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*Dear Readers,*

We present to you the following volume of our journal. For the first time we introduce the „Editorial Papers” column which will appear likewise other columns depending on the kind of articles sent and editorial's plans.

In the next „European Journal of Physical & Health Education” volume we would like to begin publishing the series of articles about broadly defined problems concerning physical education teachers' education, basing on the works sent to us by authors from various countries. The readers, who are interested in presenting among other things, their studies' results or popularization achievements of other authors from their countries, are invited to prepare an article concerning these problems. After positive review, works will be published in next volumes, in sequence of their sending. More detailed information which can help potential writers, who learn about our initiative this way, is given at the end of this issue.

We wish you a very pleasant read

Tomasz Lisicki  
/ Editor-in-Chief /

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## Can We Play a Game Now? The Intrinsic Benefits of TGfU

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### Abstract

As an instructional model Teaching Games for Understanding (TGfU) has been identified as impacting predominantly upon the cognitive domain. The impact of exposure to a TGfU Physical Education (PE) instructional model within the affective domain of learning, however, has been less well researched and calls have been made for further investigation. The purpose of this study was to examine the impact of TGfU versus a traditional skills-based approach on the intrinsic motivations of 11–14 year old children in PE.

Ninety-nine boys and one hundred and three girls from three schools were assigned to one of the treatment conditions dependent on their current PE class. The intervention lasted for six weeks during which half of the sample was taught an invasion games unit of work using a TGfU approach and the other half was taught using a traditional skills-based approach. PE teachers were trained to deliver the appropriate approach and lessons in the first two weeks were observed to ensure consistency. The Intrinsic Motivation Inventory (IMI) [Ryan, 1982] – a six-subscale instrument that measures perceptions of interest/enjoyment, sport competence, effort/importance, choice, pressure/tension and value/usefulness – was administered pre- and post intervention. A two way (group x gender) ANCOVA was used to adjust for the baseline subscale score. Significant group, gender and interaction effects were noted on all subscales.

The results clearly illustrate the positive effects of a TGfU intervention, in terms of an intrinsically motivating climate, when compared to a skill-based approach; indeed these results have particular pertinence for a National Curriculum for PE recently revised to accentuate process, concepts and student creativity.

Furthermore, longitudinal studies should investigate the efficacy of such approaches with respect to longer term physical activity participation and engagement for young people.

Keywords: Teaching Games for Understanding; affect; intrinsic motivation; creativity.

### Introduction

Research has shown that as children grow older their interest and participation in physical education (PE) decreases [22]. More specifically, The Health Education Authority (HEA) [13] has indicated that the physical activity of young people in the UK has shown a steady decline. Such findings are extremely worrying given the continued concern expressed about increasing obesity levels and sedentary lifestyles adopted by a significant number of children and adolescents [11]. However, prominent professional organisations [3] still advocate the role of physical education programmes in promoting public health. Specifically, one of the corporate objectives of AfPE is to 'raise awareness of physical education's contributions to public health and well-being' (AfPE online).

Since experts stress that lifestyle physical activity habits need to be developed early in life [29], there is little doubt that PE programmes provide the appropriate setting for the promotion

of health-related learning and behaviours. Consequently, early, positive, physical activity experiences in an educational environment ought to increase the likelihood of maintaining a physically active lifestyle [36]. Thus, as B.L. Alderman et al. [1] espouse, 'quality physical education programmes and effective physical educators play a vital role in providing youngsters with early positive experiences of physical activity' (p. 41).

Allied to this positive environment is the need to motivate individuals to initiate and maintain a physically active lifestyle [1]. The belief that motivation is a key component in active engagement is well established and generally unquestioned [18, 32]. A primary goal, therefore, for all physical education specialists is to 'increase youngster's motivation to engage in, and enjoy, regular physical activity' [1, p. 44]. As J.R. Whitehead and C.B. Corbin [38] explain:

throughout the development of school physical education and youth sport, there has been

a universal and intuitive belief held by professionals that such programmes hold tremendous potential for developing self-esteem and motivation in children...learning sports skills and success in sports can lead to self-esteem and that self-esteem can lead to a desire to persist in sports (p. 192–193).

Indeed, J.R. Whitehead and C.B. Corbin's contention might appear increasingly salient in England considering the advent of the revised National Curriculum for PE (NCPE) in September 2008 at Key Stage 3 (11–14 years) that could be viewed as less prescriptive and more student-centred [26].

Previous research has suggested that physical activity environments that promote intrinsic motivation, perceived physical competence and mastery-orientated physical activity tasks are key components in determining physical activity motivation [1, 20]. More specifically, studies have also shown that the intention to be physically active after the school years is positively predicted by intrinsic motivation [23]. Therefore, the environment in which physical educators deliver their programmes of physical activity and by inference, games, is of great importance and consequently there has been much debate regarding the delivery and learning outcomes of games experiences [14].

The introduction of the tactical Teaching Games for Understanding (TGfU) approach [5] was a key catalyst for discussions of pedagogical and theoretical aspects of games teaching. D.J. Bunker and R.D. Thorpe [5] developed TGfU in response to the typical and more prevalent method of games teaching that relies heavily on highly structured lessons where the teaching of technique is predominant (i.e. skills based teaching). Indeed, the central aspect of the debate focused on the relative merits of the TGfU approach over traditional skills-based teaching. Research that has been undertaken to elucidate upon the relative strengths of the TGfU approach has, however, tended to focus mainly on cognitive and psychomotor learning outcomes [2, 35], with limited consideration of the affective domain of learning in published literature.

C.C. Pope (2005) explains that there is a degree of, "perceived vagueness or ambiguity about the meaning of the term [affect]" (p. 273)

and the inability to provide an exact definition of 'affect' is illustrated throughout social psychological literature. B. Moore & A. Isen [21] make reference to the generic and all encompassing nature of affect – distinct from the intense, focused and disrupting nature of emotions (for example, disgust, anger, pleasure). J.A. Beane [4], meanwhile, explains that affect is also founded on a range of dimensions including beliefs, aspirations, attitudes and appreciations – individually and collectively.

Irrespective of the supposed indeterminate nature of the affective domain, young people consistently associate principal reasons for PE and sport participation in terms of fun and enjoyment [1, 30]. Therefore, the inference from these and other studies is that fun and enjoyment are defined as positive affective responses by young people, and, more saliently, intrinsic determinants of participation [25].

Most of the published research associated with TGfU focuses on outcomes in terms of the performance outcome; nevertheless as Werner et al. (1996) have suggested, the primary purposes of teaching any game should be not only to 'improve students' game performance [but also] to improve their enjoyment and participation in games, which might lead to a more healthy lifestyle' (p. 32). R.J.A. Jones et al. [16] qualify this point, by advocating such approaches (TGfU) within the National Curriculum for Physical Education (NCPE), because of the potential for the enhancement of student self-perceptions that are closely associated with intrinsic motivation.

Some studies [12] have suggested that affective outcomes, such as fun and enjoyment, may be enhanced through TGfU, and that pupils may be more highly motivated to participate due to its games-orientated approach. For example, children, coaches and parents all acknowledged that games and game-like situations were more fun than technically orientated drills [34]; while D.J. Bunker & R.D. Thorpe in their original 1982 text highlighted that pupils often perceived the skill development phase of a lesson as boring and irrelevant resulting in the commonly asked question: "when are we going to play a game?"

## Aim

The primary aim of this study was to investigate the impact of the employment of a TGfU approach compared to the impact of a traditional 'skills based' approach on the intrinsic motivations of pupils in Key Stage three (11-14 year olds).

## Materials and Methods

### Participants

Two hundred and two Key Stage three (KS3) pupils from three secondary schools in the West Midlands, England, UK took part in the study (School X n=85, 39 males, 46 females; School Y n=48, 23 males, 25 females; School Z n=69, 37 males, 32 females). Participants were grouped by their physical education classes in school and taught by their physical education teacher. Two teachers from each school participated in the study, (one male and one female) and the male teacher taught the male pupils and the female teacher taught the female pupils. This was due to the fact that within the selected schools this was the standardised format for teaching physical education.

### Ethical Considerations

All three secondary schools were contacted prior to the commencement of the study, and following discussion and in accordance with the ethics approval procedures of the University, the head teacher and PE teachers involved gave written informed consent.

### Instrumentation

#### Intrinsic Motivation Measure

The Intrinsic Motivation Inventory (IMI) was used to measure intrinsic motivation. The instrument contains six subscales assessing participant's levels of interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, and perceived choice while performing a given activity. Responses are rated on a likert-scale from 1, not at all true, to 7 very true.

The IMI items have often been modified slightly to fit specific activities without effecting its reliability or validity [28]. For the purpose of this study it was slightly reworded so participants were able to respond specifically to physical education e.g. 'this activity' was replaced with 'PE' throughout.

### Procedure

Before the beginning of the study one researcher held several meetings with the two teachers from each school to outline the underlying principles and procedures of the study. The nature of the two teaching models was explained thoroughly, through both written and verbal communication to ensure that all teachers understood how to deliver their invasion games unit of work to both groups of pupils. The two approaches were then piloted by the teachers prior to the start of the study and observed by the researchers to ensure validity and consistency in teaching approach. The IMI was also piloted with a sample to make sure that KS3 pupils understood the terminology used within the questionnaire.

Teaching took place over a six week period, known as a unit of work in which the teachers taught an invasion game dependent on their timetables. The IMI was completed by pupils at the end of their previous unit of work, in order to obtain baseline figures for motivation in physical education.

Each teacher then taught their two groups of pupils using either a skills based or TGfU approach – *selected at random* – for the duration of the unit of work. The IMI was again administered at the end of the unit of work.

## Results

Table 1 presents the pre- and post- intervention mean scores and standard deviations for all of the subscales included on the IMI and interpretation of the outcomes of 2 (teaching approach) by 2 (gender) ANCOVA for each subscale using the baseline subscale score as the covariate.

Two way (group x gender) ANCOVA adjusted for the baseline subscale identified: significant main effects for teaching approach for interest & enjoyment ( $F(1,197)=241.74, p<0.001, \eta^2=.55$ ), effort/importance ( $F(1,197)=197.39, p<0.001, \eta^2=.50$ ) and perceived choice ( $F(1,197)=154.17, p<0.001, \eta^2=.44$ ) with the TGfU group significantly higher on each subscale; significant main effects for both teaching approach and gender for value/usefulness [group  $F(1,197)=304.49, p<0.001, \eta^2=.61$ ; gender  $F(1,197)=9.83, p=.002, \eta^2=.05$ ].

squared=.05] with the TGfU students significantly higher than the skill-based students and girls significantly higher than boys in both conditions; and significant interaction effects for perceived competence ( $F(1,197)=5.99$ ,  $p<.05$ ,  $\eta^2=.03$ ) with boys in the TGfU group responding signifi-

cantly more positively than girls and for pressure/tension ( $F(1,197)=10.68$ ,  $p<0.01$ ,  $\eta^2=.05$ ) with girls in the TGfU group responding significantly more positively than the boys.

Table 1. Means ( $\pm$ SD) for subscales at pre- and post- intervention for the TGfU and skills-based groups

	Pre		Post	
	TGfU	SB	TGfU	SB
<b>Interest &amp; enjoyment</b>	4.65 $\pm$ 1.04	4.89 $\pm$ 1.00	5.98 $\pm$ .71	4.89 $\pm$ 1.02 <sup>a</sup>
<b>Perceived competence</b>	4.97 $\pm$ .82	4.94 $\pm$ .81	6.08 $\pm$ .68	5.07 $\pm$ .75 <sup>c</sup>
<b>Effort/importance</b>	4.35 $\pm$ 1.06	4.42 $\pm$ 1.11	5.64 $\pm$ .72	4.50 $\pm$ .98 <sup>a</sup>
<b>Perceived choice</b>	2.96 $\pm$ 1.14	2.82 $\pm$ .96	3.79 $\pm$ 1.00	2.88 $\pm$ .88 <sup>a</sup>
<b>Pressure/tension</b>	3.44 $\pm$ 1.00	3.26 $\pm$ .93	2.64 $\pm$ .94	3.31 $\pm$ .87 <sup>c</sup>
<b>Value/usefulness</b>	3.84 $\pm$ .83	4.12 $\pm$ .92	5.48 $\pm$ .81	4.17 $\pm$ .87 <sup>b</sup>

<sup>a</sup>Group main effect; <sup>b</sup>Group & gender main effects; <sup>c</sup>Group x gender interaction

Whilst statistically significant interaction and gender effects were identified in relation to the perceived competence and pressure tension subscales, the respective moderate to small effect sizes [9] render these particular results practically unimportant relative to the group effects. Consequently, these results will not form part of the discussion.

## Discussion

The purpose of this study was to investigate the impact of the employment of a TGfU approach compared to the impact of a traditional 'skills based' approach on the intrinsic motivations of pupils in Key Stage three (11–14 years old). The results presented in table 1 identify significant enhancement of each of the IMI subscales as a result of exposure to the TGfU teaching approach.

Significant main effects were identified for the interest and enjoyment, effort and importance and perceived choice subscales indicating that both males and females in the TGfU groups had reported enhanced levels of intrinsic motivation. Increased levels of intrinsic motivation are clearly desirable since the intention to be physically active after the school years is positively predicted by intrinsic motivation [23]. This finding is supportive of previous assertions [12] that affective outcomes, such as fun and enjoyment, may be enhanced through TGfU as pupils may be

more highly motivated to participate due to its games-orientated approach.

The results of the choice subscale reflect the notion that perceived choice, or in this respect, an autonomous physical educational environment has a positive impact on intrinsic motivation [10], since both male and female TGfU groups illustrated a significant increase in perceived choice over the six week teaching period ( $p < 0.001$ ).

It is worth noting that whilst the mean scores for choice and autonomy are relatively low, they are congruent with previous findings [23] where students also reported low scores for perceived choice and autonomy. N. Ntoumanis [23] argued that such findings could be attributed to the fact that: 'PE teachers in Britain have to follow a very prescriptive National Curriculum which often does not provide chances for student initiative and leadership roles' (p. 236), thus reducing feelings of perceived choice in games and physical education<sup>1</sup>.

<sup>1</sup> Since this study was conducted the NCPE has undergone revision: 6 *Areas of Activity* (Games, Athletics, Swimming, Dance, Gymnastics and Outdoor & Adventurous Activities) have been replaced by a *Range and Content* strand that does not refer to specific activities directly. Instead this strand is founded upon underlying principles (e.g. "outwitting opponents", "identifying and solving problems"). The Qualifications and Curriculum Authority (QCA) [26] emphasises a dramatic paradigmatic shift from product, teaching and content to process, personalised learning and transferable skills.



It is also possible, that PE teachers do not feel comfortable experimenting with new teaching models or styles, particularly ones that reduce their control over the class and provide a greater degree of student involvement. As J. Butler [6] argues, 'the rub is that change is not always comfortable' (p. 228) specifically referring to the generation of teachers who 'teach the way they were taught' (p. 226). Moreover, the Skill Based approach to games teaching is still found to be the prevailing teaching method used by PE practitioners [8], despite the recommendation for critical oriented pedagogy in initial teacher education [17].

Therefore, although the teachers in this study carried out, what they interpreted as, a TGfU unit of work with pupils, their understanding and application of the TGfU process may not have included a vast amount of choice. This is most likely due to each teacher's 'value orientation' [7]; furthermore, she contends that most teachers carry a disciplinary mastery value orientation, which is inherent in skills based teaching. This would prevent teachers, at least immediately, from being able to reduce their control over the class – control asserted possibly through the use of closed or leading questions, and thus provide fewer opportunities for choice and student involvement.

The significant gender interaction on the value/usefulness subscale, indicated that girls perceived TGfU related activities to fulfil individual needs and provide satisfaction more than boys. These findings support previous research by J. Mandigo et al. [20] who found significant gender variations in relation to TGfU lessons taught in an autonomy supportive environment. A. Lee [18] meanwhile, commenting on the work of B.W. Pissanos and P.C. Allison [24] advises that: "gender was more powerful than skill level, academic achievement, participation level, physical size, creativity, timidity, popularity, verbal ability, or impressionability in influencing how students construct meaning of...physical education (p. 143). She also maintains that the value an individual affords a particular task is critical in defining meaning, enjoyment and subsequent engagement.

Typically, but not exclusively, activities that are ego oriented in nature (competition, compari-

son) can have a *general* de-motivating effect [15] others, however [28] reported girls, specifically, valuing a task or mastery (autonomy supportive) orientation. Interestingly, A. Williams and J. Bedward [39] articulate, through relational analysis, the desire of mid adolescent girls to participate in, and experience, traditional boys games including football, rugby and cricket – denied them in formal PE settings. Undoubtedly, with the revisions – dare it be said improvements – made to the NCPE and the dissolution of specific activity areas, there is a great opportunity for both sexes to experience an array of games considered unfamiliar or novel in PE prior to 2008 (for example, Australian Rules football, Ultimate, Floor ball, Kabaddi, etc).

## Conclusions and Recommendations

The current findings lend support to previous studies [14], that affective experiences (in this respect intrinsic motivation) can be significantly enhanced through TGfU interventions in PE. Furthermore, the apparent autonomy supportive environment of such an approach [20] has important practical implications for the teaching of games within the NCPE. First, TGfU is ideally suited to a PE Curriculum underpinned by concepts and processes [26], and, hence, the opportunity to explore the transferable nature of a variety of game forms. Second, the results of this study advocate the implementation of TGfU as meaningful and valued games pedagogy (especially for girls based on the results of the current study) at a time when games (typically team games) according to A. Smith et al., [31] continue to predominate the NCPE landscape. Notwithstanding this contention, caution must be urged considering the small sample that participated in this study, and further investigation of the mediating effects of gender on TGfU interventions is warranted.

Limitations to this study include the fact that participants were treated as a homogeneous sample, all pupils were from Key Stage 3 (11–14 years of age) when subtle and dramatic variations have been measured in the self-esteem of early to mid adolescents [33]. Therefore future research should look at the influence that TGfU has on pupils from different age ranges and Key Stages and examine developmental differences. Another sug-

gestion includes carrying out a similar study but within alternative categories of games (e.g. net/wall, striking & fielding), in common with J. Mandigo et al. [20].

Students' subjective experiences within PE classes are often affected by their perception of the skill needed to successfully engage in an activity – invasion games were reported by J. Mandigo & N. Holt [19] to significantly diminish levels of motivation in their participants with an accompanying increase in negative comments.

Despite the limitations, the results of this study have important practical implications. It is

evident that TGfU has positive effects on the affective experiences of children (albeit, with respect to a small sample) in PE. Lastly, therefore, a longitudinal research design is merited to examine the long-term effects of a TGfU teaching model on the interest and participation in games and physical activity. Games will always dominate the teaching landscape in England (especially traditional team games) as it is a cultural legacy of the nation. Consequently, it is a priority that they are taught in a meaningful way that engages and motivates young people.

## BIBLIOGRAPHY

1. Alderman B.L., Beighle A., Pangrazi R.P. (2006). Enhancing Motivation in Physical Education. *Journal of Physical Education, Recreation and Dance*, 77, 41–51.
2. Allison S., Thorpe R.D. (1997). A comparison of the effectiveness of two approaches to teaching games within physical education: A skills approach versus a games for understanding approach. *British Journal of Physical Education*, 28, 17–21.
3. Association for Physical Education (AfPE). Retrieved: February 7, 2009, from <http://www.afpe.org.uk/>
4. Beane J.A. (1990). *Affect in the curriculum: toward democracy, dignity and diversity*. Columbia: Teachers College Press.
5. Bunker D.J., Thorpe R.D. (1982). A model for the teaching of games in secondary schools. *Bulletin of Physical Education*, 18, 5–8.
6. Butler J. (2005). TGfU pedagogy: old dogs, new tricks and puppy school. *Physical Education and Sport Pedagogy*, 10, 225–240.
7. Butler J. (2006). Curriculum constructions of ability: enhancing learning through Teaching Games for Understanding (TGfU) as a curriculum model. *Sport, Education and Society*, 11, 243–258.
8. Capel S., Blair R. (2007). Making physical education relevant: Increasing the impact of initial teacher education. *London Review of Education*, 5, 15–34.
9. Cohen J.W. (1988). *Statistical power analysis for the behavioural sciences* (2<sup>nd</sup> Edition). Hillsdale, NJ: Lawrence Erlbaum Associates
10. Deci E., Ryan R. (Eds.), (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
11. Green K., Hardman K. (2005). *Physical Education Essential Issues*. London: Sage.
12. Griffin L., Oslin J.L., Mitchell S.A. (1995). An analysis of two instructional approaches to teaching net games. *Research Quarterly for Exercise and Sport*, 66, 65–66.
13. Health Education Authority (2003). *Young People and Health: Health Behaviour in School Aged Children. A report of the 2002 findings*.
14. Holt N.L., Streat W.B., Bengoechea E.G. (2002). Expanding the Teaching Games for Understanding Model: New Avenues for Future Research and Practice. *Journal of Teaching in Physical Education*, 21, 162–176.
15. John Wang C.K., Chatzisarantis N.L.D., Spray C.M., Biddle S.J.H. (2002). Achievement goal profiles in physical education: differences in self-determination, sport ability beliefs, and physical activity. *British Journal of Educational Psychology*, 72, 433–445.
16. Jones R.J.A., Polman R.C.J., Peters D.M. (2009). Physical self-perceptions of adolescents in Years 8, 9 and 10 in independent schools, state comprehensive schools and specialist sport colleges in England. *Physical Education & Sport Pedagogy*, 14, 109–124.
17. Kirk D. (2009). A Critical Pedagogy for Teacher Education: Toward an Inquiry-Oriented Approach, in R. Bailey, D. Kirk (Eds.), *The Routledge Physical Education Reader* (pp. 207–224). London: Routledge.
18. Lee A. (2009). Contributions of research on student thinking in Physical Education. In: R. Bailey, D. Kirk (Eds.), *The Routledge Physical Education Reader* (135–150). London: Routledge.
19. Mandigo J., Holt N.L. (2006). Elementary Students' accounts of Optimal Challenge. In: *Physical Education. The Physical Educator*, 4, 170–183.
20. Mandigo J., Holt N., Anderson A., Sheppard J. (2008). Children's motivational experiences following autonomy-supportive games lessons. *European Physical Education Review*, 14, 407–425.
21. Moore B., Isen A. (1990). *Affect and social behaviour*. Cambridge: Cambridge University Press.

22. Mowling C.M., Eiler K.K., Brock S.J., Rudisill M.E. (2004). Student Motivation in Physical Education. *The Journal of Physical Education, Recreation & Dance*, 75, 40–51.
23. Ntoumanis N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology*, 71, 225–242.
24. Pissanos B.W., Allison P.C. (1993). Students' constructs of elementary school physical education. *Research Quarterly for Exercise & Sport*, 64, 425–435.
25. Pope C.C. (2005). Once more with feeling: affect and playing with the TGfU model. *Physical Education and Sport Pedagogy*, 10, 271–286.
26. Qualifications and Curriculum Authority (QCA) (2009). PE and the National Curriculum aims. Retrieved on May, 12, 2009, from <http://curriculum.qca.org.uk/key-stages-3-and-4/subjects/physical-education>
27. Ryan R.M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, 43, 450–461.
28. Ryan R.M., Connell J.P., Plant R.W. (1990). Emotions in non-directed text learning. *Learning and Individual Differences*, 2, 1–17.
29. Sallis J.F., McKenzie T.L. (1991). Physical Education's role in public health. *Research Quarterly for Exercise and Sport*, 62, 124–137.
30. Smith A., Parr M. (2007). Young people's views on the nature and purposes of physical education: a sociological analysis. *Sport, Education and Society*, 12, 37–58.
31. Smith A., Thurston M., Green K., Lamb K. (2007). Sports Participation and the 'Obesity/health Crisis': Reflections on the Case of Young People in England. *International Review for the Sociology of Sport*, 39, 457–464.
32. Solmon M.A. (2003). Student issues in physical education: Attitude, cognition, and motivation. In: S. J. Silverman and D.D. Ennis (Eds.), *Student Learning in Physical Education (147–163)*. Champaign, IL: Human Kinetics.
33. Stiller J., Alfermann D. (2007). Promotion of a Healthy Self-Concept. In: J. Liukkonen, Y.V. Auweele, B. Vereijken, D. Alfermann, Y. Theodorakis (Eds.) *Psychology for Physical Educators*, 2<sup>nd</sup> Ed., 123–140. Champaign, IL: Human Kinetics.
34. Streaan W.B., Holt N.L. (2000). Players', coaches' and parents' perceptions of fun in youth sport. *Avante*, 6, 84–98.
35. Turner A.P., Martinek T.J. (1999). An investigation into teaching games for understanding: Effects on skill, knowledge and game play. *Research Quarterly for Exercise and Sport*, 70, 286–296.
36. Weiss M.R. (2000). Motivating kids in physical activity. *The President's Council on Physical Fitness and Sports Research Digest*, 3, 1–8.
37. Werner P., Thorpe R., Bunker D. (1996). Teaching Games for Understanding: Evolution of a Model. *Journal of Physical Education, Recreation and Dance*, 67, 28–33.
38. Whitehead J.R., Corbin C.B. (1997). Self-esteem in children and youth: The role of sport and physical education. *The Physical Self*. Champaign, IL: Human Kinetics.
39. Williams A., Bedward J. (2002). Understanding girls' experiences of physical education: relational analysis and situated learning. In: D. Penney (Ed.), *Gender and Physical Education*, 146–160. London: Routledge.

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# What do We Know about the Profile and Characteristics of University Physical Education Students? Findings from a Pilot Study

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## Abstract

The purpose of this pilot study was to compare and to analyze defining the profile of Spanish university students who register, study and complete either a Higher Degree in Physical Activity and Sport Sciences (PASS) or a Bachelor's Degree in Specialized Physical Education Teaching (SPET). A 59-item survey was distributed among 346 university students (246 from PASS and 100 from SPET). Results showed that a liking for sport was the fundamental reason why students choose a PE-related degree. SPET students were mainly oriented towards teaching, while PASS students considered a wider range of orientations, although in both cases their choices depended greatly on current job opportunities available in their country. Men tended to opt for teaching and women for other sport-related aspects, such as training, while other options like management or sports marketing become clearly a minority choice. Although this study may contribute with some information about PE university students' profile, more and better research in this regard is needed.

Keywords: physical education, university students, teachers.

## Introduction

University degrees in Physical Education (PE) have experienced a great deal of change during the last years in such a way that qualifying as a PE teacher is not their main objective anymore but also specializing in new domains like health, training or recreation [16]. In recent years various studies have examined the profile and expectations of students from different countries registered in different health-related university degrees such as medicine [8, 13], nursing [4, 5] or physiotherapy [9, 19] but to the authors' knowledge there is hardly any information about the profile of those students who register in PE-related university degrees and wish to specialize in health.

Lately it has been commented that there has been much criticism of how PE teachers are prepared to teach [18] and indeed very little is known about what forms of professional development PE teachers have undertaken in their careers or about their views on their professional learning requirements [1]. In this regard A.M. Dewar and H.A. Lawson [6] stated that understanding the subjective warrants that people have for the profession of physical education is crucial for a complete understanding of recruitment into

the profession. Furthermore, H. Lawson [14] suggested that if we had a better understanding of who our recruits were and what their beliefs about physical education are, we may be able to better design a more robust teacher education program.

Several studies have sought to identify reasons why people wish to become physical education teachers but these have all been primarily concerned with the socialisation process [12, 16]. Because of that and bearing in mind the different specializations that PE-related degrees are currently offering it seems that there is a need for studies to clarify the issues that have influenced students to choose a degree in PE and it also seems necessary to analyze if the information acquired during university training matches the student's initial expectations on the matter which is an important aspect for the future development of a career as a physical education teacher [22].

In Spain university degrees in Physical Education are organized into two categories: higher degree (licenciatura) and bachelor's degree (diplomatura). A Higher Degree in Physical Activity and Sport Sciences (PASS) offers a possibility to spe-

cialize as a high school PE teacher (12–17 years) and to obtain specific training in the fields of health, recreation and high performance training as well as management and sports marketing. A Bachelor's Degree in Specialized Physical Education Teaching (SPET) offers mainly a possibility to specialize as a primary school Physical Education teacher (6–11 years) and to acquire basic training in the fields of health and sports recreation.

Recently it has been suggested that understanding the reasons given by the students that affect their decision to choose physical education and to consider their expectations and aspirations will aid teachers in their assessment of what is successful in attracting students and what would be useful in marketing the subject [17]. However to the author's knowledge there is a lack of studies of this kind carried out with physical education Spanish university students.

In the light of all this, this study aims at analyzing and defining the profile of Spanish university students who register, study and complete either PASS or SPET with the objective of detecting possible changes in the curriculum in order to match the degree's contents with the student's initial expectations and improve their academic training as much as possible.

## Methods

The Faculty of Education and Sports Sciences of University of Vigo was purposefully chosen to conduct the research, since both degrees (PASS and SPET) can be studied there. A 59-item survey was distributed among all the students who were registered in the faculty during the academic year 2003/2004 and who were doing SPET (Group A) or PASS (Group B). The items of the survey were selected based on a literature review and consultations with physical education students and teachers who were working in the university at the time.

The survey was divided into six sections regarding Access Profile, Working Situation, Sports History, Job Expectations, Opinion about the plan of studies and Ideal Working Situation. Each section was composed of a variable number of items which offered several possible answers for the students to choose the one which best reflected their reality. The survey was car-

ried out during the last part of the first four-month term during teaching hours. In order to reduce the number of statistical comparisons, the answers were grouped according to the three main working environments in which students of both degrees may specialize: Teaching (TE), Sports-Recreation (SR) and Health (HE). A fourth group was added under the name of "Others" including minority options such as management or sports marketing.

The data was analyzed using SPSS software version 16.0 (SPSS Inc.). Given that this study has an exploratory purpose, the obtained results are presented in percentages, since the analyzed variables are qualitative. The only quantitative variable is age, which is presented through the measurement of the central trend (median and standard deviation).

## Results

Out of 550 eligible students for the study (400 registered in PASS and 150 in SPET), 346 questionnaires were obtained (246 from PASS and 100 from SPET), which meant a response rate of 62,9%. Survey respondents ranged in age from 17 to 38 years, with an average age of  $20.73 \pm 3.16$  years for SPET and of  $21.64 \pm 2.87$  years for PASS. The majority of these respondents were male (68% in SPET; 69,1% in PASS), while 84% of SPET students and 62,6% of PASS students entered university directly from high school.

In general, it is apparent that the number of male students is more than double the number of female students and that between 64% and 73% live in cities – table 1.

Approximately 30% of men in Group B studied another university degree while in the case of women this figure is slightly higher (35%) and so is the percentage of completed studies (53% women vs. 42% men). Around 33% of students in Group A mentioned a liking for teaching as the main reason for choosing their studies although a liking for sport seems to be the key factor, especially for men (48% vs. 39%). This seems to be also the fundamental reason stated in Group B especially by women (63% vs. 73%), while the liking for teaching shows lower percentages (12%). Regarding the pupils' sport history, it can be observed that in every case

more than half of the students already practised some kind of sport before entering university,

showing the males of the Group B the highest percentage (82%).

Table 1. General characteristics of the sample

	<b>PE Bachelor's Degree (SPET)</b> 3 years		<b>Sport Sciences High Degree (PASS)</b> 4 years	
	Men	Women	Men	Women
	n=68,00	n=32,00	n=172,00	n=78,00
<b>Entry age</b>				
Age (years)	21,05±3,52	20,03±2,10	21,82±3,01	21,31±2,46
<b>Size of hometown population</b>				
Hometown population>20.001 hab	65,83%	64,60%	65,55%	72,90%
<b>Previous academic training</b>				
University studies	8,40% (12,5%)*	4,43(0,0%)*	29,98(42,45%)*	35,20(53,03%)*
<b>Reasons for registering</b>				
Easiness to find a job	18,40%	27,17%	24,63%	13,85%
Liking for sport	48,00%	39,10%	63,25%	73,90%
Liking for teaching	33,60%	33,73%	12,13%	12,25%
<b>Pre-entry sport experience</b>				
Sport practice (associated or other)	62,22%	67,10%	82,60%	64,78%
No sport practice	37,78%	32,90%	17,40%	35,23%
<b>Current sport practice</b>				
Practising(associated or other)	49,93%	56,17%	71,40%	58,58%
Not practising	50,08%	43,83%	28,60%	41,43%
<b>Family sport experience</b>				
Practising(associated or other)	49,65%	68,07%	63,10%	67,75%
Not practising	50,35%	31,93%	36,90%	32,25%
<b>Family profession linked to sport</b>				
No	96,68%	72,825%	95,255%	94,3%
<b>Studies and job</b>				
Percentage of working students	29,98%	31,10%	46,55%	35,15%
<b>Preferred working category</b>				
Employee	46,3%	26,6%	9,85%	9,175%
Freelancer	22,7%	17,6%	44,05%	66,82%
Civil servant	31%	30,8%	46,1%	24%

\* Percentage of pupils who have finished their studies.

However, the level of practice falls once they start their studies. Also practically in every case, more than 50% of students have sport antecedents in their families although, in general, they are hardly ever linked to sport in a professional way. The preferred working status varies according to gender and education. Thus, in Group A, the professional category of employee seems to be the first option for men (46%) and the second option for women (26%), while the category

of civil servant is the first chosen by women (30%) and the second chosen by men (31%). In Group B, the option clearly chosen by women is freelancer (66%) while men seem to opt for being civil servants in the first place (46%) or do freelance work (44%).

Figure 1 shows the different options by groups and genders. In Group B teaching is the first option followed by training, recreation and health. Men prefer to opt for teaching more

than women (54% vs. 40%), while women usually choose in a greater proportion the sport-recreational field (33% vs. 46%) and that related to health (8% vs. 12%). In Group A, a similar trend can be observed. Teaching is the first option more chosen by men than by women

(56% vs. 46%), while the second option is still the sport-recreational field, mainly preferred by women (13,9% vs. 24%). The third option is still the health field, which is chosen by 26% of men and women.

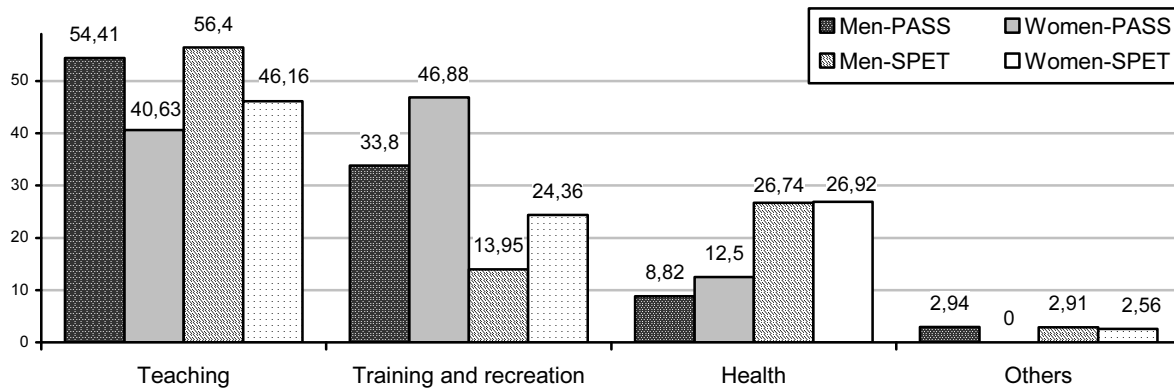


Figure 1. Different options for groups and genders

The evolution of working preferences along the academic years is shown in table 2. In Group A, the percentage of students who wish to work in teaching increases progressively at the expense of a noticeable fall in the other options. The same is true for working forecast, since the preferred category is employee at first (47%)

and later civil service ends up being the predominant option. In group B teaching is still the preferred option, although this percentage falls slightly along the academic years (47,9% vs. 44,1%), whereas the field of health is the only one which increases despite being the third option (7,6% vs. 18%).

Table 2. Evolution of working preferences along the academic years

	PE Bachelor's Degree (SPET) (3 years)			Sport Sciences High Degree (PASS) (4 years)			
	n=100			n=250			
Field you would prefer to work in	1°	2°	3°	1°	2°	3°	4°
Teaching	48,20%	65%	79%	47,90%	45,70%	43,10%	44,10%
Sport-recreational	25,90%	19,50%	13,56%	37,90%	34,56%	35,10%	28,70%
Health	14,90%	10,10%	4,97%	7,60%	13,00%	16%	18%
Others	11,00%	5,40%	2,47%	6,60%	6,74%	5,80%	9,20%
Field you foresee to be working in	1°	2°	3°	1°	2°	3°	4°
Teaching	56 %	70,57%	82,50%	51,60%	43,70%	46,69%	49,51%
Sport-recreational	30,18%	17,96%	12,45%	40,90%	42,36%	33,90%	27,65%
Health	12,58%	10,67%	4,89%	7,20%	13,00%	17,43%	19,87%
Others	1,24%	0,80%	0,16%	0,30%	0,94%	1,98%	2,97%
Working category you would prefer to work in	1°	2°	3°	1°	2°	3°	4°
Employee	47,8%	43,12%	40,44%	12,15%	13,18%	14,7%	15,6%
Freelancer	9,2%	4,08%	3,22%	52,18%	43,7%	39,7%	40,22%
Civil servant	43%	52,8%	56,34%	35,67%	43,12%	45,6%	44,18%



Table 3 shows the way last year students of both degrees perceive the academic training they have received according to their chosen specialization. Lack of theoretical basics of sport-recreational aspects is pointed out by over 40% of pupils in every case, and it is also mentioned

when they are asked about their practical training. In Group A, 27% of pupils specialized in teaching claim to have no psycho-social or pedagogical fundamentals. In Group B, 26% of pupils specialized in health acknowledge that they have no practical training in this field.

Table 3. Perceived academic level and training needs foreseen by last year PASS and SPET students

		PE Bachelor's Degree (SPET) (3rd course)				Sport Sciences High Degree (PASS) (4th course)			
		Teaching	Training	Health	Others	Teaching	Training	Health	Others
		n=24	n=16	n=14	n=9	n=19	n=21	n=18	N=9
<b>What kind of basic training do your studies lack?</b>	Sport- recreational	48,9%	43,6%	48,6%	41,7%	43,1%	41,89%	41,7%	43,0%
	Psycho-pedagogical and social	27,1%	22,9%	21,6%	22,6%	16,0%	19,3%	21,1%	19,8%
	Biomedical	11,5%	10,3%	12,1%	10,1%	16,3%	17,01%	15,2%	16,1%
	Methodological	12,5%	23,2%	17,7%	25,6%	24,6%	21,8%	22,0%	21,1%
<b>What kind of basic protocols do your studies lack?</b>	Sport- recreational	45,1%	44,4%	48,6%	47,6%	43,3%	41,1%	41,4%	43,5%
	Psycho-pedagogical and social	16,5%	12,4%	12,3%	15,9%	18,1%	20,6%	17,1%	19,1%
	Biomedical	24,9%	26,3%	23,2%	22,6%	17,6%	20,0%	26,9%	11,6%
	Methodological	13,5%	16,9%	15,9%	13,9%	21,0%	18,3%	14,6%	25,8%
<b>How do you think this complementary training can be acquired</b>	Attending congresses and courses	34,5%	36,8%	33,2%	33,2%	35,4%	30,8%	29,3%	29,9%
	Studying a second degree	24,7%	31,6%	26,1%	30,1%	15,4%	18,2%	25,9%	25,3%
	In the work market	24,7%	22,3%	24,9%	25,6%	32,9%	35,1%	36,5%	34,2%
	Personal training	16,1%	9,3%	15,8%	11,1%	16,3%	15,9%	8,3%	10,6%

In order to obtain complementary training, attendance in congresses and courses seems to be the most recurrent option in Group A, while students in Group B expect to obtain it in their working environment. 31% of Group A students specialized in sport and recreation and almost 26% of Group B students specialized in health propose studying a second university degree as a solution in this respect.

## Discussion

The results of our study show that the number of male PE university students is more than double the number of female students and that a liking for sport is the main reason why pupils of both sexes choose these degrees, especially PASS. The first aspect can be explained on the grounds that in Spain boys practise sport more frequently and intensely than girls, which is specially true during pre-university years [20] and

therefore it seems logical to think that men feel more attracted than women to choose a university degree related to this field. On the other hand, different studies explain the interest to study a degree in PE based on a process of "socialization into and via sport" which implies that positive experiences acquired during the sport practice become an important factor to choose a particular kind or university studies [6, 7, 10].

In fact over half of the students in this study claim to have practised sport throughout their lives. Thus it seems reasonable to think that a liking for sport is the most important cause of studying PE at university. In this respect, it is interesting to note that although the level of sport practice falls once the pupils start their studies, which is a common finding [2, 3], this fall is not too dramatic, which confirms the liking for sport in this kind of students. It is also important to point out the fact that SPET pupils mention a liking

for teaching as a second reason for studying the degree more often than their PASS mates, which can be explained on the grounds of the teaching-oriented training that the SPET degree offers.

P. Dodds et al. [7], showed a model for socialization into sport-related occupations which suggested that early sports situations act concurrently with personal attributes (such as family background) and the influence and expectations of significant others (parents) could influence young people to participate in sport and later to make decisions about entering sport-related occupations. In our study over half of the students claim that practising sport is a habitual activity in their family environment, although it is usually not linked to work. This is probably due to the scarce variety of sport-related jobs available when the students' parents had to decide about their working future.

As far as the preferred working category is concerned, it has been pointed out that some of the main attractors to develop a career in the PE are job security and a good income [15, 18]. If this was so, most of the interviewees would have chosen civil service as their working preference, which is not reflected in our study. This could be explained on one hand by the fact that in Spain the only option for pursuing a professional career related to PE in the civil service is becoming a PE teacher, which is rather difficult due to the demanding entrance requirements and the decreasing number of available positions every year. All these factors may well have discouraged students from considering civil service as their main working category. On the other hand, the percentage of people who wish to work in the field of sport recreation is rather high, which would mean a prevalence of the students' professional interests over the supposedly ideal working situation.

In several countries entry to university courses in the physical activity field is highly competitive [16] and Spain is not an exception. Analysing the students registered in PASS it can be observed that over 30% have started other university degrees and more than half of them have actually finished those studies. A possible reason for this is the fact that those people who do not have access directly to the PASS degree start

doing SPET which is easier to enter and then they gain access to PASS through a complementary course. It is also very frequent for those students who cannot access PASS at the first attempt to start some other studies while they wait for a new opportunity. This determination to end up registering in this degree agrees with the findings of P. Dodds et al. [7], who proved that PE students did not view entrance requirements of PE programs as a barrier for their aspirations. The fact that high percentage of students is currently living in cities agrees with the distribution of Spanish population which is basically centered there. Thus, 78% of the population is urban, mainly due to young people's migration to the cities [11].

Some of the interviewed students were combining their studies with a job, although it was not a sport-related position, since most of them were working in the field of health care. This is probably due to the fact that there is an ever-increasing demand for sport instructors in the field of fitness, physical activity for the elderly and so on in places such as gyms, town halls, recreational businesses or similar activities. Another topic of possible interest is beliefs and perceptions about the skills and abilities required to obtain and develop a specific occupation, which is known as the subjective warrant [10].

In university studies it is possible that the students' orientations and working expectations change as they successfully complete their program of study [21]. Indeed in the field of physical activity it has been observed that a different curriculum to that expected by students could have impact on them in a significant way when they already have preconceived ideas about what is expected from the subject [17]. In our study, it seems that the option of teaching PE prevails along the academic years, which is a somewhat contradictory finding, since some authors found that some PE students are firmly committed to teaching even 5 years or so after graduation [7], while others are not [2].

Although there are plenty of stereotypes regarding PE students' academic ability, our results detected that students themselves did not see great weaknesses in their training, except in those aspects regarding both practical and

theoretical sport-recreational contents, which could be a consequence of an ill-structured plan of studies and the fact that PE degrees have not been available in Spain until recently. It is also important to note the fact that although it has been commented that many teaching recruits believe they already know how to teach without professional training [10], 27% of Group A – TE students acknowledge a lack of training in psychological, sociological and pedagogical contents, therefore they seem to be aware of their academic needs.

Lastly, it is worth mentioning that 31% of Group A – SR students and 26% of Group B – HE students consider it necessary to study another degree to complete their training. This leads us to think that it is necessary to analyze the plan of studies and the curriculum of both specializations.

It must be noted that the ability to generalize the results and implications of our findings to other settings is limited, since several weak points have been detected. First, the data of the study comes from those students who attend their classes regularly; therefore it does not comply adequately with the typical PE student profile. On the other hand, there are other faculties which offer PE degrees in the north of Spain, so possible differences between those students and the interviewees could exist. Furthermore,

although this study was not approached through the framework of socialization, some important data, such as socio-economic family situation, age at which PE studies were chosen or more specific discrimination between career attractors and facilitators is missing. Therefore, although this study may contribute with some information about PE university students' profile, more and better research in this regard is needed.

Finally it should be pointed out that the exploratory study reported here was conceived as a previous phase for the later development of a longitudinal piece of research with larger samples. If possible, comparative work with colleagues at other universities will be initiated.

## Conclusion

This study confirms that a liking for sport is still the fundamental reason why students choose a PE-related degree and that, while SPET students are mainly oriented towards teaching, PASS students consider a wider range of orientations, although in both cases their choices depend greatly on their current working situation. On the other hand, it seems that men tend to opt for teaching and women for other sport-related aspects, such as training, recreational activities or health care. Thus, other options like management or sports marketing become clearly a minority choice.

## BIBLIOGRAPHY

1. Armourand K.M., Yelling M. (2004). Professional development and Professional Learning: Bridging the Gap for Experienced Physical Education Teachers. *European Physical Education Review*, 10, 71–93.
2. Belka D., Lawson H., Liopnickey S. (1991). An exploratory study of undergraduate recruitment into several major programs at one university. *Journal of Teaching in Physical Education*, 10, 286–302.
3. Chatoups C., Zounhia K., Hatziharistos D., Amouzas K. (2007). Background profiles and occupational decision factors: the case of Greek physical education students. *International Journal of Physical Education*, 44, 30–40.
4. Costantino V., Perissinotto E., Scattolin A., Vian F. (2000) Motivation and expectations of graduate nursing students at the university of Padova. *Professioni Infermieristiche*, 53, 17–25.
5. de Oliveira B.G, Porto I.S., de Assunção Ferreira M., de Abreu Castro J.B. (2007). Profile of students registered in nursing auxiliary and technician courses of the Nursing Worker Professionalization Project (PROFAE) in Rio de Janeiro – Brazil. *Revista Latino-Americana de Enfermagem*, 15, 127–133.
6. Dewar A.M., Lawson H.A. (1984). The subjective warrant and recruitment into physical education. *Quest*. vol. 30, 15–25.
7. Dodds P., Placek J., Doolittle S., Pinkham M., Ratliffe T., Portman P. (1991). Teacher/coach recruits: background profiles, occupational decision factors, and comparisons with recruits into other physical education occupations. *Journal of Teaching in Physical Education*, 11, 161–176.
8. Finucane P., Arnett R., Johnson A., Waters M. (2008). Graduate medical education in Ireland: a profile of the first cohort of students. *Irish Journal of Medical Science*, 77, 19–22.
9. Hayward L.M., Noonan A.C., Shain D. (1999). Qualitative case study of physical therapist students' attitudes, motivations, and affective behaviors. *Journal of Allied Health*, 28,155–164.

10. Hutchinson G.E., Buschner C.A. (1996). Delayed-entry undergraduates in physical education teacher education: examining life experiences and career choices. *Journal of Teaching in Physical Education*, 15, 205–223.
11. Instituto Nacional de Estadística (2009). *Cifras de población y Censos demográficos. España 2008* Available on line at: [http://www.ine.es/inebmenu/mnu\\_cifraspob.htm](http://www.ine.es/inebmenu/mnu_cifraspob.htm). Visited on 10/02/2010.
12. Jackson K., Spittle M., Casey M. (2009). Applying Self-Determination Theory to Understand the Motivation for Becoming a Physical Education Teacher. *Teaching and Teacher Education*, 25(1):190–197.
13. Kassebaum D.G., Szenas P.L., Schuchert M.K. (1996). Determinants of the generalist career intentions of 1995 graduating medical students. *Academic Medicine*, 71, 197–209.
14. Lawson H. (1983). Toward a model of teacher socialization in physical education: the subject warrant, recruitment and teacher education. *Journal of Teaching in Physical Education*, 2, 3–16.
15. Lortie D.C. (1975). *School Teacher: a Sociological Study*. University of Chicago Press. Chicago.
16. Macdonald D., Kirk D., Braiuka S. (1999). The social construction of physical activity field at the school/university interface. *European Physical Education Review*, 5, 31–51.
17. MacPhail A. (2002). Subject choice in Scottish secondary school physical education: higher grade physical education. *European Physical Education Review*, 8, 305–325.
18. O'Bryant C.P., O'Sullivan M., Raudensky J. (2000). Socialization of Prospective Physical Education Teachers: The Story of New Blood. *Sport, Education and Society*, 5, 177–193.
19. Richardson B., Lindquist I., Engardt M., Aitman C. (2002). Professional socialization: students' expectations of being physiotherapist. *Medical Teacher*, 24, 622–627.
20. Román B., Serra L., Ribas L., Roure E., Cabezas C., Plasencia C. (2007). Trends in physical status in Catalonia, Spain (1992–2003). *Public Health Nutrition*, 10, 1389–1395.
21. Senf J., Campos D., Kutob R. (2003). Factors related to the choice of family medicine: A reassessment and literature review. *Journal of the American Board of Family Practice*, 16, 502–512.
22. Williamson K.M. (1993). A qualitative study on the socialization of beginning physical education teacher educators. *Research Quarterly for Exercise & Sport*, 64, 188–201.

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## Effects of the Tobacco Smoking Prevention Programme for Secondary School Students

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### Abstract

The study explored whether a smoking prevention programme based on Theory of Planned Behavior and Persuasion Theory implemented during physical education classes could offer effective smoking prevention for students. 137 Greek students (73 females and 64 males) attending 8<sup>th</sup> grade (2<sup>nd</sup> grade of Secondary Education) participated. The programme extended for over 10 weeks. The intervention took place once a week during Physical Education class. The questionnaire used had two parts. In the first part the students filled individual data for the demographic profile, in the second part they responded to questions relating to smoking. There were questions about knowledge, attitude, perceived control, subjective norm and intention towards smoking behaviour. The experimental group showed greater gains in knowledge about smoking relatively to the control group ( $F(1,135) = 16.18, p < .001$ ). Also the experimental group showed an improvement at the attitude towards smoking behaviour ( $F(1,135) = 4.06, p < .05$ ). There were not statistically significant difference between the groups regarding perceived control, subjective norm and intention towards smoking. The experimental group maintained the improvements six months later. The results showed improvements in knowledge and in the students' attitude towards smoking. It was possible to combine Physical Education teaching with a smoking prevention programme.

Key words: smoking prevention programme, adolescents, physical education.

### Introduction

Smoking combined with lack of physical activity is among the principal factors leading to chronic illness and even early death [11]. Epidemiological research has shown that smoking is the principal indirect cause of death that is actually preventable [4].

A report by the Hellenic Heart Foundation based on a random sample of 6.206 students indicated that three out of ten Greek children tried their first cigarette at age of thirteen, with two out of those becoming regular smokers later. Over 50% of teenage smokers smoke over 10 cigarettes per day. Encouragement by peers, friends or classmates is the principal factor contributing to smoking one's first cigarette while plain curiosity also ranks relatively high [8].

In order to be effective, smoking prevention programmes need to be implemented at the appropriate age level, which would account for grades 7 through 9, the initial three years of Secondary School (called Junior High School in some countries). Smoking prevention needs to reach students before they have adopted smoking behaviour and therefore enhance the students' self-efficacy, improve the students' level

of information and help to build a negative attitude toward smoking [13]. Programmes of that nature are regularly implemented in many countries and in a pilot mode in Greece. However the results of a meta-analysis study have indicated that such programmes are not always effective [10].

C.A. Johnson et al. [10] explored the reasons why some of the smoking intervention programmes are effective and some others are not. The challenge was to determine the appropriate combination of programme features, individual characteristics and social environment that would render a smoking prevention programme truly effective. They concluded that the efficacy of such programmes to a substantial extent depends on the individual characteristics of the participants and also on the socio-political environment. For that reason, when a particular programme is more or less effective in a particular population, it may be even more effective in certain social environments compared to other, less effective on certain types of individuals, or more effective on others [10].

Several researchers have reached the conclusion that individuals involved in all forms of phy-

sical activity tend to smoke less. A study by A. Papaioannou et al. [14] provides evidence that young persons engaging in sports eat more than five portions of fruit per week and smoke less than their physically inactive peers. Generally speaking it seems that physical exercise can be closely related to other behaviour that is positive for health and less so with negative? Young persons engaging in exercise seem to adopt healthier life habits [15].

Similarly, J.Audrain-McGovern et al. [2] argued that physical exercise may reduce the incidence of young persons starting to smoke. They supported that this effect may be due to the beneficial effects that physical exercise produces on the disposition or attitude of the persons who exercise, and they propose that smoking could be prevented by promoting physical activity. Other researchers have argued that students who don't participate in group sports are three times more likely to become regular smokers than those who participated regularly in a team sport [3].

E.J.Sherman and B.A.Primack [17] reviewed the programmes commonly used for smoking prevention, and concluded that only a small percentage of them is addressed exclusively to teenagers. However, as this age is critical for preventing health compromising behaviours, more programmes should be specifically targeted for this age group.

Generally speaking those programmes include training the students in a variety of behavioural skills such as "Saying No", either by means of role-playing and dramatisation. The means employed to teach the students to face up the peer

pressure and negative social influences in general include suggestions, activities and video films. Students were trained to decipher the indirect messages hidden in advertisements. Lastly, they were instructed on the negative effects of smoking on the human organism.

The evaluation of those programmes yielded varying results. In some of the programmes, the new knowledge regarding the negative impact of smoking on the human organism, and regarding the means and methods employed in advertising tobacco products, appeared to be greater among the students who had attended those programmes. E.J. Sherman and B.A. Primack [17] also argued that they had witnessed increases in the ability of students to Say No to cigarettes offered by others, and to deal with social pressure.

Although many studies [2, 6, 14, 15] have argued that physical exercise is negatively correlated with habitual smoking, the literature of smoking prevention shows relatively few prevention programmes that aim principally at promoting physical exercise, and that would be implemented specifically by physical education teachers. Therefore we have attempted to design a smoking prevention programme for teenagers, which would be implemented as part of the physical education class. The basis of this particular programme design is a combination of two theories, that of Planned Behaviour [1], and the theory of Persuasion [16]. A combination of those two theories has been used in a previous study by E. Kosmidou [12] concerning the implementation of a smoking prevention programme (fig. 1).

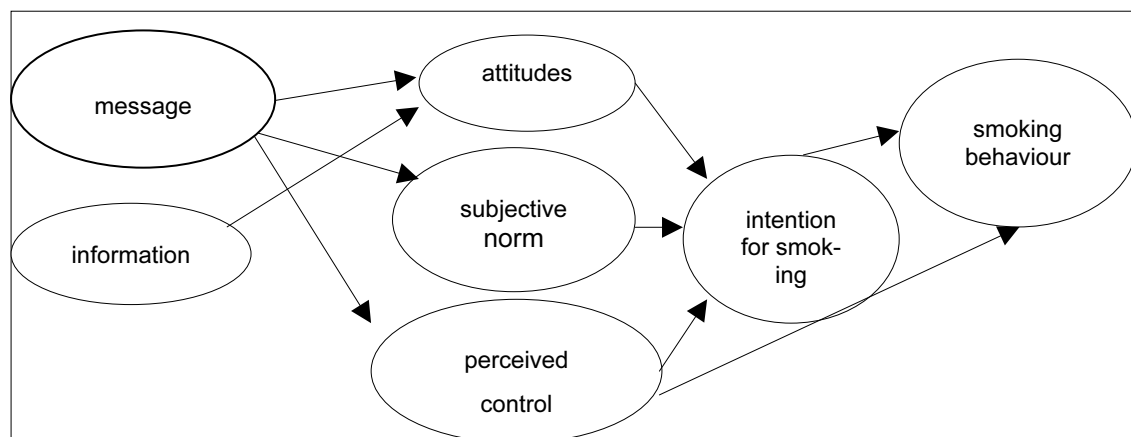


Figure 1: Combining Persuasion Theory and Planned Behaviour Theory (Kosmidou, 2007)

## Aim

The objective of this study was to explore the effectiveness implement of a smoking prevention programme during Physical Education classes. The research hypothesis was that the students participating in the programme would improve their knowledge, their attitude, their perceived control, their subjective norm and also their intention towards the smoking habit.

## Methodology

### Participants

The school where the intervention was implemented and the control group school were randomly selected by drawing lots among all schools located in urban areas of the Central Greece region. The investigation involved 137 students (73 female, 64 male) attending 8<sup>th</sup> grade (2<sup>nd</sup> grade of Secondary Education). The experimental group comprised 68 students and the control group 69 students. None of the students had previously attended any health education programme.

### Measurements

Data were gathered by means of a self report questionnaire consisting of two parts. In the first part students reported their demographic profile and in the second part they responded to questions relating to smoking.

#### Smoking Knowledge

This was assessed by means of 22 questions regarding knowledge of several particular aspects of cigarette smoking, each starting with the stem "*Did you know that ...*". The students answered on a 3-point scale: "*Yes (3) – I am not so sure (2) – No (1)*". The average of the 22 scores represented each student's smoking knowledge score. Cronbach's alpha was .69 and .64 for the two measurements.

#### Attitude towards smoking

This was assessed by means of 6 questions regarding attitude toward smoking, such as "*For me, not smoking at all during the next three months will be ...*". The students answered on a 7- point bipolar adjectives scale from 7 (*Easy*) to 1 (*Difficult*) or from 7 (*Healthy*) to 1 (*Unhealthy*). The average of the 6 scores represented each

student's smoking attitude score. Cronbach's alpha was .82 and .80 for the two measurements.

#### Smoking intention

This was assessed by means of 2 questions regarding attitude toward smoking, such as "*I intend not to smoke in the next three months*". The students answered on a 7- point Likert scale from 7 (*Likely*) to 1 (*Unlikely*). The average of the 2 scores represented each student's smoking intention score. Cronbach's alpha was .62 and .77 for the two measurements.

#### Perceived control

This was assessed by means of 3 questions regarding attitude toward smoking such as "*Not to smoke in the next three months depends only on me*". The students answered on a 7- point Likert scale from 7 (*Yes*) to 1 (*No*). The average of the 3 scores represented each student's smoking perceived control score. Cronbach's alpha was .64 and .75 for the two measurements.

#### Subjective norm

This was assessed by means of 4 questions regarding attitude toward smoking, such as "*If I smoke my friends would consider it as...*". The students answered on a 7-point scale from 7 (*Wrong choice*) to 1 (*Right choice*). The average of the 4 scores represented each student's subjective norm score. Cronbach's alpha was .80 and .77 for the two measurements.

The questionnaire was anonymous and the researchers assured the students that the results would be used for research purposes only and never communicated to school faculty or parents.

#### The intervention programme

The programme extended over 10 weeks. The intervention took place once a week during Physical Education class. In the first meeting the students filled the questionnaire and were briefed about the programme. The students were also given a letter for their parents, describing the programme to be attended by the students. The eight lessons that followed consisted of two parts each. During the first part, which lasted 10 minutes, the students received information about

the effects of smoking and exercise on the body, they saw short videos and they learned to perceive indirect advertising of tobacco products, they were trained to set goals, and to formulate a plan toward implementation of the goals; they were encouraged to believe that they can resist smoking, while smokers were encouraged to believe that they can quit; and they were taught by experiential means how to say “No” if offered cigarettes. At the end of those initial part the students together with the Physical Education teacher created a message against smoking and one in favour of exercise. During the remaining class time the students were taught motor skills as provided in the curriculum, and in the last ten minutes of each class played a group game which combined physical exercise with a message that was at times one against smoking and at other times in favour of physical exercise. During the last class of the series, the students were

asked to fill once again the same questionnaires as at the start of the series.

#### Statistical Analysis

This included descriptive statistical analyses for initial data checking (independent t-test) and repeated measures analysis of variance.

#### Results

Means and standard deviations of all variables are reported in table 1. T-tests were applied in order to check whether there were differences between the groups before the application of the program. The results did not show statistically significant differences between groups regarding their knowledge of smoking facts ( $t_{(135)} = .028, p=.97$ ), their attitudes ( $t_{(135)} = -1.84, p=.067$ ), intentions ( $t_{(135)} = -.46, p =.64$ ) and perceived control over the smoking habit ( $t_{(135)} = -.97, p =.33$ ).

Table 1. Descriptive Statistics for all variables across groups

	Experimental group						Control group			
	Pre		Post		Six months later		Pre		Post	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
smoking knowledge	2.48	.24	2.75	.23	2.77	.39	2.48	.21	2.56	.27
attitude towards smoking	5.78	1.54	6.15	1.31	6.22	1.20	6.21	1.21	6.27	1.24
intention for smoking	6.40	1.25	6.49	1.32	5.56	2.04	6.50	1.31	6.23	1.59
smoking perceived control	6.46	.97	6.57	1.02	5.78	1.70	6.61	.92	6.61	1.00
subjective norm	6.36	1.09	6.47	1.02	6.45	.85	6.74	.48	6.69	.62

#### Smoking knowledge

A repeated measures ANOVA with the group as the between groups factor, and smoking knowledge score as depended variable with repeated measures (pre-post) showed a significant effect for group ( $F(1,135) = 7.83, p < .05$ ), a significant effect for smoking knowledge ( $F(1,135) = 54.99, p < .001$ ) and a significant Group X Smoking Knowledge interaction ( $F(1,135) = 16.18, p < .001$ ). Paired comparisons showed a statistically significant improvement ( $p=.017$ ) for the Control Group (2) and an even greater improvement ( $p < .001$ ) for the Experimental Group (1) – figure 2.

#### Attitude towards smoking

A repeated measures ANOVA with the group as the between groups factor, and attitude towards smoking score as depended variable with repeated measures (pre-post) didn't show a significant effect for group ( $p > .05$ ) neither a significant effect for smoking attitude ( $p > .05$ ) nor a significant Group X Smoking Attitude interaction ( $p > .05$ ). Paired comparisons showed a statistically significant improvement between pre and post test for the experimental group (1) ( $F(1, 135) = 4.06, p < .05$ ) but a not significant improvement for the Control Group (2) ( $F(1, 135) = .075, p > .05$ ) – figure 3.



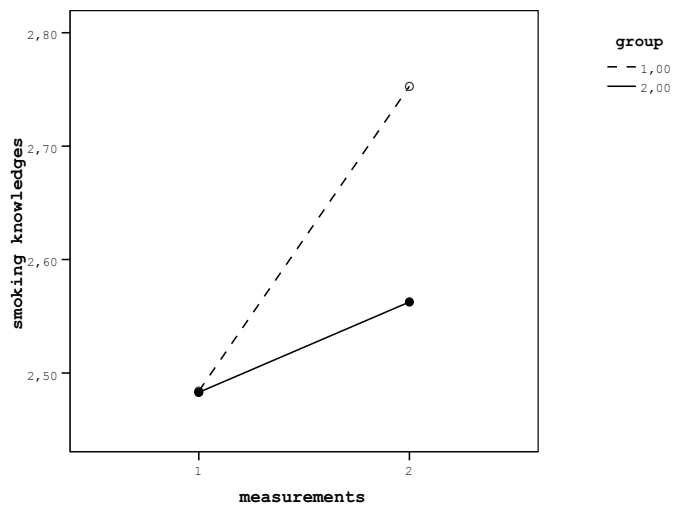


Figure 2. Smoking knowledge across measurements and groups

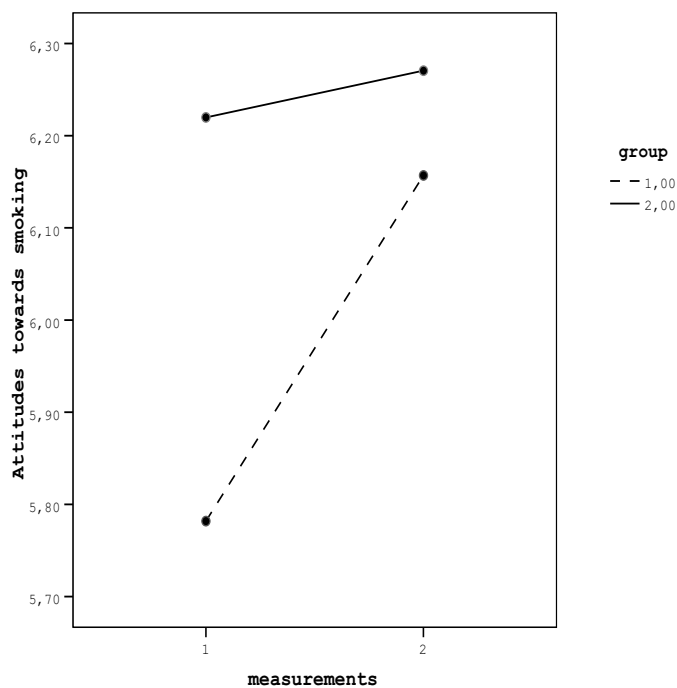


Figure 3. Attitude towards smoking across measurements and groups

### Smoking intention perceived control subjective norm

Three repeated measures ANOVA with group as the between groups factor and smoking intention, perceived control and subjective norm as dependent variables with repeated measures (pre-post) didn't show a significant

effect for group, nor for dependent variables neither an interaction effect.

### Retention measures

The experimental group underwent a retention measure six months later. A repeated measure one-way ANOVA showed that the students had retained the knowledge  $F(1, 60) = 33.17$ ,

$p < .001$  and the attitudes  $F(1, 60) = 74.43$ ,  $p < .001$  concerning smoking, while individual paired comparisons indicated statistically significant differences between the first and the second measure ( $p < .001$ ), and also between the first and the third measure ( $p < .001$ ). We didn't note

significant differences between the second and the third measures, neither concerning the knowledge of smoking facts nor the attitudes toward smoking – figures 4, 5.

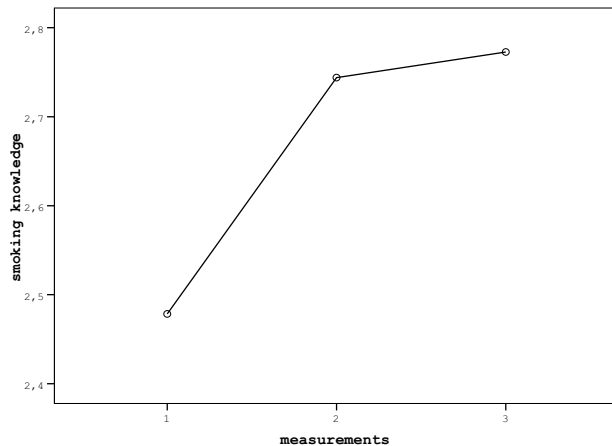


Figure 4. Retention measure of smoking knowledge for the experimental group

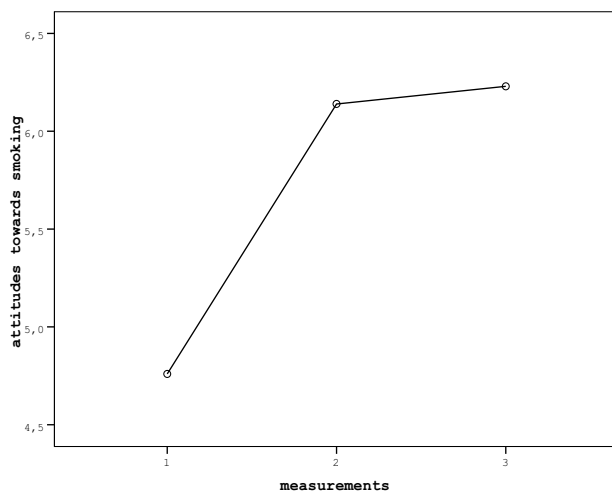


Figure 5. Retention measure of attitudes towards smoking for the experimental group

## Discussion and Conclusions

The aim of this study was to explore whether a smoking prevention programme that has been set up after the principles of the Theory of Planned Behavior and Persuasion Theory implemented during physical education class, could offer effective smoking prevention for students. It was hypothesised that the programme would increase the students' knowledge of smoking facts, the students' attitude towards smoking, the perceived control over smoking, impact their

intention towards smoking and their subjective norm for smoking behaviour. The results showed improvements in knowledge and in the students' attitude, but not in smoking intention, perceived control over smoking and social norm for smoking. Based on the theory of planned behaviour [1], action depends on intention which in turn is formulated based on attitude, on perceived control and on subjective norm. Despite the fact that attitude was improved, there seemed to be no change in perceived control and in subjective norm.

As a result we would not be able to argue that the students' intention had changed. It seemed that the combination of information with various messages against smoking and in favour the exercise was able to influence the attitudes of students but not the perceived behavioural control over smoking neither the students' subjective norm for smoking.

The success of the programme lies in the fact that it was possible to combine Physical Education teaching with a smoking prevention programme. The curriculum of Greek public schools does not provide class time for Health Education in Grades 7 through 9 of Secondary Education. Therefore, programmes of that type are implemented on a volunteer basis outside regular curriculum time by any number of students and teachers wishing to participate. That situation doesn't offer perfect conditions for enhanced participation by all students. Incorporating a programme in the Physical Education curriculum provides that all students will attend the programme. Considering that the principal aim of Physical Education class is to promote physical activity, it is more likely that Physical Education combined with a smoking prevention programme will produce greater positive effects as reported by R. Pate et al. [15] in a previous research report.

The programme that was implemented for this research project combined well with Physical Education class and was designed for teenagers with the goal of achieving the best possible results [17]. Participating students displayed a high level of interest. The information presented at the start of each class using video projection was both brief and attractive. Following

that, the class activities were structured on the Physical Education curriculum and were enhanced with messages against smoking and in favour of physical exercise. In addition to the messages in favour of physical exercise, the students were in fact physically active as they attended the programme, a situation which can operate, all by itself, as a preventive factor for smoking addiction, as demonstrated in previous research [7, 9].

The fact that no improvements appeared in perceived control and in subjective norm explains why there also appeared no statistically significant differences concerning the intention to smoke or not to smoke. In order to be able to further explore the matter of perceived control, we recommend that future application of this programme incorporate certain elements aiming to even further enhance the self-efficacy of participating students in order to also increase their perceived control. Yet we also need to acknowledge that teenagers view themselves primarily as members of social groups and thus tend to operate abiding by the groups' norms [5]. For that reason the programmes ought to focus even closer on the development of a critical attitude toward subjective norms and on the general enhancement of the individual personality. Nevertheless, it is encouraging that the impact of the program on knowledge and on attitudes appeared to be maintained six months later.

It would be interesting if a programme like this was incorporated in the school curriculum as part of Physical Education class in grades 6 (Elementary) through 9 (Secondary). It is possible that including younger students would influence the contributing factors that make up the students' intention to realize that behaviour.

## BIBLIOGRAPHY

1. Ajzen I., Albarracín D., Hornik R. (2007). *Prediction and Change of Health Behavior, Applying the Reasoned Action Approach*, Lawrence Erlbaum Associates, London.
2. Audrain-McGovern J., Rodriguez D., Moss H. (2003). Smoking Progression and Physical Activity. *Cancer Epidemiology Biomarkers & Prevention*, 12, 1112–1129.
3. Audrain-McGovern J., Rodriguez D. (2004). Team Sport Participation and Smoking: Analysis with General Growth Mixture Modeling. *Journal of Psychiatric Psychology*, 29, 299–308.
4. Bates C., Jarvis M., Connolly G. (1999). Tobacco Addictives: Cigarette Engineering and Nicotine Addiction. <http://no-smoking.org> (Retrieved: on May, 2010).
5. Brown B.B., Clasen D.R., Eicher S.A. (1986). Perception of peer pressure, peer conformity disposition, and self reported behavior among adolescents. *Developmental Psychology*, 22, 521–530.
6. Castrucci B.C., Cerlach K.K., Kaufman N.J., Orleans C.T. (2004). Tobacco use and cessation behavior among adolescents participating in organized sports. *American Journal of Health Behavior*, 28(1), 63–81.

7. Copeland A.L., Shope T.J., Waller F.P. (1996). Factors in adolescent drinking/driving: Binge drinking, cigarette smoking, and gender. *Journal of School Health*, 66, 254–260.
8. Eurostat Yearbook (2002). News release. No. 62/2002-27 May 2002. <http://europa.eu.int/comm/eurostat/> (Retrieved: on May, 2010).
9. Faulkner R.A., Slattery C.M. (1990). The relationship of physical activity to alcohol consumption in youth 15-16 years age. *Canadian Journal of Public Health*, 81, 168–169.
10. Johnson C.A., Cen S., Gallaher P., Palmer P.H., Xiao L., Ritt-Olson A., et al. (2007). Why smoking prevention programs sometimes fail. Does efficacy depend on sociocultural context and individual characteristics? *Cancer Epidemiol Biomarkers Prevention*, 16, 1043–1049.
11. Kaczynski A.T., Manske S.R., Manell R.C., Grewal K. (2008). Smoking and physical activity: A systematic review. *American Journal of Health Behavior*, 32, 93–110.
12. Kosmidou E. (2007). Smoking and exercise: effective messages for attitude change in health education programs that are addressed in secondary and university students. (Unpublished doctoral dissertation). University of Thessaly, Greece.
13. McMillan B., Higgins A., Conner M. (2005). Using an extended theory of planned behaviour to understand smoking amongst schoolchildren. *Addiction Research and Theory*, 13 (3), 293–206.
14. Papaioannou A., Karastogiannidou C., Theodorakis Y. (2004). Sport involvement, sport violence and health behaviours of Greek adolescents. *European Journal of Public Health*, 14, 168–172.
15. Pate R.R., Trost S.G., Levin S., Dowda M. (2000). Sports participation and health related behaviors among US youth. *Archives of Pediatrics & Adolescent Medicine*, 154, 904–911.
16. Petty R.E., Cacioppo J.T (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, 19, 123–205.
17. Sherman E.J., Primack B.A. (2009). What works to prevent adolescent smoking? A systematic review of the National Cancer Institute's Research-Tested Intervention Programs. *Journal of School Health*, 79, 391–399.

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## The Relationship between Healthy Eating Beliefs and Food Consumption in Adolescents

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### Abstract

**Purpose:** This paper investigates the nutritional information of adolescents and their attitude towards everyday foods. These beliefs are contrasted with the declared frequency of consumption of these foods.

**Methods:** Adolescents' opinions about healthy eating were studied in a school survey. A sample of 1663 subjects ranging from 11 to 18 years of age expressed their opinions about suitable eating habits and rated the quality of their own diet; they later classified 43 everyday foods as bad or good from a nutritional point of view and declared the frequency with which they consumed them.

**Results:** Results demonstrated an adequate understanding of current dietary recommendations. Eating a range of foods was the most frequently mentioned principle of a healthy diet, which should be low in fats and sugars and include large amounts of vegetables, fruits and fish. In fact, attitudes towards the healthiest foods were all positive, while typical fast foods, sweets and alcoholic drinks received negative ratings. High calorie foods were rated lower by girls. However, consumption seemed to be barely affected by these attitudes.

**Conclusions:** The influence of psychological mechanisms, such as adolescents' concern for health and for future or comparative optimism in these results is discussed, as is the use of these aspects in promoting the healthiest eating habits in this population.

**Key words:** nutritional beliefs; food attitudes; adolescents' nutrition.

### Introduction

A study of the adolescent diet in Spain indicated the need to reduce the level of saturated fats and sugars, moderate the consumption of red meat and encourage the consumption of fish and vegetables [22].

To correct these habits, first we must ascertain whether or not adolescents have enough information on current dietary recommendations and whether this information translates into operational knowledge to identify the healthiest nutritional options.

Their motivation in applying this knowledge to their own diets must also be determined, i.e., if taking care of one's diet for health reasons is a concern shared by adolescents. Nowadays, education in Spanish schools includes information on an inadequate diet and indicates the specific foods consumption of which should be increased or decreased. This knowledge should

reinforce recommendations customarily provided by parents at home.

A satisfactory degree of assimilation of this informational pressure has been confirmed in a number of different countries [2, 21]. In a study carried out in four European countries with children ranging from 8 to 15 years of age, 81% of the subjects believed that diet is directly related to health [10]. Moreover, several prototypical fast food items were considered "bad for me" as follows: soft drinks (59%), chips (47%), ketchup (46%) and beef hamburgers (46%). Furthermore, negative attitudes towards high-calorie foods also appear to consolidate during adolescence, especially in girls, whereas the concepts of health and weight seem to merge. Thus, higher calorie foods are considered worse for health: girls between the ages of 11 and 16 considered these foods to be less healthy than boys did,

and considered low calorie items healthier [28, 29].

Unhappily, these studies noted how little these beliefs and attitudes affected actual consumption, while other studies underscore the negative correlation between preferences and attitudes [2, 11, 21].

Present study analyses the relationship between nutritional beliefs and habits in a sample of Mediterranean adolescents. Specifically, their nutritional attitudes are explored and related to the declared frequency of consumption of the most customary foods in this region.

## Methods

A survey on food was applied to 2,000 schoolchildren in Balearic Islands between November 2003 and March 2004. The survey was administered during a one-hour class period under the direction of a survey administrator. Two hundred subjects retook the survey two months later to validate the stability of the responses. Spearman's rank correlation coefficient between the two applications was significant, while the range of coefficients obtained in the responses in the first application oscillated between  $r=0.897$  ( $P=0.000$ ) and  $r=0.658$  ( $P=0.000$ ). Reliability was determined by means of Cronbach's alpha and the Guttman coefficient, both values indicating high internal consistency (Cronbach's alpha=0.9771; Lambda=0.9444). The final number of valid subjects in the sample was 1,663 with a confidence level of 2 sigmas (95.45%) and a margin of error of  $\pm 2.5\%$ .

*The questionnaire included an open-ended question: "What advice do you think a nutrition specialist could give you to help you achieve a healthy diet?" The respondents also indicated whether or not they would be interested in acquiring more information if offered by an expert.*

*Satisfaction with their diets was determined with the statement: "I believe my diet is very good for my health." Subjects were asked to indicate their degree of agreement by marking a cross on a 9-cm line, the end of which on the left read "Very much" and the end on the right read "Not at all." The marks closest to "Strongly agree" (0 to 4.5 cm.) were classified as "Satisfied" and*

*those closest to "Strongly disagree" (4.6 to 9 cm.) were classified as "Unsatisfied".*

Subjects also classified 43 foods on a list as "Good for me" or "Bad for me" (annex 1). The survey administrator had previously told the subjects not to consider their real consumption or preference for a food, and so "good" would mean that a food could be eaten in large amounts, whereas "bad" meant that consumption of the item in question should be kept to a minimum. They were later requested to note the frequency with which they consumed each food by selecting one option: "Daily", "Three or more times a week", "Two or few times a week", "Never or not very often each month". The responses to the first two options were classified as "Frequent Consumption" and the latter two options were classified as "Infrequent Consumption".

## Results

Table 1 shows the practices that the subjects selected as the basis of a healthy diet. No differences were found between boys and girls. The most frequently mentioned principle was a varied diet and the need to eat "a little bit of everything", whereas the concept of "nutritional balance" was mentioned by 7.4% of the subjects (data not shown). Both statements were grouped for subsequent analysis. Students also pointed out the need for large amounts of vegetables as well as the regular consumption of fish, fruit and meat. Not skipping meals was a concern that appeared more often in the oldest group.

Interest in receiving more information on diet grows with age (30% at 11–12 years compared to 54% to 17–18; Chi square=43.475; d.f.=6;  $p<0.001$ ). Moreover, the percentage of girls who were interested doubled the percentage of boys (45% compared to 26%; Chi square=64.193; d.f.=2;  $p<0.001$ ).

75% of the subjects declared that they were satisfied with their diets without any differences with age being noted. The percentage of boys who were satisfied was slightly higher than girls (78% compared to 72%; Chi square=6.827; d.f.=2;  $p<0.05$ ).

Table 1. Principles mentioned in order to carry out a healthy nourishing. Total percentages and percentages inside each age group

PRINCIPLE	Total	11-12	13-14	15-16	17-18	Z test
Varied food, balanced diet	30.1	26.3	24.8	44.5	59.2	*
To include vegetables	27.8	32.9	29.2	22.9	17.3	*
To include fish	13.0	14.4	14.6	10.9	8.9	*
To include fruit	12.9	12.2	14.0	14.0	10.1	NS
To include meat	10.6	12.7	11.8	8.9	4.5	*
Not to skip foods	5.0	2.0	2.4	8.7	14.0	*
To avoid fats, cholesterol	4.8	4.8	3.4	5.3	7.3	NS
To include milk	4.0	5.4	5.3	1.5	1.1	*
To avoid excesses	4.0	3.2	3.4	5.1	6.1	NS
To include pulses	3.4	4.2	2.4	3.3	3.4	NS
To drink much water	3.0	2.3	3.7	3.3	2.8	NS
Doesn't know, doesn't answer	30.4	39.8	32.0	20.9	15.1	*

\* Results of the Z test of contrast of proportions for a level  $P < 0.05$

Table 2 shows the percentage of subjects who defined the different foods in the as "Good for me". The highest opinion by category corresponds to fruit, cereals (except bread), pulses, fresh vegetables and dairy products. Meat and fish were positively evaluated by 60% of all subjects. On the other hand, prototypical fast food (hamburger, chips and pizza) and continental breakfast (jam and butter) only obtained between 33% and 43% positive ratings. However, the worst opinion corresponded to sweets, soft and alcoholic drinks (beer and wine), which were positively rated by 20% or fewer. The breakdown by age group records the increase in nutritional value attributed to healthy foods (vegetables, pulses and fish) and wine, as well as the decrease in sweets and fast food. Moreover, girls' lower opinion of higher calorie foods such as bread, nuts, sweets, fast food and alcohol is reflected in table 3.

Table 4 show that the food consumed most frequently is bread. More than 70% also consume healthy products such as cereals, fruits, dairy products, salad and eggs almost on a daily basis, although the same percentage also consume less recommendable foods such as chips

and soft drinks with the same frequency. Half of adolescents consume pulses and dried fruits almost every day. Less enthusiasm was voiced for boiled vegetables, which were frequently consumed by 40% of the sample, whereas the regular consumption of fish fell to 23%. 34% also declared that they consumed foods rich in fat and/or sugar such as butter, jam, ice-cream or chocolate on a daily or almost daily basis. Finally 8% of those over 15 years of age consume wine and/or beer three or more times a week.

Although this pattern of consumption remains very stable throughout the entire age period contemplated, the consumption of sweets, fish and vegetables tends to decline.

Finally, table 5 shows that girls consumed the most protein-rich foods (meat, fish) and higher calorie foods such as nuts, pastries, butter, jam, pizza and soft drinks with a lower weekly frequency. Nevertheless, the most notable difference can be seen in alcoholic beverages, which are consumed several times a week by 12% of all boys, as opposed to 4% of all girls.

Table 2. Attitudes to food items. "Good for me" answers: Total percentages and percentages by age group

CATEGORY	Food item	Total	Age group		Z test
			11 to 14	15 to 18	
CEREALS	Hot soup	89,97	87,63	92,31	*
	Bread	69,43	69,11	69,76	No sig
	Corn flakes	84,29	80,29	88,29	**
	Boiled rice	85,33	81,67	88,99	**
	Pasta	75,34	73,05	77,62	*
<i>Mean</i>		80,87	78,35	83,39	**
FRUITS	Fruit juices	88,81	84,78	92,83	**
	Red fruits	89,78	85,15	94,41	**
	Whole year fruits	90,39	87,08	93,71	**
<i>Mean</i>		89,66	85,67	93,65	**
VEGETABLES	Green salad	84,98	78,19	91,78	**
	Spinaches	79,2	71,86	86,54	**
	Cauliflower or cabbage	75,46	67	83,92	**
	Boiled chards	74,75	68,56	80,94	**
<i>Mean</i>		78,6	71,4	85,8	**
PULSES AND NUTS	Nuts	53,38	53,62	53,15	No sig
	Pulses	80,42	73,6	87,24	**
<i>Mean</i>		66,9	63,61	70,19	**
DAIRY PRODUCTS	Milk	74,64	74,98	74,3	No sig
	Cheese	76,49	77,45	75,52	No sig
	Yogurt	80,21	83,5	76,92	**
<i>Mean</i>		77,11	78,64	75,58	No sig
MEAT AND EGGS	Chicken	69,09	69,48	68,71	No sig
	Pork loin	64,46	63,89	65,03	No sig
	Sausages	42,25	46,75	37,76	**
	Viscera	41,98	36,94	47,03	**
	Croquettes	57,21	60,22	54,2	**
	Eggs	70,91	68,93	72,9	*
	Rabbit	63,84	59,67	68,01	**
	Lamb	58,27	53,25	63,29	**
<i>Mean</i>		58,5	57,39	59,62	No sig
FISH	Sole	69,96	61,78	78,15	**
	Hake	60,63	55	66,26	**
	Shellfish	72,99	69,94	76,05	**
	Salted anchovies	52,57	50,78	54,37	**
	Smoked salmon	58,56	52,61	64,51	**
	Canned tuna fish	55,87	51,6	60,14	**
<i>Mean</i>		61,77	56,95	66,58	**
SWEETS	Sweet cake	15,35	19,16	11,54	**
	Ice cream	21,29	26,67	15,91	**
	Chocolate	17,7	22,64	12,76	**
	Pastry	17,63	23,37	11,89	**
	Marmalades	43,9	46,01	41,78	**
	Butter or margarine	42,67	49,5	35,84	**
<i>Mean</i>		26,42	31,23	21,62	**
FAST FOOD	Beef hamburguer	33,96	35,93	31,99	**
	Pizza	35,87	41,15	30,59	**
	Soft drinks	19,91	25,48	14,34	**
	Chips	43,35	50,5	36,19	**
<i>Mean</i>		33,27	38,27	28,28	**
ALCOHOLIC DRINKS	Wine	17,46	12,37	22,55	**
	Beer	12,75	10,82	14,69	**
<i>Mean</i>			11,59	18,62	**

\* Results of the Z test of contrast of proportions for a level  $P < 0.05$ \*\* Results of the Z test of contrast of proportions for a level  $P < 0.01$



Table 3. Attitudes to food items. "Good for me" answers: Total percentages and percentages by sex group

CATEGORY	Food item	Total	Boys	Girls	Z test
CEREALS	Hot soup	89,21	87,99	90,44	No sig
	Bread	69,46	76,35	62,57	*
	Corn flakes	83,07	84,8	81,35	No sig
	Boiled rice	84,2	84,8	83,59	No sig
	Pasta	74,67	76,96	72,37	*
<i>Mean</i>		80,12	82,18	78,06	*
FRUITS	Fruit juices	87,54	87,13	87,96	No sig
	Red fruits	88,31	87,25	89,37	No sig
	Whole year fruits	89,32	87,13	91,5	*
<i>Mean</i>		88,39	87,17	89,61	No sig
VEGETABLES	Green salad	82,82	80,39	85,24	*
	Spinach	76,91	77,08	76,74	No sig
	Cauliflower or cabbage	72,77	70,1	75,44	**
	Boiled chards	72,79	71,2	74,38	No sig
<i>Mean</i>		76,32	74,69	77,95	No sig
PULSES AND NUTS	Nuts	53,62	62,25	44,98	**
	Pulses	78,25	76,23	80,28	*
<i>Mean</i>		65,94	69,24	62,63	**
DAIRY PRODUCTS	Milk	76,16	74,88	77,45	No sig
	Cheese	80,52	80,76	80,28	No sig
	Yogurt	85,99	86,03	85,95	No sig
<i>Mean</i>		80,89	80,56	81,23	No sig
MEAT AND EGGS	Chicken	69,25	71,2	67,3	*
	Pork loin	64,34	67,28	61,39	**
	Sausages	43,79	50,74	36,84	**
	Viscera	40,48	44,12	36,84	**
	Croquettes	58,24	63,11	53,36	**
	Eggs	70,32	71,45	69,19	No sig
	Rabbit	62,61	66,42	58,8	**
	Lamb	56,77	60,42	53,13	**
<i>Mean</i>		58,22	61,84	54,6	**
FISH	Sole	67,41	67,65	67,18	No sig
	Hake	58,91	60,91	56,91	**
	Shellfish	72,06	73,41	70,72	No sig
	Salted anchovies	52,08	55,51	48,64	**
	Smoked salmon	56,77	60,05	53,48	**
	Canned tuna fish	54,62	59,07	50,18	**
<i>Mean</i>		60,31	62,77	57,85	**
SWEETS	Sweet cake	16,62	21,08	12,16	**
	Ice cream	23,05	27,57	18,54	**
	Chocolate	19,3	22,55	16,06	**
	Pastry	19,5	23,41	15,58	**
	Marmalade	44,68	50,98	38,37	**
	Butter or margarine	44,93	52,08	37,78	**
<i>Mean</i>		28,01	32,95	23,08	**
FAST FOOD	Beef hamburger	34,66	39,09	30,22	**
	Pizza	37,65	44,49	30,81	**
	Soft drinks	21,73	26,35	17,12	**
	Chips	45,67	50,61	40,73	**
<i>Mean</i>		34,93	40,13	29,72	**
ALCOHOLIC DRINKS	Wine	15,98	21,45	10,51	**
	Beer	12,23	16,67	7,79	**
<i>Mean</i>		14,1	19,06	9,15	**

\* Results of the Z test of contrast of proportions for a level  $P < 0.05$

\*\* Results of the Z test of contrast of proportions for a level  $P < 0.01$

Table 4. Consume frequency of food items. "Eat frequently" answers: Total percentages and percentages by age group

CATEGORY	Food item	Total	11 to 14	15 to 18	
CEREALS	Hot soup	71,43	74,15	68,71	**
	Bread	88,78	85,43	92,13	**
	Corn flakes	69,63	70,21	69,06	No sig
	Boiled rice	62,17	63,15	61,19	No sig
	Pasta	77,75	75,44	80,07	*
<i>Mean</i>		73,95	73,68	74,23	<i>No sig</i>
FRUITS	Fruit juices	77,59	74,24	80,94	**
	Red fruits	71,11	69,84	72,38	No sig
	Whole year fruits	78,45	77,36	79,55	No sig
<i>Mean</i>		75,72	73,82	77,62	*
VEGETABLES	Green salad	68,28	62,6	73,95	**
	Spinach	26,77	29,42	24,13	**
	Cauliflower or cabbage	21,24	22,73	19,76	**
	Boiled chards	40,25	45	35,49	**
<i>Mean</i>		39,14	39,94	38,33	<i>No sig</i>
PULSES AND NUTS	Nuts	53,2	55	51,4	**
	Pulses	54,32	54,63	54,02	No sig
<i>Mean</i>		53,76	54,81	52,71	<i>No sig</i>
DAIRY PRODUCTS	Milk	75,19	76,08	74,3	No sig
	Cheese	72,18	68,84	75,52	**
	Yogurt	76	75,07	76,92	No sig
<i>Mean</i>		74,45	73,33	75,58	<i>No sig</i>
MEAT AND EGGS	Chicken	41,72	44,27	39,16	**
	Pork loin	56,04	53,16	58,92	**
	Sausages	63,44	61,14	65,73	**
	Viscera	13,97	17,97	9,97	**
	Croquettes	46,58	50,69	42,48	**
	Eggs	69,22	67,46	70,98	*
	Rabbit	19,57	20,26	18,88	**
	Lamb	17,07	19,98	14,16	**
<i>Mean</i>		40,95	41,87	40,03	<i>No sig</i>
FISH	Sole	22,37	26,21	18,53	**
	Hake	26,05	28,14	23,95	**
	Shellfish	24,6	29,97	19,23	**
	Salted anchovies	18,32	23,01	13,64	**
	Smoked salmon	15,82	18,88	12,76	**
	Canned tuna fish	32,22	30,71	33,74	**
<i>Mean</i>		23,23	26,15	20,31	**
SWEETS	Sweet cake	22,25	22,64	21,85	No sig
	Ice cream	33,95	39,05	28,85	**
	Chocolate	39,7	41,98	37,41	**
	Pastry	45,61	46,47	44,76	No sig
	Marmalade	29,92	33,09	26,75	**
	Butter or margarine	35	39,05	30,94	**
<i>Mean</i>		34,4	37,05	31,76	**
FAST FOOD	Beef hamburger	35,92	37,4	34,44	**
	Pizza	47,98	50,5	45,45	**
	Soft drinks	68,36	68,19	68,53	No sig
	Chips	73,52	72,04	75	No sig
<i>Mean</i>		56,45	57,03	55,86	<i>No sig</i>
ALCOHOLIC DRINKS	Wine	7,55	7,24	7,87	**
	Beer	8,54	6,42	10,66	**
<i>Mean</i>		8,05	6,83	9,27	**

\* Results of the Z test of contrast of proportions for a level  $P < 0.05$

\*\* Results of the Z test of contrast of proportions for a level  $P < 0.01$

Table 5. Consume frequency of food items. "Eat frequently" answers: Total percentages and percentages by sex group

CATEGORY	Food item	Total	Boys	Girls	Z test
CEREALS	Hot soup	72,2	69,61	74,85	**
	Bread	87,7	87,01	88,43	No sig
	Corn flakes	69,9	73,9	65,88	**
	Boiled rice	62,5	65,2	59,86	**
	Pasta	77	77,82	76,27	No sig
<i>Mean</i>		73,9	74,71	73,06	No sig
FRUITS	Fruit juices	76,5	76,23	76,86	No sig
	Red fruits	70,7	70,22	71,19	No sig
	Whole year fruits	78,1	76,59	79,57	No sig
<i>Mean</i>		75,1	74,35	75,88	No sig
VEGETABLES	Green salad	66,5	65,32	67,65	No sig
	Spinach	27,6	29,41	25,86	**
	Cauliflower or cabbage	21,7	23,28	20,19	**
	Boiled chards	41,8	44,98	38,61	**
<i>Mean</i>		39,4	40,75	38,08	**
PULSES AND NUTS	Nuts	53,9	59,56	48,17	**
	Pulses	54,4	55,51	53,36	No sig
<i>Mean</i>		54,2	57,54	50,77	**
DAIRY PRODUCTS	Milk	75,5	75	75,91	No sig
	Cheese	71,1	69,49	72,73	No sig
	Yogurt	75,7	76,35	75,09	No sig
<i>Mean</i>		74,1	73,61	74,58	No sig
MEAT AND EGGS	Chicken	42,6	46,08	39,08	**
	Pork loin	55,2	55,88	54,43	No sig
	Sausages	62,7	63,97	61,51	No sig
	Viscera	15,3	19,85	10,74	**
	Croquettes	47,9	50,98	44,86	**
	Eggs	68,7	69,36	68	No sig
	Rabbit	19,9	27,94	11,92	**
	Lamb	18,1	25,86	10,39	**
<i>Mean</i>		41,3	44,99	37,62	**
FISH	Sole	23,6	27,33	19,95	**
	Hake	26,8	30,15	23,38	**
	Shellfish	26,4	30,39	22,31	**
	Salted anchovies	19,9	24,75	14,99	**
	Smoked salmon	16,9	21,57	12,16	**
	Canned tuna fish	31,8	36,89	26,8	**
<i>Mean</i>		24,2	28,51	19,93	**
SWEETS	Sweet cake	22,4	26,72	18,18	**
	Ice cream	35,6	39,83	31,4	**
	Chocolate	40,5	43,26	37,66	**
	Pastry	46	50,25	41,68	**
	Marmalade	31	34,8	27,15	**
	Butter or margarine	36,3	39,34	33,29	**
<i>Mean</i>		35,3	39,03	31,56	**
FAST FOOD	Beef hamburger	36,5	42,77	30,22	**
	Pizza	48,8	51,47	46,16	**
	Soft drinks	68,4	72,55	64,23	**
	Chips	73,1	74,75	71,43	No sig
<i>Mean</i>		56,7	60,39	53,01	**
ALCOHOLIC DRINKS	Wine	7,5	10,78	4,25	**
	Beer	8	12,5	3,42	**
<i>Mean</i>		7,7	11,64	3,84	**

\* Results of the Z test of contrast of proportions for a level  $P < 0.05$

\*\* Results of the Z test of contrast of proportions for a level  $P < 0.01$

## Discussion and conclusions

Dietary information provided by schools and families is well assimilated by Balearic adolescents. At the age of 15, they are familiar with current nutritional recommendations, while at the age of 11 they know how to classify healthy foods as "Good for me" and less recommendable foods as "Bad for me". The assimilation of these attitudes seems to begin at an early age [16] and subsists during adulthood when they are increased with additional nutritional knowledge [12].

Furthermore, the negative ratings given to fast foods items and positive ratings given to some traditional Mediterranean foods despite their reputation as fattening (bread or pulses) surely indicates certain permeability to periodic campaigns in favour of recovering the Mediterranean diet.

Yet, as remarkable as the solidity of adolescents' beliefs is the low impact on consumption they have. And if true that our data on declared consumption frequency must be evaluated with the necessary prudence, they coincide with quantitative effective consumption studies conducted on the Balearic adolescent population [24].

Thus, it can be asserted that child and adolescent habits depend essentially on their preferences towards the sweetest and the fattiest foods [18, 23]. Certainly the most frequently consumed foods are those that adolescents declare most appealing and the most highly rated foods are the least appreciated and consumed with the lowest frequency [20]. In fact we know that depriving oneself of the pleasure of food is not recommendable and eating other foods that do not appeal to us solely for their nutritional virtues is not an easy undertaking at any age.

However, other factors different from preferences may affect the dissonance observed between attitudes and consumption. Thus, the adolescent will to reaffirm personal identity may be expressed in a rejection of adult directives that contradict their preferences. Moreover, as adolescents know that their peers share these ideas, the "right" to eat junk food would also assuage the fear of seeming different from their friends [3].

But the discrepancy may also indicate a lack of conviction in the recommendations themselves, that is, that consuming appetising food poses an effective risk health or that consuming vegetables or fish is truly beneficial for their bodies.

A recent study of subjects between 9 and 13 years of age reflects the conviction that their actions today will have no influence on future health [4], which diminishes or even annuls the motivation to follow any preventative-oriented recommendation in the field of health. Furthermore, adolescents' subjective perception of time may lead many to think that they will worry about eating better when they are older... within one hundred years!

On the other hand, we observe that although declared consumption habits openly contradict the subject's own beliefs, 75% of them defined their diet as good or very good, a surprising finding not altered by age or sex. We can interpret this data as a mechanism of cognitive reactance whose goal would be to cushion the dissonance produced by the awareness of the contradiction between conduct and attitude. Complementarily, we may consider it an expression of the comparative optimism phenomena [5] which would induce adolescents to underestimate the risks involved in their poor diets.

Consequently, we should not neglect cognitive and emotional work with adolescents on the advisability of following the diet we advise not assuming that this factor is implicit in the nutritional messages provided. A. Bandura's cognitive social theory [1] has also suggested the prior need to promote subjects' perception of self-effectiveness to convince them of their capacity to introduce positive changes in their diet.

At present, the fear of gaining weight seems to be the only motivation that may spontaneously introduce certain self-control in choosing foods. This is an important motivation among adolescents [17], particularly girls [6], to the point in which dieting is considered a normal phase in female development [7].

Girls' greater motivation and interest in health around the end of adolescence has also been indicated [27]. Other studies have in fact noted girls' greater consumption of vegetables [25], concluding that the desire to be slim channels food selection towards healthy eating [13, 17]. Yet, in ours the higher rating given to lower calorie foods was not accompanied by an increase in the regularity of vegetable or fish consumption, although it does seem to contribute to reducing girls' consumption of the highest calorie and least recommendable foods (including alcohol).

This signals the need to distinguish between promoting consumption of the least appetising foods and focusing on initial efforts to achieve a restriction in the consumption of pleasing, yet not recommendable foods [8].

Undoubtedly school is the natural place to provide nutritional information but also to investigate the most effective strategies to instil good eating habits. As B.C. Petrini states [19], “Nutritional formation offered in school is too often based on transmitting nutritional tables and videos on foods that “are good for you” or “bad for you”. And what “is bad for you” are always the products they like most because they are rich in flavour enhancers: saying they are prejudicial and imposing bans does not teach adolescents anything.... It is not enough just to offer undoubtedly correct nutritional rules and explain them. Teach-

ing students where raw material comes from and letting them touch, handle and consume products directly is the most effective way of educating them in food and pleasure” (pp. 168–169).

Finally, scholar learning processes must conjugate efforts with family. In fact numerous studies agree that parents’ diet and the family menu predict the variety of a child’s diet and his or her consumption of vegetables and dairy products [9, 14, 26]. But unfortunately adolescents themselves note that the contents of their family’s diet does not always model the healthy way of eating we advocate [15]. Thus we must keep in mind that family should always be an on-going example of a healthy and pleasurable diet. And although setting a good example is not enough at times, it is always indispensable in modelling the proper eating habits we all hope to instil in young people.

## BIBLIOGRAPHY

1. Bandura A. (1986). *Social foundations of thought and action: A social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.
2. Bellisle F., Rolland-Cachera M.F. (2000). Three consecutive (1993, 1995, 1997) surveys on food intake, nutritional attitudes and knowledge, and lifestyle in 1000 French children, aged 9–11 years. *J Hum Nutr Diet*; 13: 101–111.
3. Brown K., McIlveen H., Strugnell C. (2000). Nutritional awareness and food preferences of young consumers. *Nutr Food Sc*; 30: 230–235.
4. Brown S.L., Teufel J.A., Birch D.A. (2007). Early adolescents’ perceptions of health and health literacy. *J School Health*; 77 (1): 7–15.
5. Chappé J., Verhliac J.F., Meyer T. (2007). Comparative optimism and pessimism following exposures to several threatening messages. *Rev Eur Psychol Appl*; 57 (1): 23–35.
6. Contento I., Michela J., Williams S. (1995). Adolescent Food Choice Criteria: Role of Weight and Dieting Status. *Appetite*; 25, 51–76.
7. Cooper P.J., Goodyer I. (1997). Prevalence and significance of weight and shape concerns in girls aged 11–16 years. *Brit J Psychiatry*; 171: 542–544.
8. De Bourdeauhuij I. (1997). Family rules and healthy eating in adolescents. *J Health Psychol*; 2: 45–56.
9. De Bourdeauhuij I., van Oost P. (2000). Personal and family determinant of dietary behaviour in adolescents and their parents. *Psychol and Health*; 15: 751–770.
10. European Food Information Council. (1995). *Children’s view on food and nutrition: A pan-European survey*. London.
11. Gibson E., Wardle J., Watts J. (1998). Fruit and vegetable consumption, nutritional knowledge and beliefs in mother and children. *Appetite*; 31: 205–228.
12. Glanz K., Basil M., Maibach E., et al. (1998). Why Americans eat what they do: taste, nutrition, cost, convenience and weight control concerns as influences on food consumption. *J Am Diet Assoc*; 98:1118–1126.
13. Lattimore P.J., Halford C.G. (2003). Adolescence and the diet-dieting disparity: healthy food choice or risky health behaviour. *Brit J Health Psychol*; 8: 451–463.
14. Neumark-Sztainer D., Hannan P.J., Story M., et al. (2003). Family meal patterns: Associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc*; 103: 317–322.
15. Neumark-Sztainer D., Story M., Perry C., et al. (1999). Factors influencing food choice of adolescents: findings from focus-group discussion with adolescents. *J Am Diet Assoc*; 99: 929–937.
16. Nguyen S.P. (2007). An apple a day keeps the doctor away: Children’s evaluative categories of food. *Appetite*; 48: 114–118.
17. Nowak M. (1998). The weight-conscious adolescent: body image, food intake and weight-related behaviour. *J Adolesc Health*; 23: 389–398.
18. Pérez-Rodrigo C., Ribas L., Serra-Majem L.I., et al. (2003). Food preferences of Spanish children and young people: the Enkid study. *Eur J Clin Nutr*; 57 (1 Suppl): S45–S48.

19. Petrini C. Bueno, limpio y justo. (2007). Principios de una nueva gastronomía. Madrid: Ediciones Polifemo.
20. Pich J., Ballester L.I., Canals R., et al. (2006). Evolución de las preferencias alimentarias: un estudio en la población escolarizada de Mallorca de 11 a 18 años. *Rev Esp Nutr Comun*; 12 (3): 114–155.
21. Rolls B.J. (1998). Food beliefs and food choices in adolescents. *Med J Aust*; 148: S9–S13.
22. Serra-Majem L.I., Ribas L., Pérez-Rodrigo C., et al. (2006). Nutrient adequacy in Spanish children and adolescents. *Brit J Nutr*; 96 (1 Suppl): S49–S57.
23. Skinner J.D., Carruth B.R., Bounds W., et al. (2003). Children's food preferences: a longitudinal analysis. *J Am Diet Assoc*; 102: 1638–1647.
24. Tur J.A., Puig M.S., Benito E., et al. (2004). Associations between sociodemographic and lifestyle factors and dietary quality among adolescents in Palma de Mallorca. *Nutrition*; 20 (6): 502–508.
25. Vereecken C., Ojala K., Delgrande J. (2004). Eating habits. In: Currie C, Roberts C, Morgan A., et al, eds. Young people's health in context: Health Behaviour in school-aged children (HBSC) study: International report from the 2001/2002 survey. Health policy for children and adolescents No. 4. Copenhagen, Den: WHO Regional Office for Europe: 110–119.
26. Videon T.M., Manning C.K. (2003). Influences on adolescent eating patterns: the importance of family meals. *J Adoles Health*; 32: 365–373.
27. Wardle J., Haase A.M., Steptoe A., et al. (2004). Gender differences in food choice: the contributions of health beliefs and dieting. *Ann Behav Med*; 27: 107–116.
28. Wardle J., Marsland L., Sheikh Y., et al. (1992). Eating style and eating behaviour in adolescents. *Appetite*; 18: 167–183.
29. Williams H.M., Woodward D.R., Ball P.J., et al. (1993). Food perceptions and food consumption among Tasmanian high school children. *Aust J Nutr Diet*; 50 (4): 156–163.

#### ANNEX 1. LIST OF FOODS

- |                                  |  |
|----------------------------------|--|
| 1. Sweet cake                    | 23. Boiled chards with potatoes              |
| 2. Hot soup                      | 24. Pasta dishes (spaghetti, macaroni...)    |
| 3. Bread                         | 25. Pulses (lentils, chickpeas...)           |
| 4. Green salad                   | 26. Sausages                                 |
| 5. Ice cream                     | 27. Pastry (bread rolls, donuts...)          |
| 6. Chicken                       | 28. Viscera (liver, kidneys...)              |
| 7. Corn flakes                   | 29. Croquettes                               |
| 8. Boiled rice                   | 30. Eggs (fried, omelette)                   |
| 9. Pork loin                     | 31. Chips                                    |
| 10. Beef hamburger               | 32. Jam                                      |
| 11. Sole                         | 33. Butter or margarine                      |
| 12. Chocolate                    | 34. Wine                                     |
| 13. Milk                         | 35. Beer                                     |
| 14. Cheese                       | 36. Rabbit                                   |
| 15. Pizza                        | 37. Lamb                                     |
| 16. Yogurt                       | 38. Shellfish (shrimps, mussels...)          |
| 17. Hake                         | 39. Salted anchovies                         |
| 18. Soft drinks                  | 40. Smoked salmon                            |
| 19. Fruit juices                 | 41. Canned tuna fish                         |
| 20. Spinach                      | 42. Red fruits (cherries, watermelon...)     |
| 21. Cauliflower or cabbage       | 43. Fruit of the whole year (apple, pear...) |
| 22. Nuts (almonds, hazelnuts...) |  |

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## Trends in Overweight and Obese Pre-School and School Children in Liechtenstein, 2004–2008

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### Abstract

**Background:** Overweight and obesity among children and adolescents became a major concern in health policy in the 21<sup>st</sup> century. This resulted primarily from tracking studies from childhood into adulthood and associated health consequences. It is therefore essential to continue monitoring these developments accurately.

**Objective:** The aim of this paper was to document the current prevalence and trends in overweight and obesity in 5, 10 and 14 year-old school children in Liechtenstein as based on national data measured over the five year period from 2004 to 2008.

**Methods:** A total of 2205 children were measured in three cross-sectional screening examinations. Based on the anthropometric data collected, overweight and obesity were determined according to sex- and age-specific percentiles of the body mass index (BMI) using international as well as German cut-off criteria.

**Results:** Overall the prevalence of overweight (obesity) was 17.1% (3.6%) following the IOTF standards and 12.6% (4.7%) following the German standards, respectively.

**Conclusions:** In comparison with other surveys no increase or significant changes of prevalence could be established over the five year trend of this study.

**Key words:** school children, overweight and obesity, monitoring, Liechtenstein.

### Introduction

During the last decades a dramatic increase in the prevalence and incidence of overweight and obese children and adolescents has been monitored worldwide and seems to have reached pandemic levels [5, 12, 13, 24, 25]. This alarming development is primarily the result of lifestyle changes as well as changes within the home environment and socio-ecological context. Today many children grow up in so-called “obesogenic environments” [4, 10, 26], which constitute a driving force in their attitudes and behavioural patterns.

The origin of overweight and obesity lies in multifactorial determinants and includes genetic dispositions, behavioural factors as well as the influence of the socio-cultural environment [2, 20, 22]. Specifically, daily eating and physical activity habits seem to play a key roles in the long-term positive energy balance and excessive weight gain [5, 6, 14, 16]. Thus, exercise and nutrition are regarded as central fields for action in the context of health education and prevention strategies [9].

Overweight and obesity in childhood and adolescence are associated with many adverse effects on health (e.g. cardiovascular disease, orthopaedic complications and psycho-social barriers) and a high risk of becoming an overweight adult [3, 6, 11, 19, 20]. These various comorbidities not only influence the psycho-physical health and life expectancy of the people concerned but also impact the national economy, i.e. the additional costs to our health care system [23]. For example in Switzerland, the total (obesity-link) disease costs of overweight and obesity have more than doubled from CHF Mio 2'648 (cost basis 2001) to CHF Mio 5'755 (cost basis 2006) in recent years [17]. In view of the future of public health and the multi-causality and complexity of the problem, this development is a cause for concern. Today's children are the parents of tomorrow and there is a consequent risk of severe health problems if the current trend cannot be stopped.

With this background acting as focal point it is important to detect and counteract the problem

already in early childhood. If initiated in childhood the development of a healthy lifestyle is carried through to later periods of life. Therefore the prevalence of overweight growing children needs to be monitored systematically. From a health policy perspective, continuously recorded and analysed trend data represent a crucial basis for clarifying the current situation and the relevance for initiating possible measures of prevention or intervention.

## Methods

The data were taken from a current BMI-monitoring project undertaken by the Liechtenstein national public health department. Since 2004 this ongoing cross-sectional survey has been conducted at two year intervals as part of national screening examinations. For these paediatric investigations all children aged 5, 10 and 14 years old resident in Liechtenstein were invited to take part; participation was voluntary. The current non-selected sample includes 2205 children from three surveys 2004, 2006 and 2008 – table 1. The age groups studied represented typical levels of education: kindergarten (5 year-olds), primary school (10 year-olds) and secondary school (14 year-olds). The mean of participation rate (defined as the proportion of all children invited) was 61.1%.

Anthropometric data of body weight and height were obtained by doctors using standardised procedures. Anonymity and confidentiality were ensured. Standing height was measured without shoes, using a stadiometer with an accuracy of  $\pm 0.2$  cm. Weight was determined in underwear, using a calibrated scale exactly to  $\pm 0.2$  kg. The BMI was calculated as weight divided by the height squared ( $\text{kg}/\text{m}^2$ ). The classification and analyses of overweight and obesity were based on age- and sex-specific BMI cut-off points as recommended by the International Obesity Task Force (IOTF) [1] as well as per German reference values [7]. The IOTF criteria are used most frequently for international comparison. These reference data are based on six national but ethnically very different populations (Brazil, Great Britain, Hong Kong, the Netherlands, Singapore and the USA). Therefore the German cut-off values were also used, these had been determined

from 17 studies made in different regions of Germany. In this reference system children are defined as overweight or obese, respectively when their BMI-value is above 90<sup>th</sup> or 97<sup>th</sup> age- and sex-specific percentile. In addition to the German working group for adiposity in childhood and adolescence (AGA) also the Austrian society for child and youth medicine (ÖGKJ) refers to this reference standard.

Statistical analyses were performed using SPSS (Version 15). Differences between anthropometric parameters (weight, height, BMI) were analysed by using Mann-Whitney-U-test and Kruskal-Wallis-test; trends in overweight and obesity prevalence among observation periods, gender and age groups by using Chi-square and Chi-square-test for trend, drawn at significant level of  $p < .05$ .

## Results

This study included anthropometric data of 2205 children aged 5, 10 and 14 years. The gender ratio is nearly equal with a participation of 50.8% girls and 49.2% boys. Table 1 describes mean weights, heights and BMI of children, stratified by gender and age groups, within the periods of investigation.

The current prevalence and time trends of overweight and obesity according to gender and age are summarised in table 2, figures 1 and 2. Using the IOTF references 17.1% were overweight, thereof 3.6% obese. The German references categorised 12.6% of all the children observed as being overweight, thereof 4.7% as being obese. In summary, the comparison between these two standards showed similar prevalence of obesity but major differences in overweight with a partial deviation of up to 9%. Regardless of the references used, the proportion of the combined prevalence of overweight and obesity increases from 5-year-olds (9.0% and 12.6%, respectively) up to primary and secondary school children (12.6% and 17.1%, respectively). Significant differences between the three school levels (represented by age groups) were observed between 5 and 10 year-olds (both references,  $p < .01$ ) and between 5 and 14 year-olds (both references,  $p < .001$ ). No statistical differ



Table 1. Descriptive characteristics of the national sample (n=2205). Mean  $\pm$  SD

Parameter <sup>a</sup>	Boys (n=1084)			Girls (n=1121)		
	2004 (n=357)	2006 (n=411)	2008 (n=316)	2004 (n=376)	2006 (n=423)	2008 (n=322)
<b>5 y (n=722)</b>						
weight (kg)	20.1 $\pm$ 2.7*	20.3 $\pm$ 3.2	20.2 $\pm$ 2.9	19.3 $\pm$ 2.8	19.9 $\pm$ 2.8	20.0 $\pm$ 2.7
height (cm)	113.0 $\pm$ 4.6*	113.2 $\pm$ 4.4	113.3 $\pm$ 4.2	111.5 $\pm$ 5.7	112.5 $\pm$ 4.7	112.1 $\pm$ 4.6
BMI (kg/m <sup>2</sup> )	15.6 $\pm$ 1.3	15.7 $\pm$ 1.8	15.7 $\pm$ 1.8	15.5 $\pm$ 1.8	15.6 $\pm$ 1.5	15.9 $\pm$ 1.7
<b>10 y (n=850)</b>						
weight (kg)	36.9 $\pm$ 8.1*	35.5 $\pm$ 8.0	35.8 $\pm$ 7.2	35.1 $\pm$ 6.5	35.6 $\pm$ 7.1	35.5 $\pm$ 6.9
height (cm)	141.8 $\pm$ 6.3	141.8 $\pm$ 6.5	141.8 $\pm$ 5.8	141.5 $\pm$ 6.6	141.4 $\pm$ 6.3	142.1 $\pm$ 6.1
BMI (kg/m <sup>2</sup> )	18.2 $\pm$ 3.1*	17.6 $\pm$ 3.3	17.8 $\pm$ 3.1	17.5 $\pm$ 2.5	17.7 $\pm$ 2.8	17.5 $\pm$ 2.8
<b>14 y (n=633)</b>						
weight (kg)	59.4 $\pm$ 12.1**	57.2 $\pm$ 12.2	58.6 $\pm$ 12.8**	55.5 $\pm$ 11.4	55.5 $\pm$ 9.4	54.1 $\pm$ 8.7
height (cm)	168.1 $\pm$	166.6 $\pm$	168.1 $\pm$	161.5 $\pm$ 6.5	162.8 $\pm$ 8.2	162.4 $\pm$ 7.1
BMI (kg/m <sup>2</sup> )	20.9 $\pm$ 3.3	20.5 $\pm$ 3.5	20.6 $\pm$ 3.8	21.2 $\pm$ 3.6	21.0 $\pm$ 3.6	20.5 $\pm$ 2.8

<sup>a</sup> The standard errors (SE) for weight, height and BMI range from 0.1 to 1.3. SD (standard deviation)  
 Significant gender differences (Mann-Whitney-U-test): \* p < .05; \*\* p < .01; \*\*\* p < .001  
 No significant differences between the observation periods within age groups (Kruskal-Wallis-test, p > .05)

ence could be detected between boys and girls (p > .05). During the three study periods the prevalence of overweight and obesity remained at a consistent level. The annual trend comparisons within the different age groups and stratified by gender did not reach significance level (p > .05). How-

ever the proportion of obesity among 5 year-olds between 2004 and 2008 had doubled. Otherwise the proportion of obesity among 14 year-olds between 2004 and 2008 primarily by girls tends to be in decline.

Table 2. Time trends in overweight and obesity prevalences (%) in Liechtensteinian children by age and gender, using German and IOTF reference criteria

Age <sup>d</sup>	German references <sup>a</sup> overweight / obesity <sup>c</sup>				IOTF references <sup>b</sup> overweight / obesity <sup>c</sup>			
	2004	2006	2008	total	2004	2006	2008	total
<b>5y</b>	<b>4.8 / 2.4</b>	<b>6.1 / 3.7</b>	<b>4.6 / 5.1</b>	<b>5.3 / 3.7</b>	<b>6.7 / 2.4</b>	<b>10.1 / 3.7</b>	<b>9.2 / 5.1</b>	<b>8.9 / 3.7</b>
Boys	2.0 / 3.0	7.2 / 3.3	5.1 / 4.2	5.1 / 3.5	3.0 / 3.0	9.2 / 3.3	7.6 / 4.2	7.0 / 3.5
Girls	7.3 / 1.8	4.9 / 4.2	4.0 / 6.1	5.4 / 4.0	10.0 / 1.8	11.1 / 4.2	11.1 / 6.1	10.8 / 4.0
<b>10y</b>	<b>11.0 / 3.7</b>	<b>6.1 / 5.2</b>	<b>9.2 / 5.8</b>	<b>8.7 / 4.8</b>	<b>16.3 / 3.0</b>	<b>10.6 / 4.2</b>	<b>16.7 / 3.8</b>	<b>14.4 / 3.6</b>
Boys	12.7 / 4.7	7.0 / 4.5	7.6 / 6.7	9.2 / 5.1	20.0 / 4.0	10.2 / 3.2	16.2 / 4.8	15.3 / 3.9
Girls	9.3 / 2.7	5.2 / 5.9	10.4 / 5.2	8.2 / 4.6	12.7 / 2.0	11.1 / 5.2	17.0 / 3.0	13.5 / 3.4
<b>14y</b>	<b>9.8 / 7.6</b>	<b>9.6 / 4.4</b>	<b>9.9 / 4.4</b>	<b>9.8 / 5.5</b>	<b>20.5 / 4.5</b>	<b>15.4 / 3.1</b>	<b>16.6 / 2.8</b>	<b>17.5 / 3.5</b>
Boys	10.2 / 5.6	6.9 / 4.9	11.8 / 5.4	9.6 / 5.3	22.2 / 3.7	14.7 / 3.9	19.4 / 4.3	18.8 / 4.0
Girls	9.5 / 9.5	11.9 / 4.0	8.0 / 3.4	10.0 / 5.8	19.0 / 5.2	15.9 / 2.4	13.6 / 1.1	16.4 / 3.0
<b>All</b>	<b>8.9 / 4.5</b>	<b>7.1 / 4.4</b>	<b>7.8 / 5.2</b>	<b>7.9 / 4.7</b>	<b>14.9 / 3.3</b>	<b>11.8 / 3.7</b>	<b>14.1 / 3.9</b>	<b>13.5 / 3.6</b>
Boys	9.0 / 4.5	7.1 / 4.1	7.9 / 5.4	7.9 / 4.7	16.0 / 3.6	10.9 / 3.4	13.9 / 4.4	13.5 / 3.8
Girls	8.8 / 4.5	7.1 / 4.7	7.8 / 5.0	7.9 / 4.6	13.8 / 2.9	12.5 / 4.0	14.3 / 3.4	13.5 / 3.5

<sup>a</sup> overweight (> P90-P97); obesity (P > 97), [7]

<sup>b</sup> cut-off points, extrapolated from a BMI of 25 kg/m<sup>2</sup> (overweight) and 30 kg/m<sup>2</sup> (obesity) at age 18 [1]

<sup>c</sup> chi-square-trend-test: No significant differences between the observation periods within age groups and gender (p > .05)

<sup>d</sup> kindergarten (5y); primary school (10y); secondary school (14y)

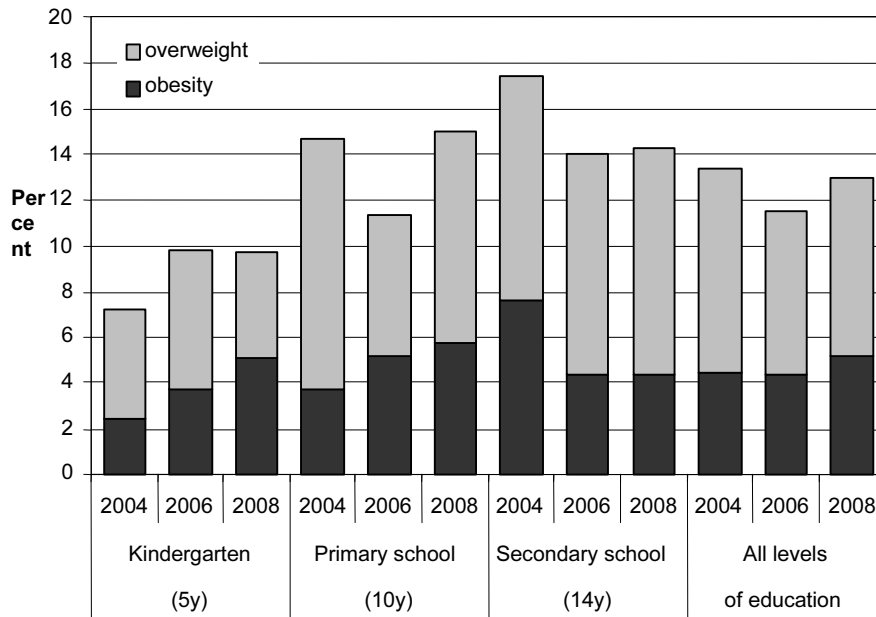


Figure 1. Time trends and proportion of overweight and obesity in the different school levels, using German references

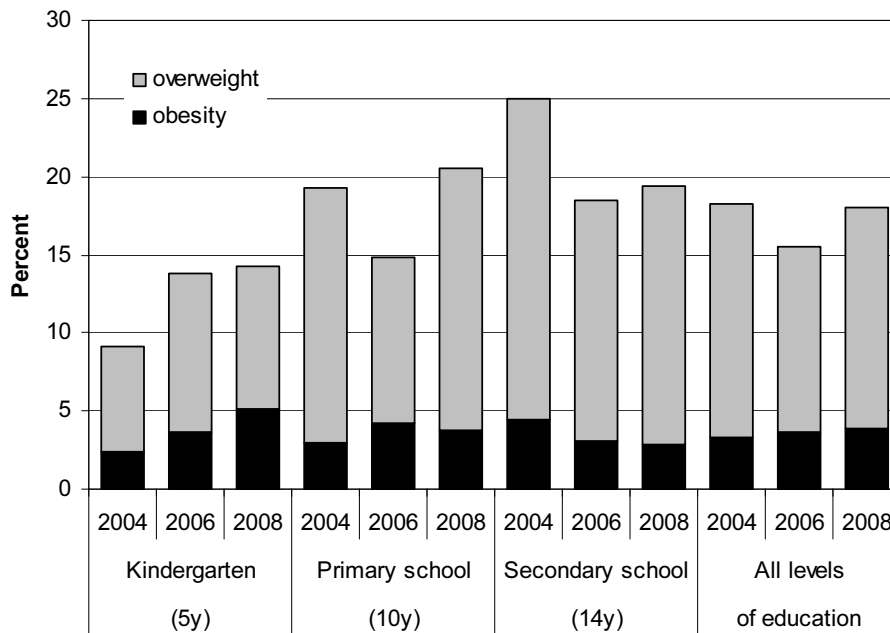


Figure 2. Time trends and proportion of overweight and obesity in the different school levels, using IOTF references

## Discussion

The present findings highlight the following important issues. Overall this national survey showed a combined prevalence of overweight and obesity of 17.1% using international IOTF

references and 12.6% using German references, respectively. Comparing the two standards used, the IOTF criteria produced a higher prevalence in overweight but a similar prevalence in obesity

than the German references because the international recommendations are less strict in their definition of overweight.

The distribution of overweight detected in this study is comparable with the prevalence of 10%–20% in states of Northern Europe [12]. In Germany, each 6–7th child/youth (15.0%) between 3–17 years is deemed to be overweight [8]; projected this corresponds to 1.9 Mio overweight (thereof 800'000 obese) children and young people in Germany. In Switzerland between 1960/1965 and 2007 the combined prevalence of overweight and obesity (using the CDC BMI reference criteria [15]) among 6–12 year olds rose from 5.4% to 16.8% in boys and from 5.8% to 13.1% in girls [18]. According to forecast projections (based on a non-linear regression model) the proportion of overweight and obese children in Switzerland may increase to 16.8% in boys and 22.7% in girls [18]. Within Europe the highest levels of childhood overweight (30%–36%) can be found in Mediterranean countries and are predicted to increase up to 41% by 2010 [12, 24].

Focussing on the neighbouring regions across the borders from Liechtenstein in Switzerland and Austria the corresponding data groups can be compared as follows: In the federal state of Vorarlberg (Austria) the current 15 year comparison within the 7–15 year-olds shows an average prevalence of 10.6% ([www.aks.or.at](http://www.aks.or.at)); the val-

ues of 2006 and 2008 with 13.0% and 13.5%, respectively are just as highly as in Liechtenstein. In the canton Graubünden (Switzerland) per the baseline examination 2007/08, each 7<sup>th</sup> child/youth (14.0%) between 3–17 years is classified as overweight [21]; in the canton St. Gallen (Switzerland) no data is available so far but a monitoring project is in planning.

As the principal finding and in contrast to other studies our trend analysis showed no increase of overweight prevalence from 2004 to 2008 but remained at a stable level. This finding must not be regarded as an all-clear signal but the development has to continue to be observed carefully. A five year period is probably a limiting timeframe. As a result of the continuing monitoring project, more precise estimates will become available in the next few years. A major strength of this study is the large national sample and the high participation rates, even though participation was voluntary. How far the 39% of those children who did not participate influence the generalizability of our findings cannot be answered precisely because no drop-out analysis is possible. It is possible that some of the parents of overweight or obese children tended not to permit participation of their children. No causal analysis or interpretation is possible because of the cross-sectional design of this study.

## BIBLIOGRAPHY

1. Cole T.J., Bellizzi M.C., Flegal K.M., Dietz W.H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*, 320, 1240–1243.
2. Dietz W.H., Gortmaker S.L. (2001). Preventing obesity in children and adolescents. *Annu Rev Public Health*, 22, 337–353.
3. Ferreira I., Twisk J.W.R., van Mechelen W., Kemper H.C.G., Stehouwer C.D.A. (2005). Development of Fatness, Fitness, and Lifestyle From Adolescence to the Age of 36 Years. *Arch Intern Med*, 165, 42–48.
4. International Obesity Task Force (IOTF) (2002). Obesity in Europe. The case for action. *IOTF*, 17–18.
5. Janssen I., Katzmarzyk P.T., Boyce W.F., Vereecken C., Mulvihill C., Roberts C., Currie C., Pickett W. and The Health Behaviour in School-Aged Children Obesity Working Group (2005). Comparison of overweight and obesity prevalence in school-aged youth from 34 countries and their relationships with physical activity and dietary patterns. *Obes Rev*, 6, 123–132.
6. Kimm S.Y.S., Glynn N.W., Obarzanek E., Kriska A.M., Daniels S.R., Barton B.A., Liu K. (2005). Relation between the changes in physical activity and body-mass index during adolescence: a multicentre longitudinal study. *Lancet*, 366, 301–307.
7. Kromeyer-Hauschild K., Wabitsch M., Kunze D., Geller F., Geiss H.C., Hesse V., Von Hippel U., Jaeger U., Johnsen D., Korte W., Menner K., Müller G., Müller J.M., Niemann-Pilatus A., Remer T., Schaefer F., Wittchen H.U., Zabransky S., Zellner K., Ziegler A., Hebebrand J. (2001). Perzentile für den Body Mass Index für das Kindes- und Jugendalter unter Heranziehung verschiedener deutscher Stichproben. *Monatsschrift Kinderheilkunde*, 149, 807–818.
8. Kurth B.M., Schaffrath-Rosario A. (2007). Die Verbreitung von Übergewicht und Adipositas bei Kindern und Jugendlichen in Deutschland. Ergebnisse des bundesweiten Kinder- und Jugend-gesundheitssurveys (KiGGS). *Bundesgesundheitsbl-Gesundheitsforsch-Gesundheitsschutz*, 5–6, 736–743.

9. Kühnis J. (2010). Health literacy – a superior educational objective. *European Journal of Physical & Health Education*, 3, 13–18.
10. Lake A., Townshend T. (2006). Obesogenic environments: exploring the built and food environments. *J Royal Soc Prom Health*, 126, 262–267.
11. Latner J.D., Stunkard A.J. (2003). Getting worse: the stigmatization of obese children. *Obes Res*, 11, 452–456.
12. Lobstein T., Frelut M.L. (2003). Prevalence of overweight among children in Europe. *Obes Rev*, 4, 195–200.
13. Lobstein T., Baur L., Uauy R. (2004). Obesity in Children and young people. A crisis in public health. *Obes Rev*, 5, 4–104.
14. Nicklas T.A., Yang S.J., Baranowski T., Zakeri I., Berenson G. (2003). Eating patterns and obesity in children: the Bogalusa Heart Study. *Am J Prev Med*, 25, 9–16.
15. Ogden C.L., Kuczmarski R.J., Flegal K.M., Mei Z., Guo S., Wei R., Grummer-Strawn L.M., Curtin L.R., Roche A.F., Johnson C.L. (2002). Centers for Disease Control and Prevention 2000 growth charts for the United States: improvements to the 1977 National Center for Health Statistics version. *Pediatrics*, 109, 45–60.
16. Pietiläinen K., Kaprio J., Borg P., Plasqui G., Yki-Järvinen H., Kujala U., Rose, R., Westerterp K., Rissanen A. (2008). Physical inactivity and obesity: a vicious circle. *Obesity*, 16, 409–414.
17. Schneider H., Venetz W., Berardo Gallani C. (2009a). Overweight and obesity in Switzerland. Part 1: Cost burden of adult obesity in 2007. Prepared for the Bundesamt für Gesundheit (BAG). *HealthEcon*, 1–57.
18. Schneider H., Venetz W., Berardo Gallani C. (2009b). Overweight and obesity in Switzerland. Part 2: Overweight and obesity trends in children. Prepared for the Bundesamt für Gesundheit (BAG). *HealthEcon*, 1–26.
19. Singh A.S., Mulder C., Twisk J.W.R., van Mechelen W., Chinapaw M.J.M. (2008). Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev*, 9, 474–488.
20. Speiser P.W., Rudolf M.C.J., Anhalt H., Camacho-Hubner C., Chiarelli F., Eliakim A., Freemark M., Gruters A., HersHKovitz E., Iughetti L., Kurde H., Latzer Y., Lustig R.H., Pescovitz O.H., Pinhas-Hamiel O., Rogol A.D., Shalitin S., Sultan C., Stein D., Vardi P., Werther G.A., Zadik Z., Zuckerman-Levin N., Hochberg Z. (2005). Consensus Statement: Childhood Obesity. *J Clin Endocrinol Metab*, 90, 1871–1887.
21. Stamm H.P., Lamprecht M. (2008). BMI-Monitoring im Kanton Graubünden. Resultate zum Schuljahr 2007/08. Im Auftrag des Gesundheitsamts Graubünden, 1–25.
22. Troiani R.P., Flegal K.M. (1998). Overweight children and adolescents: description, epidemiology and demographics. *Pediatrics*, 1001, 497–504.
23. Wang G., Dietz W.H. (2002). Economic burden of obesity in youth aged 6 to 17 years: 1979-1999. *Pediatrics*, 109, e81.
24. Wang Y., Lobstein T. (2006). Worldwide trends in childhood overweight and obesity. *Int J Pediatr Obes*, 1, 11–25.
25. World Health Organisation (WHO) (2000). Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series, 894, 1–253.
26. World Health Organisation (WHO) (2003). Diet, Nutrition and the Prevention of Chronic Diseases. Report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series, 916, 1–148.
27. Zimmermann M.B., Gübeli C., Püntener C., Molinari L. (2004). Detection of overweight and obesity in a national sample of 6–12-y-old children. Accuracy and validity of reference values for body mass index from the US Centers for Disease Control and Prevention and the International Obesity Task Force. *Am J Clin Nutr*, 79, 838–843.

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# Obesity Diffusion among Children and Adolescents: Trends, Methodological Problems and Countermeasures at European Level

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## Abstract

While the obesity epidemic is a well know public health concern, an emerging problem is that of childhood obesity. Obesity in children reaches peaks of about 30% in the US and of 23% in the South of Europe. This is a major concern not only at present but also as a perspective. Many actions have been taken by different public bodies to counteract this trend but they lack coordination. This coordination is necessary non only at a continental level but due to the globalization trend they have to be coordinated in a global dimension. The present review, after a survey of the existing data on the dimensions of the problem and of its causes, included unusual factors such as sleep and climate changes, lists the actions that have been undertaken by the European Union in order to study the determinants of childhood obesity. The necessity of globally coordinated action to fight this growing problem is addressed as well as new perspectives for the study of the problem.

Keywords: obesity, children, epidemiology, Europe, obesity determinants, multi-disciplinary approach.

## Introduction

Physical activity in primary school has been demonstrated to be a healthy behaviour that accompanies a person throughout whole his or her life.

A major consequence of the modification of life style induced by the complex interactions of many determinants in developed countries caused an increase of obesity. Due to the fact that good and poor habits are acquired in childhood, it is necessary to understand the root causes of the disease, in order to develop countermeasures.

Obesity diffusion trends have been of great public concern for many years [29]. In the United States the problem reached the 33% prevalence of obesity, defined as BMI > 30 (BMI = body weight divided body height squared), among the adult population and 31,9% obesity/overweight in children (US Center for Disease Control and Prevention [6]. This percentage is expected to grow in the coming years, also if a stabilization of the phenomenon was observed between 1999 and 2006 [6]. In Italy, a recent survey shows a different geographical distribution and incidence of obesity that follow a North to South axis, confirmed the results of previous studies [3, 5, 15, 16, 17, 19] for children between 6 and 11 years

old (Campania Region: 21%, 4% Friuli Venezia Giulia Region), with a global incidence of overweight of 23,6% and of 12,3% of obesity [10]. The study was based on Body Mass Index assessment of 46.000 children in 2.610 primary schools.

## Diffusion of children obesity in the European Union

While the available cross-sectional data, however imperfect they may be, suggest that there are complex patterns in prevalence which vary with time (also related to the economic situation), age (transition from childhood to adolescence), sex (include cultural aspects-media related) and geographical region (South-North), there is still contradictory data on obesity diffusion among children and adolescent in Europe. For example, some studies states that prevalence of obesity in young children is relatively low compared to adolescents [12], while other studies [13] show that in the transition from childhood (7–11 years of age) to adolescence (8–17 years) there is a reduction in overweight and obesity %. General consensus exist in literature in pointing out that females are more prone to overweight and obesity than males and that in recent years

there was an increase in the % of overweight and obesity among children and adolescents in Europe [12, 13, 20].

The data on obesity in children in Europe comes mainly from small Northern European towns little data is available at countries dimensions [13, 20]. Children obesity (BMI > 30) incidence in EU reported by the World Health Organization ([www.who.org](http://www.who.org)), is in a range from 4% to 8% in different small European towns [11]. This cut-off threshold is widely accepted [13] for the definition of obesity, while fewer consensus exist for overweight definition. The prevalence of obesity is slightly higher (0,2%–0,3%) in males than in females as a result of a higher metabolic homeostasis in females. The homeostasis is strictly related to climate, and interestingly, there aren't any studies on the direct effect of climate changes on children obesity, while sleep patterns and appetite are considered in some works [19, 26]. The European percentage is lower in comparison to the US data referring to the 2003–2006 [21] that show a 12,9% of children at the age 2 to 19 to be above the 97th percentile for BMI. The same study shows that from 1999 to 2006 this percentage is stable in the US and no increasing trend in children obesity is observed, while in Europe an increase was observed [13]. Obesity seems also to be linked to economic factors. Obesity level in children is lower in countries that suffered from economic recession in the transition phase of 1990 [13]. In Poland, in 1994, a year of economic crisis, the percentage of overweight children was of 8% on a study considering a sample of 2 millions of young people, compared to a national reference of 10% [20] thus showing a negative effect of lower PIL on body size. This latter study is the biggest ever known survey at the European level. The economic crisis in 2000, among Eastern European countries, affected mostly Russia (10% children overweight and obese) and less ex-East Germany (13%). West Germany remains the fattest country in the North of Europe [13] with a 16%. In Mediterranean countries the percentage can raise up to 30% (Italy, Spain and Greece) compared to a 10%–20% of Northern countries [13].

The threshold between obese/overweight is commonly established employing the Body

Mass Index > 30. However, recently, anthropometrists and economists suggest also taking into account other dimensional parameters, such as skin folds, girths and skeletal diameters [14] as well they suggest considering the extent of the excess BMI over the commonly accepted threshold in econometrics dimensional studies that counts the occurrence of phenomenon at a population level. Econometrics studies demonstrated that obesity is also an economic issue and that (in the US at least) it can be due to disparities in incomes and wealth and to the declining value of the minimum wage [4]. The availability of food at a price of less than 1 euro in fast food chains, significantly contributed to the diffusion of the phenomenon among the poorest populations, as black people living in the suburbs [29].

Various co-morbidity conditions are associated with obesity: type 2 diabetes, cardiovascular, neurological, orthopaedics and skin diseases. These collateral effects of obesity cause high costs on the health system. It is also evident from literature that an obese but active child has less co-associated morbidity than a normal weight inactive child. The “social” stigma for being obese or its lack in contemporary society is both a psychological threat and/or a psychological stimulus to be considered when affording the problem.

In synthesis, variables to be considered among determinants emerging from literature are:

- presence in schools of “junk food” vending machine [7],
- decrease in spontaneous daily physical activity due to increased use of cars by parents [19],
- motivational drives to perform physical activity [1],
- poor sleep habits [4],
- food intake timing (e.g. eating at late evening hours) [11],
- patterns and type of organized physical activity during the day [16],
- parental influences related to food choice [18],
- availability and usability of sport facilities and urban environment design (included building architecture, availability of cycling track and appropriate areas in public parks) [11],

- and possibilities to participate in sport activities at a reasonable cost [19].

## **The European Union's Actions to Counteract the Phenomenon**

The necessity to develop countermeasures was fostered in various EU documents: the European Commission Green Paper "Promoting healthy diet and physical activity: an European dimension for the prevention of overweight, obesity and chronic disease", followed by the European Parliament Resolution "Promoting healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic disease" and by the White Paper "A Strategy for Europe on Nutrition, Overweight and Obesity related health issues", in which there are addressed the EU policies that focus on developing countermeasure to the emergence of obesity among children, public actions were implemented with the cooperation of the EU Platform for Action on Diet, Physical Activity and Health.

The European Commission White Paper is aimed at highlighting the root causes of obesity and its prevention, with a large focus on children, in order to develop, on a European and local scale, networks of institutions, private companies and civil society to promote education actions on healthy behaviours. The objective of private actors, e.g. the food industry should go towards "(...) making the healthy option available and affordable (...)". The paper highlights that "(...) education on nutrition goes to encouraging physical activity (...)".

In order to develop strategies, a better knowledge of interactions among determinants of childhood obesity must be available.

Physical activity should be better explained as one of the factor influencing the BMI, as well as the food intake attitudes, so it is necessary to know how children behave with regard to physical activity. Also, the knowledge of "Obesogenic" determinants is fundamental for the implementation of the countermeasures. A new approach [28] is the bio cultural approach to obesity that attempts to formulate population obesity as a multidimensional issue involving evolutionary, cultural and historical influences on present-day genetics, physiology, society, politics and econom-

ics. Studies of population obesity usually assume ethnic homogeneity of the group or population under study. Since different identity groups may share or differentiate themselves by their valuation of foods, a priori assumptions about group homogeneity may lead to flawed interpretations of the importance of socio-cultural factors in obesogenic environments, particularly in societies undergoing rapid change, a way to identify cultural coherence in relation to obesogenic environments is that of cultural consensus modelling.

## **New Perspectives**

Cultural consensus modelling was elaborated in the 1980s following the emergence of cognitive anthropology [24, 27] and has been effective in anthropological analyses of beliefs about disease contagiousness [23, 25], cultural drivers of ecosystemic degradation [2], ethnobotanical knowledge [22] and healthcare in clinical settings [27]. In this framework cultures are not regarded as material phenomena in their own right but as cognitive organizations of such phenomena [9]. The method is based on the jury theorem of collective competence of society and uses factor analysis to identify cultural competence of ethnographic informants and distribution of cultural knowledge within a group, society or population [25]. It works on the assumption that widely shared information shows high concordance among individuals, while variation in knowledge reflects differences in cultural competence. This method has recently been adapted for use in the study of obesity [10]. An interesting approach is that of the diffusion of obesity in a large social network. The study of Christakis [8] based on a long term survey of the spread of obesity in a cohort of 12.067 people over 32 years, shows how the probability of becoming obese is directly linked to the proximity in the social environment of friends/relatives who are obese. It is of interest to know that this probability doubled if there is an interposed "normal" person between the obese person and the other who became obese, thus testify for a social "viral" "epidemic" of obesity, mediated probably by the behavioural tolerance of "normal" people toward obese people.

New variables to be considered among determinants of childhood obesity emerging from lit-

erature are: the presence of “junk food” vending machines in schools [7, 18], decrease in spontaneous daily physical activity due to increased use of cars by parents [30], motivational drives to perform physical activity [1] and poor sleep habits [4, 26].

The studies dealing with the causes of obesity in children normally focus mainly on a single aspect (e.g. genetic, hormonal and environmental) and very few are integrative studies in their nature [4]. Due to its multi factorial aetiology, the disease must be approached with a multi factorial study design, taking into account social and environmental as well as individual (both psychological and physiological) determinants.

Among the psychological and social determinants, the family status is important to know, also if it is a very sensible topic, to be approached with care. Divorce and eating patterns have been shown to be correlated in children, especially in South Europe [30].

### **European Union Founded Research Actions in the 5th and 6th Framework Programme**

Many research studies and actions were funded under the European Union Frameworks Programmes but all of them have been conducted on an adult population

In the 5th Framework Program of The European Union that spans in the years 1998–2002, the Diogenes study investigated the diet and genetics influences, the development and management of obesity in adolescents, showing the combined effect of both factors.

Under the 6th Framework Program (2002–2006) the Helena study on healthy lifestyle in Europe, stressed the importance of food choice and other environmental and genetic determinants on obesity genesis and development in adolescents.

Studies were also financed within financed projects in the 7th Framework Program dealing with different aspects of the obesity problem. “*Life style and genetic factors in prevention of type 2 diabetes*”, for instance, led by the Kuopio University (FI) focused on life style modification, with increased physical activity and eating education interventions evaluated together with genetic markers predictive of obesity. As a re-

sult material for diabetic patients were prepared and delivered. The FP7 project “*Metabo*” was a project aimed at developing instruments for monitoring body fat composition, glucose levels, energy expenditure, muscle functions (with electromyography signal detection) in patients at risk for type 2 diabetes. Adipocytokines, hormones produced by fat cells, have been studied as regulators of fat metabolism and appetite (*ADAPT* project), starting from the well know fact that sleep quality has a strong influence on appetite regulation, the effect of sleep deprivation on appetite regulation and obesity was studied within the “*Instinctive drives*” project. A limit of these studies is that they focus on a particular portion of the yet complex multifactorial problem of obesity. The interaction among these factors is still unclear and difficult to study and it needs to merge together research groups with different competences to realize such an integration of knowledge.

### **Conclusions**

Good practices for reducing food intake and increasing physical activity are well acknowledged among general population and especially in high risk and diseased groups (e.g. overweight/obese); however there is still a large distance between acknowledgment and practice. Lifestyles are inherently resistant to change so it is urgent to study new ways of motivating people and especially children (in the age at which the behaviours are forming) because of the impact of their behaviour on the whole society health conditions [19]. The implementation of large-scale programs for the involvement of children and boys in physical activity and diet education is the key in the prevention of childhood obesity. However it seems that until today the approaches in the US and the EU are fragmented and that there are no coordinated actions among the public bodies which are in charge of the obesity problem in childhood and especially that there are no coordinated actions between the US and the EU. Thus it is necessary to promote common strategies not only at a continental level but also at a global level in order to effectively fight the problem.



## BIBLIOGRAPHY

1. Acosta M.C., Manubay J., Levin F.R. (2008). Pediatric obesity: parallels with addiction and treatment recommendations. *Harv Rev Psychiatry.*, Mar–Apr; 16(2): 80–96. Review.
2. Atran S., Medin D.L., Ross N.O. (2005). The cultural mind: environmental decision making and cultural modeling within and across populations. *Psychol Rev.*, Oct; 112(4): 744–776.
3. Barba G., Troiano E., Russo P. et al. (2006). Body mass, fat distribution and blood pressure in Southern Italian children: results of the ARCA project. *Nutr Metab Cardiovasc Dis*;16:239-248
4. Barlow S.E. (2007). Expert committee recommendations regarding the prevention, assessment and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics.* Dec; 120 Suppl 4: 164S–192S.
5. Bertonecello C., Cazzaro R., Ferrareso A., Mazzer R., Moretti G. (2008), Prevalence of overweight and obesity among school-aged children in urban, rural and mountain areas of the Veneto Region, Italy. *Public Health Nutr*;17: 1–4.
6. CDC, Centre for Disease Control (2008). Overweight Trends Among Children and Adolescents. <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm> . Last accessed: 12 December 2009.
7. Chriqui J.F., Eidson S.S., Bates H., Kowalczyk S., Chaloupka F.J. (2008). State sales tax rates for soft drinks and snacks sold through grocery stores and vending machines, 2007. *J Public Health Policy.* Jul; 29(2): 226–249.
8. Christakis N.A., Fowler J.H. (2007). The spread of obesity in large social network over 32 years. *New Eng. J. of Medicine*;357: 370–379.
9. D’Andrade A., Roy G. (1989). Culturally based reasoning. In: A.R.H. Gellatly, D. Rogers, J.A. Sloboda (Eds.), *Cognition and social worlds.* Oxford, UK: Oxford University Press, 132–143.
10. Governo Italiano (2008). *Obesità Infantile.* [http://www.governo.it/GovernoInforma/Dossier/obesita\\_infantile/](http://www.governo.it/GovernoInforma/Dossier/obesita_infantile/). Last accessed: 12 December 2009.
11. Haug E., Torsheim T., Samdal O. (2008). Physical environmental characteristics and individual interests as correlates of physical activity in Norwegian secondary schools: The health behavior in school-aged children study. *Int J Behav Nutr Phys Act.*, Sep 29;5: 47.
12. Livingstone B. (2000). Epidemiology of childhood obesity in Europe. *Eur. J. Pediatr.*;159 Supp. 1: S14–S34.
13. Lobstein T., Frelut L.M. (2003). Prevalence of overweight among children in Europe. *The International Association for the Study of the Obesity. Obesity Review*, 4: 195–200.
14. Madden D. (2006). Body mass index and the measurement of obesity. HEDG (Health, Econometrics and Data Group) Working paper 06/11. University of York. [http://www.york.ac.uk/res/herc/documents/wp/06\\_11.pdf](http://www.york.ac.uk/res/herc/documents/wp/06_11.pdf)
15. Maffei C., Schutz Y., Piccoli R., et al. (1993). Prevalence of obesity in children in north-east Italy. *Int J Obes Relat Metab Disord*,17: 287–294.
16. Maffei C., Talamini G., Tatò L. (1998). Influence of diet, physical activity and parents' obesity on children's adiposity: a four-year longitudinal study. *Int J Obes Relat Metab Disord*, 22: 758–764.
17. Manzoli L., Ripari P., Rotolo S. et al. (2005). Prevalence of obesity, overweight and hypertension in children and adolescents from Abruzzo, Italy. *Ann Ig.*, 17: 419–431.
18. McNaughton S.A., Ball K., Mishra G.D., Crawford D.A. (2008). Dietary patterns of adolescents and risk of obesity and hypertension. *J Nutr.*,138(2): 364–370.
19. Nelson K.M. (2008). Designing healthier communities through the input of children. *J Public Health Manag Pract.* May–Jun;14(3): 266–271.
20. Oblacińska A., Wrocławska M., Woynarowska B. (1997). Frequency of overweight and obesity in the school age population in Poland and health care for pupils with these disorders. *Pediatrica Polska*;72: 241–245.
21. Ogden C.L., Carroll M.D., Flegal K.M. (2008). High Body Mass Index for Age Among US Children and Adolescents, 2003–2006. *JAMA*, 299(20): 2401–2405.
22. Reyes-Garcia V., Godoy R., Vadez V., Apaza L., Byron E., Huanca T., Leonard W.R., Wilkie P.E. (2003). Ethnobotanical knowledge shared widely among Tsimane' Amerindians, Bolivia. *D. Science*, Mar 14; 299 (5613): 1707.
23. Romney A.K., Batchelder W.H. (1999). Cultural consensus theory. In: R. Wilson and F. Keil (Eds.). *The MIT Encyclopedia of the Cognitive Sciences.* Cambridge, Mass.: The MIT Press, 208–209.
24. Romney A.K., Weller S.C., Batchelder W.H. (1986). Culture as consensus: A theory of culture and informant accuracy. *American Anthropologist*, , 88, 313–338.
25. Sanna E., Soro M.R., Calò C. (2006). Overweight and obesity prevalence in urban Sardinian children. *Anthropol Anz.*, 64: 333–344.
26. Seidel W.F., Ball S., Cohen S., Patterson N., Yost D., Dement W.C. (1984). Daytime alertness in relation to mood, performance, and nocturnal sleep in chronic insomniacs and non complaining sleepers. *Sleep*, 7(3): 230–238.
27. Smith C.S., Morris M., Hill W., Francovich C., McMullin J., Chavez L.C. (2004). Rhoads Cultural consensus analysis as a tool for clinic improvements. *J Gen Intern Med.* May;19(5 Pt 2): 514–518.
28. Ulijaszec S.J. (2008). Seven models of population obesity, *Angiology*, Apr-May;59(2 Suppl): 34S–8S.

29. WHO, World Health Organization (2004). Obesity: preventing and managing the global epidemic, Report of a WHO Consultation, Geneva. [http://www.who.int/growthref/who2007\\_bmi\\_for\\_age/en/index.html](http://www.who.int/growthref/who2007_bmi_for_age/en/index.html). Last accessed: 12 December 2009.
30. Yannakoulia M., Papanikolau K., Hatzopoulou I., Efstathiou E., Papoutsakis C., Dedoussis G. (2008). Association between family divorce and children BMI and meal patterns: the GENDAI study. *Obesity* 16, 6: 1382–1387.

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## Health Dimension of School Education

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### Abstract

One of the aims of educational activities of school is shaping a health dimension of personality in children and adolescents. This part of personality can be understood as an aspect of their health potential because personal health resources are important determinants of health behaviors. Pupils' health potential comprises health conducting environmental factors connected with school reality too – mainly psychosocial environment of the school. In this point of view health education in school and health culture of school are connected with the school's task to support development of pupil's physical, psychical, social and spiritual health.

Key words: health, health education, children and adolescents, personal development, school.

### Introduction

Reflections on health aspects of educational actions generated by school are justified by the fact that the major aim of educational activities of school is constituted by multifold personal development of children and teenagers. As we know, human personality comprises many dimensions – for example intellectual, psychical, social, aesthetic or moral – and one of them is a health dimension. On the other hand, an access of school in creating pupils' health is a result of the fact that the period of childhood and adolescence is largely influenced by an organized educational system. Schools should actively participate in shaping the mature personality in their pupils and help them implement developmental tasks. In the end, school cannot remain passive in the eye of commonly observed loss of young people on the ground of axiological choices, which in many cases turn out to be changeable, depending on the situation. In this way, the main duty of school is to plan and implement didactic and educational process in a way promoting general, universal values. Undoubtedly health constitutes one of such universal, human values.

The matter under our consideration is based on the contemporary concept of health. At present principles of socio-ecological model of health, the creation of which is connected with popular recognition of the definition of health created by World Health Organization's experts in 1948 and the holistic model of health are considered

binding. According to WHO definition health is not only the state of lack of disease or disability but it comprises physical, psychical and social well-being too. It is assumed that basic conditions of health are: biological factors, lifestyle and physical and socio-cultural environment. In the scale of population, lifestyle (seen as specific actions connected with health which are undertaken by a person) is believed to have the biggest impact on health. In holistic model of health functioning of particular organism is perceived through their correlation with the elements of the environment surrounding them. Health is perceived as a dynamic process of balancing human needs against environmental requirements, a process which is conditioned by the quality, availability and the ability of a human being to use the his/her own inner potential as well as the potential of the biophysical and social surroundings.

In accordance with the holistic approach to health, its constituting factors are embedded in the biosphere, culture, politics, economics, one's life environment (i.e. family, school and work) and in the very person – his/her body, psyche and the spiritual [9]. If we also assume that participation in one's health control, treatment and prevention of diseases as well as introduction of positive changes in the environment, requires proper knowledge, abilities and motivation, it seems natural that shaping such attributes, which later in life help to create health

potential of a person, constitutes a very important task of school education.

### **Health education as a process of shaping human's health potential**

In contemporary depiction of health particular importance is attributed to human's health potential. This potential contains factors which are embedded not only in biological structures, physical environment and biosphere but these are also embedded in human personality, behavioral aspects of human life, culture, social conditions and psychosocial environment. Some of these factors can be shaped in the process of education, especially in health education.

Health education and health upbringing are basic terms of pedagogy of health. In the pedagogic literature as well as in the literature of pedagogy of health, especially in Polish literature, it is assumed that the scope of meaning of the term "education" seems to be much broader than upbringing. Education comprises intentional and unintentional impingements which apply not only to children and youth but to adults as well. On the contrary upbringing is a process which comprises only intentional impingements on children and youth. These impingements are taken up by teachers, tutors and parents knowingly and they are directed at shaping young people's personality.

Maciej Demel, the author of the first modern handbook on pedagogy of health, which was published in Poland in 1980, combined health upbringing with the process of personality shaping, which would lead to creation of habits directly or indirectly connected with protection and improvement of physical and psychical health, promotion of proper skills, shaping of attitudes and stirring positive interest in health matters by occasional and systematic enrichment of knowledge concerning oneself as well as the rules governing public health [3]. So health upbringing is a part of health education which comprises all intentional and unintentional impingements on individuals and groups, which stimulate building and development of health potential of a person, enabling such a person to become an aware creator of his/her own health and also to take actions aiming at promoting health of other people [6]. At present the scope of health education

refers to basic assumptions of modern vision of health promotion. It is assumed that the basic task of modern health education is motivating and shaping competence both in individuals and in the whole groups, in order to encourage health activities on various levels of social life. Such activities should concern not only particular people but also whole families and communities, for example schools, work places, health care and social institutions.

Formation of personal health resources in a process of health education is mainly connected with educational actions directed at shaping healthy lifestyle. The notion of lifestyle, when used in connection with health, comprises a great variety of behaviors which are its constitutive elements. One can classify here all *health oriented actions* taken up knowingly and directed at protection and promotion of health as well as *actions remaining in connection with health* that comprise everyday functioning of an individual, which in turn influences one's health no matter whether somebody is aware of this fact or not. When we take into consideration the degree of awareness how important for somebody's health certain actions taken up by him or her are, we can differentiate between *habitual behavior* and *intentional behavior*. Habitual behavior connected with the sphere of health apply to various aspects of everyday life of an individual – activities connected with hygiene, nutritional manners connected with regularity of meals and peculiarity of one's diet, habits connected with spending free time and motor activities, etc. They are all shaped in the process of primary socialization and in the process of institutionalized health upbringing.

Intentional behaviors are taken up knowingly and they depend on socio-cultural and subjective factors. Among the subjective determinants of health behaviors of an individual the following are the most important:

- knowledge of the factors determining health and the possibilities of their control as well as causes and courses of illnesses, especially those which depend on behavior,
- perceiving health as a value – value of health can have two basic functions: *motivating-integrating* – referring to individual's activities which determine sense of life and allow

for perspective arrangement of actions; *decisive* – connected with choosing particular health behaviors which refer both to the individual and to other people,

- health beliefs and expectations – especially beliefs referring to one's self-efficacy, expectations towards the results of the undertaken actions as well as normative beliefs shaped on the basis of approval of a given behavior by important people (parents, teachers, peers)<sup>1</sup>,
- life skills also described as psychosocial competences, which enable a person to cope with everyday challenges effectively and without health damage (e.g. to cope with stress); they also help to establish interpersonal contacts which are satisfying and thus ensuring good mood disposition; possession of proper life skills diminishes risk of hazardous health behaviors (e.g. usage of psychoactive substances, aggression, violence, hazardous sexual behavior, antisocial behavior) and positively influences formation of health beliefs.

All of them can be shaped in a process of health education.

### **Participation of school in formation of health potential of pupils**

The period of adolescence which falls on the time of school education is connected with physical growth, development and maturation and on the other hand it forces young people to solve manifold psycho-social developmental crisis situations. Physical and psycho-social development generates many factors which influence the pupil's quality of life. The quality of life is considered to constitute health important indicator in its physical, psychical, social and spiritual dimension. In this respect searching for and defining of health dimension of school education seems to be a pedagogical duty resulting from the very essence of health.

School's participation in creation of health potential of its students is of two-dimensional character. It is built through formation of personal

resources for health in a child and through shaping of health conducting environmental factors.

### **Formation of pupils' personal health resources in school education**

Formation of personal health resources in a young people is connected with shaping skills which make possible to solve psycho-social developmental crisis situations and with educational actions directed at shaping healthy lifestyle.

The period of adolescence generates manifold psycho-social developmental crisis situations. According to the idea of E. Erikson, developmental crisis resulting from particular accumulation and disclosure of conflicts connected with co-appearance of pursuit for progression and regression of development constitutes a turning point of normative character. Health is here associated with a positively proceeding process of solving existential tasks in the context of social and cultural institutions, which enables an individual to obtain competence and virtues conditioning positive proceeding of the subsequent phases of development [4]. Initially, on the period of school education falls the conflict phase called *productivity – feeling of inferiority*. Educational institutions, teachers and peers constitute both the major source of support and a threat for positive course of this phase. Positive solution of developmental crisis gives a child a feeling of competence which constitutes one of the elements of health potential. Immediately after this phase the young person experiences an identity crisis, which in many cases shows symptoms indicating inclinations towards its negative pole [10]. Fashion, peer pressure and various contexts for safe experiments constitute at that time major sources of difficulties at defining one's identity. Such difficulties can manifest in taking up roles which are socially evaluated in a negative way. The above mentioned idea stresses that in the course of psycho-social development of an individual, the programmed developmental conflicts and strains are accompanied by vigor enabling solving the majority of them. Taking the school's educational strategy into consideration, the necessity to spot and develop developmental potential of young people is clearly connected with the school's task

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<sup>1</sup> The meaning of the beliefs mentioned in human's intentional health activity can be seen in models of health behaviors designed within the scope of health psychology, namely: Theory of Planned Behavior (TPB) by I. Ajzen [1]; Health Action Process Behavior (HAPA) by R. Schwarzer [8].

to aid development of health in its holistic understanding.

Other side of formation of personal health resources in a child is connected with educational actions directed at shaping healthy lifestyle – habitual and intentional behaviors. Habitual behaviors connected with health are shaped from the very early childhood and it seems that one of the most important tasks of school education is to modify unfavorable health habits inculcated at home and to use a variety of educational situations to promote the healthy ones.

Participation of school in teaching children and adolescents intentional healthy behavior seems to take place indirectly, through shaping subjective determinants of health activity: providing children with knowledge about health and modeling of health beliefs, life skills, personality features and inclinations which are engaged in psychological regulation of such behaviors.

In the holistic model of health personality disposition shaped on the basis of life experience in the course of childhood and adolescence is considered to constitute one of the most important hoards of subjective character. It is described by A. Antonovsky as the sense of coherence, which directs emotional and cognitive way people perceive the world surrounding them. This author defines it as a global grasp showing: *“the degree in which a particular person has a dominating, permanent but dynamic feeling of confidence that stimuli coming in the course of life from internal and external environment are of structured, foreseeable and explainable character, that there are hoards which help meeting the requirements arising from those stimuli and such requirements are seen by such a person as challenges worth effort and involvement”* [2]. The following characteristics of one’s life biography are considered particularly important for the creation of the sense of coherence: logical combination of the experienced situations (it positively influences evaluation of foreseeability of critical situations taking place in one’s life); the balance between overburdening and underburdening in respect of everyday duties and tasks (with a slight advantage of overburdening) and one’s participation in decision making. The main factors important in formation of a child’s feeling of coherence are undoubtedly educational im-

pingements of teachers and tutors, who can skillfully steer the amount of stimuli and the degree of difficulty of the tasks. Teachers and tutors can also in their work prefer such ways of solving their pupils’ problems which require the pupils’ participation in decision making process, which is conducive to shaping sense of responsibility for the outcomes of one’s behavior as well as formation of inner locus of control.

In these contexts one of the tasks of educational system is to shape healthy lifestyle and varied subjective factors, especially connected with their physical and psycho-social development that determine it, in young people.

### **The school’s participation in shaping of health conducting environmental factors**

The second important dimension of the school’s participation in creation of pupils’ health potential is promotion of factors of environmental nature, which remain in close connection with health. They are connected with the school’s functioning on material and psychosocial ground and their influence on children’s and adolescents’ health seems to be of direct character, as on one hand they participate in shaping of their good mood disposition (which is treated as definitional indicator of health), on the other hand they can cause various disturbances and disorders of somatic and psychosocial character (e.g. posture defects, curvature of the spine, disturbances connected with excessive noise exposition, results of accidents connected with the school’s infrastructure and disturbances of health and psychical development which result in fear, anxiety, increased aggression level, decreased self-assessment, feeling of helplessness and lack of self-efficiency).

Psychosocial environment of the school, known also as the climate of the school constitutes fundamental element of environmental resources for the health of the pupils. Psychosocial environment of the school usually has educational, social and emotional dimension. Educational dimension refers to effectiveness of teaching process and is described as pupils’ perception of the school’s expectations in respect of pupils’ quality of work and methods which are used to control pupils’ progress. Social dimension refers

to the way in which pupils see quality of their relations with teachers and peers, emotional dimension of the school's climate is measured by intensity of such behavior of pupils which indicate that they have a feeling of affiliation and identification with the school [11].

Analysis of research on Health Behaviour in School-aged Children (HBSC)<sup>2</sup> indicates that pupils who positively perceive psychosocial environment of their school obtain better result, do not feel overburdened with school-work, experience peer support, evaluate their health positively and rarely complain about various ailments (headaches, depression, irritation, anxiety, insomnia etc.) and infrequently undertake actions connected with health hazards [12]. The fact that a pupil likes his/her school and positively evaluates its atmosphere can be treated as one of his/her health resources.

Influence of the above described aspect of school reality upon health should be first of all seen in relation to its psychical and social dimension. At least three ways of influence of the school's climate upon psychosocial well-being of children can be indicated [7].

Firstly, psychosocial environment of the school has its share in meeting psychical needs of its pupils. Proper development and good mood disposition of a child requires school to satisfy child's basic physiological needs and ensure psychical safety, which is one of the main conditions for "higher" needs to occur and satisfy the need of belonging, success, competence, appreciation as well as aesthetic needs. Importance of school in meeting developmental needs of children and adolescents should be stressed, especially the need for autonomy, which is revealed especially in the period when young people are looking for their self-identity.

Another aspect of interaction between psychosocial school environment and the pupils' health is connected with shaping of the pupils' life skills, especially interpersonal skills, as well as the ability to cope with stress and build one's positive picture.

The third aspect of the interaction discussed is connected with formation of certain elements of health awareness, among others: sense of personal control of the environment, general feeling of one's effectiveness and sense of coherence. Undoubtedly psychosocial environment of the school generates manifold educational situations in which the pupils can have a chance to develop this sphere of their personality which participates in formation of their individual health potential.

In the end I think that it seems very interesting to consider relations between the pupils' health and the school reality when we use a notion *health culture* of school.

A large scope of notion "culture" comprises material and spiritual culture and it's assumed that culture contains products of human activity, values and ways of behaviors which are accepted in certain community. According to anthropology we can analyze cultural dimensions of institutions. When we assume that in school there are specific behaviors, norms, rituals and ceremonies we can distinguish the notion "culture of school". And when we assume that human body and health are very significant values for the most of humans' culture we can distinguish such kind of culture as health culture. So, if we accord to culture of institutions we can distinguish health culture of school [5]. I think we can assume that health culture of school contains: educational impingements which are directed at protection and promotion of the pupils' health, material environment of school connected with health, psychosocial environment of school and patterns of health behaviors which are presented at school. In this point of view participation of school in formation of health potential of pupils is connected with the level of its health culture.

The diagram below illustrates interrelations between school education and health potential of children and adolescents – figure 1.

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<sup>2</sup> Health Behaviour in School-aged Children (HBSC) research is held every four years in the majority of European countries since 1982, in co-operation with WHO's Regional Bureau in Europe.

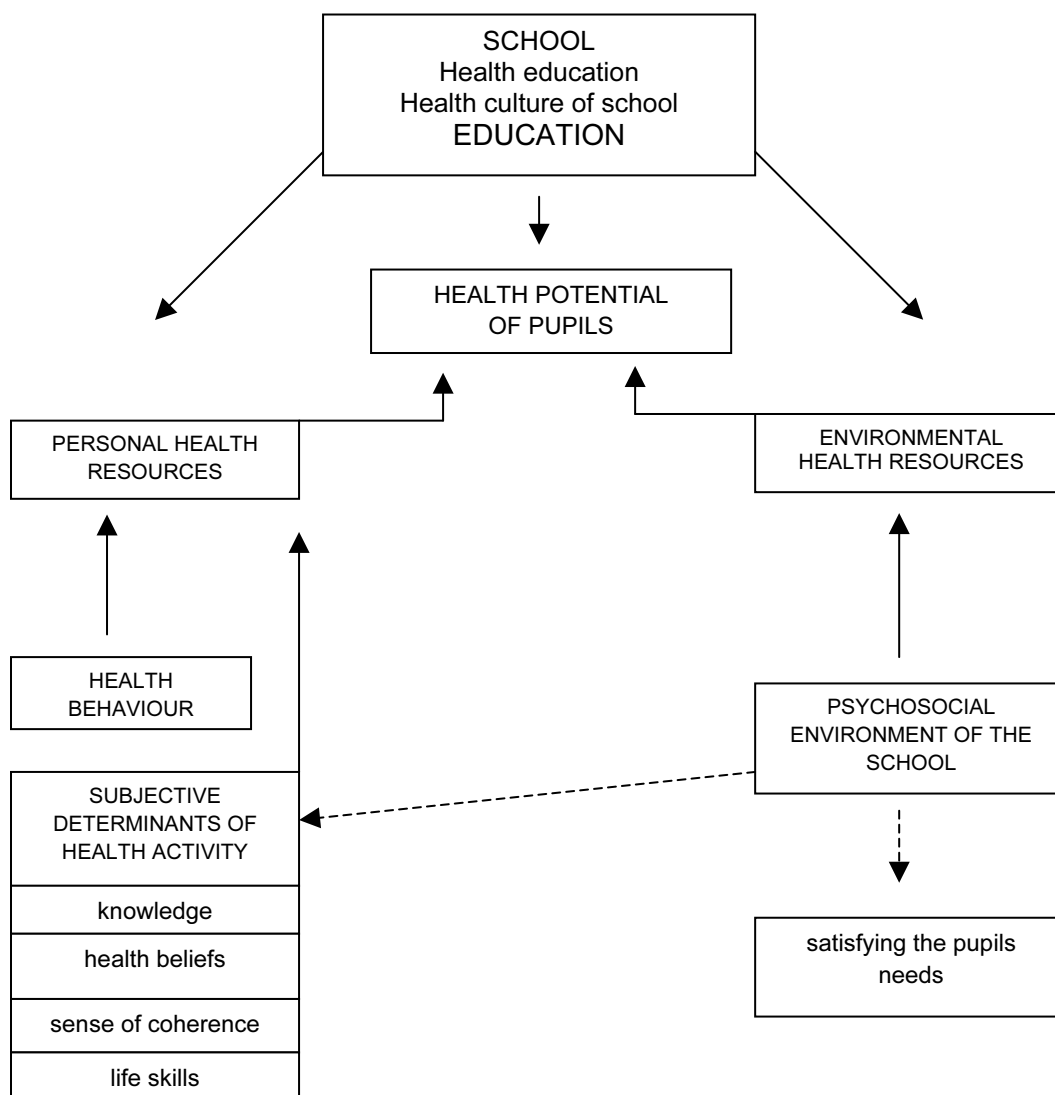


Figure 1. Health aspects of school education

The theses presented in this paper clearly indicate that children's and adolescents' health

can be promoted in the course of educational process implemented at school.

## BIBLIOGRAPHY

1. Ajzen I. (2005). Attitudes, Personality and Behavior, 2.ed, Maidenhead, Open University Press, 117–140.
2. Antonovsky A. (1995). Rozwikłanie tajemnicy zdrowia. Warszawa, Fundacja Instytutu Psychiatrii i Neurologii.
3. Demel M. (1980). Pedagogika zdrowia. Warszawa, Wydawnictwa Szkolne i Pedagogiczne.
4. Erikson E. H. (1997). Dzieciństwo i społeczeństwo, translation by P. Hejmej. Poznań, Dom Wydawniczy Rebis.
5. Gaweł A. (2006). Kultura zdrowotna szkoły, „Kultura i Edukacja” 1, 65–68.
6. Gaweł A. (2008). Wychowanie zdrowotne w perspektywie teoretycznej. In: E. Kubiak-Szymborska, D. Zajac (Eds.) Teoria wychowania w okresie przemian. Bydgoszcz, Wers, 154–162.
7. Kowalski M., Gaweł A. (2006). Zdrowie – wartość – edukacja. Kraków, Oficyna Wydawnicza „Impuls”.
8. Schwarzer R. (1997). Poczucie własnej skuteczności w podejmowaniu i kontynuacji zachowań zdrowotnych. Dotychczasowe podejścia teoretyczne i nowy model. In: I. Heszen-Niejodek, H. Sęk (Eds.) Psychologia zdrowia. Warszawa, PWN, 175–205.



9. Sęk H. (1997). Subiektywne koncepcje zdrowia, świadomość zdrowotna a zachowania zdrowotne i promocja zdrowia. In: Z. Ratajczak, I. Heszen-Niejodek (Eds.) Promocja zdrowia. Psychologiczne podstawy wdrożeń. Katowice, UŚ, 34–54.
10. Sęk H. (2003). Wprowadzenie do psychologii klinicznej. Warszawa, Wydawnictwo Naukowe Scholar.
11. Surzykiewicz J. (2000). Agresja i przemoc w szkole. Uwarunkowania socjoekologiczne. Warszawa, Centrum Metodyczne Pomocy Psychologiczno-Pedagogicznej.
12. Woynarowska B., Mazur J., Kołoto H., Małkowska A. (2005). Zdrowie, zachowania zdrowotne i środowisko społeczne młodzieży w krajach Unii Europejskiej. Warszawa, Katedra Biomedycznych Podstaw Rozwoju i Wychowania, Wydział Pedagogiczny Uniwersytetu Warszawskiego, Zakład Epidemiologii Instytutu Matki i Dziecka.

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