

Electronic media communication with friends from 2002 to 2006 and links to face-to-face contacts in adolescence: an HBSC study in 31 European and North American countries and regions

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Abstract

Objective: Because the potential for electronic media communication (EMC) has increased greatly, it is of interest to describe trends in EMC between adolescents and their friends and to investigate whether EMC facilitate or supersede face-to-face contacts among peers.

Methods: Answers of 275,571 adolescents concerning contacting friends by means of the phone, text messages, and the internet (i.e. EMC), the number of close friends, and the number of afternoons and evenings per week spent out with friends were analysed by means of χ^2 -tests and multiple regression.

Results: In 2006, between more than one third (11-year olds) and nearly two thirds (15-year olds) communicated electronically with their friends daily or nearly daily. From 2002 to 2006, EMC increased in almost all participating countries. Particularly high increases were found in Eastern Europe. Across countries, the higher the frequency of EMC the higher the number of afternoons and evenings spent with friends.

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Conclusion: The results are surprisingly consistent across the 31 countries and suggest that EMC among adolescents facilitate rather than supersede face-to-face peer contacts.

Keywords: Electronic media use – Face-to-face – Peer groups – Adolescents – Trend study – Cross-cultural research.

Introduction

The peer group (i.e., friends inside or outside the school class with whom adolescents spend their leisure time in joint activities¹) plays an important role in the psycho-social development of adolescents². Peers serve as role models and provide feedback about attitudes and behaviour. In the context of their peer group, adolescents can experiment with different identities, personalities, and roles at greater ease than at home³. Peer group interaction can foster healthful and socially-acceptable as well as health-compromising and socially-deviant behaviours. For example, research has shown that adolescents tend not only to select their peers in the light of their own substance-use habits but also to initiate or increase their substance use when they associate with substance-using peers^{4,5}. Similarly, associating with problem behaving peers increases adolescent conduct problems⁶. Independently of the kind of

activities (health-enhancing or compromising), adolescents normally consider the time they spend with their peers as the most enjoyable part of the day⁷.

Frequent interaction and communication is a central element of peer groups³. The increased popularity of various electronic media (e. g., cell phones, short message service (SMS), e-mail, instant communication software such as Skype) offers new possibilities for peer communication. In industrialized countries, for example, about 85 to 96 % of young people own a cell phone^{8–11}. A British study reported that at the age of 10 or 11 about half of the young people owned a cell phone¹². Moreover, communication by means of SMS has become very popular, particularly among young people¹³.

The increased popularity of electronic media use among adolescents raises the question, does electronic media facilitate or supersede face-to-face contacts among peers? Early research in this area found that the frequency of internet use was detrimental to 'offline' interpersonal contacts and relationships^{14–16}. However, other recent research indicated that users of electronic media spend more time communicating face-to-face with friends^{16,17}. For example, electronic media can be used to arrange appointments and to coordinate and manage face-to-face contacts among peer group members^{18,19}. Some studies found that electronic communication can facilitate not only the maintenance of existing relations, but can also help to establish new contacts with peers that later can become new friends (with whom they spend time and go out in the evening)^{20,21}. Unfortunately, evidence of the link between electronic media communication (EMC) and face-to-face contacts among adolescent peer group members is limited to a few single-country studies. A cross-national assessment of the popularity and trends of EMC and links to face-to-face contacts in adolescence is lacking.

The present study has the following three aims: (1) describe the prevalence of EMC in a sample of 11-, 13-, and 15-year olds from 31 mainly European and North American countries and regions, (2) describe changes in the prevalence in EMC from 2002 to 2006; and (3) investigate links between EMC and the number of close friends, the number of afternoons per week spent out with friends, and the number of evenings per week spent out with friends.

Methods

Description of the project in general

The data presented here are drawn from the 2005/06 World Health Organization collaborative HBSC study. HBSC is an international collaboration between research teams across Europe and North America which aim to gain insight into

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and further understanding of adolescent health. Data were collected through a school-based survey using classroom administered self-completion questionnaires in each participating country and region, with requirements in terms of sampling, questionnaire items and survey administration being set out in a standardised research protocol. Participation in the survey was voluntary, with assurances provided in relation to confidentiality and anonymity. Each country respected ethical and legal requirements in their countries for this type of survey.

The population selected for sampling was young people attending school aged 11, 13 and 15, with the desired mean age for the three age groups being 11.5, 13.5 and 15.5. Participating countries were required to include a minimum of 95 percent of the eligible target population within their sample frame. In the majority of countries, national representative samples were drawn and samples were stratified to ensure representation by, for example, geography, ethnic group and school type. Cluster sampling was used, the primary sampling unit being school class (or school where a sampling frame of classes was not available). The recommended sample size for each of the three age groups was approximately 1 500 students, assuming a 95 % confidence interval of +/- 3 percent around a proportion of 50 per cent and allowing for the clustered nature of the samples.

Following data cleaning at the study's international data bank, the final international file contained 204,534 cases across 41 countries or regions, consisting of 100,233 (49 %) boys and 104,301 (51 %) girls, and 66,707 (33 %) 11-year-olds, 69,954 (34 %) 13-year-olds and 67 873 (33 %) 15-year-olds. Full details of the study's development and methods employed can be found in this supplement and elsewhere^{22–25}.

Design of the present study

In the 2001–2002 study 35 countries and regions took part and in the 2005–2006 study there were 41 countries. One of the 35 countries participating in 2002 did not participate in 2006; another did not ask questions relevant for this study. Two other countries had a high number of missing values (i. e., more than 20 %) on the variables used in this study. Consequently, 31 countries could be included for cross-survey comparisons. Known response rates varied from 65 % to more than 90 % across countries²⁶. Each participating country obtained approval to conduct the survey from the relevant ethics review board or equivalent regulatory institution.

Measures

The questionnaire was developed by an interdisciplinary research group from the participating countries. Under supervision of the national research teams, a translation/back transla-

Table 1. Final sample sizes according to country, age group, and survey year.

	11-year olds		13-year olds		15-year olds	
	2002	2006	2002	2006	2002	2006
Austria	1,327	1,478	1,429	1,454	1,205	1,426
Flemish-speaking Belgium (FL)	1,906	1,196	1,899	1,232	1,891	1,460
French-speaking Belgium (FR)	1,252	1,305	1,336	1,352	1,281	1,256
Canada	1,520	1,357	1,440	1,948	1,158	2,225
Czech Republic	1,638	1,416	1,630	1,556	1,643	1,632
Denmark	1,556	1,987	1,497	1,962	1,320	1,484
England	2,104	1,508	1,972	1,564	1,731	1,376
Estonia	1,276	1,360	1,413	1,417	1,255	1,552
Finland	1,692	1,553	1,582	1,485	1,655	1,545
France	2,386	2,192	2,682	2,246	2,482	2,121
Germany	1,683	1,937	1,515	2,198	1,543	2,377
Greece	1,126	1,022	1,149	1,120	1,272	1,351
Hungary	1,194	989	1,320	1,129	1,255	1,115
Ireland	905	1,267	867	1,595	867	1,532
Israel	1,497	1,384	1,879	1,584	1,382	1,824
Italy	1,460	1,188	1,584	1,305	1,177	1,294
Latvia	1,735	1,767	1,777	1,838	1,809	1,821
Lithuania	1,054	1,271	1,080	1,359	1,054	1,270
Former Yugoslav Republic Of Macedonia	1,206	1,593	1,314	1,653	1,358	1,842
Malta	539	445	633	439	630	331
The Netherlands	1,328	1,229	1,378	1,405	1,185	1,247
Poland	2,010	1,451	2,060	1,591	2,086	2,224
Portugal	1,051	1,086	880	1,246	749	1,305
Russia	1,911	2,601	2,442	2,561	2,221	2,611
Scotland	1,587	1,500	1,436	2,063	1,104	2,058
Slovenia	1,410	1,620	1,359	1,756	1,024	1,516
Sweden	1,356	1,301	1,110	1,211	1,161	1,381
Switzerland	1,297	1,363	1,518	1,471	1,425	1,429
Ukraine	1,072	1,329	1,227	1,571	1,554	1,677
United States	1,411	1,042	1,890	1,443	1,589	1,251
Wales	1,258	1,270	1,312	1,427	1,130	1,297
Total	44,747	44,007	46,610	48,181	43,196	48,830

tion procedure was used to guarantee language equivalence. Electronic media communication per week. The question was “How often do you talk to your friend(s) on the phone or send them text messages or have contact through the internet?” Response options were ‘never or rarely’ (coded as 0), ‘1 or 2 days a week’ (coded as 1.5), ‘3 or 4 days a week’ (coded as 3.5), ‘5 or 6 days a week’ (coded as 5.5), and ‘every day’ (coded as 7).

Number of close friends. The question “At present, how many close male and female friends do you have?” included separate responses for male and female friends. The response options were ‘none’, ‘one’, ‘two’, and ‘three or more’. For the analyses, the answers to the questions on male and female friends were added to make one score for number of friends. Number of afternoons per week spent out with friends. The

question was “How many days a week do you usually spend time with friends right after school?” The response options ranged from zero to six days a week.

Number of evenings per week spent out with friends. The question was “How many evenings per week do you usually spend out with your friends?” The response options ranged from zero to seven evenings a week.

Analytic Strategy

Adolescents who did not answer one or more questions analysed in the present study (7.9% in total) were excluded from the analyses. The final sample consisted of 275 571 11-, 13-, and 15-year olds (51.8% girls; see Tab. 1 for a detailed overview of sample sizes according to age group, country, and survey year).

Table 2. Electronic media communication (5 days or more per week) in 2002 and 2006 (in percent) according to age group and country.

	11-year olds			13-year olds			15-year olds		
	2002	2006	Change	2002	2006	Change	2002	2006	Change
Austria	17.9	23.2	+5.3	37.3	46.1	+8.8	52.7	60.2	+7.5
Belgium (FL)	17.3	26.0	+8.7	41.2	48.4	+7.2	58.0	64.0	+6.0
Belgium (FR)	14.2	26.1	+11.9	30.6	47.5	+16.9	46.9	56.2	+9.3
Canada	49.1	43.2	-6.0	60.7	60.1	-0.6 [†]	61.1	66.2	+5.1
Czech Republic	19.3	28.4	+9.1	36.9	53.3	+16.4	54.6	61.5	+6.9
Denmark	29.5	59.8	+30.3	53.2	76.8	+23.6	66.7	81.9	+15.3
England	37.4	46.4	+9.0	49.6	57.6	+8.0	61.3	72.5	+11.2
Estonia	30.0	47.3	+17.3	38.9	56.6	+17.7	42.9	66.2	+23.4
Finland	38.1	46.7	+8.7	51.4	62.2	+10.8	58.5	69.6	+11.1
France	6.1	23.0	+16.9	17.7	45.8	+28.1	31.8	61.5	+29.7
Germany	25.7	27.0	+1.3 [†]	44.1	50.5	+6.4	57.2	59.7	+2.5 [†]
Greece	24.1	32.6	+8.5	52.0	55.8	+3.8 [†]	68.9	63.5	-5.4
Hungary	17.6	19.6	+2.0 [†]	32.4	35.1	+2.7 [†]	38.7	45.9	+7.2
Ireland	27.3	43.7	+16.4	46.1	59.0	+12.9	58.5	64.8	+6.3
Israel	46.6	51.7	+5.2	58.2	61.1	+2.9 [†]	65.1	63.9	-1.2 [†]
Italy	31.3	34.7	+3.4 [†]	54.0	56.9	+2.9 [†]	60.9	65.1	+4.2 [†]
Latvia	12.9	61.1	+48.2	19.8	74.0	+54.2	26.9	84.0	+57.1
Lithuania	21.2	44.6	+23.5	28.7	60.3	+31.6	33.7	68.0	+34.4
FYRO Macedonia	32.5	29.0	-3.5 [†]	44.8	39.1	-5.7	54.0	45.9	-8.0
Malta	31.4	35.3	+3.9 [†]	46.1	63.6	+17.4	51.9	70.4	+18.5
The Netherlands	12.7	27.4	+14.7	34.8	51.6	+16.8	48.2	68.3	+20.1
Poland	18.7	41.1	+22.4	28.9	61.7	+32.8	36.3	72.1	+35.8
Portugal	18.1	28.9	+10.8	41.0	54.8	+13.8	53.9	66.4	+12.5
Russia	57.5	61.2	+3.8 [†]	61.3	67.6	+6.4	62.0	71.7	+9.7
Scotland	35.7	45.9	+10.1	56.8	65.9	+9.1	66.8	71.8	+4.9
Slovenia	33.6	32.8	-0.8 [†]	48.3	50.7	+2.5 [†]	55.0	58.2	+3.2 [†]
Sweden	28.1	44.7	+16.6	45.5	62.9	+17.4	57.8	73.4	+15.6
Switzerland	17.6	18.4	+0.8	43.1	50.8	+7.7	57.3	65.8	+8.4
Ukraine	28.7	40.4	+11.7	37.1	48.4	+11.3	34.3	59.4	+25.1
United States	39.3	32.3	-6.9	50.2	46.7	-3.5 [†]	56.9	58.4	+11.5 [†]
Wales	43.2	45.9	+2.7 [†]	51.4	59.5	+8.1	57.1	65.8	+8.8
Total	27.8	38.8	+11.0	43.0	56.3	+13.3	51.9	65.4	+13.5

Note. All χ^2 -differences (df=1) are significant at the 1% error level except [†]

To determine statistical significance of changes in electronic media use across the survey years in each age group in each country, χ^2 -tests were used. To assess the link between electronic media use and survey year, the number of close friends, the number of afternoons and evenings per week spent with friends, controlling for gender and age effects, a multiple regression analysis was conducted.

The sampling units in the present study were classes or schools and not individuals. Such a cluster sampling usually produces smaller standard errors, which artificially enhance test power²⁷. To counteract this effect, the sample was down-weighted before conducting statistical analysis. Roberts et al.²⁸ suggested a down-weighting factor of .0833 corresponding to a sampling design effect of 1.2.

Results

In 2006, across countries, more than one third of the 11-year olds, more than half of the 13-year olds and nearly two thirds of the 15-year olds communicated electronically with their friends on a daily or nearly daily basis (Tab. 2). Frequent media use was notably prevalent among adolescents in Scandinavian countries (Denmark, Finland, Sweden), the UK (England, Scotland, Wales), Israel, and Russia. From 2002 to 2006, EMC increased in almost all participating countries and regions. Particularly high increases were found in Eastern European countries (Latvia, Lithuania, Poland, and Ukraine), Denmark (among 11- and 13-year olds), and France (among 13- and 15-year olds). In a few countries, electronic media use

Table 3. Electronic media communication regressed on study year (2002 = 0, 2006 = 1), sex (boy = 0, girl = 1), age group (11, 13, 15 years), number of close friends, number of afternoons per week spent with friends, number of evenings per week spent with friends (standardized regression coefficients and explained variance).

	Year	Age group	Sex	Friends	Afternoons	Evenings	R ²
Austria	.07	.26	.17	.15	.15	.20	28.8%
Belgium (FL)	.08	.32	.14	.15	.09	.15	25.3%
Belgium (FR)	.14	.27	.15	.13	.11	.17	21.6%
Canada	.01 [†]	.14	.21	.16	.10	.21	19.2%
Czech Republic	.14	.28	.13	.10	.14	.16	22.2%
Denmark	.26	.23	.13	.16	.14	.22	29.4%
England	.09	.20	.19	.17	.11	.16	19.3%
Estonia	.19	.13	.14	.09	.08	.19	15.7%
Finland	.12	.18	.18	.14	.11	.26	23.0%
France	.28	.30	.18	.09	.15	.11	28.4%
Germany	.05	.22	.17	.14	.17	.14	22.4%
Greece	.03	.30	.19	.09	.13	.18	22.4%
Hungary	.06	.19	.07	.11	.12	.14	12.9%
Ireland	.14	.24	.24	.16	.12	.13	22.1%
Israel	.05	.11	.14	.18	.11	.17	15.3%
Italy	.00 [†]	.26	.27	.07	.16	.08	18.1%
Latvia	.55	.15	.10	.08	.07	.10	37.5%
Lithuania	.28	.14	.14	.12	.12	.15	23.8%
FYRO Macedonia	-.10	.17	.15	.06	.19	.22	17.3%
Malta	.12	.17	.11	.18	.05	.25	20.6%
The Netherlands	.21	.30	.16	.15	.10	.18	28.9%
Poland	.31	.18	.15	.07	.12	.15	23.5%
Portugal	.12	.33	.20	.04	.14	.16	23.9%
Russia	.08	.07	.15	.09	.13	.07	7.5%
Scotland	.10	.23	.22	.15	.10	.21	24.1%
Slovenia	.03	.21	.19	.10	.17	.17	17.6%
Sweden	.16	.26	.17	.13	.19	.20	27.0%
Switzerland	.08	.31	.15	.13	.16	.21	31.7%
Ukraine	.18	.08	.14	.06	.05	.19	12.3%
United States	-.02 [†]	.15	.26	.14	.12	.17	19.5%
Wales	.07	.16	.23	.12	.07	.19	16.1%

Note. All coefficients are significant at the 1% error level except [†]

decreased significantly (among 11-year olds in Canada and the US, 13-year olds in Macedonia, 15-year olds in Greece and Macedonia). Compared to the large increases (up to 50%), the few decreases were rather small (less than 10%).

Results from the regression analyses confirmed that EMC increased among adolescents in almost all countries (Tab. 3). Exceptions were Canada, Italy and the United States where no significant changes were found. In only one country (i. e., the FYRO Macedonia), there was a significant decrease in EMC over time. EMC increased markedly with age. This was the case in each participating country and region. The greatest increases across the age groups were found in Western European countries such as Portugal, Switzerland, and Germany; the smallest increases were found in Eastern European countries such as Russia and Ukraine. Girls used electronic media

more frequently to communicate with their friends than did boys. This was consistent across countries. The most pronounced gender differences were found in Western countries such as the US, Canada, Ireland, England, Wales, and Scotland, and Southern European countries such as Italy, Portugal, and Greece.

The results in Tab. 3 further show that the higher the number of close friends the higher the frequency of EMC. A particularly strong link was found in Nordic countries (e. g., in Canada, Denmark, Scotland, Finland), while in Southern countries (e. g., Portugal, Macedonia, Greece) there was only a minor association. An exception from this general tendency was Malta. Across countries, the higher the number of afternoons per week out with friends the higher the frequency of EMC. This was particularly true for countries such as Germany, Ita-

ly, Macedonia, Slovenia, Sweden, and Switzerland. In Eastern European countries (e. g., Estonia, Latvia, Ukraine), the association was minor. Across countries, the higher the number of evenings spent out with friends the higher the frequency of EMC, except Macedonia and Malta. The link was particularly strong in northern countries (e. g., Canada, Finland, Denmark, Sweden, Scotland). In Eastern European countries (e. g., Russia, Latvia) and in Italy only a minor association was found.

Discussion

The first two aims of the present study were to describe the prevalence and trends of EMC in a cross-cultural sample of 11-, 13-, and 15-year olds. The findings indicated that across countries electronic media use is popular and widespread among adolescents. In 2006, more than one third of the 11-year olds, more than half of the 13-year olds, and nearly two thirds of the 15-year olds communicated electronically with their friends on a daily or nearly daily basis. Certainly, one reason for the high proportion of electronic media users among 11- to 15-year olds is the high proportion of cell phone owners among adolescents^{8–12} which enables them at any time to phone or write and receive text messages to and from their friends.

Results from the 2002–06 trend comparison showed an increase in EMC in most participating countries and regions. The increased popularity of different kinds of electronic media (cell phones, SMS, e-mail, instant communication software, etc.) among young people^{8–12} is likely to have contributed to the general increase of EMC. Particularly high increases in EMC were found in most Eastern European countries. The rapid economic development in these countries might offer adolescents in these countries a better access to the internet and private cell phones which might partly explain the trends in EMC in Eastern Europe.

The third aim was to investigate links between EMC and face-to-face contacts with friends in the afternoons and evenings. The results from the regression analysis are consistent with previous evidence suggesting that greater use of electronic media is associated with greater face-to-face contact with friends^{16,17}. Taken into account the large increase of EMC in most countries, the frequency of EMC increased with increasing number of afternoons and evenings spent with friends. Noteworthy, this was consistent for all participating countries despite large variations in EMC prevalence and trends over time in the different countries.

These findings are consistent with the idea that EMC facilitates rather than supersedes face-to-face contacts^{16,17}. For example, electronic media might be used to fix appointments and to coordinate and manage face-to-face contacts among

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peer group members in the afternoons and evenings^{18,19}. It has been suggested that EMC might facilitate the maintenance of existing relations and also help to establish new contacts with peers with whom to spend time and go out in the evening^{20,21}. The link between EMC and face-to-face contacts is slightly stronger for spending the evenings together than for spending the afternoons together. It might be the case that for meeting friends or fixing appointments in the evenings electronic media are more important than for meeting friends in the afternoons, for which appointments can be fixed when meeting friends in school or directly after school. Interestingly, there was a particular close association between EMC and evenings spent out with friends in countries with a high proportion of electronic media users (e. g., Canada, Finland, Malta, Scotland, and Sweden). It appears that in countries with a large community of electronic media users individuals are particularly likely to use the technology to meet friends or fix appointments in the evenings.

Among the limitations of the study is the cross-sectional design of the research, which makes it impossible to determine the direction of the associations. It could be that greater numbers of friends and more time spent with friends leads to increased ECM rather than ECM determining time spent with friends. Nevertheless, it is clear that the amount of electronic communication increased from 2002 to 2006 in most countries and was associated in all countries with increases in time spent with friends. Because HBSC is a multinational collaborative study that aims to monitor a broad variety of health behaviours among school-aged children, most concepts could only be measured by a single question. For the present study, this means that different forms of EMC (i. e., communication by phone, SMS, e-mail, instant communication software, etc.) had to be combined in one question. Therefore, it could not be determined if each of these forms of EMC had a unique impact on face-to-face peer contacts. For instance, it may be more difficult to substitute face-to-face contacts with cell phone communication given the 160 character limit of SMS and the often expensive phone call units. Thus, cell phones might be more useful for fixing appointments. Instant communication software on the internet such as Skype offers a variety of free interaction facilities such as talking to and seeing each other when using a web-cam, exchanging files, playing games, etc. Therefore, instant internet communication provides facilities that are similar to face-to-face contacts and may have greater potential to supersede, at least in part, face-to-face interactions in the future. Moreover, a variety of factors such as family affluence and degree of urbanization might moderate the link between EMC and face-to-face contacts with friends. These issues are important to be investigated in future research.

The findings were surprisingly consistent across the 31 countries and regions participating in the study. Across countries and regions, most adolescents were familiar with electronic media and use the technology frequently to communicate with their friends. Moreover, an increase in EMC was found in all three age groups in almost all countries and regions, despite large differences in culture, economic development, and geographical location. Although the prevalence level and the amount of change from 2002 to 2006 varied across the participating countries and regions, the association with other variables was highly consistent. Without exception, EMC was higher among girls than among boys and increased with age, the number of close friends, and time spent in the afternoons and evenings. Thus, the present study provides important information on the prevalence, rank order, and amount of change in EMC in various European and North American countries and regions. The findings clearly suggest that EMC among adolescents

facilitate rather than supersede face-to-face contacts in the afternoons or evenings. Even in countries with a trend toward increasing use of electronic media, young people communicating through these devices tended to have more friends and to spend more time with them.

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