

Girls growing through adolescence have a higher risk of poor health

Franco Cavallo¹, Alessio Zamboni¹, Alberto Borraccino¹, Ulrike Raven-Sieberer², Torbjørn Torsheim³
Patrizia Lemma¹ & the HBSC Positive Health Group*

¹Dipartimento di Sanità Pubblica, University of Torino, Torino, Italy; ²Epidemiological Research Group, Robert Koch Institut, Berlin, Germany; ³Research Center for Health Promotion, University of Bergen, Bergen, Norway

Accepted in revised form 14 June 2006

Abstract

Introduction: Self rated health, in adult population, is strongly associated with mortality and life expectancy. In younger people this association is less evident, but it may anticipate a similar risk in adult life. Our research, based on the HBSC (Health Behaviour in School-Aged Children) International collaboration, contributes to deepen the knowledge in this field by monitoring adolescents' health through a multi-national survey involving 29 European countries, plus North America (Canada and USA) and Israel. **Methods:** Following an established methodology, the HBSC survey has elaborated a questionnaire on health and health behaviour, filled in by a representative national sample of 11-, 13- and 15-year-old boys and girls. The sample is constituted of more than 160,000 subjects interviewed during the 2001/2002 survey. Reported symptoms and self-rated health have been analysed by sex and age and through the different countries. **Results:** Girls resulted to have a poorer perception of their health, with respect to males, at all ages and in all countries (Overall OR = 1.70, 95% CI: 1.66–1.76). Age increases this risk both for males and females, with an average increase of 32% (95% CI: 29–34%) per year in the age-range 11–15. The situation is similar for reported symptoms, with an overall OR of 1.81 (95% CI: 1.77–1.85) for females of reporting three or more symptoms at least once a week; also this risk increases of 26% (95% CI: 24–27%) per year during the pre-adolescence phase. In both cases it could be shown a significant interaction effect between age and gender: OR = 1.19 (CI: 1.15–1.23) for perceived health and OR = 1.26 (CI: 1.23–1.29) for reported symptoms in females with respect to males. **Conclusions:** Even if adolescence is described as the healthiest period of life, a consistent minority of young people perceive and report a poor health and a high number of symptoms. Females are constantly in a worse position than males and older age groups are worse than younger ones.

Key words: Adolescence, Cross-national comparisons, Gender, Self-rated health, Symptoms load

* Kristina Fürth, Austria, Kädi Lepp, Estonia, Raili Välimäa, Finland, Céline Vignes, France, Christiane Thomas, Germany, Cornelia Haehne, Germany, Gyöngyi Kökönyei, Hungary, Inese Jece, Latvia, Katerina Naumova, TFYR Macedonia, Wilma Vollebergh, Netherlands, Saskia van Dorsselaer, Netherlands, Jørn Hetland, Norway, Margarida Gaspar de Matos, Portugal, Tania Gaspar, Portugal, Eva Stergar, Slovenia, Vesna Pucelj, Slovenia, Inmaculada Queija, Spain, Pedro J. Pérez Moreno, Spain, Victoria Muñoz Tinoco, Spain, Eva Leal, Spain, Mia Danielson, Sweden, Mary Overpeck, USA, Tina Kiaer, WHO.

Introduction

It is known from literature that the adult female population suffers a worse condition, with respect to males, in everyday life, and that this gap is reflected also on health [1]. This situation seems to start very early in the life course [2–5], and that some evidence of this gap may be seen already in adolescence. However, some researchers found

doubtful results on this issue [6], also because large scale, cross-country results giving evidence on this fact are not common.

Unfortunately, being adolescence the healthiest period of life, it is difficult to analyse any health difference between genders based on 'hard' indicators, like morbidity and mortality. It is therefore necessary to turn to 'softer' indicators, like self-rated health and reported symptoms, which have proved anyway to be strongly associated, in the adult population, with 'harder' health indicators, like mortality and life expectancy [7–10]. This is the reason why a limitation of this kind of research lies in the fact that different studies use different, and sometimes not comparable, indicators [4].

Studying health and well-being differences in adolescence is also important in clarifying how the adjustment of the different genders to the developmental task is defined. In fact, many researchers [4, 5] have shown an inversion in the trend according to which males are less healthy than females during infancy, while the opposite is true for adolescence. This fact may suggest that some important change, connected with gender constructs, comes along with puberty [5]; in particular, it is suggested that different attitudes toward internalising and externalising patterns of response to the environment are implied [5, 11, 12].

This study aims at producing cross-country evidence for the gender differential in health in adolescence, using the same indicators, in a large European and North American sample. We reckon that these data, coming from the HBSC International Collaborative Study [13], can be used to further explore and validate the hypothesis that gender difference shows, already at this age, a remarkable gap in health conditions, which will probably foster more important and more stable inequalities in the future course of life.

Methods

The sample

The HBSC study is a survey carried out periodically in different European and North American countries, including also Israel. It started in 1982 with four participating countries;

data collection has taken place each fourth year since then. The last survey has involved 32 countries. Since the beginning, the study has been carried out in close collaboration with the European Regional Office of WHO. Each participating country has proved to be capable to conduct the survey, and carry out data analysis, with adequate scientific competence. The questionnaire is based on sound theories from the most recent scientific literature in the different disciplinary fields involved, public health, sociology and developmental psychology being only the main ones (see [14]; also available at the web-site <http://www.hbsc.org>).

Questionnaires were elaborated in English and translated in the different languages by each national team; a back translation was carried out independently and was reviewed and approved by the international coordinator, in order to guarantee trans-national comparability of the data.

The sample population is chosen among 11-, 13- and 15-year-old children. Sample size is set at about 1500 school children for each country and for each age group; exceptions were made for countries with very small populations, such as Malta and Greenland, where the whole population in each age group was administered the questionnaire. This number was calculated based on a sample size allowing for a confidence interval of $\pm 3\%$, with a probability of 95%, for the estimate of the true proportion of a binary variable.

Involved countries are (in alphabetic order): Austria, Belgium (divided in the Flemish and French part), Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Greenland, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland, Ukraine, UK (divided in England, Scotland and Wales), USA.

Questionnaires are administered in schools during school time and filled in by the children in complete anonymity. Data collection has taken place in all countries during the 2001–2002 school year.

The international data file is processed, cleaned and taken care of by the University of Bergen, Norway.

The items used in this paper are those dealing with:

- self-rated health (not administered in France): the item used to explore self-reported health was made up by a four ordinal response categories (poor, fair, good, excellent) as an answer to the question: “Would you say your health is ...?”;
- the presence and frequency of specific symptoms perceived by the child. Symptoms (headache, stomachache, backache, feeling low, irritability and bad temper, difficulties in sleeping, feeling dizzy, feeling nervous) are checked through a previously standardised checklist, on which each child has to report whether he/she suffered from that symptom and how often [15].

Statistical methods

Self-rated health has been analysed after collapsing the four categories item in a binary variable (good and excellent vs. fair and poor health).

Also the variables concerning self-reported symptoms have been analysed by sex and age, considering a dichotomous situation, where the symptom was considered present if reported at least once a week.

Subsequently, a new variable was created, summing up all symptoms reported at least once a week; the variable was then dichotomised in two categories: “two or less symptoms reported at least once a week” and “three or more symptoms reported at least once a week”.

A second step of the analysis tried to assess the reliability of age and gender differences emerging from the descriptive analysis, controlling for each one of the two variables and for socio-economic state. A logistic model has been fitted, using as dependent variable the dichotomised self-rated perception of health (first model) and the dichotomised sum of reported symptoms (second model). Independent variables were sex (male/female), age group (11, 13, 15) and an indicator of socio-economic status.¹ All independent variables were introduced in the model as dummy variables in a first step. Then, considering the fact that increases in risk between 11 and 13 and between 13 and 15 were roughly similar, the variable age

has been finally introduced in the model as a continuous variable. The FAS index, after considering its distribution, was dichotomised in two categories, low (including low and medium) and high. In a final step, also a term of interaction between age and gender has been introduced in the model. These analyses were carried out for the entire sample as well as separately for every country.

The reported ORs represent therefore the higher/lower probability for a female to report a poorer health or a higher number of symptoms with respect to a male with increasing age.

Results

Percentages of boys and girls in the different national samples range, for boys, from 44.38 in Hungary to 51.14 in Lithuania (Greenland is 43.32 but it is a special case where all the population was sampled) and vice versa for girls. Mean is 48.3 ± 2.0 for boys and 51.6 ± 2.0 for girls. As for the age groups, data are more scattered. With respect to the expected percentage (33.3 for each age group), 11-year-olds have a mean of 33.9 ± 2.5 , skewed to the right, while 13-year-olds have 34.5 ± 2.06 and 15-year-olds have 31.4 ± 2.6 , both skewed to the left.

Health is perceived as good or excellent from the majority of the interviewed boys and girls (80% or more), but girls are more likely to perceive a poorer health than males (Table 1).

Youngest declare to feel a better health than older children. With increasing age, boys and girls are less likely to perceive themselves in a status of good health (Table 1).

Girls report, on the overall, a higher frequency and a greater number of symptoms than boys, independently of age (Table 2); and each symptom is more represented with increasing age. The most represented symptoms are feeling bad and feeling nervous. Somatic symptoms (headache, stomachache and backache) follow the same trend: their frequency increases with age and they are more frequent in girls. The only symptom reported as less frequent for the older age group is stomachache. More than 50% of 15-year-old girls report a number of symptoms higher than two.

¹ The index used has been the Family Affluence Scale (FAS) based on the purchasing capacity of the family. This index was used, according to the HBSC international research protocol [14], after aggregation in three ordinal categories: low, medium and high.

Table 1. Perceived health by gender: percentage and number of 11-, 13- and 15-year-old children rating their health as good/excellent or fair/poor (n = 150,817)

		Boys			Girls		
		11 years	13 years	15 years	11 years	13 years	15 years
Good/excellent	%	87.96	86.48	83.93	84.31	79.21	72.60
	N	22,647	21,965	18,916	22,105	21,380	18,307
Fair/poor	%	12.04	13.52	16.07	15.69	20.79	27.40
	N	3099	3435	3622	4113	5612	6910
Total	%	100.00	100.00	100.00	100.00	100.00	100.00
	N	25,746	25,400	22,538	26,218	26,992	25,217

All differences between age groups and between genders are significant at $p < 0.001$.

Table 2. Percentage and number of boys and girls reporting specific symptoms at least once a week

		Boys				Girls			
		11 years	13 years	15 years	All ages	11 years	13 years	15 years	All ages
Headache	%	21.97	22.53	21.6	22.05	29.81	35.37	42.64	35.84
	N	5969	6077	5181	17,227	8254	10,102	11,338	29,694
Stomachache	%	16.35	13.85	11.78	14.09	24.28	24.36	23.54	24.07
	N	4443	3737	2826	11,006	6723	6958	6260	19,941
Backache	%	12.76	16.83	20.98	16.69	14.49	19.99	25.4	19.89
	N	3466	4540	5032	13,038	4011	5711	6753	16,475
Feel low	%	20.49	21.85	24.6	22.22	25.9	34.73	42.45	34.26
	N	5567	5894	5901	17,362	7171	9920	11,288	28,379
Bad temper	%	33.32	37.93	40.52	37.12	36.83	46.27	52.37	45.07
	N	9052	10,231	9720	29,003	10,199	13,216	13,926	37,341
Diff. sleep	%	25.8	23.79	23.84	24.5	28.18	29.73	32.75	30.18
	N	7008	6417	5719	19,144	7802	8492	8708	25,002
Feel dizzy	%	12.07	12.22	13.09	12.43	13.91	17.99	21.3	17.69
	N	3279	3295	3140	9714	3853	5138	5663	14,654
Feel nervous	%	30.82	34.62	36.77	33.96	33.84	42.95	49.14	41.89
	N	8372	9338	8820	26,530	9371	12,268	13,065	34,704

All differences are significant at $p < 0.001$.

On the average, symptoms are reported more frequently by girls than by boys (83.37% vs. 78.83%). This phenomenon is particularly evident with increasing age; in fact from the 11th to the 15th year of age the percentage of girls reporting three or more symptoms at least once a week increases from 36.02% to 52.50%, while for males the increase is less evident (28.73% vs. 33.07%) (Table 3).

The observed phenomenon of increasing symptoms with increasing age, and its constant prevalence in females, was further checked by controlling this difference by age and gender and by a possible effect of socio-economic status. The variables chosen for fitting a multivariate model

were self-rated health (used as a binary variable) and self-reported symptoms (also dichotomised in two categories according to the number of symptoms reported at least once a week: 'two or less' and 'three or more').

The result of the logistic models, fitted country by country, controlling for the effect of sex and age differences and for socio-economic status, using as dependent variables self-rated health and self-reported symptoms, show that the risk to declare a poorer health with increasing age varies consistently from the average value for the whole group (OR = 1.32; CI: 1.29–1.34), but it is almost always significantly greater than one. Females living in all countries, except Croatia and Russia, have

Table 3. Symptoms reporting by age and gender: percentage and number of 11-, 13- and 15-year-old children reporting two or less or three or more specific symptoms at least once a week (n = 160976)

		Boys			Girls		
		11 years	13 years	15 years	11 years	13 years	15 years
Two or less	%	71.27	69.08	66.93	63.98	54.9	47.5
	N	19,362	18,634	16,057	17,716	15,682	12,631
Three or more	%	28.73	30.92	33.07	36.02	45.1	52.5
	N	7,805	8,341	7,933	9,974	12,882	13,959
Total	%	100.00	100.00	100.00	100.00	100.00	100.00
	N	27,167	26,975	23,990	27,690	28,564	26,590

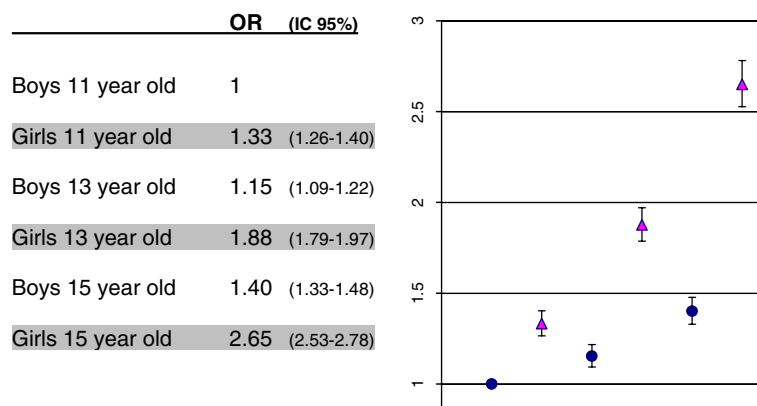
All differences between age groups and between genders are significant at $p < 0.001$.

an excess risk of reporting a poorer health with increasing age. The worst situation is seen in Canada and Switzerland (OR = 1.75; CI: 1.55–1.96), closely followed by Germany.

The risk of perceiving a poorer health, controlling for age, is higher for girls in all countries, with an overall OR of 1.70 (CI: 1.66–1.76). The only nation showing no statistically significant relationship between health perception and sex is Ireland, where the OR is 1.09 (CI: 0.88–1.37). The effect of FAS on self-perceived health was highly significant on the overall sample (OR = 1.87; CI: 1.82–1.92), and also in almost all countries, without affecting the age and gender ORs; the introduction of a term of interaction between age and gender, quite significant by itself (OR = 1.19; CI: 1.15–1.23) altered significantly the importance of gender (OR: 1.70–1.13) and of age (OR: 1.32–1.18). The estimated effect of this interaction in the overall sample is reported in Figure 1.

The risk of reporting more than two symptoms at least once a week is, on the overall, significantly related with age, with an average OR of 1.26 (CI: 1.24–1.28) for all countries and a maximum of 1.79 (CI: 1.64–1.96) for Macedonia. Only Norway, Netherlands and Denmark do not show this association.

All investigated nations do show a significant association between frequency of symptoms reporting and gender; girls are in all nations at higher risk of reporting more than two symptoms at least once a week. The overall OR is 1.81 (CI: 1.77–1.85). Also in this model the introduction of the FAS index, though significant (OR = 1.21; CI: 1.18–1.24), did not affect sensibly the age and gender ORs. On the opposite, the introduction of a term of interaction between age and gender, significant by itself (OR = 1.26; CI: 1.23–1.29), reduced almost to nil the effect of sex (OR: 1.81–1.11) and age (OR: 1.26–1.11). The estimated effect of this

**Figure 1.** Overall risk in the participating nations of perceiving a poor health for girls with respect to males and per age group.

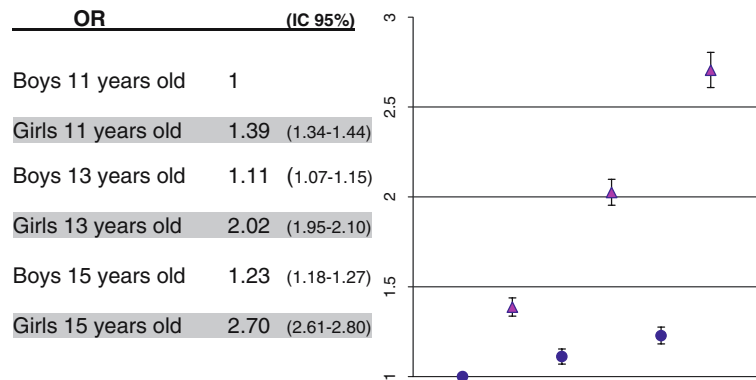


Figure 2. Overall risk in the participating nations of reporting more than two symptoms at least once a week for girls with respect to males and per age group.

interaction on symptoms reporting for the overall sample is reported in Figure 2.

Discussion

As stated in the introduction, the main objective of this work was to explore the state of health and well-being of girls with respect to boys in the area of pre-adolescence; this has led to the confirmation, on a large scale, of previous findings, already suggested by the literature in the last decades. In particular, our results confirm the already reported trend of an increasing perception of poor health with increasing age in the pre-adolescence phase [16, 17]; it also confirms the higher risk for girls to perceive a poorer health, independently of age [2, 16, 18–20]. For the first time these phenomena have been documented in such a large number of countries, including almost the whole of Europe, plus North America and Israel.

Before going into the discussion of the most interesting points emerging from our research, we should point out the main limitations of our study.

First of all, our data are cross-sectional, and therefore any longitudinal inference has to be taken with great caution, even if similar trends have been reported in the literature [5].

Second, as regards the sample composition, our data are reasonably homogeneous with respect to gender. As for the age composition, the distribution is more scattered, the older age group being the most problematic. In fact the latter is under represented by an average of two percentage points with respect to the expected frequency. This

is probably due to the higher number of non-responders and to the difficulty to over sample correctly on an age group in which the exact percentage of children with a school delay is difficult to predict.

We also realise that using a single item to measure perceived health, as a proxy for its real quality, doesn't allow us to capture the full dimensionality of health in this age group, as it could have been done using more complex scales. A single question item for self rated health has nevertheless proven to be a reliable indicator of the general health status, as the outcome of this question has been proven to be correlated with future mortality and morbidity [8–10]. It also has other important advantages, besides the one of being the only feasible approach in such a large and comprehensive questionnaire [8]: it is a general measure of the individual status, comprising also undiagnosed problems; it influences behaviours and engagement in the maintenance of one's own health; it reflects the capability of the individual to access external and internal resources.

Notwithstanding these limitations, many interesting points emerge from our research, which raise important theoretical questions and require further investigation, for a deeper understanding of the patterns of development of health within the population, and of the differences between genders.

As we pointed out in the results section, the relationship of health with age and gender is not influenced by socio-economic status, even if this latter, as it is known from literature [21], has a strong, independent influence on health. In fact,

also our data confirm this association, giving stronger validity to our findings.

The progressive worsening with age of health perception, observed here and in other studies [16, 17], is consistent with well-known developmental theories, and is coherent with other findings, as the decreasing level of self-esteem in this phase of adolescence [22]. In fact, self-esteem has been found to be associated with perception of health and it could be therefore one of the mediators of this worsening effect in pre-adolescence.

Adolescence represents the stage of life when people lose their previous certainties and source of self attributed values, originated in childhood inside the family. As developmental psychology has argued [23], peer groups become then very important, with all the difficulties of being accepted in one of them; the interpretation of this life crisis emerging in adolescence is consistent with Erickson's theories [24]. Also at school, adolescents experience an increased pressure with increasing age, together with the strengthening of the expectation to perform the socially required sexual role. It is here important to observe, with West and Sweeting [25], that school performance, as well as other sources of stress increasing in this period of life, impact much more on girls' health than on boys'.

The combined effect of sex and age, which seems to affect girls more than boys, could be the reason for the significance of the interaction term between age and gender, as also Benjet and Hernandez-Guzman [5] did observe, rather than that of gender alone.

Regarding the effect of gender *per se* on perceived health and symptoms, our results are consistent with those of other studies [3, 4, 5, 18], which observe a worsening of girls' well-being during this age span, opposite to what happens in infancy.

Some authors [5] underline the importance of the different experience of puberty, which carries much more sudden and strong changes in females', than in males', life. These changes require a much quicker adjustment and often bring physical and psychological changes, which are not consistent with the ideal image of the self (the quantity of body fat, for example). Also the impact of puberty on the social environment has its role, in that parents start to be more strict with girls than with boys [3, 5]. In fact we know

[26] that the quality of the relationship with the father decreases more for girls than for boys. The greater importance given to school performance for girls and a greater contrast between familial and mass media values are also suggested as a possible explanation for this difference [25].

Further explanations refer to the different orientation of males and females in externalising or internalising their own feelings and emotions [5, 11, 12, 27]. According to these theories, females tend to feel worse and to show more depression symptoms, while males tend more to act out and to consider their strength and good health as a part of their growing masculinity [28]. Some authors [5, 11, 12] think that this different externalisation/internalisation patterns is responsible for showing different symptoms, and in particular for bringing more symptoms and less perceived well-being for girls. The same and other authors [5, 6, 19] also suggest that these different patterns could constitute a bias in the measurement of well-being for boys and girls: in fact, we usually evaluate people's well-being more on the basis of symptoms than on actions and this can lead to an over estimation of the difference between the genders. Anyway Mincowsky and Ross [19] controlled the difference in the health status between boys and girls for their different tendency to internalise and externalise, and found that this factor cannot completely account for this difference.

But, of course, we cannot forget other explanations, of sociological rather than psychological origin, like the raising awareness, in adolescence, of the fact that females are growing in a society, which overvalues male-ness [18]. In this situation, it is more difficult for women to put together and integrate aspirations of different kinds, like being a mother and, at the same time, a socially 'successful' woman.

More work is still needed to empirically check all these hypotheses. We believe that a deeper insight of the inter-country variability characterising these phenomena, capable to join the analysis of socio-psychological and socio-economic variables with a cross-national analysis of the countries economic structure and infrastructure, could be a good starting point for bringing forward our knowledge.

Acknowledgements

This study is developed within the work of the HBSC network. HBSC is an international study carried out in collaboration with WHO/EURO. The International Coordinator of the 2001/2002 survey is Candace Currie (University of Edinburgh); Data Bank Manager: Oddrun Samdal (University of Bergen). The 2001/2002 survey was conducted by 35 Principal Investigators in 32 countries: Austria (Wolfgang Dür), Belgium (Flanders: Lea Maes; French speaking part: Danielle Piette), Canada (William Boyce), Czech Republic (Ladislav Csémy), Denmark (Pernille Due), Estonia (Mai Maser), Finland (Jorma Tynjälä), France (Emmanuelle Godeau), Germany (Klaus Hurrelmann), Greece (Anna Kokkevi), Greenland (Michael Pedersen), Hungary (Anna Aszmann), Ireland (Saoirse Nic Gabhainn), Israel (Yossi Harel), Italy (Franco Cavallo), Latvia (Ieva Ranka), Lithuania (Apolinaras Zaborskis), Macedonia (Lina Kostarova Unkovska), Netherlands (Wilma Vollebergh), Norway (Oddrun Samdal), Poland (Barbara Woynarowska), Portugal (Margarida Gaspar De Matos), Russia (Alexander Komkov), Spain (Ramón Mendoza), Sweden (Ulla Marklund), Switzerland (Holger Schmid), UK (England: Antony Morgan; Scotland: Candace Currie; Wales: Chris Roberts), USA (Mary Overpeck). New countries joining in 2001: Croatia (Marina Kuzman), Malta (Maryanne Massa), Slovenia (Eva Stergar), Ukraine (Olga Balakireva). For details, see <http://www.hbsc.org>

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Address for correspondence: Franco Cavallo, Dipartimento di Sanità Pubblica, University of Torino, Via Santena, 5bis, Torino 10126, Italy
Phone: +39-011-670-5878; Fax: +39-011-670-5889;
E-mail: franco.cavallo@unito.it