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MEDICAL STUDENTS' KNOWLEDGE AND SENSITIVITY TO DYSMORPHIC FEATURES OF A CHILD WITH CRANIOFACIAL MICROSOMIA (CFM)

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SUMMARY

Background:

The aim of the study was to examine the level of knowledge and sensitivity to dysmorphic features in a child with facial and body dysmorphism on the part of students of medicine and dentistry.

Material/ Methods:

We tested 70 students of medicine and 70 students of dentistry. A photograph of a child with craniofacial microsomia (CFM) was shown to all the tested students. Their task was to detect and name those facial deformities and describe the child in terms of selected features not related to the child's health condition. As a tool was used the *Overgeneralization Effect Scale* and a questionnaire designed by the author relating to facial deformities.

Results:

Significant differences were observed in the level of knowledge and sensitivity to dysmorphic features between students of medicine and dentistry. Future dentists detected more dysmorphic features in the face of the photographed child when compared to students of medicine. Interestingly, this sensitivity to abnormalities was found to noticeably increase with each subsequent year of study for dentistry students, while the opposite was observed for the students of medicine. Importantly, a relationship was observed between the sensitivity to dysmorphic features and the general evaluation of the child in terms of non-medical aspects by the group of dentistry students. With the increase in the students' skills to recognize dysmorphic features, the overall evaluation of the child tended to decrease.

Conclusions:

The results obtained indicate that the skills related to recognizing dysmorphic features are better in students of dentistry than in students of medicine. The sensitivity to abnormalities evidently increase with each subsequent year of study for dentistry students, while the opposite was observed for medical students.

Key words: medical students, education, learning, overgeneralization effect, empathy

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INTRODUCTION

Physical appearance plays an important role in shaping relationships between people.

The appearance of the face and the body provides numerous indicators that allow the assessment of the possibility of maintaining an interaction and evaluating its quality. On the one hand, these may be transient indicators related to the emotional state, which, if read properly, may or may not be conducive to interaction [Marsh, Ambady & Kleck, 2005; Zebrowitz, Kikuchi & Fellous, 2010]. On the other hand, permanent changes in the structure of the face and the body determine the interactions in the long term, necessitating a continuous adaptation to such changes [Paulhus & Martin, 1986; Riklin, Andover & Annunziato, 2019; Streissguth, Herman & Smith, 1978]. So far, there has been no convincing explanation as to what role the face plays in creating a person's overall image and any subsequent interaction with them.

An attempt at an explanation can be found, to some extent, in the models of facial perception from a neurobiological perspective [Bruce & Young, 1986; Hoffman & Haxby, 2000; Gobbini & Haxby, 2006; Maurer, Grand & Mondloch, 2002] as well as in Gibson's ecological approach [Gibson 1979]. The neurobiological perspective explains how the face, as an extremely complex stimulus, is processed, something that is the basis for its recognition and identification. However, this perspective offers no answers as to what impact various modifications of this complex stimulus can exert on people's attitudes. Gibson's ecological approach, in turn, provides some kind of framework for such questions. The psychological perspective inevitably requires analysis of the phenomenon of social stigma towards people with facial and body deformities.

Any abnormalities, regardless of their extent, may generate it, leading to a lower evaluation of the patient's worth. This aspect was mentioned by Goffman, who listed "abominations of the body" as one of the three factors that can discredit a person in the eyes of society [Goffman, 2005]. In recent years, the ecological approach has been integrated with the evolutionary perspective, which has broadened the context for explaining difficulties that may occur in interactions with people with a changed facial appearance [Zebrowitz, 2017; Zebrowitz & Montepare, 2008]. It has turned out that even subtle changes in the face can become an indicator which people have to adapt to. This may result in a biased perception of, or drawing conclusions about the characteristics of such a person, who has an altered physical appearance. This is referred to as the overgeneralization effect, and it serves an adaptive function in human interactions.

For educating future doctors and dentists, studying overgeneralization effects may prove to be particularly valuable. Starting from the first year of study, students of both degree programs are presented with the human body from a perspective far beyond the current canons of beauty. Moreover, in the course of study, students come across patients with particularly unattractive appearances, ones altered by disease itself. Overgeneralization effects, described in the literature on psy-

chology, which are particularly interesting for the education of future doctors and dentists, are the effects in the response to children's facial features and changes that lower the attractiveness of the face. It was concluded that regardless of the person's age, childlike facial features (one indicator or their combination) are more likely to be associated with traits such as: friendliness, honesty, warmth, or the requirement of intellectual or social support [Keating & Bai, 1986; Eibl-Eibesfeldt, 1989; Zebrowitz, Andreoletti & Collins et al., 1998].

Regarding the attractiveness of the face, overgeneralization effects turned out to be stronger here. These indicators can even evoke caution in people while establishing interpersonal relations. People tend to associate "ugly" faces with evil, while "beautiful" faces - with goodness and intellectual attractiveness [Griffin & Langlois, 2006; Zebrowitz & Rhodes, 2004; Feingold, 1992]. Thus, overgeneralization effects may also occur upon contact with a child suffering from numerous abnormalities in the structure of the face and body. People, however, have different ways of labelling and defining these abnormalities. In the course of medical studies, such labelling is indispensable for the introduction to diagnostics. Students are faced with two processes that, from an ecological-evolutionary perspective, may seem conflicting. The first one is being able to detect an increasing number of dysmorphisms for a more precise diagnosis (adaptation to the requirements of the curriculum), which is inevitably accompanied by perceiving the face and body as less attractive. The second is an attempt to keep the childlike features of the patient in mind, despite disruptions in the process of inference caused by the child's facial and body deformations (adaptation in the interpersonal relationship with the dysmorphic child). When faced with such contradictory processes, students of medicine are likely to become less empathetic, but more competent in detecting developmental defects in the course of study. It is only recently that researchers have started to look closer into the changes in the level of empathy in the course of medical studies and the diminishing role of this factor [Papageorgiou, Miles & Fromage, 2018; Schwartz, Horst & Fisher et al., 2020].

The aim of the study was to examine the level of knowledge and sensitivity to dysmorphic features of a child with facial and body dysmorphia on the part of students of medicine and dentistry.

MATERIAL AND METHODS

The examined group consisted of first and fourth-year students of medicine and dentistry. The group was selected from among other majors examined as part of the project on the perception of developmental defects among university students. 140 students participated in the research: 70 students of medicine and 70 students of dentistry. Both majors are medical sciences, the study program of which includes courses in anatomy and histology with cytophysiology, teaching about the structure of the human body. In their fourth year of study, students of dentistry have the opportunity to obtain very specialized knowledge in the field

of face and head anatomy, during classes such as oral and maxillofacial surgery with oncology. This course is only available to students of dentistry.

Participation in the study was voluntary. Consent for the scientific project was obtained from the Independent Bioethics Committee for Scientific Research at the Medical University of Gdansk (NKBBN/178/2018).

The research was conducted with the use of a questionnaire designed by the author (AQ) and the *Overgeneralization Effect Scale (OES)* developed by K. Milska and A. Mański. A brief description of the research methods is presented below. The aim of the author's questionnaire (AQ) as used in the research was to monitor the perception of developmental defects among the examined subjects. The participants were asked to list as many defects and abnormalities as possible on the face and head of a boy suffering from *Craniofacial Microsomia [CFM]*, as shown in the photographs.

Based on a professional dysmorphological description prepared by a pediatrician and a genetics specialist, 10 categories of abnormalities were defined, to which the answers of the research subjects were subsequently assigned. The categories were established according to the parts of the face and head affected by dysmorphic disorders: the skull, forehead, face, eyes, eyelids, eyebrows, nose, ears, lips, teeth. What was examined was the ability to recognize irregularities for a given part; however, the answers were not assessed in terms of their correctness. The possible score ranged from 0 (lowest score) to 10 (highest score).

The *Overgeneralization Effect Scale (OES)* is a method involving 20 pairs of adjectives with opposite meanings. Assessment of a given trait was made on a 7-point, bipolar scale. The combination of 20 OES characteristics allowed for the assessment of the child in terms of: *Fitness, Personal traits, Values and Appe-*

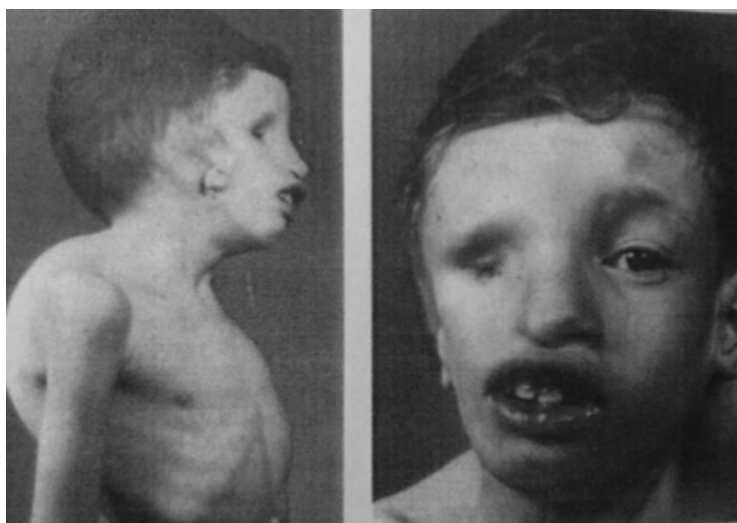


Fig. 1. Photographs of the assessed child. Source: *Syndromes of the Head and Neck*
Source: Gorlin, Hennekam & Cohen (2001)

arance, and enabled to obtain an Overall Score related to the general image of the child shown in the photographs [Mański, 2016].

Statistical analysis of the obtained results was carried out with the use of the Statistica software.

RESULTS

Author’s Questionnaire (AQ) for examining the perception of developmental defects

The lowest average score among all examined groups was obtained by the fourth-year students of medicine ($M=3.88$). The students of dentistry were more capable of detecting abnormalities in the child’s face and head. The highest average score was obtained by the fourth-year students of dentistry ($M=5.81$).

For the dentistry major, the fourth-year students obtained a statistically significantly higher result in terms of the ability to detect abnormalities of the face and head, compared to the students of the first year ($p=0.001$). The opposite was observed for the students of medicine, but the result turned out to be statistically insignificant ($p=0.555$).

Table 1. Basic characteristics of the answers obtained in the AQ for given years and fields of study

Major	Year	Average score	SE	N
Medicine	1	4.13	0.26	45
Medicine	4	3.88	0.34	25
Dentistry	1	4.40	0.28	38
Dentistry	4	5.81	0.30	32

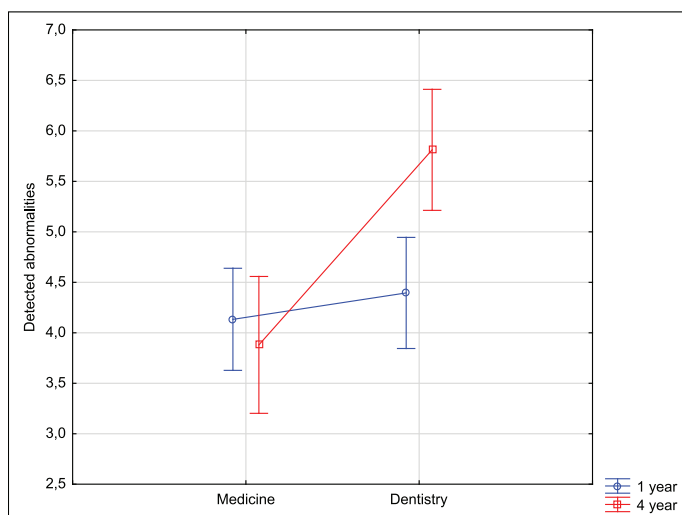


Fig. 2. A figure showing the post-hoc comparison for abnormalities detected by students of medicine and dentistry in a given year of study

The Overgeneralization Effect Scale (OES)

Statistical analysis of the *Factors* and the *OES Overall Score* showed statistically significant differences in the *Appearance* factor between the students of the first and the fourth year of medicine and dentistry. Differences in the results for the factor *Personal traits* turned out to be statistically significant between the first-year students of medicine and dentistry, as well as between the first-year students of medicine and the fourth-year students of dentistry. In terms of the *Overall Score*, statistically significant differences were found for the first-year students of medicine and the fourth-year students of dentistry. In terms of such

Table 2. Means (M) and standard error (SE) for the Factors and the OES Overall Score obtained by students of medicine and dentistry, according to the year of study (I or IV)

Major	Medicine		Dentistry	
Factor: <i>Appearance</i>				
Year of study	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
I	19.69	0.34	19.90*	0.37
IV	19.16	0.46	18.75*	0.41
Factor: <i>Values</i>				
I	20.16	0.68	18.58	0.74
IV	20.44	0.91	18.59	0.81
Factor: <i>Fitness</i>				
I	12.82	0.60	11.82	0.65
IV	13.08	0.80	11.44	0.71
Factor: <i>Personal traits</i>				
I	22.67*,**	0.60	20.50*	0.66
IV	20.92	0.81	20.56**	0.72
<i>Overall score</i>				
I	75.33*	1.69	70.79	1.84
IV	73.60	2.27	69.34*	2.00

*** $p < 0.05$

Table 3. Correlation of the Factors and OES Overall Score with the number of Abnormalities detected by the students of medicine and dentistry.

Major	Medicine			Dentistry		
	<i>N</i>	<i>Spearman's R</i>	<i>p</i>	<i>N</i>	<i>Spearman's R</i>	<i>p</i>
Factor: <i>Fitness</i> x number of abnormalities	70	0.030	0.807	70	-0.294	0.013*
Factor: <i>Personal traits</i> x number of abnormalities	70	-0.171	0.157	70	-0.311	0.009*
Factor: <i>Values</i> x number of abnormalities	70	-0.183	0.129	70	-0.236	0.049*
Factor: <i>Appearance</i> x number of abnormalities	70	0.001	0.992	70	-0.382	0.001*
Overall Score OES x number of abnormalities	70	-0.135	0.265	70	-0.353	0.003*

factors as *Values* and *Fitness*, no statistically significant differences were observed between the examined groups. In terms of all the *Factors* examined, the students of medicine tended to evaluate the child presented in the photographs better than did the students of dentistry. An exception was the average score obtained by the first-year students of dentistry in terms of the *Appearance* factor ($M=19.90$), which turned out to be higher than the score obtained by the students of medicine in the same year of study ($M= 19.69$).

Analysis with the use of Spearman's rank correlation method revealed a statistically significant relationship between all the *Factors* and the *Overall Score* on the *Overgeneralization Effect Scale*, and the number of *Abnormalities* detected by the students of dentistry. All the mentioned correlations are negative. The strongest negative correlation concerns the *Appearance* factor and *Abnormalities* ($R=-0.382$), while the weakest - the *Values* factor and *Abnormalities* ($R=-0.236$). For the students of medicine, none of the correlations analyzed turned out to be statistically significant.

DISCUSSION

The starting point and inspiration for the following discussion was the article published by Pentiado, de Almeida, Amorim et al. (2016). The authors describe a case study of a student of medicine and his difficult experience while giving care to a newborn with Patau syndrome (a chromosomal condition associated with severe intellectual disability and physical abnormalities in many parts of the body diagnosed at birth) and to her mother. The student showed great maturity and empathy stemming from humanist values. Thanks to the narrative approach adopted, the student was able to bring out the meaning behind the story and to view the situation from both the mother's and the girl's perspective. His introspection transformed an initially apprehensive interaction into a positive experience. As the authors imply – he was “strengthened by the power of maternal love”. Moreover, the student's interpretations of this meaning of love and value of life encouraged him to reframe his process of education. Two important issues emerged from that case study, which were addressed in this research: empathy and communication, as well as their enormous role in the practice of medical professionals.

The main finding of the research was that students of dentistry tend to become more sensitive and perceptive with subsequent years of study (in the test, they detected more abnormalities in the photograph), whereas the opposite correlation was observed for students of medicine, with the lowest score in detecting abnormalities obtained by fourth-year students of medicine. This suggests that students' empathy levels change in the course of their education, with the tendency to decrease with each subsequent year of study [Jeffrey, 2019]. The decrease in the level of empathy of senior students can be explained as a kind of defence mechanism, allowing future doctors or dentists to cope with the pressure and responsibility that professional practice puts on them. This sug-

gests the need for incorporating into the curriculum a regular training program to foster empathy and prevent its decline over subsequent years of study [Mani, Chen & Menon et al., 2019; D'souza, Rasquinha & D'souza et al., 2019].

Interestingly, the analysis showed that students of dentistry are better at detecting abnormalities in the structure of the face and head of the child in the presented photographs and the highest score in this respect was obtained by fourth-year students of dentistry. This might be associated with greater focus on the area of the head, and thus greater sensitivity and ability to detect any deviations from the norm there. In the course of study, from the first year, students of dentistry are focusing on the face, particularly the jaw area, which can make this group more sensitive and "alert" to any abnormalities. The results obtained in this research may be contradictory to other research suggesting that with increasing levels of experience, the level of empathy in dentistry undergraduates decreases [Narang, Mittal & Saha et al., 2019]. The results presented may also indicate the need to sensitize students of medicine, for the purpose of increasing their empathy competence. In the education process, both art and mere observation can find application. Including elements of art in the study program can not only foster empathy, but also improve observation skills and promote reflection on the part of students. This allows students to be engaged in a holistic and humanistic way, to develop competences such as socialization skills, and allows them to prevent burnout and enhance overall well-being [Shapiro, Coulehan & Wear et al., 2009; He, Prasad & Higashi et al., 2019].

On the other hand, the question remains as to whether detecting fewer deformities can be associated with a lower level of empathy. It cannot be unambiguously determined, but the present research confirmed that identifying a smaller number of abnormalities in the picture was associated with a better assessment of the child's skills and abilities (at a statistically significant level among students of dentistry). The authors agree that empathy (and its level) is a complex phenomenon difficult to define and measure, but one that can undoubtedly be beneficial to both the patient and the doctor [Mongrain, Chin & Shapira, 2010; Papageorgiou, Miles & Fromage, 2018; Moudatsou, Stavropoulou & Philalithis et al., 2020]. Nevertheless, it seems that the most important factor is the will to understand another person as a whole, with respect to interpersonal differences and boundaries. Empathy is contextual and can be influenced by many variables, such as norms and attitudes, time restraints, language, or communication barriers. Hence, there is a need for a more holistic approach in teaching empathy in the course of medical studies to better prepare students for future clinical practice [von Knorring, Semb & Fahlström et al., 2019; Michael, Dror & Karnieli-Miller, 2019; Schwartz, Horst & Fisher et al., 2020].

In summary, the research carried out suggests that there is a relationship between the level of education (year of study) and the level of empathy among students of medicine and dentistry, which emphasizes the importance of providing adequate training in this area. Properly organized special courses, programs, and educational tools in the field of communication skills and empathy

can be used throughout the teaching process for both majors. It seems, however, that the implementation of such measures is most crucial at the very beginning and then at the end of the course of study (e.g. the fourth and fifth years). Social skills and an adequate level of empathy can be helpful for doctors while facing challenges such as delivering bad news [Jackson, Cichon & Kleinert et al., 2020]. From the patient's perspective, it is extremely important to experience cognitive and emotional support on the part of the doctor as well as their attention and honesty [Redo & Bielawska-Batorowicz, 2014; Sobczak, Leoniuk & Janaszczyk, 2018]. Both doctors and dentists encounter in their practice many difficult situations requiring knowledge, appropriate skills and experience. They all have one thing in common – another human being at the other end of the communication channel, who trusts that he or she will receive the best possible help and care. For this reason, it is strongly recommended that educational interventions are introduced to increase the awareness of the benefits of learning communication skills and empathy, and its significance to patient care.

Moreover, the “Hawthorne's effect”, especially in the group of fourth-year medical students (the lowest scores in defect detection) could have affected the results. This project was carried out in an artificial, arranged setting that may not be reflective of any actual, real-life situation. Other limitations are related to the photograph used in the study. First of all, the subjects evaluated the photograph of a child, which may limit the possibility of drawing conclusions for an analogous situation, but with the use of a photograph of an adult. Nevertheless, the obtained results point to certain conclusions worth considering. Secondly, the evaluated photograph of a child may have aroused some extreme emotions.

Any perceptions and experiences, releases emotions, because it stimulates the reward / punishment system by creating new connections in the brain. An unpleasant real experience, also flashbacks, releases negative emotions because it stimulates the lateral prefrontal cortex and strengthens the penalty system by perceptions and experiences [Pačalska, 2019]. Negative emotions e.g. fear, sadness, are included in the working memory, and, they are remembered in the long term memory, if they are important for the person. At the same time, the reward system is weakened (cf. Fig. 3). Accordingly, pleasant perceptions and experiences release positive emotions (e.g. joy), because they stimulate the reward system by creating connections from the basal part of the frontal cortex to the anterior (emotional) part of the anterior cingulate cortex. At the same time, the penalty system is weakened.

The strength and duration of these emotions are associated with the importance of the event for the person. Therefore, perceptions and experiences might modify the minimal (working) self, and the longitudinal (autobiographical) self, strengthening the significance of a given (negative or positive) event (see Pačalska 2019).

As Pačalska, Kaczmarek and Kropotov (2014; 499) note, the activation of the reward/penalty systems is not indifferent to the organism, as new connections in the brain can create new neural circuits. If the person is very sensitive such

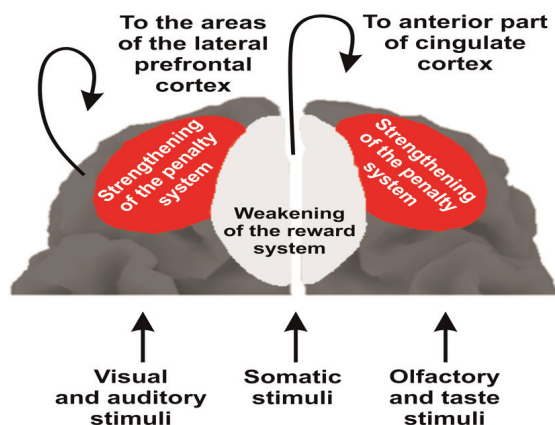


Fig. 3. The reward /penalty system: the medial part involves the processing of the reward, and the lateral part involves the processing of the penalty.

Source: Pačalska, Kaczmarek and Kropotov 2014, modified

perception and experience might return in dream. During sleep, the resting system works, creating a system of neural connections that are stimulated when we rest with open eyes or sleep, and inhibited when we perform specific tasks. Hence, it enables one to combine and evaluate data coming from outside and inside the body, because it covers the posterior part of the ACC, the lateral area of the prefrontal cortex. These structures have numerous connections with areas related to cognitive activities and emotional processes, therefore, the resting system is also assigned the role of a super-irrigator, which secures the coordinated action of individual brain areas. This is loosely linked with changes in the interpreter of the world (Pačalska, Kaczmarek & Kropotov, 2014). It means that the perception and experience may have a positive or negative impact on a given person. Despite this, none of the participants expressed the need for psychological help in connection with the research.

The authors hope that this research will draw attention to the requirement for the introduction of more specialized courses in the field of anatomy and body dysmorphism (especially of the face and head) to the study program of medical majors, in order to improve the effectiveness of diagnosing and treating developmental defects in the future. There is a need for incorporating into the curriculum within the field of medicine a regular training program for students to foster empathy and prevent its decline over subsequent years of study.

This step might improve the effectiveness of detecting defects and abnormalities by future doctors, and subsequently to improve the quality of the rehabilitation and treatment process of children with *CFM* in the future, which may translate into patients' quality of life.

Last but not least, cultural and educational diversity can have a significant impact on results obtained by researchers. Despite the promising results obtained, further research is necessary, also among the inhabitants of other countries.

CONCLUSIONS

The results obtained indicate that the skills related to recognizing dysmorphic features are better in students of dentistry than they are in students of medicine. The sensitivity to abnormalities evidently increases with each subsequent year of study for students of dentistry, while the opposite was observed for medical students.

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