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THEORETICAL DESIDERATA ON PSYCHOLOGICALLY PLAUSIBLE THEORIES

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Abstract: *One may not find it controversial or objectionable to think that any theory of mind can claim explanatory potency only if there is a psychologically plausible theory of the domain in question. Indeed this may be taken to be the minimal consensus amongst the practitioners of the field that such a condition need to be met in order to take any theory of that domain seriously. But, how does one determine the psychological plausibility of such theories? In other words, what is or are the minimum condition(s) that a theory of mind in general or cognition in particular needs to satisfy in order to be included in the set of psychologically plausible theories? The purpose of this paper is primarily to pursue this question in the context of the debates over various theories of mind and in particular with reference to the exchanges between linguists and psychologists in relation to a number of theories of language as a domain of cognition. Thus, the paper will bear a meta-methodological relation to the disbutes and discussions about the condition of psychological plausibility as a minimum requirement for any theory of mind.*

Keywords: *Competence, Descriptive Adequacy, Grammar, Linguistics, Parser, Performance, Psychological Plausibility, Psychological Reality, Psychology, Psychometric Correlation.*

When is a theory about the constitution of mind in general or cognition in particular entitled to serious attention and considered epistemologically enlightening about any of the multifarious manifestations of mental phenomena? Theoretically speaking, from early

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on in debates about such issues, it practically became a given datum that any mental or cognitive theorising can claim *explanatory potency* only if there is a *psychologically plausible* theory of the domain in question. More specifically, a theory in any of the dominions of mind can be considered psychologically plausible and thereby taken seriously only if there is a general account of its *descriptive adequacy* and *psychological reality* that can be applied in order to ascertain the viability or otherwise of the proposed hypothesis. Any mental or cognitive theory worth its name is required to satisfy these *minimum methodological-cum-theoretical constraints*.

Historically, the need to fulfil these two prerequisites came initially into prominence from the exchanges between psychologists and linguists. As Walter Kintsch observes, before 1960, psychologists were concerned with statistical properties of language such as word association, with the probability of letter and word sequences, and to some extent with meaning, which meant the semantic differential and Whorfian hypothesis.

But, Kintsch continues, in the subsequent decade, none of these 'survived as main topics' and there was no question that the work on syntax was the showpiece of psycholinguistics. Linguists were going to tell psychologists what to look for, and psychologists were going to find it sooner or later. (Kintsch, 1984, pp. 111-112)

Indeed, in 1964, Jerry Fodor and Jerrold Katz conceptualised the relationship between linguistics and psychology in the following manner,

Linguistics, in describing a language, describes the linguistic structure the speaker of the language has assimilated. Psychologists pursuing this way seek to provide a model of a device for assimilating structures such as those linguistics describe. (Fodor & Katz, 1964, p. 545)

But, what exactly do we intend to demand by descriptive adequacy and psychological reality so that we can consider a mental or cognitive theory to be psychologically plausible?

I. Descriptive Adequacy
Linguistics was developed both as an ideal description of a certain psychological competence, and as a formal tool describing a set of *data* derived from natural languages. But, as Fodor stresses, the data are subject to two broad constraints: first, they are not susceptible to an *a priori* specification but determined by *a posteriori* means; and, secondly, they are not exhausted by either *all* or *only* acceptability judgements, namely speakers/hearers' intuitions, but *any* facts could be relevant. (Fodor, 1981, p. 197-200)

Now, for a core set of cases, these data are as firm as data can be, and can be gathered by testing the intuitions of natural language users. The reason why this is possible is made clear by the existence of a formal characterisation of the psychological competence to be attributed to the user. If we assume that the set of sentences constituting a natural language is recursively enumerable, then the user's ability is ideally described as the ability to compute a partial function producing (or perceiving) the set of well-formed sentences of a language.[1] As we possess an idea of the function attributed to the user, we also expect that some data (crucially, not *all* of them) turn out as they do. The user can be seen as having a device with which he lists (or equivalently recognises) strings taken from the free monoid of words. This device will also never enumerate (or equivalently reject) other strings, while it will leave him stranded on some others. We, therefore, expect that the user will have a clear judgement on the acceptability of certain sentences, a clear intuition on the non-acceptability of others, and a set of intermediate cases where no verdict is forthcoming.

There is, however, a pernicious problem here. It is contended that a *grammar* is an intensional characterisation of the set of sentences constituting a natural language. But, the consonance between intuitive judgements of natural language users and sentences certified as grammatical by theory is only *partial*, and the formal description of the data offered by the grammar *overflows* our intuitions in both possible directions. That is, the grammar certifies sentences that the speakers would not even be able to process, and, in certain circumstances due to contextual or other factors, speakers may endorse sentences that are excluded by the grammar.[2]

Yet, the issue is not insurmountable. First, it is methodologically unsound to discard a grammar only because it happens to be dissonant

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[1] The assumption that natural languages are recursively enumerable is not uncontroversial. Matthews, among others, argues that the commonly adduced grounds for maintaining the assumption 'are inconclusive, if not simply unsound.' (Matthews, 1979, p. 209) However, the use of the assumption here is for the sake of argument, and nothing of substance hangs on it insofar as this particular passage is concerned.

[2] Unlike the latter, the former claim that the human parsing mechanism might not accept all grammatical strings is not new. For example, George Miller and Noam Chomsky (1963) pointed out many years ago that we should not expect humans or other parsers with finite memory to be able to parse sentences with arbitrary depths of center-embedding.

with some speakers' intuitions of acceptability. It is a *myopic* method, as Stephen Stich describes it, to concentrate solely on speakers' intuitions:

Speakers' judgements about acceptability are the most important data for the grammarians. But they are not his only data, nor are they immune from being corrected or ignored. (Stich, 1972/1981, p. 210)[3]

But, it should be noted that allowing the grammarian the liberty of ignoring an indefinite set of subjects' contrary intuitions concerning putative grammatical sentences is not a trifling matter. For, we are effectively sheltering the grammarian from an indefinite set of potential refutations, and, consequently, this privilege of *infirmational immunity* needs austere and careful provisions.

Secondly, and in compliance with the conditions of infirmational immunity, it is contended that there is a *systematic* and *principled* way of retaining the grammar and rejecting the speakers' intuitive judgements, *viz.* by appealing to a distinction between *competence* and *performance*. The quintessential qualification here is that: one could allow oneself the luxury of saving the theory and sinking the speakers' intuitions only if (i) there is a *reasonable* distinction between competence and performance in the context under investigation, and (ii) the distinction is invoked in a *non-arbitrary* way. *Ad hocness* is the bane of explanatory success. However, to the testimony of recent theoretical experimental studies, the simultaneous satisfaction of (i) and (ii) is a rather tall order and should not be considered complacently. The rest of this section on descriptive adequacy is, therefore, devoted to an examination and elaboration of these conditions.

Informational Immunity: Competence, Performance, and Data

It has become a common code to cross the chasm between a generated set and users' intuitions by separating competence from performance. This is customarily achieved by neutralising the effect of context on the one hand, and dwelling on interference effects with other cognitive faculties on the other. Yet, the custom has become rather complicated, since an alternative way of drawing up the distinction has gained ground. Hence, it is necessary to delve into the issue in more depth. The discussion is primarily concerned with the rationale for disengaging competence from performance.

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[3] Janet Fodor *et al.* also express the same sentiment when they remark that 'we do not take all linguistic intuitions to be veridical. Nor need all the experimental data which seem prima facie relevant to constraining grammars turn out to be so.' (Fodor *et al.*, 1975, p. 523)

It was indicated that there are two ways of characterising the bifurcation between competence and performance; or, at least, two major versions of it are being canvassed here. One conception of the dichotomy could be cashed out in terms of two *separate* theories, and it thus may be dubbed a *decompositional* doctrine of the distinction.[4] According to this conception, competence is marked from performance when the function in intention describing a certain capacity and the algorithm implementing that capacity are distinguished.

In the context of linguistics, when a *grammar* is differentiated from a *parser*, the decompositional sense of the competence/performance distinction has been exercised. The evolution and expansion of parsing studies gave rise to the realisation of how disparate the theories can be. The two sets of theories may have tenuous structural and ontological connections or even none at all. It is not mandatory for the parser to compute trees, or for the grammar to be mapped isomorphically over the data structures and operations computed by the parser. It is, indeed, possible that they might even relate to different cognitive roles in the abstract description of the final state attained by the learning mechanism, or else as the description of the system recruited for language production, whereas a parser can be seen merely as the description of the linguistic perception system.

There are, however, ways in which a grammar and a parser can be intertwined and intimately connected. This is especially notable where a grammar is seen as a library of functions that a parser may consult. On this conception, a grammar and a parser are two theories of interacting, yet distinct, cognitive faculties. This is, nonetheless, only conjectural, and after all the two classes of theories may merely comprise cognitive compartments with very loose links or correspond to different levels of description. The issue is, of course, of an empirical nature and resolvable solely on that basis.

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[4] At one time there was a temptation to identify this conception with David Marr's levels of analysis in cognitive theorizing. Marr states that the 'solution to an information-processing problem divides naturally into two parts. In the first, the underlying nature of a particular computation is characterized, and its basis in the physical world is understood. … The second part consists of particular algorithms for implementing a computation, and so it specifies how.' (Marr, 1977/1990, p. 97) However, Chomsky has recently backed away from any identification between the competence/performance distinction and any of Marr's levels. In describing the language faculty, Chomsky says that 'Marr's influential ideas about levels of analysis do not apply here at all, contrary to much discussion, because he too is considering input-output systems'. (Chomsky, 2000, p. 118)

According to the other, *compositional*, conception of the competence/performance distinction, performance constitutes competence without anything else, where 'anything else' may not refer to any particular individual domain. To illustrate this sense of the dichotomy, consider the case where the interaction of a grammar *and* the structure of working memory may result in a *sharp* modification of the set of well-formed sentences that can be generated or recognised. The compositional conception is, thus, inviting us to view the grammar as the faithful description of the competencies of the linguistic perception or production system, whereas performance, instead of denoting a separately identifiable theory of parser, is equal to grammar with interaction effects.[5]

The compositional conception of competence/performance distinction temporally precedes the decompositional variety. It was, in fact, this sense that was originally invoked in linguistics and doggedly weathered numerous inclemencies over a prolonged period. Even as late as 1981, Fodor was still saying that:

"Competence theories" account for facts about the behaviours and capacities of a speaker/hearer by reference to properties of his internalised grammar, whereas "performance theories" account for facts about the behaviours and capacities of a speaker/hearer by reference to interactions between the internally represented grammar and other aspects of the speaker/hearer's psychology. (Fodor, 1981, p. 202)

The persistence is understandable against the background of many *idealisations* deemed necessary by workers in the field. They included such observations like our several abilities to comprehend an infinite number of sentences, to know an infinite amount of numbers, and to form an infinite number of thoughts. These observations, among others, collectively contributed to the continuance of the compositional conception of the competence/performance dichotomy.

The compositional sense of the distinction, nevertheless, gradually gave way to the decompositional one. The shift was wrought by the progresses in parsing theory: it was becoming clear that grammars alone cannot account for the various stages of language processing that need to be differentiated, *i.e.* performance was not just grammar without interaction

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[5] An appropriate analogy here is the case of counting: one's ability to count may be explained by claiming that one implements *exactly* the successor function as described by recursion theory, yet, the length of pronunciation could prevent one from counting aloud beyond a certain figure. That is, one's ability to count aloud is equal to recursive theory without phonation limitations.

effects. The consequence was a spreading scepticism towards psychological status of grammars and the emergence of a new orthodoxy: namely, the theory of *grammar* as the description of linguistic competence and the theory of *parser* as the description of performance are *separate* theories.

The immediate issue was, then, to figure out their interrelationship. The matter is obviously of an open nature and admits of a spectrum of positions. In one extremity, the increasing scepticism led some workers in the field to deny that a grammar could possess any relevant psychological role to perform. It is contended that a grammar is only capable of offering a mathematically adequate description of the set of well-formed sentences of a language. The stance appears rather extravagant, but it is maintained by some that the task of a semantics for natural language is to provide a mathematically correct description of the significant sentences of a fragment of that language, no matter how psychologically implausible it may seem.

It should, however, be noted that in fairness to the original compositional conception there are aspects to which the decompositional sense is not sufficiently sensitive. The competence/performance distinction seems to be tangential to the difference between grammar and recognition systems. That is, *even if* one concedes that a grammar has *no role at all* either in parsing or in the characterisation of the final state of a learner, and thus granting that grammars are not required for describing cognitive capabilities, still one is obliged to draw on the distinction between what the parser (the algorithm) *can* do, and what it can do once some aspects of its implementation are modified. This would resurrect the same motivation forcing the competence/performance dichotomy back in its place and, ineluctably, revive the attendant problems of: 'When is one entitled to ascribe competence to a parser?' and 'What is a *non-question begging* invocation of competence?'

The seriousness of the situation could be sensed, for instance, in the context of *garden path sentences*. Generally, it is believed that such sentences, though difficult to parse, are grammatical, and their peculiarity is explained in terms of some interaction factors. It is therefore argued that garden path sentences are in our *competence*, but not in our performance repertoire.

However, the matter is more precarious when one looks at it in relation to parsing theory. Let us assume that a parser, for example, the Marcus parser, faithfully describes our parsing abilities, and it does not recognise garden path sentences.[6] Now, if the theory of parser characterises

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[6] The Marcus parser refers to the parsing model offered by Mitchell Marcus in his 1980 work.

performance, then failure in parsing garden path sentences should be performance failures. Yet, one is still making the *same* claim: garden path sentences are in our competence, and not in our performance repertoire. But this is to overlook an important issue: by looking at *why* the parser fails, one realises that the failure is a direct consequence of one of its essential features, namely, its determinism and its consequent inability to backtrack once a string has been assigned a grammatical role, *i.e.*, S. Therefore the issue is more than a matter of terminological or semantic squabble.

From this perspective, the most natural way to describe the failure is to *deny* that we have the competence to process garden path sentences, since no possible modification to the machine implementing the algorithm or to the algorithm itself could overcome the way the parser assigns a structural description to the input string. To remedy the restriction, one might try to enlarge the active windows the parser can consult, but, as Edward Stabler observes, one will always find garden path sentences where VP comes one step after the parser has attached the S node and finished its operation. (Stabler, 1984, pp. 160 ff.)

Another illustration of this issue is the set of sentences that are ambiguous depending upon where a prepositional phrase is attached. The set would include such examples like 'Kevin killed the knave with the knife'. The grammar allows us to generate two trees for it, and the retrieval of the two readings would be within our competence. But, in some strongly biasing contexts it can be very difficult for us to retrieve one of them. The Marcus parser can only deliver one reading, since it can assign only one structural description per sentence. Hence, on the basis of the equations "grammar = competence and parser = performance" dictated by the decompositional reading of the competence/performance distinction, one is led to admit that our failure in assigning multiple structural descriptions is a matter of *performance*.

If, however, the grammar were eliminated from the psychological scene and the Marcus parser were a correct psychological description of our parsing abilities, the natural conclusion would be that one cannot assign multiple structural descriptions to sentences with possible multiple PP attachments. This would shift the burden of blame from performance and one has to admit that the operation is in fact beyond our *competence*. Yet, if the parser failed because either its active stack is too small or the machine on which it is running overheats, one would have a quite different case: *there* one may wish to claim that a slight modification of the

algorithm or of the hardware can overcome the problem, and therefore we are facing a *performance* limitation *of the parser*.

The upshot is that *for any device*, or *for any level of description*, one has to draw a distinction between the capacities of the device and what goes beyond them. If one recognises the need for both a grammar and a parser, whether as separate devices or as separate levels of description of the same device, then one must separate grammatical competence from grammatical performance, as well as distinguish parsing competence from parsing performance. One can drop the grammar from the psychological picture and consider it just as an external axiomatic description of the class of languages, but a description of our linguistic abilities in terms of parsing alone will still drive us to trace a difference between competence and performance.

All in all, the moral of the story is that despite its waning popularity there was a notable rationale to the original *compositional* sense of the competence/performance distinction without which we *cannot* do. The intention of this discussion was therefore to labour this rationale: insofar as linguistics is seen as part of psychology, it has the function of ascribing certain *capacities* to language users.

Before summarising the above discussion in terms of a set of conditions for descriptive adequacy, we would like to raise one last point concerning the use of the competence/performance distinction. It was noted earlier that the chasm between the set generated by a grammar, or the set recognised by the parser, and the speakers' intuitions may be crossed by separating competence from performance. However, despite its ubiquitous appeal and application, the device demands careful and cautious usage for fear of emptiness and being *ad hoc*. The danger of arbitrariness in invoking a competence/performance distinction is inversely proportional to the internal force of the theory. The more a theory has at its disposal means of describing character and place of an anticipated interaction, the less dubious an appeal to the competence/performance distinction appears. If a theory can tell what specific features of the data as *described by the theory* would lead one to expect a divergence from what the theory predicts and the actual responses, then the appeal is innocent of the vice of vacuity. It may, for example, say that a sentence has a tree too deep to be handled by working memory, or that it is difficult to parse centre-embedded sentences; and, what is vitally important is that tree-depth or centre-embedding are features of the data as described by the grammar. It should also be added

that the competence/performance distinction could be used for reasons totally extraneous to the theory provided that there is a sufficient development of the theories describing the *other* domains to justify recourse to the distinction.

We are now in a position to collect the foregoing thoughts in the form of a set of conditions for determining the descriptive adequacy of a theory: namely, the *Conditions for Descriptive Adequacy* (*Coda*). Thus, the descriptive adequacy of a theory depends on:

> *Coda 1*: whether and how well the theory generated the data, where the data are the sentences speakers/hearers make/recognise irrespective of their payoff metrics, *i.e. lower bound condition*, and of the highest level reproducible in experimental frameworks, *i.e. upper bound condition*;
>
> *Coda 2*: whether and how well the theory describes the known *complement* set; and,
>
> *Coda 3:* whether and how well any appeal to the *competence/performance distinction*, *i.e.* any attempt to rule out potentially *falsifying* data, is coupled with an account of what features of the data are responsible for the anticipated failure in using the described capacity.

II. Psychological Reality

Although linguistics is nowadays regarded as the best body of theories of cognitive abilities, there is yet to be a descriptively adequate theory. What is very interesting is that when in linguistics the formal tool was still clearly unsatisfactory, paradoxically the strongest theses on the psychological reality of linguistic constructs were proposed.[7] In detail, it was suggested that there is an isomorphism between structures and operations of the grammar and structures and operations of the mind. However, the confidence on a direct correspondence between grammar and the mind waned in equal measure with the progressive refinement of the formal tool – or, at least this was the attitude among those interested in the problems of implementation.

There was thus a gradual but fateful shift from the hypothesis that basically grammars are directly realised as parsing algorithms, *i.e.* as faithful description of the speaker's recognition mechanism, to separating grammar from parser and relegating the grammar to the description of the

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[7] The paper of Miller and Chomsky (1963) epitomises the situation in linguistics.

final state of the learner. The move went even as far as questioning the internal role of grammars. According to the new orthodoxy, grammars could be treated as axiomatic descriptions of the data without any commitment to any detailed hypothesis about mental mechanisms. As Chomsky puts it, although we may describe the grammar *G* as a system of processes and rules that apply in a certain order to relate sound and meaning, we are not entitled to take this as a description of the successive acts of a performance model … in fact, it would be quite absurd to do so. (Chomsky, 1972, p. 117)

Chomsky's point seems to be that it is not part of the intended interpretation of grammatical theories that the linguistic constructs that figure in a grammar are to be construed as descriptions of underlying mechanisms. The intended interpretation is to take the grammar as simply the intensional specification of the function, *viz.* 'to relate sound and meaning', that the speaker/hearer computes.[8]

What is of immense interest here is the historical progression of the issues. It seems that the temporal train of thoughts should have travelled in the opposite direction. That is, one expects that the less one knows about the grammar, the less one claims about the mind, and the more a grammar is descriptively adequate, the stronger the theses about its role in mental processes should become. However, what disturbed the direction of development, amongst others, was the increasing awareness of the difficulty encountered in accounting for language acquisition. Even with a heavily committed hypothesis about the psychological reality of the initial and final states like Chomsky's that expects to find 'universal grammar and the steady state grammar … physically represented in the genetic code and the adult brain, respectively' (Chomsky, 1980, pp. 82-3), there is still an explanatory vacuum of how to move from the former to the latter. As Neil Smith observes, for many years Chomsky and his followers devoted considerable effort to devising formal mechanisms adequate to describing the vast complexity of natural languages, a complexity that becomes ever more amazing the more one looks at individual languages. … The trouble with this stage of the theory was that the resultant complexity made it look as if languages were unlearnable: how could a child master this dramatic complexity in the few years during which first language acquisition takes place? (Smith, 2000, p. x)

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[8] Matthews also elaborates on this theme and argues that 'grammars are not assumed to bear an explanatorily transparent relation to underlying performance mechanisms.' (Matthews, 1991, p. 197)

Consequently, the theory was relentlessly haunted by the learning problem in its various guises, and the growing sophistication of the proposed solutions did not correspondingly reflect on the increasing chances of the success of the theory. The obvious outcome was the advancing atrophy of the audacious hypotheses of the early days.

The issue of learnability is nowadays dealt with within a *parametric* approach in which language acquisition is viewed as a process of fixing parameters or option points defined in universal grammar. Although this conceptual change has been highly controversial and, as David Lightfoot laments, not much 'attention has been paid to what it takes to set parameters' (Lightfoot, 1993, p. ix), for the present purpose the following observation is noteworthy. Once the descriptive power of a grammar has increased as the *principles and parameters theory* has in the last twenty-five years (Chomsky, 1995, *passim*), and once the connection between structures postulated by the grammar and other psychological constraints like the ones imposed by the problem of acquisition gets tighter, the pursuit of investigating the grammar's psychological reality has started making sense and become more manageable. At least, on the basis of the data available to children, in principle it now makes sense to ask whether, how and with what psychological mechanisms a parameter is set during children's learning period.[9]

Optimism, however, should not be allowed to overflow, since there are still suspicions about claims of psychological reality. For one thing, there is yet to be a parameterised descriptively adequate theory. Secondly, there are various ways of asserting psychological reality, obviously on the condition that there was such a descriptively adequate theory already available.[10] There is thus a spectrum of states *vis-à-vis* the thesis of psychological reality. One could go to the extremity of claiming *strong psychological reality* according to which the structure and procedures postulated by the theory are the actual structures and procedures implemented in the mind/brain; or, one could go to the other pole and rest content with a *weak psychological reality* claim that even if a descriptively adequate theory makes commitments to certain ontological and procedural assumptions, one can at most claim that the mind

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[9] Stephen Crain also illustrates how the hypothesis has contributed towards a more empirical appreciation of the issue of psychological reality in linguistics. (Crain, 1991)

[10] As Matthews observes: 'There are many different ways in which a speaker/hearer might realize a grammar'. (Matthews, 1991, p. 188)

computes the function/relation described by the theory, but not that the theory is realised by certain internal representations. The strong version is the one which first appeared on the scene but subsequently gave way to a more sober state of minimalism. The weak variety of psychological reality merely maintains that 'the grammar ascribed to an individual can be true of an individual'. (Matthews, 1991, p. 188)

The availability of a continuum allows one to envision different degrees of psychological reality depending upon the requirements and commitments of the hypothesis in hand. For example, a weak psychological reality leads us to assume the ontology of the theory, but requires few or no commitments about the relationship between the rules postulated by the theory and the rules, if any, followed in mental processes. One may yet go one step further by assuming that for each rule postulated by the theory there is a corresponding mental operation, although the inner structure of mental operations may be quite different from the way the theory describes the working of the rule. This can occur in cases where, for example, the rules are realised by distributed nets. One may raise the stakes much higher by committing oneself to the thesis that *all and only* the objects and the manipulations of objects postulated by the theory are structurally preserved by the mind. This would be stipulating an isomorphism which converges towards a strong psychological reality thesis.[11]

However, despite the availability of a range of options *vis-à-vis* psychological reality, one is not at full liberty in one's selection. What degree of psychological reality can be claimed for, say, a grammar is a purely empirical question, depending on a realistic analysis of the state of development of the grammar and of what is known about its implementation algorithms. This means that in applying the same scenario to other cases, one should not let one's fertile fantasy loose in the barren epistemic reality. There is a host of constraining conditions involved that one has to heed, and it goes without saying that among the prominent members of the set, learnability considerations would loom large.

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[11] Robert Berwick and Amy Weinberg devote a chapter of their book to illustrate the possibility of various degrees of psychological reality in linguistics. They note that 'there is a continuum of more or less direct parsing "realizations" of grammars as parsers. There is not just an "all or none" choice between a grammar embedded directly as a computational model … and a total decoupling between grammatical rules and computational rules, with the structural descriptions of the grammar computed by some totally unrelated "heuristic strategies".' (Berwick & Weinberg, 1984, p. 76)

Notwithstanding the successes in linguistics, what often transpires in other cognitive domains is to lower the expectation for a full descriptively adequate theory. Initially researchers opt for a conservative *ad interim* strategy that would be chiefly concerned with certain core domains of the field in question. The viability of the strategy is, of course, dependent on whether there is an independent motivation for the selection of core cases. Therefore, the minimum condition of adequacy would be an ability to deal with those core cases; otherwise, the theory could be ignored for its inadequacy. This means that the issue of psychological reality of a theory is subsequent to the satisfaction of this minimal condition. Obviously, the strategy is particularly pedestrian in its prowess and abandons any ambition for attaining *strong* psychological reality in the early stage of theoretical development. The theory is initially going to cover the core cases only, and the pursuit of proving its *weak* psychological reality could be accomplished through some psychometric methods.

Psychometric Correlations

One way of establishing the psychological reality of a theory is to identify some psychological measure that correlates with the theory's constructs and operations. The most obvious one is to ascertain the correlation between *difficulty* of a task and its *response time*. Yet, the measure has suffered from a very unfavourable press in the past.

The infamy was induced by the *derivational theory of complexity* in linguistics. (Chomsky, 1990, pp. 637 ff.) The theory was centred around a simple set of three theses about human sentence processing. They were about: (1) what representation is constructed during a parsing process; (2) how the representation is constructed; and, (3) the complexity of the computation itself. These are the three necessary components of any complete computational model that links grammar to external behaviour: a representation, an algorithm, and a complexity metric. The hypothesis maintained that: the complexity of a sentence is measured by the number of grammatical rules employed in its derivation. (Fodor *et al.*, 1974, p. 320)

Thus, under the assumptions of the derivational theory of complexity a passive sentence, for example, would cost one more unit than an active sentence since there would be an extra operation, the passive transformation, involved in the mapping between deep and surface structure for passive sentences. Although the hypothesis received favourable empirical support initially, subsequent and more elaborate

experiments found no correlation between sentence processing time and length of transformational derivation.

But, one should be cautious in extending this result to other cognitive tasks where operations of thought may have a better claim to differential *chronometric* costs. Nevertheless, the success of a chronometric correlation depends on whether there is a *bona fide* body of information about the internal mechanisms of thought. Yet, this is where the difficulties start: there is practically no inkling about the internal mechanisms of thought, thus rendering such a psychological measure rather unsuitable and ineffective. In the case of language, study of brain lesions may offer evidence about the existence and localisation of certain functions. But, admittedly, the evidence is not compelling, since lesions that show a deficit in a functional capacity are not sufficient to determine whether there is a faculty underlying such capacity or whether such capacity is an interaction effect, which happens to materialise precisely in the damaged area. However, despite a dearth of detailed knowledge in this area, the existence of such evidence can meaningfully contribute to the issue of psychological reality.

Still, one could widen the net of psychometric measures and search for methods other than chronometric ones. Indeed, what undermined the derivational theory of complexity was not its attempt to correlate theoretical constructs with psychological costs, but rather to confine the methods to chronometric measures. Detection of chronometric differences, for example, between sentences involving a different number of transformations, depended on two things: (i) any transformation had a direct flat psychological cost, and (ii) this cost would show up in time differences. Thus, despite the destiny of the derivational theory of complexity, one could continue to appeal to psychometric means by discarding the latter assumption and diluting the former one. The project of determining the psychological reality of a theory should, therefore, remain a viable one, if other measures are available.

Taking stock of what has transpired thus far, one may conclude the discussion by putting the preceding points together in the form of the *Conditions for Minimal Psychological Reality*. Minimal psychological reality could be attributed to a theory if:

Condition 1: the theory is descriptively adequate for some *core* cases; and,

Condition 2: the theory correlates with a *multiple* of psychometric measures.

It goes without saying that minimal psychological reality is only a *lower* bound prerequisite for any psychological hypothesis and as such is quite a *conservative* condition on the psychological plausibility of theories of mind and cognition.

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THE MORALITY OF *HOMO ŒCONOMICUS* – BETWEEN SYMPATHY AND ENVY (I)

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Abstract: *The humanization of competition and of the profit/success dispute, the socialization of egotisms and egoism, the taming of the daily interhuman relationships and the emotional - sentimental assimilation of the outcome of labor can only be achieved through an intelligent compatibility between the economic and the moral order. Nonetheless, this does not rule out the tensions and, beyond any genuine moral intentions, the practicing of a normative and value-bound conventionalism is used - as an image amplifier and a justifier of hidden interests. The most transparent moral gestures can encapsulate rebellious instinct-ridden energies, temperamental inclinations being resignified from the perspective of virtuous meanings. The moral radiography of sympathy/compassion and of envy, respectively, can be enlightening in this line.*

Keywords: *homo œconomicus, moral philosophy, sympathy, compassion, envy, resentment, responsibility.*

Any discussion on moral issues can not ignore the obscure spiritual energies, the temperamental trends and inherited inclinations, the complexity of the psychological humus on which self-control, the awareness of one's own interiority, the devotion toward the others will sprout. The image about man should not be construed out of a false decency. Beyond the value attraction and concomitently with it, the moral gesture entails psychological depths in turmoil. The will itself bears the instinctual pressures, the sensations placed underneath the threshold of awareness and is subjected to hard-to-manage intentions, which make body with the proper desires; the adaptive purpose is obvious, but, at the same time, it can be said that, under these circumstances, man does not really mean, intensely, what he really implies/states he wants. At stake here is the existential commitment of desires attached to the hypothetical

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imperatives defined by Imm. Kant. However, the truly significant will is, from a moral viewpoint, submitted to the rational reflection, to the inner axiologically-related decision and to the duty toward the humane side within one's own self and the others. Nonetheles, it is self-evident that spirituality/spiritualisation is - by its very origin, contents and functions - impure, always bearing the burden of corporeality/materiality and its genetic dowry. For instance, self-love is normal, being a natural hypostasis of the instinct of self-preservation; however self-critical a human being will be, he will eventually accept and love himself and even, in some instances, he will like himself regardless of the conscious attitude shown. That is why the recommendation to renounce at self-love and love instead your fellow being may be hypocritical; you can not truly love the humanity in others unless you are able to value and cultivate both the humanity in yourself; egoism is qualitatively something else, the pathological condition of loving one's own self, the effect of an unnatural egocentrism and the missing affection and openness toward the issues of the fellow beings.

This pre-reflexive background of human nature is always present and active, having an unavowed intensity in the contemporary world, for the simple reason that the utility values take a privileged place within the system of life values. The myth of efficiency and success at any cost finds often its exemplary expression in *homo œconomicus* paradigm. The contemporary man is somehow tempted to reduce the quality/value variety of socio-cultural utilities to economic efficiency. This standard is, however, misleading and much too restrictive.

As a matter of fact, *homo œconomicus* is a myth rather than a reality. Examined from the epistemological angle, *homo œconomicus* is an ideal model, with no correspondance to actual reality, catching up in a pure state those absolutely necessary conditions the real human beings need to achieve/fulfill in order to have an efficient/significant behaviour in point of economic valorization; *homo œconomicus* is the outcome of a mental projection, of a constructive abstactization toward which are striving all rigor-bound sciences trying to go beyond the level of mere inductive, factual generalizations. For instance, in physics, the law of inertia is formulated for the ideal case in which there are no frictional forces; in real experiments that force can be reduced, tending towards zero, and - proportionally – the vehicle will cover a longer distance; this tendency is captured in a pure state when we move from the real experiment to an only logically possible experiment, in which it is assumed that the friction

force is equal to zero; the noticed/formulated correlation is, therefore, always empirically false, with no factual correspondent, but instead with obvious explanatory valences. By analogy, we can say that egoism - be it narrow-minded or enlightened – the rigorous awareness of one's own interests, the rational mastership of action plans, of contexts and consequences are mere idealized assumptions, a fact which makes possible to capture the necessary and specific correlations in economic life. As such, the economic man is bestowed with a rationality, a cognitive rigor he never practices. The paradox is the very fact that, at the same time with the mythization of rational knowledge, it is accepted as a model an egoism whose contents are non-logical. Through the variable of egoism – however it is interpreted – the economic sciences recognize a factor of logical indetermination, a rebellious variable to discipline and scientific exhaustion, with multiple heterogenous tendencies, unified only through their non-rationalizable structure. For instance, the concrete subjectivity of contents and motivations are treated as a random factor, circumvented in the paradigmatic equation; on the contrary, in reality, this essential component of any economic behavior reasserts its existential rights in and through the very variable of egoism, which is resistant to conceptualization. From such an analytical angle, we have to acknowledge that the economic activity does not have moral virtue as its explicit goal and its invariable outcome, the more so as moral appreciation cannot be the substitute for the value exigencies of a specific economic activity. Once we overrule - legitimately - the confusion between these two plans, we have to accept the possible junctions and interferences of criteria in terms of human consequences, be them individual or collective[1].

The humanization of competition and the profit-related dispute, the socialization of egotisms, the taming of daily interhuman relationships and the emotional-sentimental assimilation of work results can be achieved only through an intelligent compatibility between the economic and the moral order. This does not exclude, but implies tensions and even the practicing of a normative/value-bound conventionalism as an image amplifier; concomitently with the morally valid intentions, it is reached a public justification of possibly hidden interests. Even the most innocent moral gestures can encapsulate rebellious instinctual energies, the temperamental inclinations being resignified from the perspective of

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[1] Cf. in detail André Comte–Sponville, *Le capitalisme est-il moral? Sur quelques ridicules et tyrannies de notre temps*, Éditions Albin Michel, 2004, pp. 75-89, 124-129.

moral expectations. X-raying sympathy / compassion and envy, respectively, can be enlightening thereon. This attitudinal choice is not accidental. It is well know that Adam Smith[2] considered that his economic theory – centered on the paradign of *homo œconomicus* and the action of „the invisible hand" – and his treaty on ethics are in an indissoluble unity, to the extent that the harmonization of individual economic interests is completed *by* and continued *through* a morality of simpathy, reaching thus a desirable universal harmony. From another angle, Max Scheller reveals the historical role of envy and of the resentful man in the evolution of Western capitalism. The option I suggest has, nonetheles, another motivation, devoid of any analytical comfort: as a general rule, in everyday life, at least at the level of mere justificatory judgments, compassion/pity/mercy is recommended and appreciated as a positive value, whereas envy is attributed with intentions stripped of any nobleness.

As an ideatic prelude to the analysis we are going to undertake on the moral complexity of envy, we shall embark on a lucid insight into the psiho-attitudinal architecture of compassion, as evidenced in the everyday life of the economic man. Sympathy/compassion and envy are forms of community participation. The affective conjunction (mercy, compassion) and the affective disjunction (envy) make up a complex scheme of interhuman relations; the mere dichotomy attraction-rejection, complicity-divorce permeats various combinations wherefrom arise structural changes, behavioral dominancies and – why not? – value legitimations. Even when we see them as first instance reactions, they are indicative of the fact that our fellow beings are not indifferent to you and you wish that your presence should not be indifferent to them. Everyone whises to be pitied, though he is not willing to pity the others to the same extent. Nonetheless, everyone aspires not to be pitied, but, instead, to be in the situation to arise envy, though he repudiates it. With modulations varying between empathy and resentment, the two affects share in-between the

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[2] Amartya Sen, *On Ethics and Economics*, Oxford, Blackwell Publishing, 2004, on the relations between prudence personal interest in Adam Smith's conception: „As Smith explains in *The Theory of Moral Sentiments,* prudence is 'the union of' the two qualities of 'reason and understanding', on the one hand, and 'selfcommand' on the other. The notion of 'self-command', which Smith took from the Stoics, is not in any sense identical with 'self-interest' or what Smith called 'self-love'. Indeed, the Stoic roots of Smith's understanding of 'moral sentiments' also make it clear why both sympathy and self-discipline played such an important part in Smith's conception of good behaviour"(p. 22).

pathos of cutting down any distances and differences among men. In fact, they are the species of „sorrow" and „saddening"[3]. The comparison with others makes you accept that there always will be someone who has more – either joys, or troubles –, which makes you feel more easily envy than admiration or respect, more easily pity than generosity. Someone else's good is a pretext for pleasure (by no means for enthusiasm) much less often than the same person's bad (cruelty exists!). On the contrary, the good or/and the bad facing someone else can very often be a source of suffering for the fellow beings. We gather that, beyond the spectacular and the moral labelling, inside these contradictory inclinations of the human soul - envy and pity – the instinct of self-preservation - in expansion or in crisis, fractured, threatened – strives for humanization, starting with the experience of pain, sorrow, suffering. The moral modulations oscillate between the egocentric reflex and the intense inner life. The reasonable articulation settles down around a lucid compassion and a good envy - that is simultaneously admiring and competitive.

Moral modulations and implications specific for psychic inclinations (tendencies) can be more easily traced down if we use as an operational scheme the triad attraction-rejection-participation to distance ourselves, in more appropriate terms: sympathy-antipathy-empathy; according to the personalizations of this text: envy-compassion - humaneness / humanity.

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[3] Cf. Diogenes Laertios, *The Lives and Doctrines of Philosophers*, The Academy Publishing House, Bucharest, 1963. [Diogenes Laërtius, *Lives and Opinions of Eminent Philosophers* (literally translated by C.D. Yonge, B.A, London, Henry G. Bohn, York Street, Covent Garden, MDCCCLIII: "And grief they define to be an irrational contraction of the mind, and it is divided into the following species, pity, envy, emulation, jealousy, pain, perturbation, sorrow, anguish, confusion. Pity is a grief over some one, on the ground of his being in undeserved distress. Envy is a grief, at the good fortune of another. Emulation is a grief at that belonging to some one else, which one desires one's self", p. 300; "But rage is anger at its commencement", p. 301; "Anger is a desire of revenge, on a person who appears to have injured one in an unbecoming way", p. 300].

René Descartes – *Les passions de l'ame*, Mozambook (online edition), 2001 – defines envy and pity as "varieties of sadness": „Mais lorsqu'il nous est représenté comme appartenant à d'autres hommes, nous pouvons les en estimer dignes ou indignes: et lorsque nous les estimons dignes, cela n'excite point en nous d'autres passion que la joie, en tant que c'est pour nous quelque bien de voir que les choses arrivent comme elles doivent. Il y a seulement cette différence que la joie qui vient du bien est sèrieuse; au lieu que celle qui vient du mal est accompagnée de ris et de moquerie. Mais si nous les en estimons indignes, le bien excite l'envie, et le mal la pitié, qui sont des espèces de tristesse", p. 39).

Miguel de Unamuno captures a truth we are not always willing to acknowledge, mainly in public: everyone wishes from the depth of one's heart to be loved or, more precisely, wishes that one's sufferings and sorrows to be felt and pitied by others too. [4]

Compassion is humane in intentions: neither can you admire with detachment, as if watching a light comedy, the others' troubles, nor do you have the right to take advantage of them with inner joy and cruelty. Empathy is a defining variable of humanization, to the extent to which it cancels the desastruous effects of selfish brutality and domineering tendencies, making possible the solidarization with the others' suffering. As a matter of fact, Arthur Schopenhauer considers that spontaneous sympathization, with no hidden thoughts, with the other's suffering and the sensitive participation in the suppression of the evil affecting someone is the basis of moral life. Pity is uplifted to be the supreme principle of spontaneous justice and genuine charity.[5] Notwithstanding this, by itself, compassion stands more like an inclination and a psychological condition rather than a moral virtue. To the extent that it unfolds only on an emotional level and is belittled to an occasional impression, it can be certainly suspected of ambiguity. Symptomatic in this regard is that, although it is not absent from technical recommendations on shaping up human love, it has been seldom submitted to a lucid analysis. The reticence to look more closely into this issue comes, probably, from the intuition of certain flaws, and in order to avoid disappointments, it is better to admire from afar its benevolent effects. Interhuman relations can not bear the never-ending suspicion, the freaking out attitude, the stalking, the obscure handling of interests, the demanding rational depths. That is why, compassion is spontaneously accepted, being rarely examined to see *by what and how precisely* it legitimates itself. We will try to identify the most obvious moral symptoms. It is, first, an affective discriminatory reaction: usually, you pity neither your opponents nor your superiors – let's say they deserve their fate - but only those whom we assume are truly our equals, being at that time in a delicate, precarious existential situation, awakening in us the illusion, the sense of minimal superiority, as Nietzsche points out. At the same time, exteriorization depends on the psychological state of the

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[4] Miguel de Unamuno, *Spansih Essayists,* anthology, introductory study, notes and translation by Ovidiu Drâmba, Universe Publishing House, 1982, p. 143-144.

[5] Arthur Schopenhauer, *On the Basis of Morality*, The Antet Publishing House, 1994, p. 103.

moment, either willful to get involved or emotionally resistant. Equally true is the fact that, through compassion/pity, certain temperamental layers meet their strict selfish need for public assertion or compliance with certain conventions, customs, traditions. Even more: people can make remarkable strides ahead in lucidity, but no one can say that they will stay lucid up to the end or that they can live with lucidity alone. They are, as such, prone to self-pity. Unamuno considers self-love – called egotism – as being opposed to vulgar egoism, since this love or compassion of our own selves – structured around the despair not to have been before our birth and to cease to be after our death – is the foundation of compassion/love for our fellow beings.[6] The relationship based on heartfelt solidarity in the face of evil/misfortune called sympathy can be sincere and truly comforting. We believe, however, that honesty does not grant it depth and morality. Psychological spontaneity can not be held as a criterion for the morality of ourgestures. It is, in the case of compassion, an intention to help spiritually, to provide support and to comfort. Nonetheless, its content is heterogeneous, with many aspects of which we are still unaware of, while the principle of reciprocity may fail into an outrageous pragmatism.

Compassion is, nonetheless legitimate. The human being has, as an extension of the self-preservation instinct, the fear of danger, pain, sickness, failure, death. They are there whatever the circumstances, just staying on the watch, lurking surreptisiously in our thoughts, gestures, dreams, conduct. The emotional participation in the other's problems and sufferings project these personal worries into a show parading comfort, tenderness, even false humility, fear and so on. Emotions are triggered by a real situation and also by soul projections set into motion in order to comfort, instinctively, our own self; sympathizing with the other's feelings and situation does not aim, in compassion, at spiritual identification, but rather at imaginative transposition; we are moved, because we should be impressionable; we feel it as a social/humane duty. „Pity – said Burke – is a passion accompanied with pleasure, because it arises from love and social affection."[7]

Had compassion been, indeed, a full and profound participation in the other's suffering, people would, perhaps, avoid such situations. This is, in fact, how the weak people react. It is, however, a joy or, rather, a barely

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[6] Miguel de Unamuno, *cited works*, p. 145.

[7] Edmund Burke, *Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful,* Oxford: Oxford University Press, 1998, p. 42.

detectable relief felt by the sympathizer related to the fact that he is protected from the misfortune facing the other, he feels safe, not exposed to danger, experiencing, at these thoughts, some relief. All the same, he is still a bit worried: he moves toward the other to see, as if in a possible mirror, if it may happen to him as well. Whenever he sympathizes with others, to some extent, man self-pities himself, feeling sorrow, by suggestion and self-suggestion, for his weaknesses/limitations/ constraints. Proof thereon is that the above-mentioned feelings are contemplative, thus satisfying a need to show off one's pain, centered on the tender fragility of our being – a feeling that life experience elevates to the foreground. Basically, an existential resemblance and a generic fatality become self-evident. We can say that this very similarity/analogy of destiny we feel about the humanity inside us triggers this reaction of compassion. Seen in this light, compassion is full of antinomies. It means transposition onto the other, emotional orientation to participate in the distress that hit the other, and also stimulation of one's self-reflection linked to the precariousnes of existence - so easily forgotten in the turmoil of everyday life; desire to be helpful, and also an unpleasant shudder, even the taste for thrilling experiences, not to the point of being harmful. Compassion strives to be a spiritual support, but, out of too much sentimentality, it unnecessarily complicates the situation; it aspires to a disinterested, sincere help, but it is consumed at ease as an intention, not as a practical finality. The expectation of a future gratitude is not excluded either. It rallies around kindness, sorrow, thoughtful communication, a soothing face, a slow-paced inner rhythm, and also the commentary, the curiosity, even the indiscretion and the small talk. That is why, compassion is rather an emotional state that brings people together in special/difficult situations; when put to a test, it suspends the practical relations with the world, restoring the rights of sensitivity to vibrate on behalf of one's own self and of generic humankind. The moral intention of compassion seems to be mediocrely served just by few emotions: tenderness, contemplative sorrow for existential precariousness and happiness, fear that bad things may happen to you as well, joy that, for the time being, they have avoided you, manifest being only the desire to be close to the neighbor *in* trouble, for which we comfort him. Also present are, of course, truly instructive vistas: the introspection, even in a confused state, will emphasize the seriousness of life, having curative effects and possibly fostering kindness, forbearance, the sense of how relative humanity is, the power to settle for less, etc.; as a therapeutic tool, it can curb down the enthusiasms lacking any sense of reality. Nonetheless, the identification with the other's inner self and troubles

implied by compassion is limited only to a fleeting and comforting tenderness; the effective communication, for the same reasons, mimed, and the get-together fails. Here is a naive imaginative transposition, up to a point, even narcissistic, handled according to facile, discriminatory and conjunctural cultural conventions. Even more: we are willing to commiserate with those whom we know or think they are inferior or equal and to the extent they are dignified in their suffering. Those close to our souls fall already in a completely different category, where at stake is not compassion, but love, generosity, moral nobleness. Compassion is more an affective/emotional disorder and, out of too much zeal for relief, ignores or even blocks away the practical finality; emotion and panic are easily converted it into self-pity. This does not rule out the possible compatibility between the logic of spontaneous sensitivity and the order of moral significations.

We have specifically targeted the pathological hypostases – simply and purely – lacking the elementary sincerity of the moral gesture, a fact which generates, for the economic man, advantageous existential contexts and climates, although precarious from an ethical viewpoint. These postures and impostures should not be identified with genuine moral commitments, such as the love for others, sympathy based on solidarity, responsible empathy and noble generosity. Following these ideas, but opposite to pity/compassion, envy - as we shall see - is subject, more often than not, to a morally intransigent qualification; at least in public reactions, it is systematically disavowed; however, we believe that certain determinations and hypostases can be capitalized upon from a moral viewpoint.

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HAPPINESS – AN INDICATOR OF ECONOMIC DEVELOPMENT? WHO IS MENTORING US?

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Abstract: *The present essay explores the way happiness could be used as an indicator for economic development and its pedagogic implications. In other words, if there is a positive corelation between happiness and economic development then what does the education system do to teach people to be happy?*

How to measure it –higher prosperity leads necessarily to higher happiness, happier people? How to teach people to be happy – when marketing and business tells the story of never be content, always want something different, the sky is the limit which leads to unhappiness? Is this a good business model? A good model of education?

Keywords: *health, happiness economics, well-being, education, mentoring.*

1. Introduction

The idea to explore the relation between happiness and economic wellfare, understood as the standard of living and the prosperity of

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people, or economic development, considered in its very general sense of efforts made to improve the economic well-being and the quality of life of a community is neither new nor easy. It is not new as the quest for happiness has been around since the human species became aware of itself and it is not easy as concepts such as the ones we consider are highly subjective, their understanding being a matter of personal differences, culture, historical age, in other words it very much depends on the personal and the community mindset.

However, given the insistence with which the pursuit of happiness in the sense of the fundamental human right which allows you to unrestrictedly pursue joy and live your own life in a way that makes you happy, obviously within legal limits and not violating the rights of others[1] has led to a race to which businesses have added the pressure and necessity to be happy by, obviously, consuming more and better and more expensive, it is a question that needs to be addressed particularly in today's system of education. Officially, there is no formal curriculum, at least in the Romanian system of education, to the authors knowledge, to teach children and teenagers and (young) adults what happiness is and how to get it. And yet, those very systems of education pride themselves that they endow their students with practical skills and competences to help them succeed in their future lives and careers.

The authors of the present essay set out to explore why this happens, explore the connections between happiness and economic growth and development and to consider what is done in other education systems in order to address this issue with possible contributions to how Romanian education could provide practical guidance for its multiple stakeholders.

2. So what is happiness?

It is an elusive concept that does not allow for comfortable definitions, from any perspective, psychological, economic, social and /or political perspectives. That is why researchers needed to get together in 2006 in an international conference held at the University of Notre Dame[2] to discuss and analyze the theme "New Directions in the Study of Happiness: US and International Perspectives". It seems that the conference and the resulting book published three year later, *Happiness, Economics and Politics.*

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[1] As mentioned in the Declaration of Independence of the United States, 4 July 1776. Retrieved from http://www.archives.gov/exhibits/charters/declaration_transcript.html

[2] http://www3.nd.edu/~adutt/activities/program.htm

Towards a Multi-Disciplinary Approach could not really come up with a widely accepted definition. They offered, however, to those interested in the subject the certainty that a new field is emerging for academic research: the study of happiness. This emerging field is, obviously, interdisciplinary or rather multi-disciplinary, and explores the concept through the lenses of history, philosophy, economics, sociology and politics. The studies focus on how economic and political factors, separately and together, affect the quality of human life.

Darrin McMahon, a historian, looks at some comparative linguistics clarifications of the word, noting that from an etymological point of view there is a connection between the terms "happiness" and "luck" in all Indo-European languages. He therefore concludes that when things are good for us, we express ourselves as we are lucky and, therefore, happy. The reverse seems to be also true, linguistically. The old Norse and Old English root *hap*, like the old French *heur* or the Mittelhochdeutsch *Glück*, all mean luck or fortune. We have mishaps when bad things happen to us, but we are happy, Glücklich, filled with bonheur when good things happen[3]. It seems that this was the intended meaning of the word happiness that the founding fathers of the United States had in mind for their Declaration of Independence, since they could not have envisioned anything similar to what some of us today seem to understand through happiness, whether material and consumeristic or simply visionary, activist and idealistic. McMahon reminds us that as late as the 18th century it was still uncommon to think of happiness in the terms we do today. Happiness was considered an award after a lifetime of good, virtuous behaviour, as Aristotle used to tell us. Or for most religions, true and lasting happiness could be achieved in afterlife though a communion with the divine.

Sonja Lyubomirsky, a positive psychology researcher with the University of University of California, Riverside, with a Ph.D. from Stanford University in 1994, writes in her book *The How of Happiness* (2007) that happiness is "the experience of joy, contentment, or positive well-being, combined with a sense that one's life is good, meaningful, and worthwhile." On her official web page[4] she directly asks the question of the importance of the scientific research of happiness and gives the

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[3] Darrin M. McMahon, *The History of Happiness and Contemporary Happiness Studies*, International Conference New Directions in the Study of Happiness, Notre Dame University, Oct. 22-24, 2006,

http://www3.nd.edu/~adutt/activities/documents/McMahonNotreDameTalk.pdf

[4] http://sonjalyubomirsky.com/

following answer: it is important "…because most people believe that happiness is meaningful, desirable, and an important, worthy goal, because happiness is one of the most salient and significant dimensions of human experience and emotional life, because happiness yields numerous rewards for the individual, and because it makes for a better, healthier, stronger society."

From Lyubomirsky's definition it starts to become even clearer that happiness is no longer a vague pursuit, but has very practical social ends that could be summed up in "making the world a better place for everybody" no matter how cliché this may sound.

The Romanian born economist Nicholas Georgescu-Roegen was among the first important economists who considered that economics has to be connected to happiness if there is any sense or meaning in human activities. In his 1975 influential article he puts forward his well-known theory of the entropic nature of the economic process. Due to the myth of continuous and technological progress, which at the time he ascribed to both mainstream and Marxists economists, he draw the attention to the fallacy of constant and continuous technical progress through which "nothing (…) could ever stand in the way of an increasingly happier existence of the human species". We are not concerned here with the economic implications of his economic thinking, though they are so profound that Samuelson referred to him as "a scholar's scholar, an economists's economist, while Kenneth Boulding underlined the importance of his book *The Entropy Law and the Economic Process* by writing that "if the right 500 people were to read it, science perhaps would never be quite the same again."[5] We are interested here in Georgescu-Roegen's claim that happiness or the "enjoyment of life" should be a major component of the economic process, its output. Not a "physical outflow of waste, but the *enjoyment of life*. And this point is the main difference between this process and the entropic march of the material universe."[6]

3. How to measure happiness?

If it is so difficult to define, how do we measure it? Is it enough to recognize it when we see or feel it as we used to do with "quality" before the time of the by now well established academic and business fields of research on quality control, evaluation or assessment? How to compare

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[5] http://link.springer.com/article/10.1007%2Fs10818-015-9208-1

[6] Georgescu-Roegen, 1971, p. 282.

reports among individuals, specific communities or even whole cultures?

The measuring of happiness has been mostly done in the field of happiness economics or economics of happiness which look at the quantitative and theoretical study of happiness and all related aspects. Blanchflower showed since 2008 that economic researchers have focused on three relatively simple questions on life satisfaction and happiness that they afterwards tried to model. The important aspect of comparing reported, and therefore subjective, issues related to happiness seems to have been solved by the use of cross-sections of large data samples which show consistent patterns in the determinants of happiness[7].

The data show that richer people are happier and healthier, but can we be sure about causality? As in other areas of economics, this is both of central importance and difficult to establish beyond all doubt.

And then there are, of course, the popular surveys of the happiest and least happy countries[8], cities, places in the world. How reliable are they? It is difficult to answer, but they have become mainstream news in the media. And the World Happiness Report which surveys and ranks 156 countries by their happiness levels by using data from the Gallup World Poll. This World Report on Happiness uses measurements of well-being to assess the progress of nations. The report, of which three have been published so far since 2012 and an extension in 2016, assesses the state of happiness in the world today and looks at how the new science of happiness explains personal and national variations in happiness. These reports reflect a new worldwide demand for more attention to happiness as a criteria for government policy.[9]

4. Richer people = happier people?

Thomas Corley, a contributor to Business Insider and the author of "Rich Habits: The Daily Success Habits of Wealthy Individuals" has studied the rich and the poor for 5 years. A period of time that is not really very long, nor too short. He interviewed 361 individuals, out of which 233 were wealthy and 128 were poor to find out whether the saying "money doesn't buy happiness" is true or not. He discovered it was not true, according to his survey. The data Corley processed from his survey

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[7] Summed up from David G. Blanchflower, *Happiness Economics, Research Summary* 2008 Number 2, NBER, retrieved from

http://www.nber.org/reporter/2008number2/blanchflower.html on 1 May 2016.

[8] http://www.telegraph.co.uk/travel/galleries/The-worlds-happiest-countries/

[9] Summed up from http://worldhappiness.report/overview/

showed that: 82% of the wealthy were happy, while 98% of the poor were unhappy; 87% of the wealthy were happy in their marriage, while 53% of the poor were unhappy; 93% of the wealthy were happy because they liked or loved what they did for a living, while 85% of the poor were unhappy; 0% of the wealthy were unhappy due to finances, while 98% of the poor were unhappy. The implications Corley draws from his study are diverse, but for the present essay we are interested in one of his conclusions, namely that happiness can and has to be taught.[10]

Does democracy lead to greater happiness for the many? This is an important question which has quite captivated both the media, politicians and the ordinary people for obvious reasons in the last century or so.

Ronald Inglehart has been interested in the important aspect of the correlations between happiness and democracy underlining the complexity of aspects of the answers researchers reached for the long run. Inglehart showed that a climate of free choice may be conducive to happiness, but rising levels of democracy do not necessarily triggeer higher levels of happiness. Inglehart offers examples of the countries in Central and Eastern Europe that did not start showing higher levels of happiness after the fall of their communist regimes even though their levels of democracy were increasing. In some of the former communist countries democratization was accompanied by social and economic collapse. Referring to Romania, Inglehart says: "Democratization occurred later in Romania than in Hungary, with Romania moving into Freedom House's "free" category only by 2000. Happiness declined from 1990 to 2000 and rose slightly in 2006 but remained below her earliest level. As of 2006, a huge increase in Romania's level of democracy – rising nine points on a scale having a maximum of twelve—has not brought a significant increase in happiness." Inglehart's study is challenging raising a serious dilemma: does democracy promote satisfaction or are satisfied citizens a necessary condition for the successful operation of the democratic process? This is an important question for a large number of stakeholders in the democratic process, but especially for the politicians and activists selling democracy as a way to be happy, and Inglegart's answer rather daunting "it is clear that democratization does not necessarily bring happiness."[11]

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[10] Data from http://www.businessinsider.com/study-shows-money-can-buy-happiness-2015-1 and from http://richhabits.net/rich-habits-study-background-on-methodology/

[11] Ronald Inglehart, *Democracy and Happiness: What Causes What?*, 2006, https://www3.nd.edu/~adutt/activities/.../InglehartHappinessandDemocracy1.pdf

5. How do we teach happiness in our schools?

The clear inference from the above brief discussion is that happiness is important both for social and personal development. Then how do we teach it? Or rather, more bluntly, do we teach it in the present system of formal education? Before looking at Romania, let us have a look at what happens in other systems of education. In many places around the world researchers describe an ever growing interest in the business model of higher education which has not proved sustainable and is under constant revision. But the fact remains that as a society most of the developed or aspiring world considers education a business and in some places it is even considered a highly profitable one. This, among others, is why educational discourses of the moment no longer talk of aims, goals or higher purposes but of competences, skills, standards and employment opportunities. The following section is roughly based on Smith (2005, 2013) who concludes that those societies which concentrate mainly on economic growth run the risk of significantly undermining the happiness of many of their members and of other people. Part of this materialistic discourse is justified and needed to obtain one's means of subsistence, to do work well, to contribute to the development of one's community, and so on. Some educationalists look at scenarios of educating for 'personal life' (building a home, loving places and caring for nature, parenting, developing character and spirituality, and interpersonal growth) and educating for 'public life' (preparing for work, educating for community, democracy and service). This means, broadly and roughly, that the possession of general understandings and skills is not enough – educators also have a fundamental role in shaping mindsets, values. Put differently this means that if people are to develop and be happy they need to acquire values or virtues to help them make sense of a complex and unpredictable world. Smith is sceptical that the present western system of education, narrow, prescriptive and economistic, may foster this approach and he echoes other researchers by recognizing that individuals need the 'courage to teach' rather than only repeating mechanically the requirements of the curricula while finding the resources to do this is a struggle.

In Romania we have been witnessing endless and senseless, very often, waves of reforms which affected both individuals and society at large. The hopes that somehow those reforms may have been beneficial for the many have been shattered by the ever growing and vocal recognition

of the inefficiency of the Romanian system of education[12]. A quick and, therefore, superficial browsing of higher education curricula shows a clear emphasis on quantitative and hard core disciplines, and a constant neglect of the humanities, including arts and other areas which might contribute to the development of a whole, harmonious personality of businesspeople, in the case on business and economics higher education. Where and how to teach happiness and/or mindfulness in such a system?

To echo again Smith (2005, 2013) one cannot teach happiness by teaching about it. Like arts and vocations "we come to flourish in important ways through experiencing flourishing." In other words education for happier people and happier societies can be made through cultivating environments where people can be happy and through providing mentoring to show what happiness may be and how it can be achieved.

6. Some conclusions

It is difficult, though not impossible, to think of the Romanian system of education as a happy environment. And yet, despite all the issues and obvious or hidden agendas, the Romanian system of education gives one permanent space for the genuinely concerned - a space to start anew and build for the happiness for the many. Which means opportunities and experience, including enlarging and engaging the system, looking at informal education, community learning thinking of people as people not as statistics.

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[12]http://cursdeguvernare.ro/capitalul-uman-al-romaniei-forta-de-munca-adecvata-din-economie-si-producatorul-de-valoare-adaugata-in-societate-cum-recuperam-ce-am-ignorat-in-ultimii-25-de-ani.html

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http://infed.org/mobi/happiness-and-education-theory-practice-and-possibility/, retrieved: 1 May 2016

PARENTAL EDUCATION AS HEALTH PROTECTION FACTOR IN VULNERABLE CHILDHOOD AND ADOLESCENCE

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Abstract: *Family education is considered a protection factor with regard to the healthy development of children, especially in social risk situations. In this paper we present the results related to the family's role in the healthy development of their children, from two works that stress on two moments of special difficulty for families, as the birth of a child and the adolescence. They are part of the strategic lines on sexual and reproductive health. Such works try to explore the families' guidance needs to outline a program on parenthood education and to analyse the needs of teenagers in vulnerable situation in relation to sexual and reproductive health to develop a strategic action plan. A research-action methodology was applied with focal groups with 56 professionals and 13 families in the first work, and 48 professionals and community workers with 72 teenagers in the second group. The results show that the families feel insecurity and anxiety before the birth of a child, especially, in relation to how to look after him/her or for family pressure. The teenagers demand a better communication with their parents in sexual health issues; and the professionals suggest the development of family guidance programs, especially in risk situations.*

Keywords: *Sexual and reproductive health; health protection factor; healthy development; health education; parental education; vulnerable childhood and adolescence.*

Parental education in healthy development of infants and adolescents

Research has shown that the family has an important role in children's health and that it represents an important social support group. Parental skills have an influence on children's emotional state, social relationships and academic achievement. Social changes require an active role of the family to promote healthy and responsible values, attitudes and

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behaviour. However, families do not always receive any specific training to improve their skills and resources.

The development of parental skills is seen as a protector factor with regards to the healthy development of children, especially in social risk situations. Croitoru[1] highlight the family's active role to promote values, attitudes and healthy responsible behaviour, how they educate and their ability to face adverse situations. Their own way of life represents a behaviour pattern that has an influence on the children's and adolescents' adoption of habits and values, and it becomes a protector factor when facing vulnerability. According to[2] the family's function is emotional, social and educative, and he highlights as significant factors in the intra-family relationships: a) the degree of control over their children's behaviour; b) the communication between parents and children; c) the requirements of maturity d) a relationship of affection. However, families do not always feel capable or do not receive the specific training to improve their skills and resources.

The family, from the moment of their child's birth, and even before, has to face difficult situations in critical periods of mother and fatherhood, for which they are not always prepared. The emotional links and the intra-family relationships are often damaged when the families are in social risk situations, the family can feel unprotected and insecure if they do not have social support available. At the time of birth, for example, in premature situations, with children of low birth weight or when the parents have difficulties in looking after their children, they require educative programs to develop their parental skills. For example, the SORT – System of Risk Triage proposed by[3] to attend the premature child, identifies risk factors through a triage that takes into account not only the medical side but also the psychosocial risk factors.

High risk factors in the family are those related to a low level of education, having multiple maternal responsibilities, difficulty in the learning of basic care routines, an ambivalent perception of pregnancy and drug abuse. There is a further risk (higher risk) of having a background of regular violence and a life organized around drug abuse. Chelcea, S.[4]

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[1] Croitoru, Crina, *Parental Method of Appreciative Intervention in Social Assistance* in Sandu, Antonio (coord.), *Appreciative Seminars*, Iaşi, Lumen Publishing House, 2010, p. 73-97

[2] Albu, G., *In Search of Authentic Education,* Iaşi, Polirom Publishing House, 2002, p. 92

[3] Băban, Adriana. (coord.), *Educational Counselling*, Cluj-Napoca, Risoprint Publishing House, 2003, p. 185.

[4] Chelcea, S., *Personality and Society in Transition*, Bucharest, Science and Technique Organization., 1994, p. 140.

suggests ideas to improve parenting of newborn babies and in infancy from programs based on a practical application of skills, as they are more effective than the theoretical programs or those based only on advice. Nowadays, a way to consider parental skills in neonatology are through the patterns of "care centred on development (CCD) and on the family" and, especially, from the "Neonatal Individualized Developmental Care and Assistance Program" system, suggested by[5]. A system implemented in several hospitals in Argentine, Spain, The United States of America, France, Holland, England and Sweden.

The family support programs during the transition to parenthood have acquired great relevance in Spain in recent years[6], as an answer to the families' needs to face parenthood with satisfaction and confidence. Given the importance of the first years of life in later development, the necessity of supporting families during this critical period has gained strength. For Kotliarenco, Gómez, Muñoz, and Aracena (2010), this challenge is even more significant in the most vulnerable population sectors. Further-more, Haragus[7] shows in his work some negative repercussions in later years as a consequence of the family vulnerability, as for example, an early maternity.

Although it is necessary to propose family education as a process that must be started at early infancy, better even from birth, it is essentially relevant to develop parental education in the families of adolescents. This is an especially vulnerable phase, where risk behaviour for health is most often observed, above all related to sexual and reproductive health. The latter has gained special importance, at an international level with the increase of adolescent maternity and paternity. Rodríguez, Rodrigo, Correa, Martín and Maíquez[8] observed a higher level of self-sufficiency, internal locus, co-parenthood and a higher use of inductive practices in the families of social risk, who had participated in a personal and family support program in comparison with the control group.

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[5] Als H., *A synactive model of neonatal behavioral organization: framework for the assessment of neurobehavioral development in the premature infant and for support of infants and parents in the neonatal intensive care environment.* In: Sweeney JK, editor. *The high-risk neonate: developmental therapy perspectives*; 1986, p. 3-5.

[6] Menéndez S., Sánchez, J. López I., Hidalgo, M.V., *Nacer a la vida. Un programa de apoyo y formación durante la transición a la maternidad y la paternidad. Infancia y aprendizaje*, 27, 2004, p. 407-416.

[7] Haragus, M., *Early Motherhood in Romania: associated factors and consequences, The Social Intervention and Research Journal*, 32, 2011, p. 63-85.

[8] Martín, J.C., Maíquez, M.L., Rodrigo, M.J., Correa, A.D. and Rodríguez, G., Evaluación del programa "Apoyo personal y familiar" para madres y padres en situación de riesgo social. *Infancia y aprendizaje*, 27(4), 2004, p. 437-445.

In Catalonia-Spain, the pregnancy rate in teenagers has shown an important growth during the last decade. In the youngest group, from 14 to 17 year olds, the pregnancy rate has gone up from 4.9 per thousand in 1996 to 11,7 per thousand in 2008 (Maternal-infancy Health Registry, DGSP and IVE Registry, State Public Health Department). Likewise, in the group from 15 to 19 year olds it has risen from 17.5 per thousand in 2000 to a 29.2 per thousand in 2008. This increase in pregnancies, general all over Spain, has resulted in both a higher birth rate and an increase in voluntary termination of pregnancies.

Recent works confirm the relationship between adolescent pregnancy and social type determining factors as, for example, the links with the school and the low expectations of future employment. Swan et al.[9] state that there is a higher pregnancy risk in certain situations like being homeless, of academic failure, being the daughter of an adolescent mother, belonging to an ethnic minority or being involved in serious criminal situations. Other works related it to genre violence. Several qualitative studies provide data about the factors that teenagers relate to adolescent pregnancy: little motivation and interest in school, an unhappy childhood, poor home conditions, as well as low future expectations and aspirations (Harden, 2009). In girls, good academic achievement, positive plans for the future, and strong links with the family, the school and the religious community are high-lighted as factors that reduce the adolescent maternity rate.

When looking at other scientific research we find different authors that point out as protector factors in the risks of sexual behaviour and adolescent pregnancy family relationships based on the communication of values, in the expectations and concern in an affective atmosphere and the close relationship between parents and children. A good relationship and communication with their children helps to reduce anti-social behaviour and health risk. Through communication the family establishes rules and limits among its members. The communication about sexual aspects also has certain influences on their sexual relationships. Research work carried out in England with teenagers from 10 to 15 years old shows that more than half of them say that if they have doubts of a sexual nature they would speak first to their father or mother. In the teenagers from 15 to 17 interviewed, of which 56% had already had a sexual relationship, more than half admitted that they have never spoken to their parents about

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[9] Swan, C., Bowe, K., McCormick, G. and Kosmin, M., *Teenage pregnancy and parenthood: a review of reviews*. London, HAD, 2003, p. 134.

when a teenager is ready to start having sex. According to Welling et al.[10], speaking to parents about sexual issues is an important protector factor in connection with pregnancy, as it is associated with the use of some type of contraception in first sexual intercourse. However, the family's perception about the communication related to sexuality does not always coincide with the findings of the research. Some families do not speak about the use of contraception, because they are afraid of raising the interest in sexual intercourse. Kirby,[11] however, shows that speaking about abstinence and contraceptive methods does not bring forward the start of sexual activity, not the frequency of the relationships or the number of partners. On the contrary, some show the opposite tendency, as the expression of negative opinions about the use of contraceptive methods.

Another determining factor is the control the family has over their children's lives. Vézina[12] point out that the teenagers that are supervised by their parents tend to start their sexual experiences later and present a lower pregnancy risk.

On the contrary, and according to recent information, there are pregnancy risk factors related to the family such as problems in family relationships, the family structure and the parents' difficulty in communication. At the same time, Vézina point out that an extremely strict vigilance is also related to a higher pregnancy risk in adolescents. We can summarize that, in general, the quality of relationship and the communication in the family nucleus is a protective factor in adolescent pregnancy. According to Blum[13] parents should speak in a clear and sincere way to their children about sex, love and relationships for the benefit of their sexual and reproductive health.

Methods
The works presented are in the sexual and reproductive health strategic lines, both on a national and autonomous level, and emerge from the

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[10] Wellings K, Collumbien M. and Slaymajker E., *Sexual Behaviour in Context: a global perspective.* Lancet; 368, 2006, p. 1706-28.

[11] Kirby, D., *Emerging Answers: research findings on programs to reduce teen pregnancy.* Washington, DC: National Campaign to Prevent Teen Pregnancy, 2007, p. 182.

[12] Vézina, J. and Hébert, M., *Risks Factors for Victimization in Romantic Relationships of Young Women: A Review of Empirical Studies and Implications for Prevention.* Trauma, Violence & Abuse, 8, 2007, p. 33-66.

[13] Blum, R.W. and Rinehart, P.M., *Mothers' Influence on Teen Sex: Connections that promote postponing sexual intercourse.* Center for Adolescent Health and Development, University of Minnesota. Minneapolis, MN, 2002, p. 129.

demand of a Maternal-child Health Program, from the Health Department of the Catalan-Spanish Governments, with the support of the Catalan Midwives Association, Barcelona University and the Health and Social Services Department, to respond to the current families' support needs and to health promotion issues. In this work the research team (GRISIJ) Socio-educative Intervention in Infancy and Youth Team, is formed by researchers from Barcelona University and Lleida University, as well as health, education, social services and community workers. These projects follow a common pattern based on the combination of scientific evidence and the needs analysis observed by the experts involved (intervention experts and the people to whom the program is addressed).

The research method applied was the action participative research in the cooperative modality with the involvement of all the participants. In the first case, the professionals (midwives) and the mothers; and, in the second case, the professionals and the adolescents. The research was developed in five phases: 1) Review of scientific literature; 2) Preparation of the tools for the gathering of data and negotiation with the institutions participating to have access to the subjects of study; 3) Analysis of the needs through discussion groups; 4) Analysis of data; 5) Report on results and conclusions. This participative process allowed us to define the action proposals to improve the health of the teenagers involved influencing on the families and, in this way, to change the intervention methods.

The following objectives were established: 1) To identify the families' guidance needs to be able to prepare a parental program; 2) To analyse the sexual and reproductive needs of teenagers in situations of risk in order to outline a strategic action plan.

Participants

In the analysis of the families' guidance needs in facing the birth of a child, 56 professionals from 39 health centres from different Catalan provinces and 13 families have taken part. Among the professionals, the midwives, the average age was 43.71 years old with an average professional experience in maternal education of 16.68 years (minimum 10 months – maximum 30 years). In the families, the mothers' average age was 33.15 years old, (the youngest 20 and the oldest 41 years old).

For the teenagers' needs analysis related to sexual and reproductive health, 48 professionals, and social workers from the health, education and social fields took part, 75% of them were women and 25% were men. 72 teenagers from three contexts considered of special social vulnerability:

teenagers under protection or in fostering care, immigrant teenagers or teenagers from deprived neighbour-hoods, 62.5% of girls and 37.5% of boys.

Data Gathering and Analysis

A qualitative research outline was applied, through focus groups. The aim of this research is to develop the possibility to create alternatives to bring the theoretical world and the real world closer and to work as a training process from the reflexion on what is practised and the resources used. To carry out the focus groups a guide of questions was prepared for each different group, as well as an identity card for the participants with a basic profile, and a results form with the main groups' contributions and the moderators' opinions about the dynamics and atmosphere in the discussion group. The question guide included some questions considered of basic importance by the researchers. In the case of teenagers, three sets of questions were prepared according to their ages: from 12 to 14 year olds, from 15 to 17 year olds and from 18 to 20 year olds.

Each discussion group was monitored by two professionals and recorded on tapes with the previous agreement of both parties. The content analysis was carried out by the Atlas ti 5.0 qualitative data analysis program, after the transcriptions of the audio files. To make the participants' profiles the SPSS 12.0 qualitative data analysis program was used.

Two focus groups were formed with the families, which were selected by the professionals from the Catalan Midwives Association who took part in the re-search. All women were pregnant and belonged to maternal education groups. The midwives took part in 5 focus groups.

The professionals and social workers from the different health, educative institutions and youth associations got in touch with the teenagers, and 10 focus groups were formed (5 with immigrant girls, 3 with girls from deprived neighbourhoods and 2 from girls in care in Educative Action Residential Centres). Furthermore, 8 focus groups were formed in which professionals from the health sector (45.8 %) educative sector (33.3%) and social sector (20.9%) took part. For the work with the families the content analysis for midwives and mothers was carried out bearing in mind the conditions of the pregnancy, the labour, the puerperal situation and the psycho-physical preparation. The categories related to the puerperal factors were presented as shown in Table 1 below.

Table 1. Puerperal length categories

Category	Category definition
PP-Physical	Puerperal physical aspects
PP-Psycho	Psychological puerperal aspects
PP-Social	Puerperal social and family aspects (family's support or intrusion)
PP-Baby	Attention received by the baby: baby's features, first caring at hospital, baby's general treatments, and aspects to deal with at home
PP-Breast feeding	Breast feeding aspects: typology, breast feeding problems, breast feeding promotion…
PP-Behaviour	Newborn's behaviour (crying, sleeping types…)
PP-P	Partner's role
PP-Emotions	Emotions related to labour

In the teenagers' study the content analysis of the professional focus groups was carried out through the dimensions related to sexual and reproductive health promotion, the programs performance, the teenagers' needs, their suggestions, strengths and weaknesses.

The content analysis in the teenagers' focus groups was carried out from the information received, the risks, the pregnancy and the proposals. In table 2 the information related to dimension categories is presented.

Table 2. Information dimension categories

Category	Category definition
General Information	General information that adolescents have about sexual and reproductive Heath.
Affectivity Information	Information and believes the teenagers have related to affectivity.
Contraceptive Methods Information	Information the teenagers have about contraceptive methods.
Source of Information Reliable Information Sources	Person or people, institutions and actions that have provided them with the information. Reliability of the information sources.
Actions and Resources received Useful information and issues of interest	Actions and resources related to sexual and reproductive health that the teenagers have received or used. Teenagers' assessment about the information they have got and about issues of their interest.

Results

The results of two of the most significant works carried out about the specified dimensions are shown below.

Family guidance needs related to puerperal time

According to midwives and mothers, the care of the newborn baby and the family reorganization from the moment the parents go back home is one of the most difficult times for the family. With regards to the physical, psychological and social changes, mothers express a lack of information about their own recovery, because they focus on the newborn baby and do not look after themselves properly.

"I found I needed somebody to explain to me how to take care of myself" (mothers, Barcelona)

With regards to psychological changes, the feelings that arise in the new situation and the number of changes can produce problems.

"You have to accept a new situation" (mothers, Blanes-Barcelona)
"It affects you psychologically because when you have a child, it is a very important change and not many people are aware of what it implies" (midwives, Girona)

On a social level, there are also changes that are necessary to assume and face. The mother's time to dedicate to her partner, the home logistics, the time, social relationships and, maybe, there are family pressures, that transmit worries and information not always appropriate for the new mother, ending, some times, with the family's privacy:

"There are some times in which help is like a competition to see who does more… and sometimes I say: "well, I appreciate it a lot, but go away" (mothers, Blanes-Barcelona)
"It is necessary to find moments to look after the baby and be with your partner" (midwives, Sabadell-Barcelona)
"A difficult change is when the partner has to accept the attention given to the baby. During the first month the attention to the baby is constant. This, sometimes, causes aggressive behaviour in the partner" (midwives, Girona)

According to midwives the aspects for which girls do not feel confident are breast breeding and the baby's care, when they have to face this situation on their own.

"They worry if the baby cries, if he/she has little spots… they are very anxious" (midwives, Lleida)

"Mothers and fathers have doubts as how to look after their baby" (midwives, Girona)

The new mothers express that it is especially distressing to receive advice from different sources and not know how to behave with the baby, how to care for him/ her, how to have a relationship with him/her. The contradictory information they receive from informal sources caused them great confusion and worry. They also have difficulties organizing themselves, feeling that their emotions are out of control and they do not think about asking for real and effective help to family support services and close relatives.

Being with the partner during the puerperal time is very important to reduce the insecurity and the fear of not been capable of looking after their babies properly. When the couple has received guidance the support is more effective and shared. If tasks are shared, the emotions and experiences of motherhood are more positive.

"When you have to feed the baby…, because when you leave the hospital you are very worried…it is good for you to have your partner with you, to help you, that he understands what happens" (mothers, Barcelona)

"In the past, mothers helped a lot, but I think the situation has changed now. It is the partner who helps" (midwives, Girona)

Despite everything, midwives agree that mothers generally have an idealized perception of maternity until they find themselves in that situation daily.

"You need to adapt yourself to the situation" (mothers, Blanes-Barcelona)

"The puerperal time is very hard, and depression can become an illness" (midwives, Sabadell-Barcelona)

"Co-responsibility is not only with the men… it also happens to many mothers… even though it is them who are pregnant, when the child does not stop crying at night what they want is a dummy that makes him/her stop. Sometimes, there is a very idealized image of maternity" (midwives, Tarragona)

In the midwives' groups contributions were made related to introduce elements to improve the maternal preparation programs and to be able to meet the current needs:

The information. It was considered important to maintain the basic contents, for example, feeding, due to the great ignorance and false beliefs that there are about this subject. The importance of feeding during early infancy should be considered for later physical development and the adoption of nutrition habits.

The real image of the process. Even though maternity and paternity must be lived as a positive experience, it is important to avoid excessive idealizations and to acquire skills to face the difficult situations that can emerge.

Preparation is not only to inform but to reinforce the confidence to make decision in an independent way.

To work with group dynamics, requiring the preparation to know the group and to monitor it.

To propose timetables compatible for the families.

To encourage the partner's participation.

To have suitable material available, updating existing ones and taking into account cultural diversity.

The family's role in teenagers' sexual health

The most significant results obtained by the professional groups that refer to the family's function and its guidance needs are presented below. The professionals who took part in the focus groups mentioned several means of sexual and reproductive health, from which, only in the one related to the neighbor-hoods some plan addressed to the families was mentioned, for example, the *parents' schools*. This fact explains, in part, the value given to school attendance as a measure to compensate the family relationship difficulties, and the lack of the family's intervention. In fact, the teenagers at risk who give up school also present a greater lack of information relating to sexual and reproductive health[14].

"What worries me is not the children at school who are protected, but those who do not have any sex education information and this can be a more serious situation" (Immigrants).

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[14] Serrano, I., *La juventud inmigrante en España. Comportamientos sexuales y propuestas para la prevención de riegos,* http://www.injuve.mtas.es/injuve/con-tenidos.item.action, 2007, p. 93.

Both the professionals and the social workers in the three fields (neighbour-hoods, immigrants and CRAE) agree with the need and effectiveness of working with the families. They consider it especially necessary, as the sexual and re-productive health depends on the parents' attitudes, practices and values.

"When we realized we only worked with the parents we saw that we were not doing it well, as we had left out the children. You have to work with children and parents at the same time, and there must be communication between them…" (Professionals from socially deprived districts).

"I have found that if we speak to groups with certain social deprivations, on some occasions we have met teenagers who are 17 or 18 years old who ask questions more appropriate to 11 or 12 year old children, about menstruation, how to use a tampon… I suppose that there are probably some educative values that are learnt in the family. A person who has not had a certain family structure, who is in an institution, or who is homeless… has not had anyone to learn about these things from (…)" (Professionals from socially deprived districts).

They also refer to the need of working with the families, bearing in mind the culture of origin and the length of stay in the country, due to the importance these factors have in the socialization context and the family acceptation of the culture, above all, in these issues.

"Not all immigrants are the same. A Latin American girl does not need the same as a Moroccan girl who has grown up here, but who has parents who want her to behave like in Morocco. Here there are problems that can be prevented, generational problems" (Professional, immigrants).

According to professionals from the centres of state protection, the teenagers' different needs compared to those who live with their families are due to the abuse or abandonment the teenagers suffered from their families. In these cases the risk behaviour of wanting to become pregnant or the submission to their partner is a way of replacing the emotional deprivations they suffered from their early child-hood or a tendency to repeat behaviour, for example, premature pregnancies, difficult and conflictive relationships, promiscuous behaviour and, in other cases, because they have suffered sexual abuse. Family education in early childhood can be a support tool to reduce these situations.

"One sometimes realizes that when they are just about to go into a care centre they change boy/girlfriend… they take what they can because, what can I do after five or more years living in the centre? So, I cling on to the person I have, even if he/she is a sexual object, and in this way I feel loved or think that I am loved. It is their best idea of a future" (Professional from CRAE).

In general, professionals reiterate the need to work on a network and to increase the coordination of all the community services, by means of the creation of guidance services for families. In this way, they highlight the importance of the programs that are being carried out as a socio-educative process that aims to work with teenagers and their families.

In all the teenage groups, the family was observed as the most common source of information, together with school and friends, although this varies according to the culture of origin and the time they have spent in our country. Immigrant boys and girls aged 18 to 20 say they have less information, which could be due to the fact that 76.9% spent most of their infancy and youth in their countries of origin. In some cultures, as the Moroccan, sexuality is a taboo issue in the family environment.

"Me, from my parents. 8. me, from a book, Carlota's red diary which I have read and which tells you about sexuality. It explains more or less what sexuality is, contraceptive methods and other things…. At school and at the hospital… From the television…. From my friends, in the street and experience. In magazines" (12 to 14 year old boys, CRAE).
"At school they teach you a little when you are young, your parents some-times. With friends. Yes, above all with friends. It is where this subject is spoken about every day. On TV, the Internet... that's it more or less" (Boys of 18 to 20, districts groups).

The dialogue with fathers and mothers seems difficult for teenagers of between 15 and 17. Differences according to the culture origin were also observed in these groups, greater difficulties being found in families from Asia and Africa.

"We get information everywhere, from our parents and at school. You can get information at hospitals. Lots at the same time: You do not speak to your parents" (Boys from 15 to 17, neighbourhood groups).
"(Asia): I cannot speak to my father or to my mother. I speak to my cousins, but to my parents, never. 4. (Asia): Yes, I also speak to my cousin. (Africa): Better to speak to friends" (Boys of 18 to 20, Immigrant groups).

The teenagers who participated show a great variety when considering the reliability of their information sources. Despite that, they agree that fathers' and mothers' influence is one of the most common, as that of friends. Even though these are the most frequent sources, very different opinions are generated about the credibility, although in the cases of some female friends with a good family relationship, in an indirect way, this source can be very reliable.

"I trust more in what my family says or in a book than in what my friends tell me. I prefer to trust my parents more than my friends, magazines… I can trust what doctors say. I trust my mother…" (Boys from 12 to 14, CRAE group).

"If I can choose, I think that the most reliable would be the school, because I suppose that it would be truthful information. More professional about the subject. The things that are said in the streets are not always true. They are things that they believe, so you take the opinion of a non professional on the issue, and TV, the Internet, they often tell the truth, but other times they only want to sell things or give you the wrong idea. With the family it is more difficult, it depends on the family. I think that the only true information is the one you get at school and it has been a great help to us" (18 to 20 year old boys, neighbourhood groups).

We were especially interested to learn from the young people about how they think their emotional and sexual education should be and their suggestions. In this respect we found no differences between cultural origin, their different situations or sex.

When they were asked who they would speak to about these issues, they mentioned three criteria to choose the person: somebody they trust, the responsibility these people have over them and their knowledge on the subject. In the first two cases they mentioned the family and, in the latter, the health and education professionals. The girls showed preference for their mothers or other women in the family. On the other hand, they said that many times they cannot speak about these issues due to problems in the relationships within the family.

"Health centres, a centre with doctors, speaking about this with your father or mother makes you feel uncomfortable. The school… Better doctors, they know more. Me, with a doctor. Me, with a doctor. 6. Parents because they have the duty to speak to their children because they go out and get pregnant and do not know how to take care of themselves. Yes, me with my parents." (Boys of 18 to 20 years old, immigrant Group).

"Cannot speak to my parents about this, but I can with my tutor and doctors, they explain it better than parents. Me, with my mother. Me too. Me, with my sister-in-law, my friends. I with my parents. I with my aunt. I don't know. I with my sister. I with my parents, I trust them more, and they have more experience. If they have not done it, well, they can tell you to ask somebody else. I keep everything to myself, my things are mine. Me, with my mother and my psychologist. Me, with my aunt and my mother. Me, with my aunt and my grandmother" (Boys of 12 to 14 years old, CRAE Group).

When they are asked where they would prefer to speak about sexuality, they say their homes, and one of the issues that they would like to be discussed in the sexual education programs is how to dialogue with their families.

"At home. In places like this. At home would be the best option. I don't speak about this to my family. At school or in centres like this (It is a youth resources centre) I feel embarrassed. I feel more shy than pregnant. I don't want them to think the worst of me." (boys of 15 to 17 years old, neighbourhood groups).

In the "Spanish Young Institute" Work (INJUVE) teenagers considered it important that their fathers and mothers received sexual education, as they think that they have had a traditional education and they are old fashioned in this subject.

Conclusions

Our results show that to prepare families through educative actions to face new situations, especially difficulty ones, as for example the birth or their children's adolescence is a need perceived by the professionals, the families and the teen-agers.

It has been proved that families do not feel confident when they have to face the changes that parenthood involves, for instance, at personal, couple, family and social levels. To this feeling it should be added the difficulty to make decisions, due to the pressure and recommendation they receive from the people close to them. Families express their fears and their low self-efficiency perception in issues related to care, and it is obvious, that they take on an excess of responsibility for the multiple tasks they have now, without thinking of asking for help to their partners or to the people they have near.

Another identified aspect is maternity idealization during pregnancy, what can lead to frustration when the family has to face reality and their initial expectations are not exactly fulfilled. Maternal education must prepare with information and reflexion about the changes that it implies at physical, emotional, couple and social relationships levels. It is necessary to offer information, but it is even more important that the families acquire strategies to allow them to reduce and self-regulate their negative emotions, fears and insecurities to deal with the changes and to make efficient decisions. Parenthood as a positive experience will be possible if the family feels capable of facing the difficulties and of enjoying the experience.

The educative patterns and the family life models from the time of birth have an influence in the children's development and in their behaviour patterns through their development, an aspect that health professionals and social workers who work with teenagers in social risk situations highlight. They also express the need of working with the family and the children from an early age, above all, in cases of immigrant population. With regards to teenagers under protection who live in centres, there exist a series of risk factors associated to the reproduction of models they have lived, as for example, sexual abuse, difficult relationships and premature pregnancies, in some cases to meet their emotional deprivation, for which it should be appropriate to develop specific projects for teenagers under protection.

The need to improve the parental skills to promote the dialogue in the family is also observed. There is a request for proposals related to the fathers and mothers training on communicative abilities to be able to communicate with their children about sexual issues. It is probable that in social risk families, for reasons of negligence or for culture barriers, there has not been a fluid communication about this issue. Teenagers express this need and their wish of a higher opening and presence with regards to their needs. The family education actions that are developed during the infancy and the adolescence development are especially significant to lower the consequences of certain risk practices, as, for example, pregnancy in teenagers and sexual transmission infections.

The needs identified in our work inevitably lead us to consider, on the one hand, the relevance of guidance actions for the family from the same moment of birth until adolescence, to contribute to the establishment of affective bonds and to direct our efforts towards educative styles based on

the communication and the dialogue, with the aim of encouraging a healthy development. On the other hand, we point out the importance of introducing group didactic methods in the family guidance programs, as well as motivating didactic resources that bear in mind the culture diversity.

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ONTOLOGY AND TAXONOMIES FOR eLEARNING

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Abstract: *In a lexical universe where the acronyms are gaining more ground and the technical jargon is becoming more comprehensive, while developments in information and communications technology (ICT) require a rapid amending of terms – the need for clarification becomes obvious regarding the studied domain's ontology and taxonomy - in this case ICT-based distance learning (eLearning).*

Keywords: *TIC, ontologie, taxonomie, educație, eLearning, modele ontologice.*

"Informatics not only restores unity of applied and pure mathematics, of the solid techniques and abstract mathematics, but also that of natural sciences, humanities and society. It revives the concepts of abstract and formal and reconciles art with science, not only within the scientist's soul, where they were always at peace, but also in their philosophy."

Gr. Moisil (1906 - 1973)

Academician, Professor, College of Mathematics, Bucharest - founder of the Romanian logics and science school.

Since the time of Aristotle interest was manifested to define and classify knowledge about the world through the use of methodologies for structuring hierarchically classes and subclasses of objects with common properties. This representation is called an ontology. One of the most cited definitions of ontology defines it as: "a formal and explicit specification of a generally accepted conceptualization"[1]. Another definition is given by Studer, Bejamins and Fensel in 1998: "An ontology may take a variety of forms, but will necessarily include a vocabulary of terms and the specification of their meaning. This is a domain's semantic sphere generally accepted by several parties, facilitating communication accuracy

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[1] Gruber, T.R., *A translation approach to portable ontology specifications*, în Knowledge Acquisition, nr. 5(2), 1993

and efficiency of transmitting the messages, which in turn ensures the development of other benefits such as interoperability, reuse and sharing of knowledge."[2]

Ontologies in ICT have developed due to the need to facilitate access to the representation and cognitive content of a field. Ontologies are now used in a wide range of ICT areas, from systems' configuration and computer engineering to commerce. Regardless of the representation language used, ontologies present a common set of characteristics that make processes of representation and cognitive inference possible[3].

Development of educational ontologies

In the educational field, one of the first researchers interested in the development of cognitive functions in the learning process was Benjamin Bloom. His work from the mid-1900s – "Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain", although called taxonomy, it goes beyond the taxonomic level and gets into the scope of ontology by defining various learning and the relationships between them.

Bloom's educational taxonomy[4] (Figure 1), first proposed in 1956, grouped educational objects and objectives in three key areas: cognitive, affective and psychomotor, stressing the need for a comprehensive approach to the educational process. The ontology developed by Bloom covers, however, only traditional education (face-to-face), as during 1950s this was the main educational model implemented.

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[2] Studer, R., Benjamins, V.R., Fensel, D., *Knowledge Engineering, Principles and Methods*, în Data & Knowledge Engineering 25(1-2), March, 1998.

[3] Silva Muñoz, L., *Ontology Based Metadata for e-learning Content*, Federal University of Rio Grande do Sul, Porto Alegre, Brasil, 2004.

[4] Bloom *et al.*, *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*, 1956.

Figure 1. Bloom's taxonomy for the educational objects and objectives
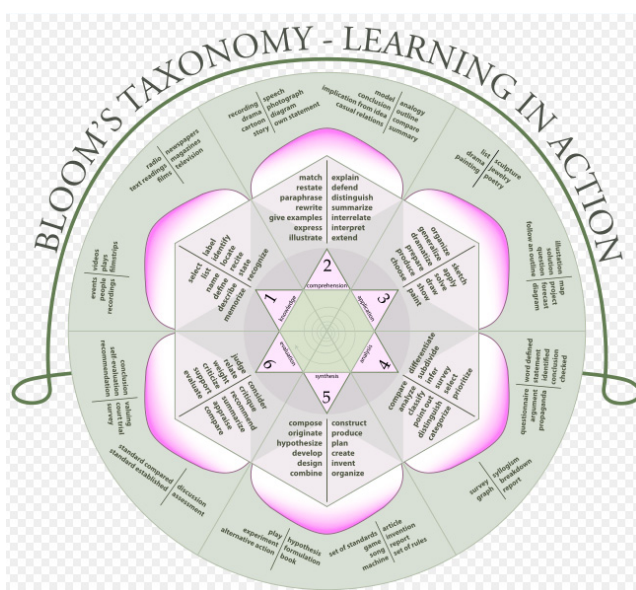
With the development of the distance education via postal mail, radio and television and Bloom's taxonomic and ontological model has been constantly updated to meet the new developments. As Toffler anticipated since the 1970s, the new educational technology not only encourages standardization, but rather leads to a post-industrial diversity[5] illustrated by the wide variety of tools / technologies used as support for the development of distance learning (Figure 2.)

Figure 2: The evolution of educational technologies

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[5] Toffler, A., *Future Shock,* Political Publishing House, Bucharest, 1973.

The development of the concept of knowledge society in the 21st century led to the implementation of interdisciplinarity in most industries[6]. In this new paradigm, education is seen less and less as a stand-alone system and more as an interdisciplinary[7] system in which educational theories and practices, and elements of the ICT domain share the same importance. Educational technologies led to the improvement and repositioning of distance learning, transforming it into a model-concept within the knowledge-based society paradigm and while the traditionalist approach, which limits the boundaries of education to f-2-f teaching / learning, has been replaced by a more flexible and open approach where technologies were bivalent in the educational process, being both the instrument and the medium.

The theories discussing the importance communication has acquired in contemporary society were synthesized by McLuhan's theory in his famous phrase "the medium is the message"[8]. McLuhan demonstrates that the environment used for communication determines the perception, mentality and cultural activity of users, with profound consequences on life and social structure[9].

Education is a communicational process by nature, which aims for the transmission of a message via a communication channel, mainly of a cognitive content from a transmitter / carrier of information to a user / student involved in the process of knowledge. Therefore the overlapping of the message with the medium leads us to conclude that electronic media has gained the valence of cognitive content.

Thus, researchers in ICT and eLearning understood the importance of building effective relationships between educational practice, research and theoretical foundation and stressed the need to understand the educational process in the cultural, economic, political and social context of the reality of which it belongs to. This trend is also reflected by the increased interest in ontological models, thus Bloom's taxonomic and

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[6] L. Butum, S. Stan, A. Zodieru, *Development of new capacities forresearch and teach/learn tools in higher education, using the new financing funds in Romania*, Proceedings of *EDULEARN15* Conference, 6th-8th July 2015, Barcelona, Spain, ISBN 978-84-606-8243-1, p. 3674.

[7] Quillian, M., *Word Concepts: A Theory and Simulation of some Basic Semantic Capabilities*, în Behavioral Science nr. 12, 1967.

[8] McLuhan, M., Fiore, Q., *The Medium is the Message*, Gingko Press, 2005.

[9] McLuhan, M., Powers, B., *The Global Village: Transformations in World Life and Media in the 21st Century*, Oxford University Press, 1988.

ontological model was used by a significant number of researchers and experts in education, updated and supplemented with new terms, classifications and definitions relevant to the new paradigm – the knowledge-based society.

The indisputable influence of ICT on the learning process, now acknowledged and used in all areas of activity, changed learning as Toffler [2000] predicted almost four decades ago – the most part of the study occurs at the student's home, whenever the student wants[10].

Acquisition, integration and application of knowledge in practice are essential elements of an effective management of knowledge-based content distribution and cognitive quick access.

ELearning is one of the most effective tools for knowledge management. Information architects in collaboration with experts in teaching[11] are those who, using various tools of representation of the cognitive content, build ontological and taxonomical structures necessary for the proper functioning of such a system of knowledge management.

In the sphere of eLearning, ontologies may be developed in two directions. On the one hand, ontologies are constructed to define the studied field, its evolution and utility, the objects belonging to it, and the structures and relationships that are created among these objects, within the field. On the other hand, ontologies aim to define more precisely the meaning and context of terms used to describe entities and realities specific to the field in order to create a common vocabulary for all actors involved, terms which are then categorized and prioritized taxonomically.

The main reasons for building ontological and taxonomical systems are[12]:

- Establishing a common understanding of the structure of information transmitted both for software applications and among software developers and users;
- Facilitate the use and re-use of the knowledge in the field;
- Facilitate the understanding of the field axioms;
- Distinction between nominal and operational knowledge;
- Clear definition and analysis of knowledge in the field;

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[10] Toffler, A., *cited works.*

[11] Sarker, B.K., Wallace, P. Gill, W., *Some Observations on Mind Map and Ontology Building Tools for Knowledge Management*, 2007.

[12] McGuinness, D.L., Wright, J., *Conceptual Modeling for Configuration: A Description Logic-based Approach*, în Artificial Intelligence for Engineering Design, Analysis, and Manufacturing - special issue on Configuration, 1998.

- Increasing the interoperability between different fields of knowledge;
- Improve the scalability of field knowledge;
- Facilitating the identification of specific elements in the field.

In practical terms, developing an ontological and taxonomical system includes:
- Defining concepts / classes of domain-specific objects;
- Taxonomic hierarchy of concepts / classes (sub-classes vs. over-classes);
- The definition of variables and accepted values for these variables;
- Metrics system in concrete cases by assigning exact values of variables.

Ontological models for eLearning
There are many authors who analyze the significance of ontology and taxonomy in ICT and eLearning, who propose and study different types of ontologies.

Guarino[13] and Muñoz[14] discuss the role a well-defined ontology (Figure 3) can play in a computer system and argue in favor of the architectural perspectives where ontology plays a central role in the development and operation of the system.
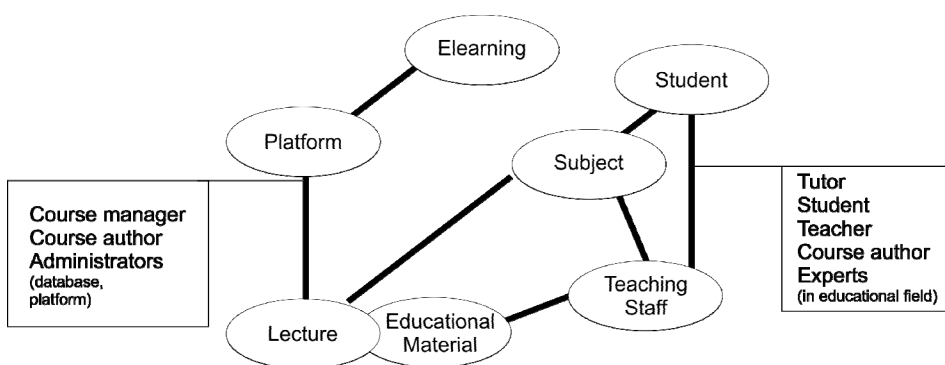
Figure 3: The ontological model for eLearning that includes objects, instances and relationships

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[13] Guarino, N., *Formal Ontology and Information Systems*, in N. Guarino (Ed.) Formal Ontology and Information Systems, IOS Press, Amsterdam, 1998.
[14] Silva Muñoz, L., Moreira de Oliveira, J.P., *Applying Semantic Web Technologies to Achieve Personalization and Reuse of Content in Educational Adaptive Hypermedia Systems*, 2005.

According to Devambu *et al.*[15], ontologies can serve as the essential foundation of the development of software applications, supporting software developers by linking knowledge within the field of the application with already developed software components, to facilitate their reuse.

Stojanovic, Staab and Studer[16] believe that the role of an ontology is mainly to describe the generally accepted meaning of a formal set of symbols for use in a specific field. More precisely, an ontology provides a map of the possible relationships between symbols and their meaning.

Regarding cognitive eLearning content, the problem of effective communication of meanings is structured on three levels that describe certain aspects of the use of educational content (Figure 4).
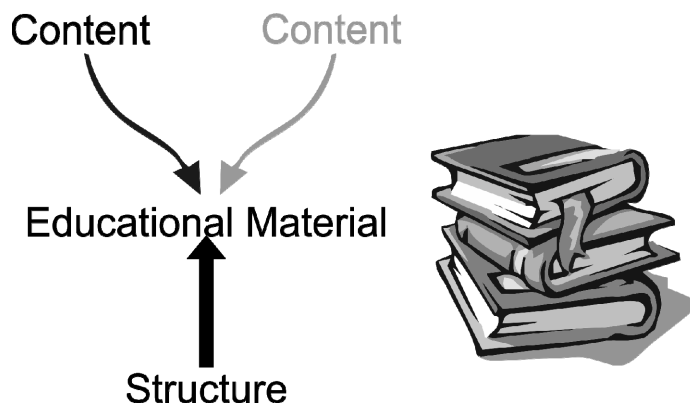
Figure 4: Educational content

Furthermore, the same authors[17] observe that in the eLearning environment there is the risk two or more authors of educational content refer to the same element or issue using different terms. This means that they can use semantically identical concepts expressed in different terms, even though both terms belong to the domain jargon. Using semantically equivalent terms can create confusion and problems in understanding the message[18]. For example, the following terms are semantic equivalents of the concept of agent: representative, spy, active factor, provoking factor, participant, microorganism, but their use depends on the context and

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[15] Devambu, P., Brachman, R.J., Selfridge P.J., Ballard L., *LASSIE: A Knowledge-Based Software Information System*, in Communications of the ACM 34(5), 1991.

[16] Stojanovic, L., Staab, S., Studer, R., *E-learning Based on the Semantic Web*, 2002.

[17] Stojanovic, L., Staab, S., Studer, R., *cited works.*

[18] Evans, T.D., Nation, D.E., *Critical Reflections on Distance Education*, London, Flamer Press, 1989.

often these terms, even if all are semantically to "agent", they are not interchangeable.

The problem could be solved by integrating two elements in the ontology:

1. A vocabulary of the field that provides users with a map of possible relationships between different terms and their meaning;

2. An axiom establishing that two terms or two symbols are in a two-way equivalence relationship if and only if both check clarity and coherence of the message sent.

The search for information is the process by which individuals seek to find data to clarify or confirm their knowledge of a particular topic. The underpinning strategy for information search about a particular topic in within educational content relies mainly on finding answers to simple questions, such as *how?* or *where?*.

The data search process via web is usually a complicated one. Much of the information found is either inaccurate, biased or outdated. One of the main challenges that students face is filtering irrelevant documents from the results provided by search engines. One example relates to how classic search engines (Google, Yahoo, Bing) operate the search for text in the enormous amount of documents indexed. They seek only words or groups of words requested by the user, and most documents that contain synonyms of these terms will not be identified as relevant by the search engine, while many irrelevant documents from the point of view of the user would be deemed relevant by the search engines. On the other hand, search engines that rely on ontologies find documents associated to key terms used in the search, even if the user searches for a term that the ontology considers synonymous or associated[19].

Ontological relations are also used in navigating the educational content. In this respect, an approach to ontology-based search of data allows users / students to express more clearly the need for information and to streamline their navigation style. This involves user interaction with the ontology concepts and relationships through a dialogue which could be interpreted as a search or which may serve to suggest various possible further choices[20].

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[19] Desmontils, E., Jacquin, *Indexing a Web Site with a Terminology Oriented Ontology* – prezentat la International Semantic Web Working Symposium (SWWS 2001), Stanford, CA, USA, july 30 - august 1, 2001.

[20] Freitas, V., *Autoria Adaptativa de Hipermídia Educacional*, Instituto de Informática, UFRGS, Porto Alegre, 2002.

Building a common ontology for the entire Web is an almost impossible task, but if we would focus on a particular area, we could specify concepts or relationships that provide the basis for knowledge dissemination[21].

Thus, from the point of view of the user there is the issue of choosing keywords when searching for educational content. In this case, students need to be provided with a technology that would allow them to find relevant data on a given topic, and not just disparate data such as those provided by traditional search engines.

Simple search only by keywords, applies only in situations where users have a clear idea of what they want and the information is well defined. This approach is insufficient for eLearning, where the knowledge and perspectives of content creators and users could be totally different.

This raises the obvious need to create mechanisms for establishing shared meanings. (Figure 5)
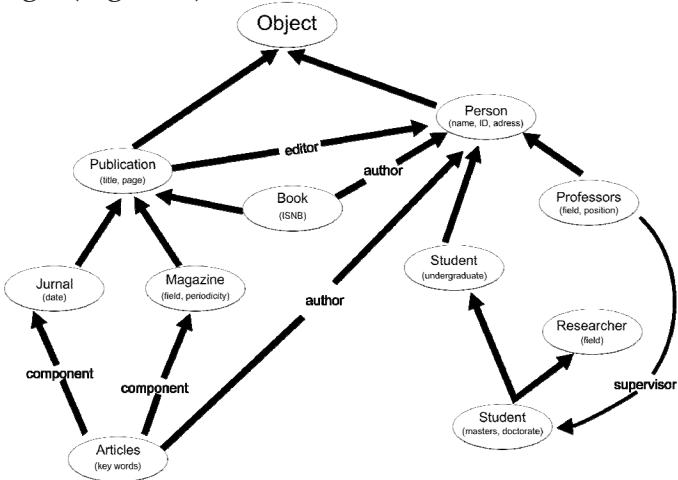
Figure 5: Mechanisms for advanced search

On the other hand, usually a simple search by keywords will be vitiated, it will not show results for synonyms (eg. Agent / organism) after abbreviations (eg. World Wide Web / www), after the word counterparts in other languages (eg. house - English / haus - German) and often will not provide results after morphological variations (eg. peer to peer / peer2peer), especially since the search ignores the context.

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[21] Evans, T.D., Nation, D.E., *Educational Technologies: Reforming Open and Distance Education*, London, Cogan Page, 1993.

This problem is solved by defining ontological relations of correlation[22] (synonyms, abbreviations, acronyms, word families, jargon, etc.). Thus, in navigating the educational content, whether the terms *network* and *protocol* there is a well-established ontological relationship, the search results for any of the two terms will contain references to both terms.

In the context of the knowledge society, educational contents must be linked / related (at least through hypertext links) to ensure ontological unity, a greater diversity of search results and improved access to the knowledge of all fields studied. Ontologies are used in smart integration of information as metadata[23]. Thus, they allow, for example, semantic search for content in databases without requiring the user to know the database structure.

According to Zimmermann, Mimkes and Kamke[24], within the ICT paradigm, ontologies represent a digitized semantic description of a concept, having as main defining elements the encoding and the logical structure. They believe ontologies should be implemented as a network of meanings, where heterogeneity is the basic condition. Thus, an ICT ontology helps the codification and logical structuring of existing knowledge so it can be digitized and then accessed efficiently.

The same authors define the ontologies as ordered lists composed of four elements:

- A set of concepts (C)
- A set of relationships (R)
- A set of constants (I - Instances)
- A set of axioms (A).

So, mathematically speaking, a certain ontology can be described as follows[25]:

$$O = <C; R; I; A>.$$

[22] Gruber, T.R., *cited works*

[23] Musen, M.A., *Ontology-Oriented Design and Programming*, in Cuena, J., Demazeau, Y., Garcia, A., Treur, J. (Eds.), Knowledge Engineering and Agent Technology. IOS Press, Amsterdam, 2004.

[24] Zimmermann, K., Mimkes, J., Kamke, H.U., *An Ontology Framework for E-learning in the Knowledge Society*, 2005.

[25] Kasai, T., Yamaguchi, H., *Building an Ontology of IT Education Goals*, în International Journal of Engineering Education and Lifelong Learning, Vol. 16, No. 1/2, 2006.

In conclusion, eLearning approaches can be structured depending on the technology used and on the educational purposes and methods[26].

Thus, within the **technology centered approach** eLearning can be defined as:

- *online* - involves the use of both information and communication technologies;

- *offline* - involves using only information technology.

Content-centered approach

This approach presents the eLearning elements from the perspective of the developers and providers of eLearning platforms, who consider the courses and teaching materials as forming the core concept of eLearning[27]. They focus on the ergonomics of the platforms, and for this they continuously update the software and make infrastructure improvements.

User-centered approach

This approach has as a central core the student / user, who allegedly has already acquired the necessary experience and skills to use multimedia and information systems and also holds a degree of knowledge of the fields that she/he wants to learn more about.

In this case, when accessing educational content, the user's goal will be to acquire advanced skills and knowledge specific to the selected field. For the students / users to choose elements of the educational content that best suit their training needs, a detailed, well-structured and easily accessible description of the entire content has to be provided. For the user, the accessibility of the content is the most important.

It is generally considered that students ignore teacher's names, as long as their need for information / learning is satisfied. In this context, it is recommended to establish a personal profile for each user where to store specific information about his/her professional needs and aspirations so that the platform could subsequently extract, filter and deliver the right information, according to a preset algorithm[28].

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[26] Marzano, R.J., Kendall, J.S., *The New Taxonomy of Educational Objectives*, Thousand Oaks, CA: Corwin Press, 2006.

[27] Ivan, Loredana and Frunzaru, Valeriu, 2014, „The Use of ICT in Students' Learning Activities", *Journal of Media Research*, vol. 7, no. 1-2, p. 6.

[28] Anderson, L.W., & Krathwohl (Eds.), *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*, New York: Longman, 2001.

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A COMPARATIVE STUDY REGARDING THE VOCATIONAL EDUCATION AND TRAINING IN TOURISM IN ROMANIA, BULGARIA AND TURKEY

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Abstract: *The development of the system of vocational education and training represents a priority assumed by Europe 2020 development strategy. Starting from the known relationship between the employee competence and the performance of a field of activity, we have analyzed the system of vocational education and training in tourism in three Black Sea riparian countries. We have highlighted similarities and differences, so that we can identify the right solutions for a significant quantitative and qualitative development. The option for tourism is based on the fact that, for all the analyzed countries, the development of this industry is a powerful incentive for the national economic growth. The study confirms the existence of a relationship of direct proportionality between the level of development of the vocational education system and the competitiveness of the tourism sector, and highlights the benefits of sustainable investment in the vocational education and training of the young people, and the costs of this process.*

Keywords: *vocational education and training, education system, vocational skills, comparative study, tourism, benefits and costs of vocational education.*

1. Vocational education and training of the young people in Romania, Bulgaria and Turkey

The interest of companies to remain competitive puts more pressure on the society to develop education and training systems able to prepare young people that can fulfill the requirements of the business

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environment. In this context, we intend to study more closely *the vocational education and training* system that seems to be able to meet these goals. At the beginning of this section we will deal with clarifying the concepts, and we will then present the level of development of this system in the three studied countries.

The term *vocational education and training* (VET) is used most often to describe the acquisition of knowledge, skills and competencies needed to achieve performance at work. However, this term is imprecise and problematic as there is no universal definition.[1] Over the centuries, various terms have been used to describe elements of the field known today as *vocational education and training*: apprenticeship training, vocational education, technical education, vocational and technical education, occupational education, career and technical education, labour force education, education at the workplace, etc.[2]

In the report regarding *vocational education and training* in Europe, Pascaline Descy and Manfred Tessaring emphasize the complexity of this field and the difficulty to describe it explicitly: "vocational education and training (VET) comprises all more or less organized or structured activities – whether or not they lead to a recognized qualification – which aim to provide people with knowledge, skills and competencies that are necessary and sufficient in order to perform a job or a set of jobs. Trainees in initial or continuing training thus undertake work preparation or adapt their skills to changing requirements."[3] The same report specifies that vocational education and training do not depend on "the venue, the age, or other characteristics of the participants, and on their previous level of qualification".

We retain the recommendation of revision adopted by UNESCO in 2001 which refers to *Technical and Vocational Education* (TVE) as a "comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life." It is also specified that technical and

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[1] *Vocational Education and Training through Open and Distance Learning*-Book review, The International Review of Research in Open and Distributed Learning, pp.3, http://www.irrodl.org/index.php/irrodl/article/view/216/299

[2] Maclean R. and Wilson N. D., (2009), International Handbook of Education for the Changing World of Work, pp.40, http://www.unevoc.unesco.org/go.php?q=UNEVOC

[3] Pascaline D., and Manfred T., (2001*), Training in Europe: Second report on vocational training research in Europe 2000,* p.3, http://aei.pitt.edu/43153/

vocational education is understood as "an integral part of general education; a means of preparing for occupational fields and for effective participation in the world of work; an aspect of lifelong learning and a preparation for responsible citizenship; an instrument for promoting environmentally sound sustainable development; a method of facilitating poverty alleviation."[4]

The study "Literature Review – Vocational Education and Training" (2009)[5] presents different approaches as regards the definition of the term *vocational education and training*. One is *the practical approach* (from this point of view the definition of the vocational education and training requires answers regarding the venue, the beneficiaries, the providers of this form of education, the methods and the conditions under which they work); *the analytical approach* (starts from explaining the etymology of the term "vocational". Thus, analyzing the emergence of *vocational education and training*, Venn G. (1964)[6] compares the term "vocational" to a "calling" of the person for a stable job, for a safe career in a reputed profession) and *the political approach* (this starts from the idea that establishing the position of the vocational education and training in relation to the rest of the education system is a political problem).

According to the National Europass Centre, founded in Romania in 2007 for the creation of a framework of ensuring the transparency of competences and qualifications, the *vocational education and training* is that form of "education and training that can offer to the individuals the abilities, skills, and knowledge for certain occupations or, useful on the labour market."[7]

As we have mentioned in the title, we aim at comparing the systems of *vocational education and training* in the three countries. In the following we will present some significant aspects.

A) *Vocational education and training in Romania*
Romania has a tradition in regard to the formal vocational education and training. However, the evolution has not always been positive. The

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[4] http://portal.unesco.org/en/ev.php
http: http://download.ei-
ie.org/Docs/WebDepot/091213_VET_Literature_EDITED%20AA.pdf
[5] Literature Review – Vocational Education and Training" (2009),
[6] Venn G., *Man, Education and Work: Postsecondary Vocational and Technical Education,* Washington, D.C.: American Council on Education, 1964
[7] http://www.see-educoop.net/education_in/pdf/fin_eval_vet_ro9405-rom-enl-t05.pdf

first law of vocational education and training in Romania was adopted in 1898. In the period following the taking over of the power by the Communist regime, the system of vocational education evolved a lot, and could be compared to that of the most developed European countries as concerns its structure and content. Yet, after the passage to socialism, this tradition was interrupted, and the system of vocational education in Romania became more industrially oriented, aiming at training only in certain specializations necessary to the state enterprises. The Revolution in 1989 had a deep impact on the education system in our country and especially on professional / vocational education.

In Romania, the vocational education and training is named *professional education and training* and has two forms, according to the moment of development: *initial* professional training and *continuous* professional training. The responsible body supervising the permanent improvement of the professional (vocational) and technical education is the National Centre for the Development of the Professional and Technical Education, subordinated to the Ministry of National Education.

Initial professional (vocational) education and training is carried out in the initial education system, usually before the students' entrance on the labour market and refers to training programs included in compulsory education and those immediately after its completion, which ensure the acquisition of a professional qualification.

In the pre-university education, the initial vocational training is achieved through the technological and vocational high school education organized in high schools in the technological or vocational field, for qualifications from the National Qualifications Register, updated regularly in accordance with the needs of the labor market. The technological and vocational high school education could be also organized according to the demands of the employers or of the National Agency for Employment, through the conclusion of tuition contracts.

The vocational education and training also takes place in vocational schools, the vocational education being introduced by the National Education Law of 2011. It stipulates professional education "between six months and two years organized in professional schools that may be independent units or affiliated to state or private technological high schools".[8]

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[8] The National Education Law no. 1 / 2011, The Official Journal of Romania, no.18, Part I, 10.01.2011

The professional / vocational education and training also takes place within the education for high school graduates. This is organized for the high school graduates, with or without passing the baccalaureate exam. Post-secondary education is achieved through post-high schools and foreman schools representing specialized training routes, with duration of 1-3 years, leading to a certificate of professional competence of level 3, corresponding to 5 EQF level, technician specialist.[9]

In Romania, the initial vocational education and training has been restructured to provide a better match with the labor market and a good connection with higher education, in a lifelong learning perspective.

In 2011 - 2012 school year there were 1,139 school units in Romania offering vocational / professional education and training to a number of 637,616 students. The situation of the schools by type of schools was that presented in the following table:

Table 1 – School units in the vocational and technical education, Romania, 2011/2012

CATEGORIES OF SCHOOL UNITS	NUMBER OF SCHOOLS
Total units of vocational and technical education	*1,139*
Technical high schools	565
Agricultural high schools	44
Forestry high schools	10
Agro-mountain high schools	5
Veterinary high schools	18
Economic high schools	184
Administrative and services high schools	4
Normal schools	25
Plastic arts high schools	17
Music high schools	25
Choreography high schools	2
Visual arts high schools	1
Physical education and sport high schools	34
Military high schools	3
Theological colleges	75
Special technical high schools	35
Professional schools	6
Post-secondary schools	86

Source: https://statistici.insse.ro

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[9] http://www.tvet.ro/

The number of students in the vocational /professional and technical education, on categories of school units, in 2011/2012 school year was the following:

Table 2 – Number of students in the vocational and technical education, Romania, 2011/2012

CATEGORIES OF SCHOOL UNITS	NUMBER OF STUDENTS
Total units of vocational and technical education	*637,616*
Technical high schools	316,721
Agricultural high schools	14,609
Forestry high schools	4,682
Agro-mountain high schools	2,701
Veterinary high schools	5,983
Economic high schools	141,106
Administrative and services high schools	7,279
Normal schools	6,848
Plastic arts high schools	6,988
Music high schools	4,499
Choreography high schools	387
Visual arts high schools	1,578
Theatre high schools	948
Physical education and sport high schools	15,542
Military high schools	1,319
Theological colleges	10,644
Special technical high schools	3,934
Professional schools	12,382
Post-secondary schools	79,466

Source: https://statistici.insse.ro

B. Vocational education and training in Bulgaria

Vocational education and training in Bulgaria are the responsibility of two bodies, namely the Ministry of Education and Science and the Ministry of Labour and Social Policy. The Ministry of Education and Science is responsible for the education system as a whole and is the main policymaking body in the field, having also budgetary responsibility and control over the Initial Vocational Education and Training (IVET). The Contionuous Vocational Education and Training (CVET) for adults is the responsibility of both ministries.

Vocational education and training are regulated in Bulgaria by the Law of vocational education and training adopted in 1999. This act

establishes the rights of citizens to education and vocational training, appropriate to their interests and abilities. The law also regulates the conditions for ensuring the functioning and development of the vocational education and training system based on cooperation between government institutions, local authorities and social partners.

According to the Law of vocational education and training of 1999, the main objective of the vocational education and training is gaining a professional qualification and general education. This process of acquisition of skills is consistent with the framework programs approved by the Ministry of Education and Science, programs that specify the age of entry and completion of the education level, the skill level of the students, the content, the duration and the possibilities for improving the vocational education and training.

Vocational education and professional training are offered taking into account the existing professions and specialties regulated by the List of Occupations for Vocational Education and Training. This list is established by the National Agency for Vocational Education and Training in cooperation with the social partners and is approved by the Ministry of Education and Science, Ministry of Labour and Social Policy, representatives of employers and employees at the national level. This list is updated annually, according to the needs of the labour market.

In 2011 – 2012 school year, the number of vocational schools was 477, with the following situation of the types of school:

Table 3 – Vocational schools in 2011/2012 school year, Bulgaria

SCHOOLS	No SCHOOLS
TOTAL	477
Arts and crafts schools	22
Vocational specialized secondary schools	414
Vocational colleges with selection after the secondary education	35
Schools of professional / vocational training	5
Out of which: in private schools	58

Source: http://www.nsi.bg

In the same school year, the number of students registered in the vocational schools was of 145,728, and according to the types of schools, the students were distributed as follows:

Table 4 – Students of vocational schools in 2011/2012 school year, Bulgaria

SCHOOLS	No. STUDENTS
TOTAL	*145,728*
Arts and crafts schools (level 3 of qualification)	3,816
Vocational specialized secondary schools (level 3)	96,080
Vocational colleges with selection after the secondary education (level 4)	2,804
Vocational secondary schools and professional / vocational schools (level 2)	40,285
Schools of professional / vocational training after the sixth and seventh grades (level 1)	1,902
Schools of professional / vocational training after the eighth grade (level 1)	841
Out of which: in private schools	3,299

Source: http://www.nsi.bg

C. Vocational education and training in Turkey

The vocational education and training in Turkey is the responsibility of the Ministry of National education, and the legislative framework that regulates its policies and activities, represented by Law no. 3308/1986 and Law no. 4702/2001, have brought many changes in the system, establishing new and strong relationships with industry and commerce.

Vocational education system in Turkey includes: vocational / professional and technical high schools for training students in more than 130 occupations, ensuring the qualification of specialists and technicians; apprenticeship training, which is a combination of practical training provided in enterprises and theoretical training offered in vocational education centers; informal education, which can be provided mainly in vocational education centers.

Secondary vocational and technical education includes at least 19 different types of schools, along with vocational education centers, open education and special private schools. The Ministry of National Education is responsible for supervising all professional / vocational or technical schools, or even if they are or not under the jurisdiction of the Ministry.

According to statistics provided by the Ministry of National Education in 2011/2012 school year there was a number of 5,501 and vocational and technical secondary schools in which 2,090,220 students were enrolled.

In the school year 2012/2013 were dissolved the Directorate General of Technical Education for Boys, the Directorate General of Technical

Education for Girls, the Directorate General for Education in Commerce and Tourism, and the Department of Health Problems, remaining the following education institutions:

Table 5 – Vocational schools and the number of students in 2012/2013 school year, Turkey

TYPE OF SCHOOL	NO. SCHOOLS	NO. STUDENTS
Total vocational and technical secondary education	*6,204*	*2,269,651*
Public vocational and technical high schools	*6,078*	*2,007,128*
- Directorate General for Vocational and Technical Education	5,061	1,614,837
- Directorate General for Religious Education	708	380,771
- Directorate General for Special Education and Counselling Services	298	10,934
- High schools subordinated to other ministries	11	586
Private vocational and technical high schools	*126*	*17,854*
Open secondary education	-	*244,669*

Source: http://sgb.meb.gov.tr

To facilitate a comparative view based on the above mentioned data, we've compiled the following table regarding the number of schools providing vocational education and training and the number of students registered in these schools, in the Black Sea riparian countries, for 2011-2012 school year.

Table 6 – Vocational school units and the number of enrolled students, 2011/2012

Country	Vocational schools	Students
Romania	1,139	637,616
Bulgaria	477	145,728
Turkey	5,501	2,090,220

Source: Authors' contribution

The data provided by various sources allow us to make a *hierarchy* of the three analyzed Black Sea riparian countries and to *establish the position of our country* in this group, depending on the number of vocational

schools and the number of registered students in 2011/2012 school year. It can be noticed easily that Turkey has the most developed vocational education and training system of the above mentioned countries. It has the largest number of schools providing vocational education and the highest number of students enrolled in them. On the second place is Romania, followed by Bulgaria.

Starting from the data presented above, one can see many similarities and differences among these countries as regards the level of development of education and vocational training system. Thus, in every state, vocational education is included in the formal education system at the secondary education level and is conducted in schools authorized to provide education and training to obtain qualifications. VET system is administered by the Ministry of Education in each country in cooperation with other ministries (Ministry of Labour and Social Protection) and specialized state bodies, which supervise permanently the improvement of the system of vocational education.

The vocational education system in each country aims to prepare young people for different occupations and professions based on professional standards and principles which are globally valid. These consist of orientation of vocational education to labour market requirements, the inclusion of practical training in training programs, cooperation between public authorities and social partners as regards the implementation of vocational education policy, etc.

The educational systems of the analyzed countries is in an ongoing process of reform based on the adoption of various laws on education, aiming to a permanent adaptation to the requirements of the labour market and of the society as a whole.

What differentiates the three countries surveyed in terms of vocational education and training is, among other things, the starting moment of the reform in the education system, the degree of policy implementation of vocational education, the level of development of the vocational education system represented by the number of schools providing technical and vocational training and the number of students enrolled in them.

2. Vocational education and training in tourism

The rapid development of the tourism industry, both internationally and nationally, has led to an increased need to develop the human resources in this area, and an important role in their development is

played by the vocational education and training in tourism. Education in tourism is considered by the World Tourism Organization as the crucial element for ensuring the tourists' satisfaction and for enhancing the competitiveness of business and tourist areas.

Tourism is a field where more and more young people want to qualify in. In recent years an increase in the number of students and trainees registered in tourism education institutions has been observed as well as in the number of scientific studies and training courses.

The three Black Sea riparian countries pay high attention to the tourism industry, which is considered an important area of their national economies. Besides, each of these three countries recognizes the importance of the human resources, their skills and competencies for businesses in general, and especially for tourism and, consequently, has developed over time many and varied educational programs in tourism. Currently, all the analyzed countries prepare young people to acquire various qualifications specific for the tourism industry within the formal system of education, in educational institutions at different levels of education: higher secondary, non-university tertiary, and university.

In the following we will briefly present the beginnings and development of the vocational education in tourism in the three countries:

A. Vocational education and training in tourism in Romania

Vocational education and training in tourism in our country has started in the Communist period, when were established the first classes of *public food service* in the secondary education, within economic and services high schools. Since 1990, the education institutions offering courses in tourism and *public food service* in our country have multiplied and diversified to follow the development trend of tourism and the increasing requirements of the labour market as regards the skilled labour force in this field.

In 2012, 221 high schools offered 10,664 places for tourism and food service specialization throughout the whole country of which 9,634 places were occupied, according to the following table:

Table 7 – Allocation of schools at county level, Romania Tourism and food specialization, 2012

No.	County	Units	Places	No.	County	Units	Places	No.	County	Units	Places
1	Alba	4	196	16	Dâmboviţa	3	168	31	Prahova	8	420
2	Arad	4	140	17	Dolj	4	364	32	Satu -Mare	4	168
3	Argeş	2	140	18	Galaţi	5	392	33	Sălaj	1	140
4	Bacău	11	672	19	Giurgiu	1	56	34	Sibiu	5	308
5	Bihor	8	504	20	Gorj	3	140	35	Suceava	15	868
6	Bistriţa - Năsăud	5	224	21	Harghita	7	308	36	Teleorman	2	84
7	Botoşani	4	168	22	Hunedoara	7	504	37	Timiş	4	252
8	Braşov	6	322	23	Ialomiţa	2	56	38	Tulcea	2	140
9	Brăila	4	280	24	Iaşi	6	420	39	Vaslui	6	308
10	Buzău	4	168	25	Ilfov	4	140	40	Vâlcea	4	224
11	Caraş – Severin	4	196	26	Maramureş	11	420	41	Vrancea	5	336
12	Călăraşi	4	168	27	Mehedinţi	2	140	42	Bucureşti	11	868
13	Cluj	8	364	28	Mureş	8	392		*Total*	221	12,614
14	Constanţa	12	672	29	Neamţ	5	364				
15	Covasna	4	252	30	Olt	2	168				

Source: http://admitere.edu.ro/2012/

Analyzing the obtained data, it is observed that the most schools including Tourism and food service specialization can be found in Suceava, Constanţa, Bacău, and Maramureş counties, and Bucharest, and the most places offered in the same specialization are in Bucharest and in Bacău, Constanţa, Bihor, Iaşi, Prahova, Maramureş, and Hunedoara counties. These counties represent at the same time major tourist areas of our country, with a significant tourism potential, especially arranged for receiving guests, with wide infrastructure and material resources, made up of multiple units of accommodation, food service and leisure: Bucovina, the Black Sea coast, Prahova Valley, Western Carpathians, etc.

Yet, it can be noticed the shortage of schools specialized in tourism and food service in counties from other tourist areas in our country, such as Tulcea (Danube Delta), Vâlcea and Gorj counties etc.

The fewest places in the studied specialization are in the smaller counties, with less touristic importance: Giurgiu, Sălaj, and Teleorman.

B. Vocational education and training in tourism in Bulgaria

In recent years, the interest in vocational education and training in tourism in Bulgaria has constantly raised. The economic crisis and the gap between the supply and the demand on the labour market in Bulgaria require the qualification and the requalification of a large number of people. Tourism is one of the sectors with the greatest shortage of qualified specialists, while it may generate a significant number of jobs.

Education in tourism in Bulgaria is marked by a high degree of diversity in terms of education level - there are a large number of public and private secondary schools, colleges and universities. Training is usually embedded in the upper secondary education, and lately in an increasing number of training centers.

Table 8 – Allocation of schools in Bulgaria, Tourism, 2013-2014 school year

No.	Region	No. schools	No.	Region	No. schools	No.	Region	No. schools
1	Blagoevgrad	7	11	Lovech	7	21	Smolyan	5
2	Burgas	5	12	Montana	4	22	Sofia oraş	4
3	Veliko Tarnovo	6	13	Pazardzhik	7	23	Sofia regiune	6
4	Varna	8	14	Pernik	2	24	Stara Zagora	5
5	Vidin	4	15	Pleven	5	25	Targovishte	2
6	Vratsa	4	16	Plovdiv	7	26	Haskovo	7
7	Gabrovo	1	17	Razgrad	2	27	Noisy	2
8	Dobrich	7	18	Ruse	2	28	Yambol	1
9	Kardzhali	3	19	Silistra	1		*Total*	*123*
10	Kyustendil	4	20	Sliven	5			

Source: Authors' contribution, based on the data offered by the Ministry of Education and Science, Bulgaria –

http://www2.mon.bg/adminmon/ranking/default.asp

According to the List of Occupations at the base of the vocational education and training approved in 2014, the two professional fields (*Hospitality, restaurants and catering*, and *Travel, tourism and leisure*) include the following professions and specialties:

Table 9 – The fields, professions and specialties of the vocational education and training, Bulgaria

No.	Professional field	Profession	Specialization
1.	Hospitality, restaurants and catering	Hotelier	Hospitality organization
			Organization and hospitality management
			Organization of activity in accommodation
		Hotel administrator	Organization of services in hospitality
		Butler/ Chambermaid	Hospitality
		Bellman	Hospitality
		Restaurant owner	Restaurant organization and management
			Production and services in restaurants, recreation, catering
			Catering
		Chef	Food and beverage production
		Waiter – bartender	Catering services
		Employee in restaurants and entertainment	Employee in food production, in restaurants and in recreation units
			Employee in restaurants, catering and entertainment
		Sculptor - decorator	Organic material decoration
		Instructor - decorator	Organic material decoration
2.	Travel, tourism and leisure	Organizer of the travel agency	Organization of tourism and recreation
			Rural tourism
		Mountain guide	Tourism
		Guide	Guide services
			Organization of guide activity
		Tourist entertainer	Tourist entertainment
			Organization of entertainment

Source: Authors' contribution, based on the data offered by the Ministry of Education and Science, Bulgaria,
http://www.minedu.government.bg/?go=page&pageId=2&subpageId=295

C. Vocational education and training in tourism, in Turkey

The first studies on education in tourism in Turkey were initiated in 1940. By 1960 various courses had been organized that formed cooks and waiters, and the first hotel school was opened later.

In the absence of a law on education and training in tourism, on October 29, 1890, the Ottoman State promulgated the "Regulation 190 of travelers' personal translators". Non-Muslims who speak a foreign language worked as private or independent translators. During the Republic, "Decree number 1730 of passengers' personal translators" came into force in 1925, with the publication of the implementing regulation. Since then, the Touring and Automobile Association of Turkey has played an important role in training the tourist guides, and in preparation and publication of literature related to education and training in tourism.

Education in tourism in Turkey continued with the establishment of the Vocational High Schools for Commerce in Ankara and Izmir, offering training courses for tourism and with the emergence of tourism associations proposing training courses for translators and tourist guides. The vocational courses for tourist guides began in Istanbul in 1955, and in Izmir in 1960. In 1961-1962 school year in accordance with the Law 7334 of the Academy of Economic and Commercial Sciences were established the Foundation of Tourism Departments as a specialized branch, and the Foundation of the Schools of Tourism and Hotel Management in Ankara.

In the "Period of planned development" were set up schools of "hotel management" in Istanbul in 1967 - 1968 school year, and in Kusadasi in 1975 - 1976 school year. In 1975 they were transformed into "Vocational High Schools for Tourism and Hotel Management". The training in these schools was divided into branches such as a "Reception", "Service" and "Kitchen" in 1975 - 1976 school year, branches such as "Reception", "Service", "Kitchen", and "Housekeeping" in 1987 - 1988 school year, and branches such as "Reception", "Service", "Kitchen", "Housekeeping", and "Travel Agency" in 1993 - 1994 school year. Starting with 2005-2006 school year, the overall structure of these schools has been amended and some basic fields emerged, such as catering, accommodation, travel services, entertainment services. They were divided into multiple and varied sub-branches. In 2006 - 2007 school year, there were 23,376 students enrolled in 88 Anatolian Vocational High Schools for Tourism and Hotel Management.

Currently, education in tourism is done in two forms: formal and non-formal education. Formal education is performed at the same level for people in the same age groups through educational programs developed

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according to the educational purpose. This is provided in secondary schools and in higher education institutions.

In Turkey, vocational education and training in tourism at the secondary level is done in high schools of different types, such as: Anatolian High Schools for Tourism and Hotel Management (134) Vocational High School for Girls, Anatolian High Schools for Girls, Anatolian Vocational High Schools, Anatolian Technical High Schools, Anatolian Vocational Commercial High Schools, Multi-Program High Schools, Vocational High Schools, Technical and Vocational Educational Centres.

In 2013 - 2014 school year, in Turkey there were 513 high schools offering training in tourism in two qualifications: *Food and Beverage Services* and *Accommodation and Travel Services*. These schools are spread throughout the country, in 79 of the 81 provinces of the Republic of Turkey.

Table 10– Allocation of school units in the Republic of Turkey, Tourism, 2013–2014 school year

No.	Province	No. schools	No.	Province	No. schools	No.	Province	No. schools
1	Adana	10	28	Elazığ	3	55	Manisa	8
2	Adiyaman	4	29	Erzincan	3	56	Mardin	2
3	Afyonkarahisar	10	30	Erzurum	6	57	Mersin	10
4	Ağri	1	31	Eskişehir	5	58	Muğla	12
5	Aksaray	2	32	Gaziantep	4	59	Muş	4
6	Amasya	3	33	Giresun	5	60	Nevşehir	6
7	Ankara	41	34	Gümüşhane	2	61	Niğde	4
8	Antalya	20	35	Hakkari	2	62	Ordu	5
9	Artvin	3	36	Hatay	10	63	Osmaniye	2
10	Aydin	11	37	Iğdir	2	64	Rize	5
11	Balikesir	14	38	Isparta	4	65	Sakarya	6
12	Bartin	2	39	İstanbul	48	66	Samsun	11
13	Batman	4	40	İzmir	29	67	Siirt	3
14	Bayburt	1	41	Kahramanmaraş	4	68	Sinop	4
15	Bilecik	2	42	Karabük	3	69	Sivas	4
16	Bingöl	1	43	Karaman	2	70	Şanliurfa	5
17	Bitlis	3	44	Kars	2	71	Tekirdağ	1
18	Bolu	6	45	Kastamonu	6	72	Tokat	3
19	Burdur	2	46	Kayseri	6	73	Trabzon	6
20	Bursa	19	47	Kirikkale	3	74	Tunceli	2
21	Çanakkale	6	48	Kirklareli	4	75	Uşak	2
22	Çankiri	3	49	Kirşehir	3	76	Van	4
23	Çorum	4	50	Kilis	2	77	Yalova	3
24	Denizli	7	51	Kocaeli	8	78	Yozgat	9

25	Diyarbakir	7	52	Konya	13	79	Zonguldak	7
26	Düzce	3	53	Kütahya	6		*Total*	*513*
27	Edirne	8	54	Malatya	3			

Source: Authors' contribution, based on the data offered by http://mtegm.meb.gov.tr/okullar.asp

During our research, we have found that vocational education and training produces multiple positive effects for individuals and organizations, and for the economy and society as a whole.

Table 11 – Benefits of vocational education and training

For individuals	For organizations	For society
- the increase of income, employability, and mobility; - the possibility to change jobs; - the development of the capacity of lifelong learning and of the analytical capacity of the working conditions; - increased job satisfaction.	- labour productivity growth	- net benefits, both socially and fiscally; - the improvement of public health ; - the care for the environment; - democratization, the respect for human rights; - the decrease of criminality and delinquency at national level.

Source: Authors' contribution

The discussion about vocational education and training can be complete only if it takes into account the benefits and costs of vocational education and training – the direct and indirect resources for carrying out the training courses. The methodological issues concerning the calculation of the training program costs include the economic cost identification, classification and assessment of the training cost and cost estimation.

There is no standard classification of training costs, and many countries have their own methods of determining them. However, generally accepted distinctions can be made. Thus, the costs can be divided into direct costs including salaries of apprentices, salaries of the training staff, expenditure on teaching material, equipment, infrastructure construction etc., and indirect costs such as tax expenditures, subsidies, opportunity and renunciation costs.

It should be noted that, compared with the general or academic education, vocational education and training entails substantial costs, especially in the case of occupations that require heavy equipment and sophisticated infrastructure. In many countries, these costs are shared between the state, employers and learners, based on co- financing arrangements varying from country to country and over time, depending on the economic circumstances.

If we analyze closely the practice of many countries, including the three countries of our research, we see that the proper management of vocational education and training systems makes the benefits of these actions significantly exceed the incurred costs. This would be an additional reason for the continuation and amplification of the efforts to develop the vocational education and training systems in all areas, including tourism.

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THE INTERCULTURAL SPEAKER'S COMPETENCES

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Abstract: *This article is a plea for the introduction of the intercultural approach in teaching Romanian for foreigners. It is important both for the awareness of cultural differences and for the acquisition of intercultural communication competence. In the European linguistic area this competence holds an important place in teaching modern languages.*

The work approaches concepts such as intercultural communication, intercultural speaker and intercultural communication competence. The method used is the focus group, which allowed for data collection regarding foreign students' perceptions of the communication with native students and of intercultural speaker's competences.

The article analyses foreign students' attitudes in the communicative act with Romanian students from the perspective of an intercultural context."

Keywords: *intercultural speaker, communication, teaching foreign languages.*

Litterature review

The theoretisation of intercultural communication is done for the first time by Edward T. Hall[1] in 1959, in his work "The Silent Language". In this work the concepts of time and space have an important role in the communication between persons from different cultures. For example, punctuality is understood differently by a Mexican in comparison to a British individual. If the Mexican is 15 minutes late for a business meeting, the British person will arrive at the appointed time and, most probably, will interpret the Mexican's delay as a sign of disrespect, unless he/she is trained in intercultural matters and aware of cultural differences. Equally, the space, understood as the comfortable distance between interlocutors may lead to misunderstandings in a discussion between representatives of different cultures. It is necessary to become aware of one's own cultural

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[1] Edward Hall, *The Silent Language*, New York, Doubleday & Company, 1959.

values as well as of the foreign interlocutor's. That is why, the concepts of *miscommunication* and *misunderstandings* are among the key concepts of intercultural communication. Miscommunication arises from the unfamiliarity with the interlocutor's cultural framework and his/her cultural values. Moreover, misunderstandings are based on faulty decoding or misinterpretation of speaker's message.

Effective intercultural communication, as a process, is produced when the interlocutors from different cultures are aware of their cultural differences and act as mediators, continuously negotiating the conveyed messages. According to Gerhard Maletzke[2] and Ulrike Litters[3] intercultural communication is a process of communication between individuals who are aware of the cultural differences between them, and it is also an interpersonal, direct and unmediated type of communication.

The concept of *intercultural*, in comparison with the term *transcultural* refers to the phenomena and exchanges which take place when representatives of two or more cultures meet. Transculturality characterises both societies and individuals and involves the infusion of elements of a foreign culture into one's own. On the other hand, the concept of *multicultural* refers to the coexistance of many cultures inside a social system (nation, community, school classroom, etc).

The intercultural approach describes the intercultural speaker as having the following skills: to compare various perspectives, to analyse reactions, and to manage problems and conflicts. He/she is a mediator, a person who can decentre from his/her own visions, prejudice, and values and who can move closer to the interlocutor's cultural framework of reference. In the societies with enough mobility, the individual experiences may take the form both of the quality of "guest" and "host".

The intercultural speaker model is an ideal one which the foreign language learners and teachers aim to achieve. It is a dynamic model, which doesn't have a fixed aim, because the competence to mediate in different contexts, to distinguish between various cultures, to understand different perspectives and to self-reflect on one's own identity is a continuous process.

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[2] Gerhard Maletzke, *Interculturelle Kommunikation zur Interaktion zwischen Menschen verschiedener Kulturen Westdeutscher Verlog*, Opladen 1996, p.37.

[3] Ulrike Litters, *Interculturelle Kommunikation aus fremdsprachendidaktischer Perspektive*, Nan Verlag, Tubingen, 1995, p.20.

The intercultural approach is an intermediary way, a third virtual space where the interlocutors recreate a common cultural code. In this intermediary space the interlocutors negotiate meanings, interpret and reinterpret the communicative act so that this is an effective one, based on mutual respect, understanding and tolerance.

According to Juliane House[4] an intercultural speaker is that person who managed to create his/her own intermediary space between his/own culture and another culture which he/she is familiar with.

In our view, an intercultural speaker has acquired intercultural communication competence both by experience and by education. The table below presents an ideal competence profile of the intercultural speaker, based on the literature reviewed and on our own research:

Table 1. A profile of the intercultural speaker

Intercultural speaker	**Cognitive dimension**	- knows at least one foreign language spoken internationally - has general knowledge about his/her own culture (objective but especially subjective[5]) and about other cultures, at least the culture associated to the language learnt - knows to define and identify cultural stereotypes regarding one's own culture and other cultures, at least the learnt language-culture - is aware of the importance of cultural differences
	Attitude dimension	- is proud of and pleased to talk about his/her own culture, which he/she shares with others -understands and accepts points of view which are different from hers/his - respects the right to cultural

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[4] Juliane House, *What is an intercultural speaker?* In E.A. Soler and M.P Jorda. Intercultural language Use and Language Learning. The Netherlands. Springer, 2007.

[5] *Objective culture is referred to in the humanistic sense, as cultural heritage made of literary-artistic and monumental works of a community. Subjective culture bears the anthropological meaning given to culture interpreted as a certain lifestyle of a society/community. This comprises mentality, traditions and customs, dress codes, cultural values, behaviour patterns, lifestyle, the discursive implicit etc.*

		diversity and is convinced that it is beneficial - is curious about other cultures and is open to its members - recognises the equality of cultures, avoids hierarchization and respects cultural diversity
	Behaviour dimension	- does not use language stereotypes - uses strategies of conflict management and cultural mediation - negotiates meanings of words and gestures to interpret them correctly - is interested in interacting with persons from other cultures - can decentre from his/her own cultural code - effectively manages new, ambiguous, unknown situations.

In teaching foreign languages it is known that learners do not need to know only grammar or vocabulary, but to be able to use the language adequately in different social and cultural contexts.

The concept of intercultural communication competence was introduced in the Council of Europe's works and it is described in Michael Byram's book "*Teaching and Assessing Intercultural Communicative Competence*". Briefly, intercultural communication competence involves the acquisition and use of the following resources: knowledge, skills and attitudes, which are interrelated.

There are two types of necessary knowledge:

➢ Knowledge about social and cultural groups (social group's products and practices) referring to both speaker's culture and the interlocutor's. As this type of knowledge cannot be acquired only during a language class, unless a pluricultural approach is used, there is the alternative of extending the intercultural approach to various subject matters such as history, sociology, geography and others. Besides the knowledge acquired in the formal educational environment, the intercultural approach opens doors to the exterior world (the society, the mass media etc), where the learner may find the necessary knowledge. This

is learned both consciously and unconsciously in the process of socialisation.

➢ Knowledge about the interaction processes at society and individual level. This refers to socio-linguistic and socio-cultural knowledge, which refers to interaction norms in a given context, non-verbal and paraverbal elements.

The affective dimension refers to two types of attitudes:
➢ Curiosity and openness to others
➢ Wish to eliminate lack of trust in other cultures and trust in one's own culture, which is translated by wish to overcome negative stereotypes and bias, as well as ethnocentric/xenocentric views.

Regarding the skills, respectively the behaviour dimension, Byram differentiates between three categories:
➢ Capacity to interpret a document or an event from another culture, to explain it and to put it in relation to documents from one's own culture
➢ Capacity to acquire new knowledge about a culture, it's practices and to use the knowledge, attitudes and skills in real communication.
➢ Critical cultural awareness: this involves the capacity to assess critically and based on explicit criteria cultural practice and products of one's own culture and other cultures.

Intercultural communication is a dynamic process, which involves movement from one cultural space to another. Intercultural communication competence does not limit itself only to culture, but it involves cognitive, affective, operational adaptability of the inner system of an individual to all intercultural communication systems. For Byram, Nichols, & Stevens[6], the intercultural speaker shows willingness to relativise his/her values, beliefs and behaviours, thus, assuming these are not the only correct ones.

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[6] Michael Byram, Nichols, A., & Stevens, D. (Eds.), *Developing Intercultural Competence in Practice*. Tonawanda, NY. Multilingual Matters, Ltd, 2001.

Method

In our research we organised two focus-groups with foreign students of the Polytechnic University of Bucharest, the Faculty of Engineering in Foreign Languages. In both focus-groups we had 7 students, who spoke English at intermediate and upper-intermediate levels. The focus groups were held in English.

The objectives of the focus-groups were:
- knowing the students from personal data point of view and languages spoken;
- identification of participants' prior intercultural experience;
- knowing the foreign students' interest of interaction with the Romanian students' and their attitude before diversity;
- knowing the foreign students' perceptions regarding the intercultural speaker's competences.

Results

Following the analysis of the students' answers we find that the participants have two types of attitudes before diversity: positive and negative ones. The participants with negative attitudes have less prior experience abroad, before coming to Romania or they have biased expectations from the host society. These state for example that in their country things are different, in term of bureaucracy, and cannot accept that in Romania it is possible to be different. This shows an interpretation of culture taking into account one's own cultural frame of reference and applying it to the host culture. This also shows an inability to decentre from one's own culture.

Other students use language stereotypes such as "the Romanians do not have respect for foreigners". A stereotype represents the generalisation of an individual feature to a whole nation. All generalizations or language stereotypes are proof of miscommunication, which is one of the main reasons for failure to communicate effectively in intercultural environments. These findings show the need to introduce intercultural approach to teaching foreign languages, which makes students aware of cultural differences and deal with them.

Regarding intercultural speaker's competences, the foreign students consider that it is important for both interlocutors to speak a common language, preferably English. Moreover, the foreigner should speak the target language at conversational level and should know and understand the native interlocutor's lifestyle.

The main reason why the degree of interaction in the university group between the foreign students and the Romanian ones is reduced is, in the foreign students' opinion, their low level of Romanian language competence and culture shock. For the students who originate in non-UE countries the culture shock is more intense because the cultural distance is more significant. These participants feel the need of a wider openness from the Romanian students' part, who may both help them better integrate and speak the target language. This need is based on a misunderstanding of the Romanian students' attitude. The perceived Romanian students' lack of cannot be generalized and, instead, it represents a stereotype. It is supposed that the Romanian students speak English very well (since they study in English at the Faculty of Engineering in Foreign languages) and thus the communication between them may take place, unless there was no intention or reluctance to communicate on part of the foreign students. On the other hand, the possible foreign students' reluctance was noticed by the teacher of foreign languages. The foreign students seem to interact more with their co-national colleagues or even with other foreign students. This interaction can be translated as by a safety feeling of the foreign students to communicate with their colleagues who find themselves in the same situation.

From among the teaching methods which teachers may implement in order to increase de degree of interaction between foreign and Romanian students, the most efficient ones are the intercultural project, group work, role plays and simulations.

Conclusions

The intercultural approach involves the comparison and reflection both on one's own culture and on the target culture. Therefore, language teachers shall help learners identify their own cultural values, reinterpret them by comparing them with other cultural values, shall offer opportunities to investigate cultural complexity and shall promote interest for other cultures.

The current practices of teaching and learning foreign languages focus on interculturality and reconsider the teaching objectives by taking into account the intercultural speaker's competences, capable of adapting, mediating in multicultural contexts. Since fluency is not enough to communicate effectively with persons form different cultures, the teaching approach focuses more on the combination language-culture. The teaching of foreign languages considers language an instrument of expressing one's culture that seeks to express the way in which the interaction between representatives of different cultures is performed.

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POLICIES TARGETING THE PHYSICAL ACTIVITY EFFECTIVENESS ON CHILDREN

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Abstract: *The World Health Organization is encouraging countries to develop and implement policies aimed at increasing physical activity in children and adolescents. The purpose of this paper is twofold: (1) to identify the common existing international policies established to increase physical activity in children and adolescents; and (2) to examine the extent to which these policies are supported by solid scientific evidence. Existing policies as well as intervention studies for children and adolescents in Europe, America, Asia, and Oceania that were identified via scientific databases. For these policy areas, the intervention literature was reviewed and segmented into three domains: policy research (studies examining the relationship of policies to physical activity levels in young people), effectiveness studies (multi-site physical activity interventions), and efficacy studies (single site or local physical activity interventions). Effectiveness studies provided support for policies that focus on increasing Physical Education in School, improving School Environmental Support and Active Transport/Urban Design, and launching Mass Media/Advertising Campaigns designed to increase physical activity levels in children and adolescents. The results for Physical Activity-Related Health Education and Community Environmental Support were mixed, indicating that more research is needed to determine the effectiveness of physical activity policies in those areas.*

Keywords: *accelerometry, active transport, MVPA (moderate-to-vigorous physical activity), school environment.*

Introduction

Over the past two decades, promotion of physical activity has become a recognized public health priority in developed and developing countries across the world. In 1992, the American Heart Association, based on sizeable bodies of epidemiological and physiological research, declared lack of physical activity to be a major risk factor for cardiovascular disease

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Subsequent to that pronouncement, the U.S. Centers for Disease Control and Prevention and the American College of Sports Medicine issued a public health guideline on physical activity, and the U.S. Surgeon General released a report declaring that, "people of all ages can improve the quality of their lives through a lifelong practice of moderate physical activity (U.S. Department of Health and Human Services)." In the intervening years, many nations' public health authorities have issued guidelines calling for persons of all ages to target increased participation in moderate to vigorous physical activity as a key strategy for reducing the incidence of a broad array of chronic diseases (World Health Organization 2004). Despite broad acceptance of promoting physical activity as a key to enhancing public health in the 21st century, many millions of people across the globe fail to meet physical activity guidelines. While most people are aware of the important health benefits of physical activity, this awareness has not translated into measureable increases in population levels of physical activity. It now seems clear that public health education will not be the singular solution to this growing and challenging problem. Rather, increasing physical activity at the population level will require making profound changes in policies that influence the nature of our communities. It is against this backdrop that the World Health Organization has called on nations across the world to develop comprehensive strategic plans for promoting increased physical activity.

National strategic plans for increasing physical activity have typically included policy recommendations that are aimed specifically at children and adolescents. The purpose of this article is to present a summary of a review of those elements of national physical activity strategic plans. First, we identified the common existing international policies established to increase physical activity in children and adolescents. Second, we searched the scientific literature to examine the extent to which these policies are supported by solid scientific evidence. The overarching goal of this article is to focus attention on the need to include recommendations that have the potential to be broadly effective in physical activity strategic plans.

Methods
Policy search
To identify the common existing international policies established to increase physical activity in children and adolescents, physical activity policies written in the English language for children and adolescents in Europe, America, Asia, and Oceania were identified via scientific

electronic databases (PubMed, Academic Search Premier, Medline, PsychInfo, Health Source: Nursing/Academic Edition, Psychology and Behavioral Science Collection, ERIC, Health Source: Consumer Edition) and existing archives and databases via non-electronic search. The reference lists of the resulting articles from the search were also used to locate additional articles. Policy-related documents such as writ-ten policies, governmental plans, and national and international organizational plans (e.g., World Health Organization's Global Strategy on Diet, Physical Activity and Health) were identified via multiple webpage searching. Combinations of the following keywords were used: physical activity, policy, public policy, physical activity plans, children and adolescents, and health policy.

Policies were searched via commonly-used electronic databases in Chinese (CNKI, VIP Information, Wanfang Data) and internet search engines (Baidu, Google). Combinations of the following keywords were used: children, adolescents, youth, school, physical education, physical fitness, policy, plans.

During the search, we became aware that many countries do not have written documents developed specifically for physical activity or for particular population subgroups (children and youth). However, many policies had combinations of strategies and recommendations, policy documents, action plans, and web sites designed to inform the public of the health benefits of physical activity. Given the purpose of this study, we included policy documents that specifically described a procedure or a guide initiated by governmental or non-governmental organizations to promote physical activity in children and youth (≤ 18 years of age). We defined physical activity policy as "a formal written document that provides guidelines to promote physical activity in the public". The exclusion criteria incorporated documents that did not represent one specific country, were not written in English or Chinese, and for which physical activity and children and youth were not included in the policy.

Intervention search

To examine the extent to which the above policies are supported by solid scientific evidence, a literature search of interventions aimed at promoting physical activity in children and adolescents was performed across the same countries using the same databases. All years for which articles were first electronically available through June 2010 were included in the initial search. Combinations of the following keywords were used:

children, youth, physical activity, intervention, exercise, physical education, community, school, active transport, urban design, mass media, effect, and randomized controlled trial. Reference lists of existing reviews of physical activity in children and youth also were examined. The search for interventions was restricted to articles written in the English and Chinese languages.

The initial search of the title, abstract, and then the full paper was performed by WB and JLT. Studies were included if they involved physically and mentally healthy people ≤ 18 years of age engaged in an intervention program that targeted one of the policy areas identified from the policy search. We also included interventions that had a non-physical activity-based treatment for the control group, and interventions that had a primary outcome measure of physical activity behavior change that was quantitative and statistically analyzed. The intervention literature was assessed for methodological quality using 10 criteria described by van Sluijs et al.[1] and Engbers et al[2]. In brief, the studies were examined against the criteria of randomization, adequate control condition, similarity of groups at baseline, acceptable attrition rate, blinding of either the investigator or the participants, timing of outcome assessment, length of follow-up, intention to treat analysis, and control for confounders. Studies were considered of moderate or high quality if 5 or ≥ 6, respectively, of the internal validity criteria obtained positive scores.

Studies that met the inclusion criteria were then categorized into one of three types of studies: efficacy studies, effectiveness studies, and policy research. The first domain examined efficacy studies (e.g., small, randomized controlled trials performed to examine the effect of a physical activity intervention at a single site or locally). Efficacy studies provide enhanced internal validity and maximal opportunity to demonstrate the potential benefit of a physical activity intervention. However, since the generalizability of these studies is limited, the second domain focused on effectiveness studies (i.e., studies with multiple sites and/or with sample sizes ≥ 250 participants; that allow for a physical activity intervention in a more naturalistic and less-controlled environment. The enhanced external validity of effectiveness studies allows for generalizability of the results

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[1] van Sluijs EM, McMinn AM, Griffin SJ. *Effectiveness of interventions to promote physical activity in children and adolescents: systematic review of controlled trials*. BMJ 335, 2007, p. 703.

[2] Engbers LH, van Poppel MN, Chin APMJ, van Mechelen W. *Work-site health promotion programs with environmental changes: a systematic review*. Am J Prev Med 29, 2005, p. 61–70.

and subsequently gives credibility to informing the policy process. The third domain examined interventions that focused on policy research, or the effects of local, regional, or national policies on physical activity levels in young people.

The strength of the evidence was thoroughly examined to draw conclusions regarding levels of effectiveness based on best evidence synthesis. Briefly, strength of the evidence was based on the results of studies with the highest available level of quality (e.g., large high-quality randomized controlled trials *vs.* small, low-quality non-randomized controlled trials) and results were considered consistent if at least three-quarters of the relevant studies had significant results in the same direction. Effectiveness was defined as: (1) Effective, (2) Moderately effective, (3) Limited/inconclusive, and (4) Not effective.

Results

Policy

After extensive review according to the policy search criteria, the specialists have identified 43 written policies designed to increase physical activity in children and adolescents from 10 countries: Australia, China, Japan, Northern Ireland, Norway, Scotland, Singapore, Sweden, Thailand, and United States. We then categorized the 43 policies into six distinct policy areas found to be the most common and repeatedly endorsed in policy documents and the scientific literature: (1) *Physical Education in School* (9 policies); (2) *Physical Activity-Related Health Education* (without a PE component; 9 policies); (3) Community Environmental Support (10 policies);(4) *School Environmental Support* (8 policies); (5) *Active Transport* (3 policies); and (6) *Mass Media/Advertising Campaign* (4 policies). Because several policies within each of the six policy areas were not mutually exclusive enough to be summarized separately, we eliminated or combined similar policies to avoid space burden and overlapping (i.e., redundancy). Therefore, we were left with two to four policy examples within each policy area (Table 1).

Interventions

We identified 702 references from the combined data-bases (PubMed = 435; Academic Search Premier = 86, Medline = 70, PsycINFO = 47, Health Source: Nursing/ Academic Edition = 39, Psychology and Behavioral Science Collection = 17, ERIC = 4, Health Source-Consumer Edition = 4) using a combination of the specified keywords. A preliminary

selection was per-formed using title and abstract, and after deletion of irrelevant studies, we retrieved full text of 98 articles. Since the purpose of this review was to identify interventions to support policy, we chose to focus our evaluation on effectiveness interventions only. We found no existing studies to date that examined physical activity policy research interventions in children and youth.

Table 1. Summary of identified physical activity policies from 10 countries

Policy area	Country	Policy description	References
Physical Education in School	Northern Ireland Scotland Norway Sweden China Japan U.S.	• Include the PE curriculum as part of school review process • Require a minimum of 2 hours of high quality PE per week for all children • PE is taught by certified and highly qualified PE teachers	National Physical Activity Plan 2010; Scottish Physical Activity Research Collaboration 2009; U.K. Department of Health 2009; Central Committee of the Communist Party of China and State Council of China 2007; Ministry of Education of China and General Administration of Sports of China 2007, 2006, 2002; Norwegian Ministry of Health and Care Services 2005; Swedish National Food Administration and National Institute of Public Health 2005; Scottish National Physical Activity Task Force 2003; The Sports and Youth Bureau of the Ministry of Education Culture Sports Science and Technology 2000; Health Promotion Agency for Northern Ireland 1997; Sports Law of the People's Republic of China 1995
Physical Activity-Related	Norway Sweden	• Health education classes should incorporate promotion of PA for	National Physical Activity Plan 2010; Central Committee of the Communist Party of China and

Health	Australia	health benefits	State Council of China 2007; Ministry of Education of
Education	Japan	• Collaborate with universities to	China and General Administration of Sports of China
	U.S.	establish teacher education (i.e., continuing education) classes to include the topic "PA and health" in school curriculum • Provide training in motivational interviewing techniques for PA to healthcare professionals in primary and secondary school healthcare services • Provide education that encourages parents to be positive role models for their children through regular PA	2006; National Public Health Partnership 2005; Norwegian Ministry of Health and Care Services x 2005; Swedish National Food Administration and National Institute of Public Health 2005; The Sports and Youth Bureau of the Ministry of Education Culture Sports Science and Technology 2000

Community Environmental Support	Northern Ireland Scotland Norway Australia Singapore China	• Design open space, playgrounds, and parks that are challenging and interesting for children and youth • Schools, colleges and youth clubs should work with local authorities, community groups, and health professionals to devise programs to maximize involvement in PA, including providing subsidized club fees for children whose families are experiencing financial Hardship • Encourage, fund and support local governments and community organizations to develop PA programs that aim to get families active using existing infrastructure

		• Public sports venues and facilities should be free or discountable to students

Scottish Physical Activity Research Collaboration 2009; UK Department of Health 2009; Central Committee of the Communist Party of China and State Council of China 2007; Ministry of Education of China and General Administration of Sports of China 2006; National Public Health Partnership 2005, 2004; Health Promotion Agency for Northern Ireland 1997; Sports Law of the People's Republic of China 1995

Table 1. (Continued)

Policy area	Country	Policy description	References
School	Northern	• Allow access to a wide range of	Scottish Physical Activity Research Collaboration
Environmental	Ireland	activities, including play, sports,	2009; UK Department of Health 2009; Central
Support	Scotland	dance, exercise, outdoor activities,	Committee of the Communist Party of China and
	Norway	active travel, and being active in	State Council of China 2007; Ministry of Education
	Australia	daily tasks in and around school	of China and General Administration of Sports of
	Sweden	• Design and renovate school	China and Communist Youth League of China 2006;
	Thailand	playgrounds and surrounding	Ministry of Education of China and General
	Singapore	parks so that they inspire play,	Administration of Sports of China 2006, 2002;
	China	movement, sport, and outdoor education	National Public Health Partnership 2005; Norwegian
			Ministry of Health and Care Services 2005; Swedish
		• Award given to schools to	National Food Administration and National Institute
		promote holistic health in school	of Public Health 2005; National Public Health
		kids—focuses in on promotion on	Partnership 2004; Scottish National Physical Activity
		PE, PA in students, staff, parents	Task Force 2003; Health Promotion Agency for
		• Encourage schools to take students' fitness tests every year and record the data	Northern Ireland 1997

Active Transport/ Urban Design	Northern Ireland Australia Norway	• Education Boards and schools should work with the Department of the Environment to develop safe routes to school • Develop designated car drop-off zones 500 m from schools, supported by organized walking for the rest of the journey to School

National Public Health Partnership 2005; Norwegian Ministry of Health and Care Services 2005; National Public Health Partnership 2004; Health Promotion Agency for Northern Ireland 1997

Mass Media/ Advertising Campaign	Australia Norway Thailand	• Support a community-wide, comprehensive PA campaign that provides education and opportunities directly to children and families in schools, neighborhoods, and communities • Use celebrities with positive images as spokespersons on topics such as exercise to increase public awareness and the importance of these issues	National Public Health Partnership 2005, 2004; Norwegian Ministry of Health and Care Services 2005; Ministry of Education of China and General Administration of Sports of China 2002

PA = physical activity; PE = physical education.

In addition, although smaller-scale, efficacy studies provide high internal validity, evaluation of these smaller studies is beyond the scope of this review due to low generalizability to the children and youth population, as well as the limited ability of efficacy interventions to

support policy. After omitting studies that did not meet the inclusion criteria, 35 intervention studies met the inclusion criteria and qualified as effectiveness studies.

Methodological quality

The methodological quality for most of the effectiveness interventions was acceptable. Using the nine criteria adapted from van Sluijs et al. (2007), 24 of the effectiveness studies possessed high methodological quality (e.g., met ≥ 6 of the criteria), 5 studies possessed accept-able quality (met ≥ 5 criteria), and 3 were considered of low methodological quality (≤ 4 criteria). Almost all of the effectiveness studies identified had randomization, an adequate control condition, equivalent groups at baseline, and measurement of groups at the same time point. Some lacked blinding to the group assignment, intention to treat analysis, and adjustment for potential confounders. Three of the studies (VERB campaign, Agita Sao Paulo, and Safe Routes to Schools) were not eligible to be evaluated because these studies were not randomized controlled trials. However, we chose to retain those studies for the policy support because no randomized controlled trials exist for large-scale studies in mass media and active transport.

Characteristics of the studies

The majority of the effectiveness interventions identified for supporting the policy domains were performed in the United States, while the remaining studies were performed in Australia, the United Kingdom, France, Ireland, Canada. Greece, Belgium, the Netherlands, and Iran. Twenty-three studies used physical activity questionnaires/surveys, 9 studies used accelerometry or pedometry, 3 used both self-report/survey and accelerometry, and 2 studies used direct observation. Although the primary purpose of most of the studies was to implement an intervention to promote physical activity in children and youth, 11 studies examined change in physical activity as a secondary outcome measure. We included those studies because the instrument used to assess physical activity had been previously validated (i.e., self-report) and was quantifiable (i.e., accelerometry), and the outcome measure was statistically analyzed.

Effectiveness of the interventions for policy

Table 2 summarizes the effectiveness interventions that qualified, using our inclusion criteria, to determine whether policy could be supported for improving physical activity for children and youth in the six designated policy areas[3]. For *Physical Education in School,* the two studies identified provided strong evidence to suggest that implementing policies such as improving the PE curricula, materials and staff development, as well as having specialist-led PE instruction, may increase physical activity levels in children and youth through improved quality and quantity of physical education in schools[4]. For *Physical Activity-Related Health Education* that did not involve a PE component, the two studies identified gave limited/inconclusive evidence to establish whether implementing policy for physical activity-related health education without PE would improve physical activity[5]. In particular, while web-based education did not seem to be effective for increasing physical activity in children and youth, there is promise for school-based, teacher-directed, physical activity-related health education[6]. The two studies identified for policy in *Community Environmental Support* (after-school and summer programs, activity badges for Boy Scouts) were also limited/inconclusive for supporting policy in this area to increase physical activity in children and youth[7]. The majority of studies identified (*n* = 11) focused on improving *School Environmental Support*[8]. This policy domain included increasing

[3] McKenzie TL, Sallis JF, Prochaska JJ, Conway TL, Marshall SJ, Rosengard P. *Evaluation of a two-year middle-school physical education intervention*: M-SPAN. Med Sci Sports Exerc 36, 2004, p. 1382–8.

[4] Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Faucette N, Hovell MF . *The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. Sports, Play and Active Recreation for Kids.* Am J Public Health 87, 1997, p. 1328–34.

[5] Harrison M, Burns CF, McGuinness M, Heslin J, Murphy NM. Influence of a health education intervention on physical activity and screen time in primary school children: 'Switch Off — Get Active', J Sci Med Sport 9, 2006, p.388–94.

[6] Palmer S, Graham G, Elliot E. *Effects of a web-based health pro-motion on fifth grade children's physical activity knowledge, attitudes and behavior.* Am J Health Educ 36, 2005, p. 86–93.

[7] Pate RR, Saunders RP, Ward DS, Felton G, Trost SG, Dowda M. *Evaluation of a community-based intervention to promote physical activity in youth: lessons from Active Winners.* Am J Health Promot 17, 2003, p. 171–82.

[8] Donnelly JE, Greene JL, Gibson CA, Smith BK, Washburn RA, Sullivan DK, DuBose K, Mayo MS, Schmelzle KH, Ryan JJ, Jacobsen DJ, Williams SL. *Physical Activity Across the Curriculum (PAAC): a randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children.* Prev Med 49, 2009, p. 336–41.

teacher training, increasing game equipment during recess, executing an intervention based on physical activity behavioral models, employing student leaders as advocates for physical activity, and emphasizing fun rather than competition. The evidence was strong to support policy within the school environment to increase physical activity in children and youth. For the three studies that focused on interventions to increase *Active Transport* (promoting walking or biking to school, active[9] commuting), the strength of the evidence was moderate to support policy for improving physical activity[10]. Finally, although the studies identified for *Mass Media/Advertising* were not randomized controlled trials, the positive results from both the VERB campaign and Agita Sao Paulo clearly supported policy in mass media/advertising for increasing physical activity in youth[11].

Multi-component interventions for multiple policy areas

While the object of our review was to determine the effectiveness of interventions within each individual policy domain, we thought it essential to also examine the effectiveness studies that had more than one intervention component. Table 3 identifies large, multi-site

Table 2. Summary of effectiveness studies

Policy area	Authors	Project name	Location	Participants	Intervention	Effectiveness
Physical	McKenzie	MSPAN	USA	*n* = 25,000; 24 schools;	2-yr PE program included curricular	Effective
Education	et al. 2004			12 INT and 12 CON;	materials, staff development and	↑MVPA during PE in INT schools.
in School				6–8th grade	on-site follow-up. CON had usual practice.	
	Sallis	SPARK	USA	*n* = 1,538;7 schools;	3-yr PE programs: Specialist-led	Effective

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[9] Mendoza JA, Levinger DD, Johnston BD. *Pilot evaluation of a walking school bus program in a low-income, urban community*, BMC Public Health 9, 2009, p. 122.

[10] Wen LM, Fry D, Merom D, Rissel C, Dirkis H, Balafas A. *Increasing active travel to school: are we on the right track? A cluster randomised controlled trial from Sydney*, Australia. Prev Med 47, 2008, p. 612–8.

[11] Staunton CE, Hubsmith D, Kallins W. *Promoting safe walking and biking to school: the Marin County success story.* Am J Public Health 93, 2003, p. 1431–4.

Category	Author	Program	Country	Sample	Intervention	Outcome
	et al. 1997			4 INT and 3 CON; 4–5th grade	PE condition; teacher-led PE condition; and CON (untrained teacher-led PE).	↑MVPA in INT schools *vs.* CON.
Physical Activity-Related Health Education	Palmer et al. 2005	Healthy Hearts for Kids	USA	n = 233; 8 schools; 5th grade	1-mo web-based instruction on PA, cardiovascular function, nutrition and health.	Not effective — No impact on increasing PA behavior.
	Harrison et al. 2006	Switch Off-Get Active	Ireland	n = 312; 9 schools: 5 INT and 4 CON; 5th grade	16-wk, 30 min of health education on PA and decreasing TV time.	Moderately effective — ↑blocks of MVPA in INT *vs.* CON. No change in fitness or TV viewing time.
Community Environmental Support	Pate et al. 2003	Active Winners	USA	n = 436; 2 rural communities; 5th grade	18-mo PA programs included after-school, summer PA, home, and community components designed to increase PA in youth.	Limited/inconclusive — Time constraints prevented implementation of the planned home, school and community components.
	Jago et al. 2006	Fit for Life	USA	n = 473; 42 troops; 21 INT and 21 CON; boys only	9-wk PA troop and internet program to increase PA skills included 20-min PA sessions during troop meetings.	Not effective — No effect on MVPA; ↑LPA by 12 min (n.s.).
School Environmental	Naylor et al. 2006	Actions Schools!	Canada	n = 444; 10 schools; 3 CON, 4 Liaison,	Multi-phase, multi-discipline initiative that provided resources	Effective — ↑PA (girls), number of steps/d,

Support	BC		and 3 Champion, 4–6th grade	and recommendations for creating school-tailored action plans to integrate PA into the school environment.	fitness (CRF) in intervention schools (girls) compared to CON.
Dzewaltowski	Healthy	USA	n = 1,582; 16 schools,	Aimed to influence proxy by	Effective
et al. 2009	Youth		8 INT and 8 CON;	building youths' confidence that	↑blocks of MVPA and VPA in INT.
	Places		6th grade	they could influence others to assist	
			n = 954; 8 schools;	them in building healthy places.	
Simon	ICAPS	France		4-yr program that provided access	Effective
et al. 2004			4 INT and 4 CON;	to fun activities during and after	Improved self-efficacy and supervised
Simon			11 yrs old (at	school; encourage debate on PA;	leisure-time PA by 38% in INT.
et al. 2006			baseline)	provide social support; change environment to promote PA; emphasize fun and not	
Jurg et al.	JUMP-in	Netherlands	n = 510; 6 schools,	Interventions included school sports	Effective
2006			4 INT and 2 CON;	activities, monitoring of PA levels	↑PA in INT, especially in grade 6;
			4–6th grade	yearly, in-class exercises, awareness lessons, parental information and activity week.	remained stable; ↑PA considerably in CS.
Van	Move it	Australia	n = 1,045; 18 schools,	Aimed at supporting teachers	Limited/inconclusive

Beurden	Groove		9 INT and 9 CON;	through training, curriculum,	Small ↑MVPA (4.5%) and VPA (3.0%)
et al. 2003	it		7–10 years old	web site and lesson plans. Creating a supportive environment through school policy and purchase of equipment.	in boys. VPA in PE classes.
Donnelly	PAAC	USA	$n = 167$ (subsample for PA); 24 schools; 12 INT and 12 CON; 2–3rd grade	Teachers implemented 90 min MVPA per day during "active lessons" in classrooms.	Effective INT had ↑PA during school day (12%), on weekends (17%), and 27% greater levels of MVPA compared to CON.
et al. 2009					
Bayne-Smith et al. 2004	PATH	USA	(at baseline) $n = 442$; 3 high schools; 310 INT and 132 CON; 14–19 years old; girls only $n = 235$; 7 schools;	12-wk, 30-min classes 5 d/wk; 5–10 min lecture on cardiovascular health; followed by 20–25 min of VPA (resistance or endurance exercise); CON had usual PE classes.	Limited/inconclusive INT group ↑PA 26%; CON 12%. Difference was not statistically significant.
Verstraete		Belgium		INT received game equipment	Effective
et al. 2006			4 INT and 3 CON; 10.8 yrs old; girls and boys $n = 636$; 10 schools;	during morning recess and lunch break.	Lunch break: INT ↑MVPA by 12% and VPA by 1%; CON ↑MVPA by 5% and VPA by 6%. Morning recess: ↑INT MVPA by 4%; CON by 7%.

	Sahota	APPLES	UK		1 academic year, teacher training,	Not effective
	et al. 2001			5 INT and 5 CON;	development and implementation of school action plans designed to	No PA difference between INT and CON.
				8.4 yrs old		
				n = 161; THP = 55,	promote healthy eating and PA.	
	Taymoori		Iran		6-mo intervention, then 6-mo	Effective
	et al. 2007			HP = 54, CON = 52;	follow-up; 3 groups: (1) Pender's	At follow-up, ↑THP by 121% (32.88
				14 yrs old; girls	Health Promotion model (HP);	min/d); ↑HP by 100% (28 min/d);
				only	(2) combination of HP and the Transtheoretical model (THP); (3) CON.	CON by 51% (15.63 min/d).
	Haerens		Belgium	n = 2,434; 15 schools;	1-yr intervention provided in-school	Moderately effective
	et al. 2006			IP = 5, I = 5, CON = 5; 7–8th grade; 13 yrs	opportunity for PA and sports materials. 3 conditions:	In-school ↑PA 6.4 min/d in IP, and 4.5 min/d in I compared to CON.
				old	(1) intervention with parental support (IP); (2) intervention alone (I); and (3) CON.	
Active	Staunton	Safe	USA		Aimed at improving recreational PA,	Effective
Transport/	et al. 2003	Routes to			promoting walking to school and	Increased walking 64%; biking to
Urban Design		Schools			encouraging active commuting.	school 114%.
		(SRTS)		n = 653; 3 elementary		

	Mendoza	Walking	USA		12-mo Walking School Bus program	Effective
	et al. 2009	school		schools; 1 IG;	including part-time coordinator	Walking to and from school increased;
		bus		2 wait-list	and parent volunteers.	25% of students in INT walked to school *vs.* 7% in CON.
				kindergarten–5th grade		
	Wen et al.		Australia	*n* = 1996; 24 schools;	2-yr program included classroom	Limited/inconclusive
	2008			12 INT and 12 CON;	activities, development of school	Parent surveys showed active transport
				10–12 yrs old	Travel Access Guides, parent	in INT, but student surveys did not.
					newsletters and improving environments.	
Mass Media/	Huhman	VERB	USA	*n* = 3,120 parent/	Nationwide, paid advertisement	Effective
Advertising	et al. 2005			children dyads	on TV channels aimed at children.	9 and 10 yr olds aware of the
Campaign					Supported by print advertisement, in-school promotions, radio and	campaign engaged in 34% more free-time PA sessions/wk than those
				n = 6 million students;	Internet exposure.	who were unaware.
	Matsudo	Agita	Brazil		Agita Galera Day: 6,000 public	Effective
	et al. 2004	Sao		nationwide	schools, > 6 million students;	After 1 yr: significant increase in the proportions of
		Paulo			included disbursement of over18,000 manuals/yr,	males (↑20%) and females (↑38%) who met criterion.
					6,000 posters/yr, and 6 million flyers to	

encourage
participation
in at least 30
min of
MVPA/d,
5 d/wk, in
continuous or
accumulative
bouts.

PA = physical activity; PE = physical education; INT = intervention group/school; CON = control group/school; MVPA = moderate-to-vigorous physical activity.

Table 3. Summary of multi-component effectiveness studies

Policy area	Authors	Project name	Location	Participants	Intervention	Effectiveness
School multi- component	Luepker et al. 1996	CATCH	USA	n = 5,106; 104 schools; 56 INT and 40 CON; 3rd grade (at baseline)	(1) PE to increase PA during class; (2) health education curriculum; (3) comprehensiv e multi-components school-based intervention. School-based family intervention incorporating "Family Fun Night" and activity cards.	Effective More time spent in VPA during PE in INT (increased 58.6 min/wk) *vs.* CON (46.5 min/wk).
	Harrell et al. 1996	CHIC study	USA	n = 1,274; 12 schools; 6 INT and 6 CON; 3–4th grade	8–12 wk; exercise program and health classes.	Moderately Effective INT = 23% ↑ in MVPA; CON = 15% in MVPA.
	Kriemler	Kinder-	Switzerland	n = 540; 28	1-yr	Effective

			classes	intervention: two additional PE	
et al. 2010	Sportstudie		randomized 16 INT	classes per week given by trained	additional PE classes per week ↑
	KISS		and 12 CON;	PE teachers, short PA breaks	total PA and MVPA in INT compared
			1st and 5th grade	(2–5 min each) during academic lessons, PA home work, and adaptation of recreational areas around the school.	to CON.
Pate	LEAP	USA	n = 2,744; 24 schools;	Intervention included components	Moderately effective
et al. 2005			12 INT and 12 CON;	of PE, health education, school environment,	Girls in INT reported ↑VPA during
			9–12th grade; girls only	school health services, faculty/staff health promotion, and family/community involvement.	an average of 1 or more 30-min time blocks per day (45% of girls in INT *vs.* 36% of girls in CON).

Caballero   Pathways USA n = 1,704; 41 schools;
et al. 2003   21 INT and 20 CON;
3–5th grade

3-yr intervention included dietary, PA increase, classroom knowledge, family involvement—implementing a minimum of three 30-min sessions per week of moderate-to-vigorous physical activity; exercise breaks of 2–10 min duration.

Not effective

Conflict in results between accelerometery-based PA and self-reported PA. Overall no difference in PA between INT and CON.

Gortmaker   Planet   USA n = 1,295; 10 schools;
et al. 1999   Health   5 INT and 5 CON;
6–7th grade

Intervention included teacher training, wellness sessions, PE materials, fitness funds.

2 yr; health sessions included into curriculum and PE; to increase MVPA; (1) PE component; (2) classroom PA lessons.

Not effective

No difference in MVPA between CON and INT.

Pangrazi et al. 2003	PLAY	USA	n = 606; 35 schools; Groups: PLAY only = 9 schools, (2) PLAY + PE = 10 schools, (3) PE only = 10 schools, (4) CON = 6 schools; 4th grade
Marcus et al. 2009	STOPP program	Sweden	n = 3,135; 10 schools; 5 INT and 5 CON; 1–4th grade

12-wk intervention (PLAY) included

15-min activity break during the school day for PA and student's self-monitoring on daily PA.

Groups: (1) PLAY only,
         (2) PLAY + PE,
         (3) PE only,
         (4) CON.

30-min/d integrated into regular school curriculum; PA was aimed to increase by 30 min/d during school time and sedentary behavior restricted during after school care time.

Moderately effective

Girls ↑PA in the PE & PLAY and PE Only groups scored higher in overall PA and MVPA than girls in CON. Girls in the 'PLAY Only' showed higher PA levels *vs.* girls in CON.

Limited/inconclusive

Total PA tended to be higher for children in INT compared with CON (p = 0.06). PA during after school care time was significantly higher for children in INT than CON (p = 0.004). But no group difference in PA was found after cluster adjustment (p = 0.27).

Salmon	Switch	Australia	n = 311; 3 groups;
et al. 2008	Play		Behavioral
modification = 69;			
Fundamental			
motor skills = 73;			
and CON = 61;			
10 years old			
Webber	TAAG	USA	n = 8,727; 36 schools;
et al. 2008			18 INT and 18 CON;
6–8th grade; girls			
Only			

6–12-mo follow-ups on control; Moderately effective

behavior modification (PA-related FMS and BM groups recorded higher health education); FMS (PE levels of PA over CON. fundamental movement); or BM+FMS.

2-yr intervention included programs Limited/inconclusive

linking schools and community No differences in adjusted MET-weighted agencies, physical education, MVPA between INT and CON. However, health education, and social after 3 yr of intervention, girls were marketing. A 3rd yr intervention more physically active in INT than CON

used school and community (10.9 more MET-weighted minutes personnel to direct intervention of MVPA).

activities.

Spiegel et al. 2006	Wellness, Academics and You (WAY)	USA	n = 1,013; 69 classes; 35 INT and 34 CON; 4–5th grade

Teachers trained to implement WAY: module-the based teaching of health and PA, 10-min/d PA during class time, increased PE, as well as journaling and role playing.

Effective
↑PA 43.5 min during school day and 15.1 min outside of the school day.

Manios   Greece n = 393; 24 schools;

et al. 1998   12 INT and 12 CON;
1st grade (at baseline)

3-yr intervention promoted PA awareness through health education, school environment, PE, activity on the playground, and props.

Effective
↑MVPA 2 hr/wk outside of school in INT *vs.* 0.4 hr/wk in CON.

PA = physical activity; PE = physical education; INT = intervention group/school; CON = control group/school; MVPA = moderate-to-vigorous physical activity; VPA = vigorous physical activity.

effectiveness interventions that span more than one policy domain. These interventions included elements of PE, physical activity-related health education, teacher training, community, and media, as well as a family component or parent involvement. Overall, these multi-component interventions were of high methodological quality and provided strong, scientific evidence for improving physical activity in children and adolescents.

Discussion

To our knowledge, this is the first systematic review that identified common existing international policies for increasing physical activity behavior in children and youth, and evaluated the extent to which the poli-cies identified were supported by solid scientific evidence. Given our definition of physical activity policy (i.e., "a formal written document that provides guide-lines to promote physical activity in the public"), we identified a total of 43 policies across 10 countries that focused on increasing physical activity in children and youth. As physical activity is a complex behavior, and its change is influenced by multiple constructs[12], each policy included specific strategies to pro-mote physical activity in different domains.

With regard to the effectiveness studies supporting physical activity policies in children and youth that met the defined inclusion criteria, our review indicated that there was strong evidence to support policies focused on *Physical Education in School*, *School Environmental Policy Support*, and *Mass Media/Advertising*; moderate evidence to support *Active Transport/Urban Design*; and limited/inconclusive evidence to support *Physical Activity-Related Health Education* and *Community Environmental Support.* Therefore, more research is needed in the areas with moderate-to-low evidence to determine if policies in these areas can increase physical activity in children and adolescents.

Although our goal was to identify interventions that evaluated individual policy domains for physical activity promotion, we found that the most effective interventions were multi-component in nature. For example, LEAP, CATCH, and TAAG included elements of increasing quality and quantity of PE classes, providing physical activity-related health education, improving the school environment, including the student health services, as well as incorporating faculty/staff health promotion and family and community involvement[13]. Most of these large-scale, multi-site, multi-component effectiveness interventions yielded strong evidence to support physical activity promotion in multiple do-

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[12] Webber LS, Catellier DJ, Lytle LA, Murray DM, Pratt CA, Young DR, Elder JP, Lohman TG, Stevens J, Jobe JB, Pate RR. *Promoting physical activity in middle school girls: Trial of Activity for Adolescent Girls. Am J Prev Med* 34, 2008, p. 173–84.

[13] Luepker RV, Perry CL, McKinlay SM, Nader PR, Parcel GS, Stone EJ, Webber LS, Elder JP, Feldman HA, Johnson CC, et al.. *Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health.* CATCH collaborative group. JAMA 275, 1996, p. 768–76.

mains in order to increase physical activity in children and youth. Therefore, implementing physical activity policies across domains will likely be the most effective strategy for improving physical activity in children and youth.

Conclusion

Strengths of this review included identifying inter-national physical activity policies and evaluating the effectiveness of these policies, and including Chinese-language policies and interventions that were not published in English, which made for a more comprehensive review. Limitations included the inability to access policy documents and interventions not available in electronic databases or existing archives, and documents not written in English or Chinese.

In conclusion, because the health benefits of regular physical activity in children and youth are now well understood, advocacy to increase physical activity in this population is widely promoted by public health professionals. Although our review demonstrated that diverse physical activity policies designed to increase physical activity in children and youth exist, and that many of these policies can be supported by rigorous scientific evidence, to the best of our knowledge, no research has specifically examined the effect of policy implementation on physical activity outcomes in children and youth. Future studies should focus on the effectiveness of implementing physical activity policy in different domains to determine whether the policies implemented are actually affecting physical activity behavior. Results from large-scale physical activity policy research would facilitate implementation of effective policies to increase physical activity in children and youth.

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INFLUENCE OF FAMILY MODELLING ON CHILDREN'S HEALTHY EATING BEHAVIOUR

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Abstract: *The development of eating behaviours is a dynamic process that begins in infancy and continues throughout life, being strongly influenced by the family models. Our study aimed to evaluate the food behaviour in children aged 11, 13 and 15 years old in relation to the family models. We did a cross-sectional study in 206 school children from Arges county (rural and urban areas) using the Romanian version of HBSC questionnaire. We analysed the frequency of breakfast and dinner with the family, the lunch circumstances, the frequency of snacks during playtime or computer work, the family influence on the consumption of certain unhealthy foods, the frequency of fast-food restaurants attendance and the compliance of family dining rules. High proportions of children were found not to have breakfast with family, to eat snacks during playtime and to receive soft drinks, sweets and chips without restriction. Also a high proportion of children in urban areas use to have the lunch at school (as a snack) due to the school program. By opposite, the situation seemed much better in relation to dinner, most of the children having daily dinners with their parents. Also a low percent of children use to visit the fast food restaurants. Moderate compliance was found in relation to family dining rules. This results are quite concerning, showing limited involvement of the parents and moderate influence of family modelling in relation to the children eating behaviour.*

Keywords: *healthy eating; family modeling; children; parental influence; behaviour.*

Introduction

It is a fact that parents exercise a very important influence on children's life. Parents represent the basic environment in which children live, grow up and develop, so they watch and imitate the adults around them, look at them in order to learn the proper behaviour for everything, from saying „please" and „thank you" to learn about computers, sports or nutrition.

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There have been many studies (psychological, social, medical) trying to understand why children eat the way they do. Having as a starting point the social learning theory of Bandura, it seemed that the role of observational learning and modelling played a major part on influencing children's food patterns. Evidence also indicates that food habits acquired in childhood persist until adulthood, too[1]. Several studies have shown that a child's eating behaviour is strongly influenced by the family environment. The family eating environments refers to the parents' own eating behaviours and the child-feeding practices. The results of research on behavioural mediators of familial patterns indicate that parents' own eating behaviours and their parenting practices influence the development of children's eating behaviours. Parents create good or bad environments for their children, fostering the development of healthy eating habits and weight, or may promote overweight and aspects of disordered eating. Characteristics of these environments include socio-demographic factors, parental activity, parental eating styles and parents' child-feeding styles[2]. Parents shape the development of children's eating behaviours, not only by the food they make accessible to children, but also by their own eating styles, behaviour at mealtimes and child feeding practices.

The development of eating behaviours is a dynamic process that begins in infancy and continues throughout life. Eating behaviours may refer to food preferences, patterns of food acceptance and rejection, or the types and amounts of food a person eats. Genetics and the contexts in which food is presented are two key factors that determine the development of eating behaviours. Although parents provide a child's biological predisposition, which may affect factors like taste perception, they are not the only adults influencing the development of a child's eating behaviours. Every family member and caregiver interacting with a child when eating has the potential to do so[3]. Food preferences develop from genetically determined predispositions to like sweet and salty flavours and to dislike bitter and sour tastes[4].

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[1] Airinei Greta, Movileanu Lenuţa, Sima Carmen, *Education for Health (pupil's notebook–1st grade),* Corint Publishing House, Bucharest, 2005, p. 120.

[2] Graur Mariana and colab., *Guide to Healthy Eating*, Performantica Publishing House Iaşi, 2006, p. 180.

[3] Stama Ioana, *Education for Health, optional textbook*, 3rd-4th grades, Corint Publishing House, Bucharest, 2005, p. 72.

[4] Ministry of Educationand Research, *Education for Health in the Romanian School*, 2004.

Repeated exposure to a new food reduces a child's fear of the food and helps increase acceptance. Observing family members eating and enjoying a variety of foods makes these foods more appealing to children. In contrast, children who are pressured to eat specific foods learn to dislike them. Restricted access to some foods, such as cookies or potato chips, often results in over-consumption of those foods when children are free to choose them[5].

Factors influencing the eating behaviour development

There are certain key factors that greatly influence the eating behaviour development. One of these factors is the *fear of food*. In young children, there is also the predisposition to "neophobia" about food[6]. Particularly towards the second year of life, period of time which coincides with the important period of transition to the adult diet, there is a tendency to avoid novel foods (neophobia). Neophobia, or the fear of the new, is a protective behaviour observed in omnivores, including humans, that helps preventing the consumption of harmful substances[7]. Neophobia manifests itself as a rejection of unfamiliar foods in favour of familiar ones. In a survey of almost 600 2–6-year-old children, neophobia was significantly negatively associated with fruit, vegetable and meat intake[8]. The acceptance of new foods is a slow process. Particularly at the ages 2 to 5, persistence is essential and it is important to continue introducing a variety of foods throughout early childhood. Although children are sceptical of many foods during these early years, the variety of foods they accept is greater in this developmental phase than it is later, during childhood. Enjoyable, positive, satisfying or on the contrary, disliking experiences with a food highly influence a child's subsequent choice of a food on given occasions and its adoption into their regular diet. These experiences may take the shape of family meals during which the television is off and the parents or caregivers are enjoying the mealtime by

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[5] Neagu Anca, *The Secrets of the Human Body and Curiosity, vol. X*, Oriental Gate Publishing House, Iaşi, 2002, p. 201.

[6] Popa Ioan, Brega Daniela, Alexa Aurora, *Child Obesity and Body Fat*, Mirton Publishing House, Timişoara, 2001, p. 211.

[7] Miheţiu Maria, *Assessment of Nutritional Status in Children*, Pediatru.Ro, Pediatric Nutrition, Anul III, No. 8. December, 2007, p. 54-59.

[8] V. Mocanu, C. Galeşanu, S. Măndăşescu, R. Haliga, A.R. Costan, M. Bădescu, *Detection and Prevention of Obesity in Childhood – Practical Considerations*, The Romanian Journal of Pediatrics, Vol. LX, Nr.3, 2011, p. 173.

talking and enjoying eating the food. Positive exposure to multiple foods helps children develop a taste for more foods, choose them as regular mealtime selections, and have a healthy and rich diet.

The *family environment* is another factor that influences the development of the eating habits. During the early years, parents play a particularly important part. There are many variables within the family setting that can affect children's eating behaviour and, ultimately, their weight outcome. Here, we may mention the parents' eating behaviours, foods made available to children, and child feeding strategies used by parents. Parents play a pivotal role in the development of their child's food preferences and energy intake, with research indicating that certain child feeding practices, such as exerting excessive control over what and how much children eat, may contribute to childhood overweigh. Some of the family factors that influence both parents and children are: parents' weight status, dietary intakes, perceived responsibility for child feeding, eating style, parent's dietary intake, food preferences, physical activity, feeding practice, portion size, food available at home, food accessibility, eating locations, ambient temperatures and lighting, time of consumption, ambient sounds, temperature and smell of foods, family meals v. eating away from table, family income.

A recent paper[9] describes two primary aspects of control: restriction, which involves limiting children's access to junk foods and restricting the total amount of food, and pressure, which involves pressuring children to eat healthy foods (usually fruits and vegetables) and pressuring to eat more in general. Parents may use a combination of these methods to obtain a desired result; for example, pressuring a child to eat healthy foods by using bribes or rewards consisting of sugary snacks that are otherwise restricted. Parent restriction has short term and long term effect on children's intake. It enhances preference, increases attention and intake at first, then this curb increases intake, increases eating in the absence of hunger, does not produce ability to self-regulate diet but causes negative self evaluation, greater weight gain from 5 to 11 years. Pressuring children to eat, likewise appears to be counterproductive, reducing children's ability to regulate their energy intake. A further study[10] has linked the

[9] Birch L.L, Fisher JO, Confirmatory factor analysis of the Child Feeding Questionnaire: a measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*, 36, 2001, p. 201-210.

[10] Fisher, J.O., & Birch, L.L., Eating in the absence of hunger and overweight in girls from 5 to7 y of age. *American Journal of Clinical Nutrition*, 76, 2002, p. 226-231.

"pressure to eat" to reduced consumption of fruit and vegetables in 5-year-old girls. A common assumption runs through these studies: that controlling children's intake of food is a causal factor in their poor eating patterns. It is entirely plausible, however, that the direction of causality runs counter to this; that, in fact, parents' use of control is a response to unhealthy eating habits. Others have explored the impact of controlling food intake by rewarding the consumption of „healthy food" as in „if you eat your vegetables I will be pleased with you". For example, Birch[11] gave children food in association with positive adult attention compared with more neutral situations. This was shown to increase food preference. Similarly an intervention study using videos to change eating behaviour reported that rewarding vegetable consumption increased that behaviour. The relationship between food and rewards, however, appears to be more complicated than this. In one study, children were offered their preferred fruit juice as a means to be allowed to play in an attractive play area. The results showed that using the juice as a means to get the reward reduced the preference for the juice and have been supported by similar studies[12]. These examples are analogous to saying „if you eat your vegetables, you can eat your pudding". Although parents use this approach to encourage their children to eat vegetables the evidence indicates that this may be increasing their children's preference for pudding even further as pairing two foods results in the „reward" food being seen as more positive than the „healthy" food.

Maternal influences are of particular interest on children's eating behaviour, as mothers have been shown to spend significantly more time than fathers or any other family member in direct interactions with their children during several familial situations, especially mealtimes.

Mothers who exert a greater degree of control over their child's food intake had children who demonstrated less ability to regulate energy intake. External parental control of the child's dietary intake may indirectly foster the development of excess adiposity in the child. It has been shown that mothers, who were preoccupied with their own weight and eating, reported higher levels of restricting daughters' intake, encouraging daughters to lose weight over time. There were situations in

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[11] Birch, L., Development of Food Preferences. *Annual Reviews of Nutrition*, 19(1), 1999, p. 41-62.

[12] Lepper, M., Sagotsky, G., Dafoe, J.L., & Greene, D., Consequences of superfluous social constraints: effects on young children's social inferences and subsequent intrinsic interest. *Journal of Pesonality and Social Psychology*. 42, 1982, p. 51-65.

which, mothers' encouragement of daughters' weight loss was linked to daughters' restrained eating behaviour. This relationship was partially mediated by daughters' perception of maternal pressure to lose weight. These findings suggest that mothers' preoccupation with weight and eating, via attempts to influence daughters' weight and eating, may place daughters at risk for developing problematic eating behaviours. The predictors of maternal child-feeding style are maternal and child characteristics. Mothers reported using more restrictive feeding practices when they perceived daughters as overweight and reported using more pressure in child feeding when they perceived daughters as underweight. Mothers' child-feeding practices were related to mothers' own investment in weight and eating related issues, daughters' observable weight status, mothers' perceptions of daughters' weight status, and mothers' concern for their daughter developing a weight problem in the future. This model held for maternal restriction, in that mothers reported greater use of restriction in child feeding when they had greater weight and eating concerns of their own, when daughters were overweight, when they perceived that their daughters were at risk for developing a weight problem, and when they had concerns about daughters' weight[13].

These are only some of the aspects related to parental modelling and control over their children's eating styles and attitudes. It is therefore highly recommended to raise awareness on interventional programmes to educate parents on how to feed their children, and especially with focus on how parents should change their own eating behaviour, making them understand and recognize that their own eating behaviour is the most important source of information for their children.

Here are some recommendations to a positive eating behaviour addressed to parents, which may be included in parents' educational programmes (Eliassen, 2011). Ten Steps to Positive Eating Behaviours: 1) Provide a variety of foods at meals and snacks, especially whole grains, vegetables, and fruits; 2) Offer repeated opportunities to taste new foods; 3) Share with families nutrition resources, such as lists of foods (by category) to guide their food selections and offer new ideas for meals sent from home; 4). Apply the same guidelines to food selections in teachers' lunches brought from home; 5). Sit with children at meals, and enjoy

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[13] Scaglioni, S., Salvioni, M., & Galimberti, C., Influence of Parental Attitudes in the Development of Children Eating Behaviour. *British Journal of Nutrition*, 99, Suppl. 1, 2008, p. S22–S25.

conversation. Talk about the taste, texture, appearance, and healthful aspects of foods; 6). Plan adequate time for all children to finish eating; 7). Respect a child's expression of satiety or sense of being full; 8). Develop a routine for serving snacks, applying the same rules whether offering carrots, crackers, or cookies; 9).

Wash hands before snack and mealtime; encourage touching and smelling a food as a step toward tasting; 10) Find alternatives to using food as a reward or serving foods high in fat, sugar, or salt as part of a celebration.

Methodological approach

This is a pilot study conducted in order to evaluate the eating behaviour on children in relation to the family modelling.

It was a cross-sectional, descriptive study and included children aged 11, 13 and 15 years old from Arges county, of V, VII, respectively IX grade, both from the urban and rural environment. A total of 206 students were included in the study, as follows: 78 students from rural areas (36 students from the School with Grades I-VIII, Rădeşti village, and 42 students from the School with Grades I-VIII, Stâlpeni village,) and128 urban students (61 students from M.I.U. Industrial High Schooland 67 students from „I.C. Stâlpeni" High School, both from Stâlpeni village).

The data collection was done using an anonymous tool based on the questionnaire used for the HBSC (Health Behaviour in School-aged Children) study, 2009/2010 and 2005/2006. The questionnaire was previously validated by a team of experts and piloted for validation in Romania previously the implementation in 2005. The following dimensions were assessed: frequency of breakfast and dinner with the family, the place where the lunch is taken, frequency of snacks during playtime or computer work, family influence on the consumption of certain unhealthy foods, such as coke or other drinks containing sugar, sweets, chocolate, biscuits and other pastries, chips, the frequency of fast-food restaurants attendance and the compliance of family dining rules. From each school, one class corresponding to an age category was selected (for example, grade V, for the age group of 11 years old), and in order to avoid any potential problems of apparent discrimination of certain students, we have applied the questionnaire to the entire class.

Statistical processing of the data was done with the SPSS program, version 19.0. Proportions were calculated by age group for each variable of interest. The results obtained from urban area were compared by age

group with the national level from the HBSC study 2009/2010[14] (no children of 15 years old in rural area). Differences among rural and urban areas were analyses in age groups 11 and 13 years.

Results and discussion

The distribution of the study group on origin environments, age groups and genders showed that in the urban areas, 128 students were included in the study, of which 41 students were aged 11 years old (23 girls and 18 boys), 36 students aged 13 years old (15 girls, 21 boys) and 51 students aged 15 years old (25 girls and 26 boys). In the rural areas, the students included in the study were numerically lower than in the urban areas, and that is primarily because the school-age population is lower in rural areas, not all the population is attending school and the last but not least, the 15-year old students cannot be found in the rural schools as these have only secondary education. Thus, in the rural areas we studied the eating behaviour in a number of 78 students, of which 42 were aged 11 years old (26 girls and 16 boys) and 36 students were aged 13 years old (19 girls and 17 boys).

Table 1. Subjects' distribution by age, gender and origin environment

	Urban		Rural		Total	
	Girls(n)	Boys(n)	Girls(n)	Boys(n)	Girls (n)	Boys (n)
V grade (11 years)	23	18	26	16	49	34
VII grade (13 years)	15	21	19	17	34	38
IX grade (15 years)	25	26	0	0	25	26
Total by gender	**63**	**65**	**45**	**33**	**108**	**98**
		(n)	(%)		(n)	(%)
Gender	Girls	108	52.43	Boys	98	47.57
Origin environment	Urban	128	62.14	Rural	78	37.86

The healthy eating habits are formed by dining at home together with family. It is good that at least breakfast and dinner should be reserved to the whole family. In order to see how often this happens in the study students' families, the questi-onnaire contained the following two

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[14] Băban, A., Crăciun, C., Stan, A., Balazsi, R., Vonas, G., Popescu, A.M., Cosma, A. et al., *Eating Behaviour and Physical Activity with the Romanian Students*, Cluj Napoca, Risoprint Publishing House, 2011, p. 143.

questions: How often do you have breakfast with your mother or father?, or How often do you take dinner with your mother or father?
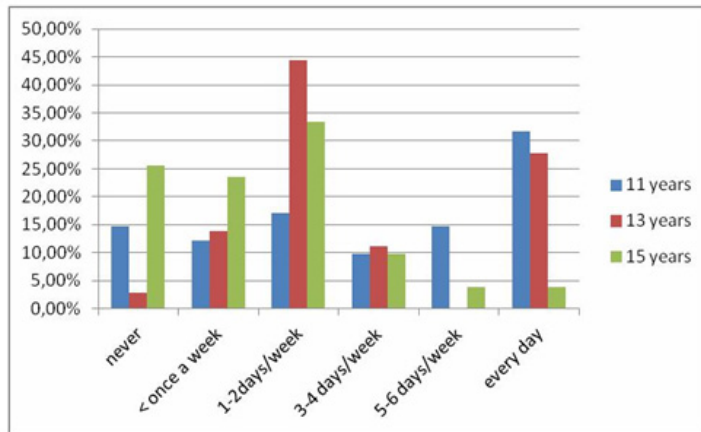
Figure 1. Frequency of family breakfast in children aged 11, 13 and 15 years old in the urban areas, in the study group

According to the study results presented in the above figure, the reported percentage of students having breakfast with the family, daily or almost daily (5-6 days/week) decreased from 46.34% in age-group of 11 years to 7.84%, in age-group of 15 years. High percentage of students of 13 years old (44.44%) and of 15 years old (33.33%) said they had breakfast with their mother or father, 1-2 days a week, while most of those of 11 years old (31.70%) said they took breakfast at home daily. It is not to neglect the fact that a quite important percentage of students do not take breakfast in the family ever and this percentage increases by age (from 14.64% in 11-years age-group to 25.50% in 15-years). The lack of this family practice can be one of the explanations for the relatively high percentage of children who do not serve this meal with parents, daily. Another reason could be the discrepancy between the parents' work schedule and the start times at school, so parents do not have time to prepare breakfast, leaving this to children, while these ones from convenience or from the desire to sleep more or even for loosing weight (especially the girls) are skipping this important meal of the day.

Family meals improve the communication between parents and children, resulting in reducing the risk of the latter to have behavioural or antisocial problems in adolescence. Families that eat together develop healthier, sustainable and meaningful relationships, and regardless of age, everyone will learn a lot from one another.

Children who are hungry during school have limited benefits from education both in developed and developing countries[15] while younger children may be impaired in their ability to interact effectively with their physical and social environments[16].

Teenagers can benefit by including them in the family as future adults and can gain a sense of the value of its own and care for their loved ones. Regular family meals are associated with a better nutrition and therefore, with a lower risk of having weight problems.

The breakfast in the family is a rare phenomenon among the children in the study group and the same situation is seen in the HBSC survey results (Baban et al., 2011). By opposite, the family dinner is a more common event, probably because in the evening, all family members are present at home. Thus, high percentage of children at all ages said they took dinner with parents daily (65.85% of the students of 11 years old, 50% of those of 13 years old and 29.41% of those of 15 years old).
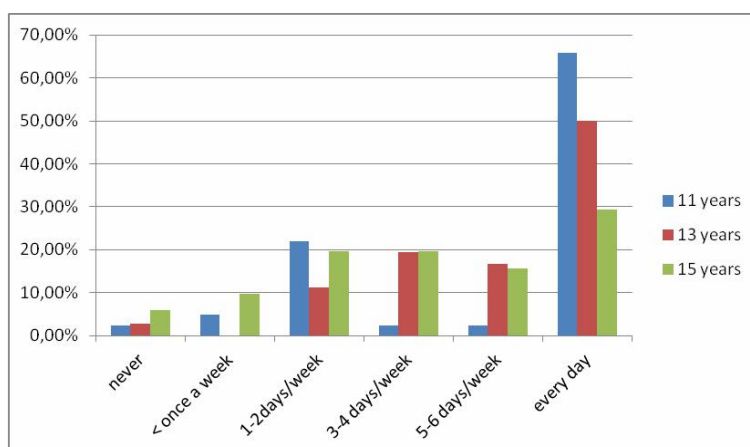
Figure 2. Family dinner frequency in the 11, 13 and 15 years old in the urban environment, in the study group

However, some students declared they served dinner with parents 1-2 days a week (21.95% students of 11 years old and 19.60% students of 15 years old) or 3-4 days a week (19.45% students of 13 years old and 19.60%

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[15] Winicki, J., & Jemison, K., Food security and hunger in the kindergarten class-room: its effect on learning and growth. *Contemporary Economic Policy*, 21(2), 2003, p. 145-157.

[16] Maggi, S., Irwin, L., Siddiqi, A., Poureslami, I., Hertzman, E., & Hertzman, C., *Early Child Development, Analytic and Strategic Review Paper*: International Perspectives on Early Child Development for the World Health Organization's Commission on the Social Determinants of Health, 2005, p. 183.

students of 15 years old). This increased trend of attending family dinner was also recorded in the results of the HBSC study, 2009/2010 (Baban et al., 2011).

For the study of eating habits in children, it is important to observe not only what they eat, but also where they eat, which is why we considered useful the question: Where do you usually have lunch on school days?

The comparative study of the children of 11 and 13 years old, on origin environments, shows that the majority of the subjects in the rural environment, both of 11 years old (83,33%) and those of 13 years old (80,55%) said that, during school days, they usually took lunch when they arrived at home, while the highest percentage of the students of the same age in the urban environment, said they ate at school (53,66% students of 11 years old, respectively 63,89% students of 13 years old). Having lunch at school is not very appropriate because the schools do not have lunch facilities usually, so the lunch is replaced by a snack. However this is a very common fact especially in urban areas, due to the school program (afternoon classes for grades V to VIII).

Another assessed behaviour refers to the frequency with which children serve a snack while watching TV, working or playing on the computer, because eating at the same time with performing another activity (in the young people, most commonly watching television or working on the computer) is a reliable source of overeating. Eating in front of TV or computer does not represent a ritual for children to develop later an ordered and healthy lifestyle, moreover, the children have no longer the opportunity to communicate, they lose the harmonious family model and grow up with incomplete notions about what entails responsibility and family communication. Another issue is that in time, this caprice will become an unhealthy habit, if we consider that the young people prefer to eat while watching TV or playing/working on computer, foods with many calories and nutritionally poor (chips, popcorn, seeds, sweets).
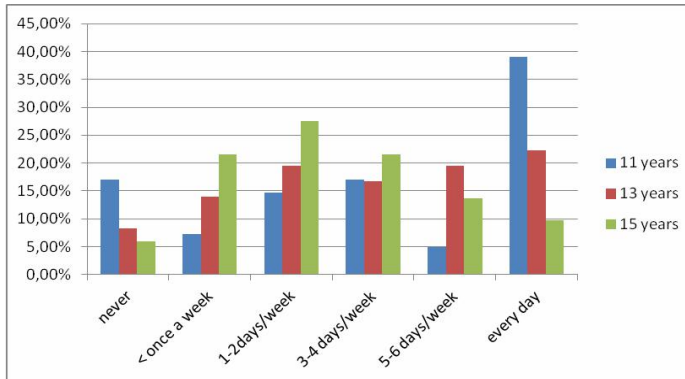
Figure 3. Frequency of eating snacks while watching TV or playing/working on the computer in the students of 11, 13 and 15 years old, in the urban environment

A small percentage of all students (17,07% students of 11 years old, 8,34% students of 13 years old and 5,89% students of 15 years old) said they did not ever get snacks while watching TV or playing/working on the computer, which shows that students and their parents know the negative effects of this practice on health. By opposite, high percentage of children declared they eat snacks while watching TV daily and this percentage seems to be higher in younger age. At national level, too, the tendency of associating snacks daily with viewing the TV programmes or with computer activities is growing, being reported by about one-third of the children and adolescents (Baban et al., 2011).

Eating fast food is increasing worldwide and that is due to the convenience of cooking, to quickly purchasing the desired menu, due to the variety of menus and promotions with discounts for increasing helpings. In order to find out how often students consume such foods, we included in the questionnaire the following question: How often do you eat at a fast-food restaurant?
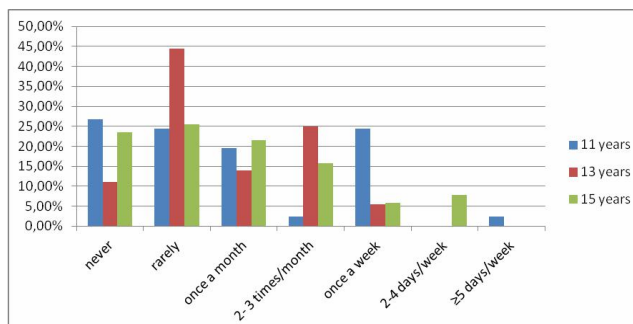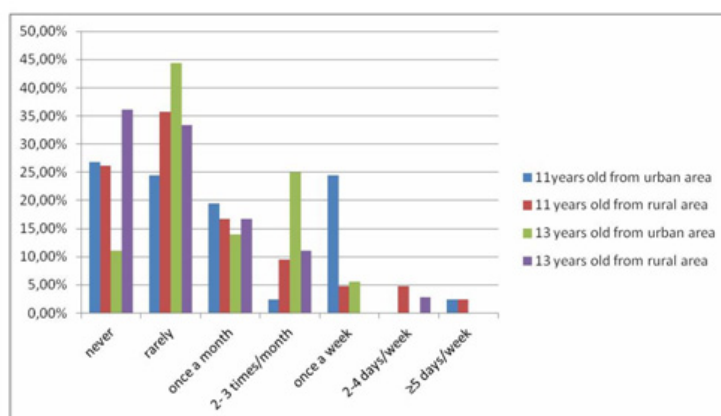

Figure 4. Frequency of eating at fast-food restaurants in the students of 11, 13 and 15 years old in the urban areas

Although at national level, the HBSC 2009/ 2010 survey results show that between 14% and 25% of students eat at least once a week (up to 5-7 times per week) at a fast-food restaurant (Baban et al., 2011), in the present study, only a percentage of 15.62% have this habit. Highest percentage of the students of 13 years old (44.45%) and of 15 years old (25.50%) said they go less than once a month at a fast-food restaurant, while 26.83% of the fifth grade students and 21.1% of the total of 128 students included in the study said they have never been to such a restaurant. It would be good if children but not only, should consume only occasionally these products, which have important con-sequences for their health and the quality of life.


Figure 5. Frequency of eating at fast-food restaurants among the students of 11 and 13 years old, compared on origin environments

The largest percentage of the respondents of 11 and 13 years old, both from the urban and rural areas, answer to the question regarding the frequency of meals taken at fast-food restaurants, that they do not attend such restaurants at all (26.82% of the 11-year old students in the urban areas and 36.11% students of 13 years old in the rural areas) or very rarely (35.71% the 11-year old students in the rural area and 44.44% of the students of 13 years old in the urban areas). The percentage of those who often attend such restaurants (2-4 days a week, or 5 or more days per week) is overall small, but apparently higher in the rural areas (5.12% students) than in the urban ones (1.30% students). This could be due to the novelty of the fast food restaurants in rural areas.

In order to see the role of the parents in modelling a healthy food behaviour in their children, we chose to address the following question

included in the questionnaire: Are you being offered the following things (cola, sweets, pastries, chips) from parents if you ask for them?
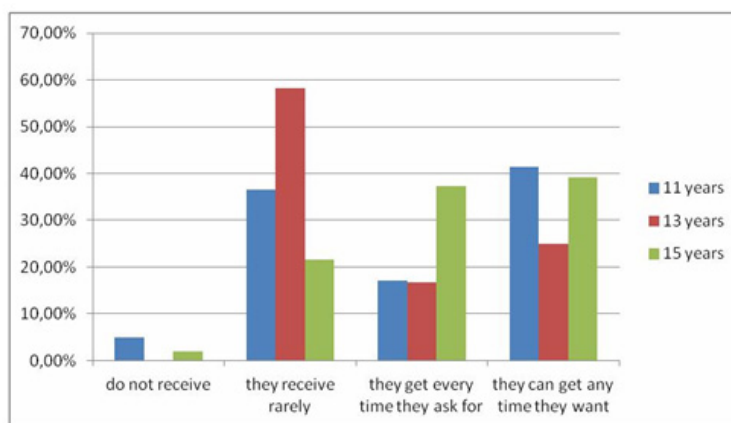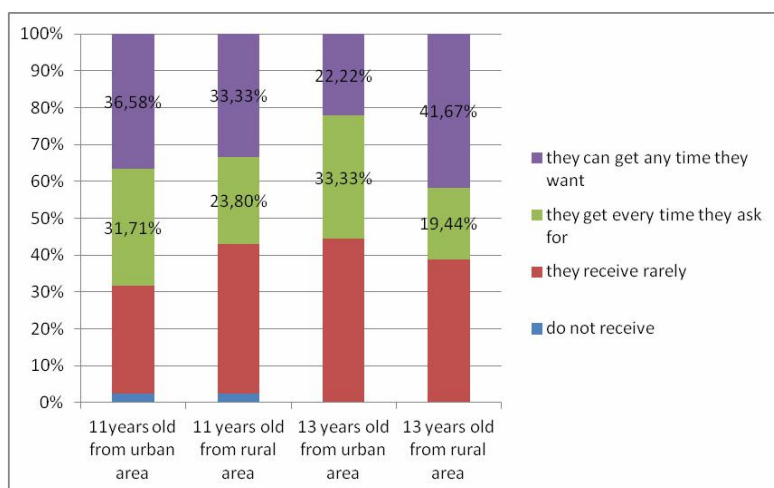

Figure 6. Family influence on the consumption of cola or other soft drinks containing sugar among the children of 11, 13 and 15 years old in the urban areas

41.46% of the students of 11 years old, 25% and 39.22% of those of 13 and 15 years old respectively said that they are allowed to consume cola or other soft drinks that contain sugar whenever they want, without any restriction from their parents. Another 17.08%, 17% and 37.26% of children of 11, 13 and 15 years old respectively said they receive soft drinks every time they ask for. It seems that the consumption of soft drinks containing sugar, including the well-known cola is only partly restricted in some subjects, as long as around half of them get this products whenever they want or ask for. On the contrary, only 41,46%, 58.33% and 23.52% of the 11, 13 and respectively 15 years old subjects receive rarely or never soft drinks in urban areas. In rural areas, 33,33% of 13 years old do not have any restriction from their parents regarding the consumption of such soft drinks, being allowed to consume them any time they want. It seems that this unhealthy food behaviour has its origin in the family behaviour, meaning that first of all, parents should become aware about the negative effects of such food products on their health and in particular, on the development of healthy eating habits of the future adults. The situation seems more severe in rural areas.

Although parents should know the effects of the excessive consumption of refined sweets on children (increased risk of tooth decays, phosphate-calcium metabolism disorders, weight excess, vitamins deficiencies), it seems that the family influence regarding the consumption

of such food products is not quite favourable because in this situation, as well, as in the consumption of soft drinks, the highest percentage of children of 11 and 15 years old (36.59% and 43.14%) responded that they can eat whenever they want sweets or chocolate, their parents having nothing to reproach in this respect, while a percentage of 44.44% of students of 13 years old say they sometimes receive sweets from their parents, which means that however there are students who benefit from a supervised eating behaviour by their parents, so that not to create any excess.

Figure 7. Parental influence on the consumption of sweets in the children of 11 and 13 years old, compared on origin areas

By comparatively studying the origin environment of the 11 and 13-year old students in terms of parental influence on the consumption of sweets, the same trend has been observed as for coke consumption, most students 11 years from urban area (36.58%) and 13 years from rural area (41.67%) being allowed to consume the sweets they want, and 40.48% of students 11 years from rural area, respectively 44.44% students 13 years from urban area receive only sometimes the sweets they ask from parents. A fairly large percentage of subjects, much higher in the urban areas, say they receive sweets whenever they ask from their parents, and hence we conclude that parents are unaware of the effects of the excessive consumption of sweets and the practice of rewarding the children with sweets for certain facts or excellent results at school still exist.

Regarding the use of cookies and other pastries, the highest percentage of students of all ages in the study group (43.90% of students

of 11 years old, 44.44% of those of 13 years old and 41.18% of those of 15 years old) respond that they can eat whenever they want, followed closely by the relatively high percentages of students who say they get these products whenever they ask for them from their parents (39.02% of the students of 11 years old, 33.33% of the students of 13 years old, 41.18% of the students of 15 years old).

As for the consumption of chips, only a percentage of 12.5% of the total number of the students included in the study, say they never get chips if they ask for them from their parents, otherwise 31.70% of the students of 11 years old and 35.3% of those of 15 years old, say they can eat chips whenever they want, and 38.89% of the students of 13 years old receive chips from their parents whenever they ask for.
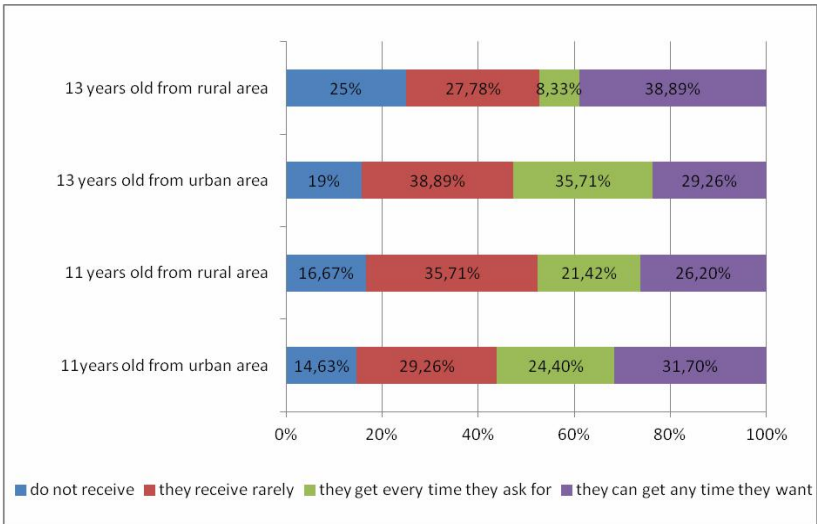

Figure 8. Parental influence on the consumption of chips in the students of 11 and 13 years old, compared on origin environments

Neither in terms of chips consumption, which is supposed to be among the most common obesogen products, the students of 11 and 13 years old, both from the urban and rural areas, seem to have no restriction from parents. The same as in the case of sweets or soft drinks sweetened with sugar, most of the students of 11 years old in the urban areas (31.70%) and of 13 years old in the rural areas (38.89%) may consume this product whenever they want, while 35.71% of the rural students of 11 years old and 38.89% of those of 13 years old in the urban areas, receive chips whenever they ask for from their parents. It is pleasing that a significant percentage has been registered among those who are aware of

the harmful effects of these products and they never give them to their children, the highest percentage being recorded in the subjects of 13 years old in the rural areas (25%).

The mistakes parents make in educating their children's food behaviour are highlighted by the question in the questionnaire covering certain statements about the rules and table manners.
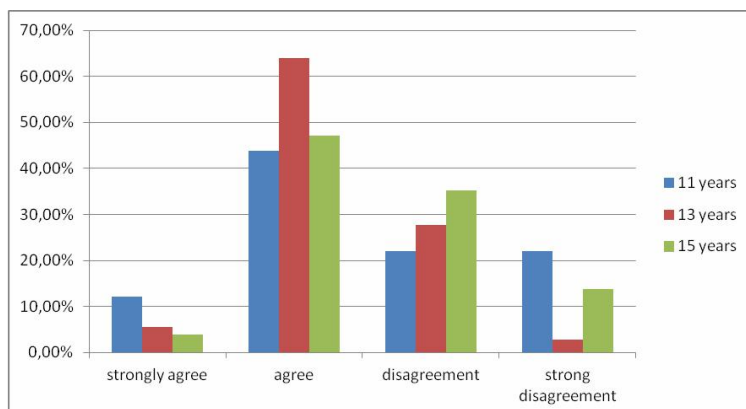
Figure 9. Children's opinion of 11, 13 and 15 years old in the urban areas about the rules they must comply with at table

The highest percentage of students of all ages (43,90% of the students of 11 years old, 63,89% of those of 13 years old, respectively 47,06% of those of 15 years old) agreed that every family have certain rules at table and parents expected from their children to follow them. A significant percentage (42.18%) of all students taking in the survey say they disagree or strongly disagree with the fact there are certain rules within their family that should be observed, reason for which we can deduce the influence of the family, through the rules imposed on the food behaviour.

Both the students from the urban and rural areas agree or strongly agree that the good manners at table are important. The percentage of those who agree with this statement is higher in the rural areas (71,42% students of 11 years old, respectively 58,33% students of 13 years old) and this is probably because in the urban areas, both the parents and the children are overwhelmed by the disorganized schedule of the family meals, forgetting about the good manners. We must consider, however, that the habits learned in childhood are turned in reflex acts, in lifestyles during adulthood, reason for which parents are responsible for the children's right or wrong skills.

Conclusions

The distribution of the study population showed a prevalence of subjects from urban areas and a slight domination of girls. They predominate in the urban areas in the ages group of 11 and 13 years old, while in rural, only in age of 11 years old. The habit to have breakfast in family every day or 5 - 6 days per week was found in less than half of the study subjects and the proportion decreased by age increasing from 46.34% in 11 years to 7.84% in 15 years age-group respectively. Meanwhile, 14.64% and 25.50% of children aged 11 and respectively 15 do not take breakfast in the family ever. By opposite, the situation is much better in relation to dinner. Most of the children have daily dinners with parents, even the proportion decreases by increasing age. Lunch is served mostly at school in urban areas, in accordance to the school program. Due to the lack of eating facilities in schools, lunch is probably replaced by a snack. In rural areas lunch is served mostly at home because the schools program is scheduled in the morning.

Only small percentages of students did not ever get snacks while watching TV or playing/working on the computer. The phenomenon is more frequent in younger age, corresponding to the growing trend reported at national level. Fast food restaurants are visited once per week by 15.62% of the responders while 21.1% said they have never been to such a restaurant. The phenomenon is registered both in urban and rural areas (apparently more present in rural).

Low level of awareness was observed in parents in relation to consumption of soft drinks, sweets and chips. More than half of the children (all ages) are allowed to consume cola or other soft drinks that contain sugar without any restriction from their parents, the situation being more acute in rural areas. Also high pro-portions of children are allowed to eat whenever they want sweets or chips. Moderate compliance was found in relation to family dining rules. Around half of the children agreed that every family have certain rules at table and parents expected from their children to follow them, but 42.18% of all students taking in the survey said they disagree or strongly disagree with the family dining rules. Our study is a pilot unfolded in only one county of Romania. However, the results are quite concerning, showing limited involvement of the parents and moderate influence of family modelling in relation to the children eating behaviour. More extended research is needed to confirm the situation at national level and to understand its causes. These should be followed by specific interventions aiming to raise awareness of

the parents about their major role in influencing the children and in creating the basic premises for a healthy lifestyle in their adult life.

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PROMOTING PHYSICAL ACTIVITY FOR REDUCING THE SEDENTARY BEHAVIOUR OF CHILDREN

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Abstract: *The high prevalence of overweight and obesity among children necessitates the need to promote physical activity and reduce sedentary behaviors in children. Consequently, there is a need to be able to reliably and accurately measure physical activity and sedentary behaviors in children. Unfortunately, there is no one measurement tool that captures physical activity and sedentary behaviors perfectly. When choosing a measurement tool to assess physical activity and sedentary behavior, researchers and practitioners must be aware of the strengths and limitations of each measurement. To assist practitioners in choosing the appropriate measurement tool for the desired study, we overviewed the most common methods currently being used to measure physical activity and sedentary behavior in children, noting the strengths and limitations of each instrument.*

Keywords: *assessment, exercise, measurement, behaviour sedentary.*

Introduction

The high prevalence of overweight and obesity among children necessitates the need to promote physical activity and reduce sedentary behaviors in children across an array of environmental settings. Consequently, it is important that researchers and practitioners have the ability to accurately and reliably measure physical activity and sedentary behaviors. An accurate and reliable measure of physical activity and sedentary behavior will help us better understand: (1) the association between these behaviors on health out-comes, (2) the dose of physical activity required to elicit favorable health outcomes, (3) determinants of physical activity and sedentary behavior, and (4) the impact of physical activity and sedentary-reducing interventions on the prevalence of overweight and obesity in children. Notably, measuring physical activity in children is particularly challenging as, unlike adults, children's physical

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activity patterns are intermittent rather than occurring in continuous time periods. As a result, physical activity measures designed specifically for children are necessary to ensure their intermittent activity patterns are captured.

Currently, a wide variety of measures are used to assess the physical activity behaviors of children. The most common methods used include self-report measures such as questionnaires, proxy-report from parents and teachers, and objective measures such as heart rate, accelerometry, pedometers, direct observation, and doubly-labeled water. When determining which method to use, there is no easy choice as each method has strengths and limitations. Factors that influence the selection of a physical activity measurement tool include population (age), sample size, respondent burden, method/delivery mode, assessment time frame, physical activity information required (data output), data management, and measurement error and cost (instrument and administration)[1].

Time spent watching television or engaged with other technologically-based sedentary behaviors, such as computer use or playing video games, are the most commonly measured sedentary behaviors in children. To measure these, data are usually acquired using self-report surveys, self-report diaries, parental reporting for children, or direct observation. In the narrative that follows, common methods currently being used to measure physical activity and sedentary behavior in children and adolescents are summarized in greater detail.

Measuring Physical Activity Behavior

Self-report
Self-report measures that are used to evaluate the activity behavior of children include self-administered recalls, interview-administered recalls, and diaries. Self-report measures of physical activity are commonly used in epidemiological research because they are relatively simple to administer, fairly inexpensive, and have the ability to provide information on the type and context of physical activity in a large sample of individuals. However, limitations to the use self-report methods include item interpretation, recall, and social desirability effects. With regard to recall, the sporadic activity patterns and short duration of bouts make it

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[1] Dumitraşcu, Coca, *Together for the Students' Well-Being*, Grafit Publishing House, Bacău, 2005, p. 160.

very difficult for children to recall their physical activity behavior[2]. Children often overestimate the amount of time engaged in physical activity, as well as the intensity of their physical activity participation.

Several comprehensive reviews have summarized the literature evaluating the reliability and validity of self-report measures developed for children and adolescents. Overall, for self-report measures, reliability coefficients ranged from 0.56 to 0.93 and validity coefficients ranged from 0.03 to 0.88. Importantly, lower validity coefficients were observed for children compared to adolescents. Therefore, studies involving children 10 years or younger should rely on objective measures of physical activity, or if this is not feasible, rely on parental reports of child physical activity.

Proxy-report

Children under 10 are not able to accurately or reliably report their physical activity patterns, therefore, one alternative for estimating the physical activity patterns of children in this age group is to ask parents or teachers to report the child's activity behavior. Sallis (1991) and Sirard and Pate (2001) have provided a review of proxy reports of child physical activity. Sallis (1991) showed that for proxy reports, activity estimates were moderately correlated with activity monitor counts *(r = 0.41–0.60)*. However, there was no association when proxy reports were com-pared to direct observation and heart rate data. Sirard and Pate (2001) identified three studies examining the reliability and validity of proxy reports of physical activity. For proxy reports by parents *(r = −0.19–0.06)* or teachers *(r = −0.13–0.04)*, activity estimates were not associated with direct observation. However, proxy reports by teachers were significantly and positively associated with accelerometry *(r = 0.41–0.66)*. When heart rate was used as the criterion measure, significant positive associations were observed for both parent *(r = 0.72–0.82)* and teacher proxy reports *(r = 0.07–0.59)*.

Overall, proxy-reporting methods have some promise in providing accurate estimates of young children's physical activity behavior. Using the parent or teacher as a proxy respondent for young children, recall bias caused by children's limited cognitive ability can be avoided. However, improving proxy-reporting methods is essential if this type of measure is

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[2] Hu FB, Li T, Colditz GA, Willett WC, Manson JE. *Television watching and other sedentary behaviors in relation to risk of obesity and type 2 diabetes mellitus in women*. JAMA 289, 2003, p. 120-123

to be successfully used in large epidemiological research and surveillance studies.

Heart rate

Heart rate monitoring is an attractive approach for assessing physical activity as it provides an objective, but indirect, assessment of the frequency, intensity, and duration of physical activity in children. Additionally, it is relatively inexpensive and unobtrusive. A well-documented problem with using heart rate monitoring is the weak relationship between heart rate and energy expenditure during high and low-intensity levels. Using heart rate monitors may introduce measurement error as most children spend a large percentage of their day in sedentary and light activity[3]. Additionally, the heart rate energy expenditure relationship may be influenced by age, body size, environ-mental (e.g., ambient temperature and humidity) and emotional stress, and cardiorespiratory fitness. Another limitation of heart rate monitoring is that there is a delay in heart rate response after movement. This may mask the intermittent activity patterns of children.

In an effort to overcome some of these limitations, researchers have used various techniques such as con-trolling for individual differences in resting heart rate and performing individual heart rate oxygen consumption calibration curves. With regard to controlling for individual differences in heart rate, three common approaches have been used: (1) physical activity heart rate (PAHR) index (mean of the recorded heart rate minus resting heart rate), (2) PAHR-25 (percentage of heart rates 25% above resting heart rate), and (3) PAHR-50 (percentage of heart rates 50% above resting heart rate). Importantly, all three of these techniques depend on an accurate assessment of resting heart rate. Unfortunately, there is great variability across studies in the operationalization of resting heart rate and the protocol used to measure resting heart rate[4]. Depending on the definition or protocol used, estimates of physical activity can vary considerably.

Another approach to assessing physical activity using heart rate monitoring is to create an individual calibration curve by assessing the relationship between heart rate and oxygen consumption for each

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[3] Dragnea, A. (coord.), *The Theory of Physical Education and Sports*, School Book Publishing House, Bucharest, 2000, p. 192.

[4] Anton Moisin, *The Art of Educating Children and Teenagers in School*, D.P. Publishing House, 2001, p. 183.

participant. A common approach for obtaining individual heart rate oxygen consumption curves is using the HR flex method. To estimate oxygen consumption, this method uses the linear prediction equation for heart rates above the HR flex point. For heart rates below the HR flex point, the average of a series of heart rates obtained during rest is used. This method appears to exhibit reasonable accuracy at the group level; however, at the individual level, heart rate-based estimates of energy expenditure, compared with doubly-labeled water, exhibited large differences ranging from −16.7% to 18.8% [5].

Overall, the strengths of using heart rate monitoring to assess children's physical activity patterns are that it is an objective assessment that is inexpensive and fairly unobtrusive. However, drawbacks for using heart rate monitoring to assess children's physical activity pat-terns include: (1) the variability across studies in the operational definition of resting heart rate and the protocol used to measure resting heart rate, (2) contribution of other factors that influence heart rate, and (3) the impracticality of using heart rate monitoring in large epidemiological and surveillance studies.

Accelerometry

Accelerometers have become one of the measures of choice for assessing children's physical activity. Accelerometers are relatively small (as small as a wristwatch and no larger than the size of a pager), lightweight, and are typically worn around the waist on an adjustable belt. Accelerometers record the frequency and magnitude of the body's acceleration during movement. As acceleration occurs, the acceleration signal from the accelerometer is digitized and generates an "activity count". Activity counts are then summed over a pre-determined time interval or epoch (e.g., 1 second, 5 seconds, 15 seconds, 30 seconds, 1 minute). The activity count value can then be entered into a prediction equation to estimate physical activity intensity (i.e., sedentary, light, moderate, vigorous) or energy expenditure. Most accelerometers have the battery life and memory capacity to record short epoch data (e.g., 5 seconds) for up to several weeks, making this objective measure ideal for capturing children's intermittent physical activity.

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[5] Epuran, M., The *Methodology of Corporal Activities Research*. Physical Exercises, Sport. Fitness FEST Publishing House, 2005, p. 210.

Validity

To date, numerous studies have validated different accelerometers for use in children. Sirard and Pate (2001)[6] reviewed 17 studies investigating the validity of accelerometry in children. Of these, nine studies used a Caltrac accelerometer with direct observation and indirect calorimetry serving as the most frequently used criterion measure. When direct observation was used as the criterion measure, associations ranged from r = 0.16 to 0.86. For indirect calorimetry, associations ranged from r = 0.80 to 0.85. The other eight reviewed studies used other accelerometers such as LSI (Large-Scale Integrated Motor Activity Monitor), CSA (Computer Science Application), Tritrac, Mini-logger, and Actical. These accelerometers were also most frequently validated against direct observation and indirect calorimetry. For direct observation, associations ranged from r = 0.38 to 0.87. For indirect calorimetry, associations ranged from r = 0.37 to 0.94 for studies using ambulatory activities. One study investigated the validity of the Mini-logger using a cycling protocol and reported a correlation between r = 0.06 and 0.15. This lower correlation addresses the recognized limitation of accelerometry in that they do not accurately measure activities such as cycling. Overall, studies using indirect calorimetry show a strong positive correlation with accelerometry (i.e., typically greater than 0.7). The large variation in the association against direct observation may be a reflection of the type of activity monitored and large variations in the ages of children being studied.

Reliability

With regard to the reliability of accelerometry-based activity monitors, few of the studies reviewed by Sirard and Pate (2001) evaluated evidence of reliability. Of those that did, one study showed the Caltrac and CSA accelerometers had a high correlation (r > 0.86) between accelerometers placed on the right and left hips, whereas another study showed a statistically significant, but not physiologically important, difference between CSA counts from the left and right hips (32 counts·min^{-1} difference) (Fairweather et al. 1999). During treadmill trials, test–retest reliability (7–13 days) for the Mini-logger ranged from 0.61 to 0.84, and that for the Caltrac accelerometer from 0.76 to 0.80[7].

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[6] Sirard JR, Pate RR., *Physical Activity Assessment in Children and Adolescents*. Sports Med 31, 2001, p. 150.

[7] M.S., I.O.M.C., *Guideline regarding Obesity screening for Children*, Oscar Print Publishing House, 2010, p. 201-203.

Uni- versus tri-axial accelerometers

Physical activity patterns of children comprise short bursts of spontaneous play that are episodic (Bailey et al. 1995). It is also thought that children's intermit-tent activity patterns involve movement in multiple planes. Because of this, it is suggested that an accelerometer that detects movement in multiple planes (i.e., tri-axial) is more accurate for measuring physical activity intensity than an accelerometer detecting movement in only one plane (i.e., uni-axial). To date, few studies have examined whether tri-axial accelerometers are more accurate than uni-axial accelerometers at estimating energy expenditure or physical activity intensity in children[8].

Eston et al. (1998) had 30 children (mean age: 9.3 ± 0.8 years) walk on a treadmill at 4 and 6 km·hr^{-1} and participate in various play activities (i.e., catch, coloring, and hopscotch) while wearing a Tritrac accelerometer (tri-axial) and ActiGraph 7164 accelerometer (uni-axial). Using indirect calorimetry as the criterion measure, the Tritrac vector-magnitude accel-erometer counts (r = 0.74–0.93) and ActiGraph 7164 accelerometer counts (r = 0.69–0.85) exhibited similar correlations.

Also examining the association between accelerometer counts from the Tritrac and ActiGraph 7164, Louie et al. (1999) employed a similar protocol as Eston et al. (1998) by having 21 Chinese boys, aged 8–10 years, walk (4 and 6 km·hr^{-1}) and run (8 and 10 km·hr^{-1}) on a treadmill, play catch, play hopscotch, and color. During these activities, accelerometry and indirect calorimetry were concurrently measured. Overall, when all activities were combined, the correlation between scaled and Tritrac vector magnitude counts was r = 0.94; VO2 the correlation between scaled VO$_2$ and ActiGraph 7164 accelerometer counts was r = 0.86. For treadmill activities and unregulated play activities, the correlation between scaled VO$_2$ and Tritrac vector magnitude counts was r = 0.93 and r = 0.93, respectively. For treadmill activities and unregulated play activities, the correlation between scaled VO$_2$ and ActiGraph 7164 counts was r = 0.81 and r = 0.88, respectively. These two studies demonstrate that tri-axial and uniaxial accelerometers report similar correlations with VO$_2$. These results are similar to findings from Rowlands et al. (2004) who showed that RT3 counts in the vertical plane did not differ from the RT3 vector magnitude counts among 19 boys (mean age: 9.5 ± 0.8 years) during treadmill

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[8] Eston RG, Rowlands A, Ingledew DK. *Validity of heart rate, pedometry, and accelerometry for predicting the energy cost of children's activities.* J Appl Physiol 84, 1998, p. 89

(walking at 4 and 6 km·hr⁻¹, running at 8 km·hr⁻¹) and unregulated play activities (i.e., hopscotch, kicking a ball, or sitting). When all activities were combined, the correlation between vertical counts and vector magnitude counts with scale VO_2 were $r = 0.86$ and $r = 0.87$, respectively. For the treadmill trials, the correlation between vertical counts and vector magnitude counts with scaled VO_2 were $r = 0.86$ and $r = 0.89$, respectively. For the unregulated play activities, the correlation between vertical counts and vector magnitude counts with scaled VO_2 were $r = 0.81$ and $r = 0.82$, respectively.

Overall, the current evidence suggests that tri-axial accelerometers are not superior to uni-axial accelerometers at estimating energy expenditure in children. However, to draw firm conclusions, additional studies are needed that compare the physical activity intensity classification accuracy of tri- and uni-axial accelerometers.

Epoch length

As mentioned, children engage in intermittent pat-terns of play. As a result, epoch length may play an important role in the estimation of time spent at different physical activity intensities. Longer epoch lengths, such as 1 minute, may mask children's spontaneous, discontinuous patterns of play. This may result in underestimations of time spent at higher intensities (e.g., MVPA).

To date, few studies have examined the effect of epoch length on time spent at different physical activity intensities. However, only one study has employed a criterion measure to compare accelerometry estimates against[9].

McClain et al. had 32 5th grade students (mean age: 10.3 ± 0.5 years) wear an ActiGraph 7164 accelerometer during a single physical education class lasting approximately 30 minutes. During the class, participating children were video-recorded with the videotapes later used for direct observation using C-SOFIT (Computer System for Observing Fitness Instruction Time). Accelerometers were initialized to 5-second epochs and then after data collection, re-integrated up 10-, 15-, 20-, 30-, and 60-second epochs. Accelerometry-derived time spent in MVPA was calculated separately based on count thresholds established. Results showed that for

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    [9] McClain JJ, Abraham TL, Brusseau TA Jr, Tudor-Locke C. *Epoch length and accelerometer outputs in children: comparison to direct observation*. Med Sci Sports Exerc 40, 2008, p. 143

the Treuth and Mattocks cut-points, the shortest epoch length, 5-second epoch, produced the smallest differences compared to direct observation MVPA. For the Freedson cut-points, all epochs yielded similar mean estimates of MVPA versus direct observation MVPA.

These results suggest that both epoch length and activity count cut-point can influence children's estimates of MVPA. Future studies using a criterion measure are needed to further examine the effect of epoch length on estimates of physical activity intensity in children.

Number of monitoring days required

Researchers are interested in selecting a monitoring protocol that is long enough to reflect children's habitual physical activity behavior, but not too long that it becomes a burden to participants. To determine the amount of monitoring days required to capture children's usual physical activity patterns, Trost et al. (2000) had 381 students ($n = 92$ in grades 1–3; $n = 98$ in grades 4–6; $n = 97$ in grades 7–9; $n = 94$ in grades 10–12) wear an ActiGraph 7164 accelerometer for 7 consecutive days. Spearman-Brown analyses indicated that between 4 and 5 days of monitoring was necessary to achieve a reliability of 0.8 in children, and between 8 and 9 days of monitoring was necessary to achieve a reliability of 0.8 in adolescents. These results indicate that a 7-day monitoring protocol provides reliable estimates of usual physical activity behavior in children and adolescents. Also, significant differences in MVPA were observed between weekend and week-days; therefore, it is recommended that the monitoring protocol include at least 1 weekend day.

Calibration studies

Most investigations using accelerometers to measure children's physical activity are interested in estimating energy expenditure or quantifying time spent at different physical activity intensities (e.g., MVPA). In an effort to use accelerometer output to estimate energy expenditure or quantify time at different intensities, investigators have developed prediction equations and their respective count cut-points by calibrating accelerometers to some criterion measure (e.g., indirect calorimetry). To date, several prediction equations/cut-points, using regression modeling or receiver operating curves, have been developed for various activity monitors. With the existence of multiple count cut-points, researchers must choose between count cut-points when reducing accelerometer data to estimates of physical activity intensity.

Unfortunately, they must make this choice in the absence of any population-based study simultaneously comparing the influence of the different cut-points on estimates of time spent in sedentary, light, and MVPA intensity.

In general, prediction equations/cut-points do not accurately estimate energy expenditure at the group or individual level; however, the majority of prediction equations/cut-points do a reasonable job of correctly classifying MVPA in children. Differences among cut-point values for each accelerometer may be a function of the differences in the age range of participants, differences in activities studied, and differences in the measurements systems used. The existence of multiple cut-points makes it hard for researchers to decide which cut-point to use when reducing accelerometry data. As a result, making comparisons between studies is difficult.

Sirard and Pate (2001) introduced an approach to accelerometer data processing that aims to indentify patterns in accelerometry data and use modeling to interpret the patterns found. Although speculative, using pattern recognition models may pre-vent some of the misclassification of activity intensity that often occurs when using activity count thresholds. Additional research on the development and validation of this approach is needed before widespread adoption occurs.

Pedometry

A cost-effective and well-tolerated alternative to accelerometers and heart rate monitors is to measure physical activity using a pedometer, which estimates the number of steps taken over a given period. Similar to accelerometry, pedometers are insensitive to certain modes of exercise such as bicycling.

Pedometers appear to be a valid measure of physical activity in children. During over-ground self-paced walking and during treadmill trials at comfortable speeds of locomotion (approximately 2.5–3.5 mph), the Digiwalker SW-200 and the Walk4Life 2502 have shown a strong association with steps measured by an observer (ICC > 0.90). However, at slower walking speeds (< 2.0 mph), there was a lower magnitude of association between pedometer steps and observed steps. Pedometers have also been compared against accelerometer counts ($r > 0.87$), oxygen uptake ($r = 0.806$) (Eston et al. 1998) and heart rate ($r = 0.622$) (Eston et al. 1998).

In addition to evidence of validity, pedometers appear to demonstrate evidence of reliability in children. Inter-instrument reliability has been

assessed by examining differences in pedometer steps between pedometers attached at different locations (e.g., left hip, right hip, and umbilicus). Although some studies show certain locations to be more accurate, most studies reported no differences in pedometer steps between attachment sites.

Although most pedometers are limited in that they only count the number of steps taken over a given period, they can provide estimates of overall activity, as in most populations, ambulatory movement contributes to the majority of overall activity. Because of this, its objectivity, and evidence of reliability and validity, pedometers are well suited for measuring physical activity in children.

Direct observation

Direct observation is a method by which a trained observer classifies children's free-living physical activity by objectively recording their activity behavior for a predetermined length of time. All recordings are entered into a computer-based or paper-and-pencil entry form. Observations typically occur in natural settings such as at home or during school.

Direct observation has a number of advantages over other measurement tools. First, it is an objective method that provides contextually rich data to identify other factors related to physical activity behavior (e.g., physical and social factors). Second, it can provide information on the type and intensity of physical activity. Third, it can be used in a variety of different settings. Lastly, with the development of software packages [e.g., BEST (Behavior Evaluation Strategies and Taxonomies), The Observer], data can be entered directly into a computer, handheld computer, and allow events to be coded directly from a videotape—all of which reduces error and speeds up analyses and reporting[10]. The main disadvantage of direct observation is the time-intensive nature of observer training and data coding.

Various observation systems have been developed and used in measuring the physical activity behavior of children. The CARS (Children Activity Rating Scale) observation system is a commonly used observation instrument where an observer rates the child's activity intensity level from sedentary to vigorous on a scale of 1 through 5 (1 = stationary – no

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[10] McKenzie TJ., *Use of Direct Observation to Assess Physical Activity*. In: Welk G (Ed.), Physical Activity Assessments for Health-related Research. Human Kinetics, Champaign, IL, 2002,p. 179–95.

movement; 2 = stationary – with movement; 3 = translocation – slow/easy; 4 = translocation – moderate; and 5 = translocation – fast). Another commonly used observation system is the OSRAC-P (Observational System for Recording Activity in Children—Preschool Version). This observational system uses the CARS observational instrument to code a focal child's activity level in a preschool setting. The observer also records the type of activity the designated child is engaged in (e.g., running, walking climbing), their location (indoors, outdoors), whether prompts for activity are occurring, and contextual factors such as playing in a group or solitary. Unlike CARS and OSRAC-P, SOPLAY (System for Observing Play and Leisure Activity in Youth) is an observation system that does not focus on the individual child but rather captures behavioral and contextual information in groups of children. The observer briefly scans the target area recording the number of boys and girls present, the activity level of each sex (sedentary, walking or very active), and the type of activity the children are participating in. Other contextual factors such as the presence of equipment are also recorded.

McKenzie (2002) showed that direct observation is a valid and reliable method for measuring children's physical activity. In his review, a total of nine observational systems were reviewed, and among these, eight demonstrated evidence of validity. Additionally, all nine demonstrated evidence of reliability with interobserver reliability coefficients greater than 0.84. Specifically, CARS, OSRAC-P, and SOPLAY have all been psychometrically tested. CARS has been validated against indirect calorimetry, accelerometry, and heart rate monitoring. In terms of reliability, CARS, OSRAC-P, and SOPLAY have all demonstrated evidence of reliability (McKenzie et al. 2002).

When observers are highly trained and follow a specific protocol, direct observation can provide valid and reliable estimates of the physical activity behavior of children. The ability to provide an objective assessment of physical activity as well as providing information on the type and context of physical activity makes direct observation an attractive method for measuring children's physical activity. Additionally, the use of video recording can increase the reliability of direct observation measurements as well as create a permanent record.

Doubly-labeled water
Another criterion measured used to measure children's physical activity in free-living environments is doubly-labeled water. This method

measures total energy expenditure over approximately a 2-week period by directly measuring carbon dioxide production. This involves ingesting a "heavy water" that contains two stable isotopes of water: deuterium-labeled water ($^2H^2O$) and oxygen-18-labeled water ($H_2{}^{18}O$). After the ingestion of the "heavy water," deuterium-labeled water is eliminated from the body through water loss (e.g., sweat) while oxygen-18-labeled water is eliminated as carbon dioxide and water loss. The difference between the elimination rates of these two stable isotopes is directly proportional to carbon dioxide production or energy expenditure.

In children and adults, doubly-labeled water has been validated against indirect calorimetry for subjects living in metabolic chambers. Overall, studies show that the doubly-labeled water technique is accurate within 10%, and consequently, has been considered a criterion or gold standard measure because of its precision.

There are several advantages of doubly-labeled water. First, the technique is noninvasive and provides an unobtrusive measure of energy expenditure in free-living environments. Second, when doubly-labeled water is combined with indirect calorimetry, it can measure individual components of daily energy expenditure. Third, energy expenditure can be assessed up to 2-week time periods. Major disadvantages of doubly-labeled water include the expense (up to US$300 per child), the availability of the stable isotopes, the inability to deter-mine the intensity, duration, and frequency of physical activity, and the inability to differentiate the components of energy expenditure. Given these limitations, the doubly-labeled water technique is not a feasible method for measuring children's free-living physical activity in large-scale epidemiological studies.

Measuring Sedentary Behavior

Given the independent association between sedentary behavior and negative health outcomes in adults, such as obesity and type 2 diabetes[11], the study of sedentary behavior and its association with health outcomes in children is emerging. Sedentary behavior is often assessed by the amount of time children spend viewing TV or other technologically-based sedentary behaviors, such as computer use or playing video games. However, these sedentary behaviors provide only a partial picture of overall levels of sedentary behavior in a typical waking day (Matthews et

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[11] Ford ES, Kohl HW 3rd, Mokdad AH, Ajani UA. *Sedentary behavior, physical activity, and the metabolic syndrome among US adults*. Obes Res 13, 2005, p. 130.

al. 2008). For example, Gorely et al. (2007) found that adolescent girls spend about 1 hour doing home-work, 45 minutes in motorized transport, and 30 minutes "sitting and talking" during each day of their leisure time (non-school).

Various methods have been used to measure screen-based time, including self-report surveys, self-report diaries, parental reporting for children, and direct observation. Recently, Gorely et al.. evaluated the methods used to measure TV viewing and summarized these methods' measurement properties. Among the 98 studies reviewed, 80% of the studies measured TV viewing by self-report surveys, 8% used self-reported diaries, 29% used parental report, and 5% used direct observation. Some studies were entered into more than one option; therefore, the percentages within the categories do not add up to 100%. Few of the reviewed studies used a measure that had been psychometrically tested. Of the 98 studies, 14 examined test–retest reliability and 15 assessed some form of validity. Of these, seven studies were assessed for both reliability and validity. Test–retest reliability ranged from $r = 0.13$ (measured 2 weeks apart) to $r = 0.98$ (measured 1 hour apart). Only 4 of the 15 studies assessing validity used an objective measure of TV viewing as a criterion method (e.g., direct observation). The remaining 11 studies reported correlations with other self-reported or objective measures of physical activity. Although it is suggested that TV viewing displaces time that would otherwise be used for physical activity, using a physical activity measure as a criterion measure to validate sedentary surveys is inappropriate. For example, in a meta-analysis by Marshall et al. (2004), only a small negative correlation between physical activity and TV viewing was observed (mean effect size: –0.09).

To provide a better overall assessment of sedentary behavior, objective measures of physical activity, such as accelerometry, have been used (Matthews et al. 2008). Researchers have conducted several calibration studies to determine accelerometer count cut-points for sedentary behavior in children. For preschool-aged children, count cut-points have been developed for the ActiGraph 7164 accelerometer. Sirard et al. (2005) used direct observation as the criterion measure to develop the following count cut-points per 15 seconds in a sample of 16 preschool-aged children: ≤ 301 (3-year-olds), ≤ 363 (4-year-olds), and ≤ 398 (5-year-olds). Applying the received operating characteristic area under the curve (AUC), these sedentary cut-points exhibited excellent classification accuracy (AUC ≥ 0.9). In a sample of 30 preschoolers, Hu et al. used direct observation as

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the criterion measure and identified sedentary behavior as < 1,100 counts per minute. Sensitivity and specificity were 83% and 82%, respectively. The cut-points obtained in these studies are quite different, reflecting differences in epoch length (15 seconds *vs.* 1 minute) and population.

In a sample of 74 13–14-year-old adolescent girls, Gorely et al.[12] used indirect calorimetry to develop sedentary cut-points for the ActiGraph 7164 accelerometer. The sedentary cut-points were found to be < 50 counts per 30 seconds and < 100 counts per minute. The lower cut-point of 50 counts per 30 seconds resulted in perfect classification accuracy.

Overall, the findings of these studies indicate that accelerometers provide valid estimates of sedentary behavior in children when the cut-points selected are valid for the population under study. Given the lower epoch length and better classification accuracy, the sedentary cut-points developed by Sirard et al. (2005) are recommended for use in preschool-aged children. For children and adolescents, a sedentary cut-point < 100 counts per minute should be used.

Conclusion

To date, a wide range of methods have been used to measure physical activity in children. These include self-report measures such as questionnaires, proxy-report from parents and teachers, and objective measures such as heart rate, accelerometry, pedometers, direct observation, and doubly-labeled water. When determining which method to use, researchers and practitioners should consider the population (age), sample size, respondent burden, method/delivery mode, assessment time frame, physical activity information required (data output), data management, and measurement error and cost (instrument and administration).

Sedentary behavior is often assessed by the amount of time children spend viewing TV or other "screen-based" activities. Common methods used to measure screen-based time include self-report surveys, self-report diaries, parental reporting for children, and direct observation. Of these methods, it is difficult to draw conclusions as to which method is best given the paucity of research examining the reliability and validity of these measures. Given this, as well as that screen-based time provides only a partial picture of overall levels of sedentary behavior in a typical

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[12] Gorely T, Marshall SJ, Biddle SJ, Cameron N., *The prevalence of leisure time sedentary behaviour and physical activity in adolescent girls: an ecological momentary assessment approach.* Int J Pediatr Obes 2, 2007, p. 128,

waking day[13], a better alternative to measure sedentary behavior in children is the use of objective measures of physical activity, such as accelerometry.

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