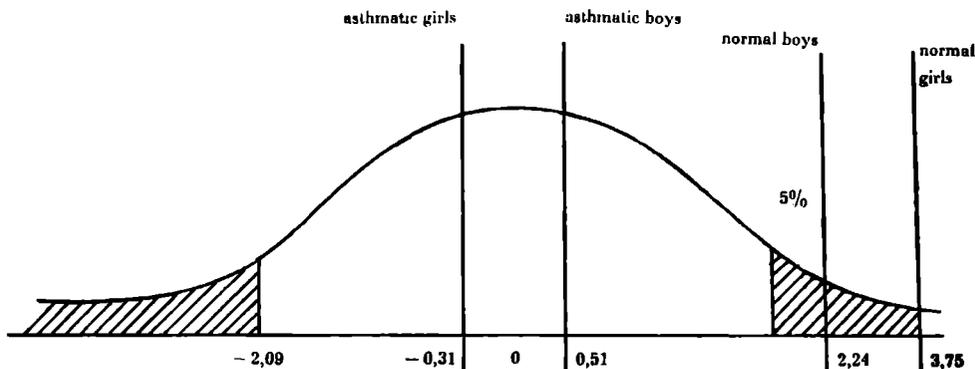
$$t = \frac{l_{ij}}{S_{ij}}$$

in this way we get:

for the group of asthmatic boys	t	0,51
for the group of asthmatic girls	t	0,31
for the group of normal boys	t	2,24
for the group of normal girls	t	3,75

We have tested with respect to bilateral alternatives. The respective quantile of Student's distribution

$$t_{0,975}(f = 22 - 2) = 2,09$$



In the two first groups of asthmatic boys and girls the observed value did not belong to the 5 % critical region. The effect of age is not significant on the 5 % level, and thus the tested hypothesis got corroborated.

In the other two groups of normal boys and girls the observed value belonged to the critical region, while the hypothesis was not corroborated and must be rejected. The effect of age is therefore statistically significant in the two groups of normal children on the 5 % level.

Conclusions

It was found that

1. the upper limit of emotional tolerance with respect to electric current is significantly higher in normal children than in asthmatic children;
2. the upper limit of emotional tolerance is independent of the sex, which makes the results reliable;
3. the upper limit of tolerance depends on the age in so much that it rises with the progress of age in normal children, whereas in asthmatic children it falls, which also contributes to the reliability of the results; it means that the longer is the duration of the illness the weaker becomes the ability of the child to inhibit his or her reaction on unpleasant impulses.
4. Apart from the results pertaining to the upper limit of emotional tolerance we have also registered the values determining the time of the child's first sensation of the electric impulse. The sensation threshold was on the average lower in asthmatic children, which again speaks in favour of the assumed higher irritability of these children.
5. Further contemplated investigation:
 - a) children will be investigated in the course of acute fits;
 - b) comparative studies of other allergic diseases and of some chronic diseases will be performed.

6. Conclusions applicable to practical work:

- a) The above method may be used as indicator in the course of illness or at the time of improvement, and the objective character of the results may be found helpful when the methods of medical and pedagogic treatment are being decided upon.
- b) The results may be found useful to those who try to get a deeper theoretical insight into the problem of the origin and development of bronchial asthma.

Translated by S. Kostomlatský

ROZDÍL V EMOČNÍ DRÁŽDIVOSTI DĚTÍ ASTMATICKÝCH A ZDRAVÝCH

Emocionalita je v základu spouštěcích mechanismů rady astmatických záchvatů i v základu vývoje některých negativních charakterových vlastností bronchiálního astmatem nemocného dítěte. Zvýšená emocionální aktivace takového dítěte může být sama zdrojem neúspěchu léčebných zásahů lékaře.

Všechny emocionální zvláštnosti vyskytující se v klinickém obraze psychiky astmatika lze převést na společného jmenovatele, kterým je zvýšená emoční dráždivost na podněty, především na podněty nepříjemné.

Proto byla podrobena výzkumu emoční dráždivost na průchod elektrického proudu (a napětí 1—25 V) lalůčkem ušního boltce dítěte. Dítě mělo možnost v kterékoliv fázi zvyšování intenzity elektrického podnětu spontánně rozpojit pomocí malé páčky elektrický okruh a zbavit se tak pocitu mravenčení až bolesti.

Bylo zjištěno, že: 1. horní mez emocionální tolerance vůči elektrickému proudu u zdravých dětí je významně vyšší než u dětí astmatických; 2. horní mez emocionální tolerance není závislá na pohlaví, což podmiňuje spolehlivost výsledku; 3. horní mez emocionální tolerance je závislá na věku, a to tak, že u dětí zdravých se s věkem zvyšuje a naopak u dětí astmatických se s věkem snižuje; 4. pocitový prah je u dětí astmatických v průměru nižší.

Protože výzkum byl proveden na astmatických dětech v období rekonvalescence, budou ještě vyšetřeny děti v období akutních záchvatů, kdy lze předpokládat, že změny v emoční dráždivosti budou ještě výraznější. Perspektivně bude provedeno srovnání s jinými alergickými chorobami a s některými chronickými chorobami.

Možné závěry pro praxi: Použitá metoda by mohla sloužit jako indikátor průběhu onemocnění, resp. procesu uzdravování, takže výsledky získané touto metodou mohou být objektivním vodítkem pro stanovení léčebných a výchovných postupů. Výsledky mohou přispět k prohloubení teorie vzniku a vývoje bronchiálního astmatu.