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Cohorts and reading time on the basis of the Finnish time use data 1979–2009

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One of the most striking trends in leisure time reading is that the time devoted to reading has decreased. This is also evident on the basis of the longitudinal analysis of the Finnish Time Use Surveys from the years 1979, 1987, 1999, and 2009. In addition to the period effect, there seem to be a positive age effect and a positive cohort effect. Older people read more, as do older cohorts. At first glance, the decline in reading time seems to be mainly due to time devoted to computer and/or the Internet use and time devoted to watching TV. Control variables, such as time used for paid and domestic work, do not change the results. However, time devoted to computer use and time used for reading do not correlate, and only in extreme cases – when watching TV or reading is excessive – do time used for watching TV and time used for reading correlate negatively. There is a strong interaction between age and cohort: cohorts which read less when they are young, read even more when they grow older than cohorts which read more when they are young. This seemed to be due for better education of younger cohorts.

Keywords: Age, cohort, period, reading, time use

Introduction

The decline in book reading in recent decades has been documented in several studies in several countries (e.g. Griswold et al., 2005; Knulst & van den Broek, 2003; Knulst & Kraaykamp, 1998; Toivonen, 2006). Even "times of de-reading" have been suggested (Knulst & van den Broek, 2003). One of the reasons mentioned for the decline in reading in the 1990s is the increase in television viewing. Also diversification of leisure has been mentioned: there are many alternatives for leisure. In respect to TV, we can suppose that the cohorts which did not have television in their childhood are more inclined to use their leisure time reading than those who had the possibility to watch television in their childhood. We can talk about a "TV watchers' generation (cohort)" and a "non-watchers' generation" i.e. people who did not experience TV in their childhood. In Finland, television became common among the whole population in the middle of the 1960s. Thus, cohorts born in the middle of the 1950s and after have been used to watching TV already in their childhood.

Today, TV viewing is no longer mentioned as the most dangerous threat to reading but the Internet. According to the time use survey of 2009, 15-24- year-olds used as much time on their computer hobby as on TV viewing, namely, one hour 40 minutes per day, and on reading only 20 minutes (Pääkkönen & Hanifi, 2011; Table 2). Because there are big differences, e.g. between age groups in computer use, we talk about the "digital divide" (e.g. Robinson et al., 2003). It seems that the power of TV and later the Internet has been irresistible. For instance, in a Dutch study, it was found that although changes in literary education over time have developed more positively for book reading (more student-centred), book reading has continued to decline (Verboord, 2005). However, we must remember that when we talk about the Internet, we are talking about multimedia, i.e. people read and watch TV through the Internet. For instance, it is evident that people use the Internet more and more for reading. Already, according to the Finnish time use data of 2009, 73.4 per cent of Internet users and even 55.5 per cent of all respondents used the Internet as a news service.

The decrease of time devoted to reading has been seen as a cohort phenomenon: the younger the cohort the less it reads. For instance, Knulst and Kraaykamp reported in their study that the impact of cohort on the decrease in leisure time reading was strong in the Netherlands. Also the impact of age – reading increased as people got older – was strong but only in older cohorts. The reading activity of younger cohorts remained the same over different periods (Knulst & Kraaykamp, 1998, 29–31). Thus, *the differences between cohorts in time devoted to reading, is the main purpose of this article*.

However, not everyone has reduced their reading. Some people also read more than others, because they have been socialized to read (Knulst & Kraaykamp, 1998, 36). This means, for instance, that people, whose parents read, have been used to reading in their childhood. In addition, it should also be remembered that not all studies show a general decreasing tendency in reading. For instance, the results of Warde, Southerton, Olsen and Cheng (2004) show that the

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declining time devoted to reading is not a common international trend. They compared time use in the UK, the USA, the Netherlands, and Norway, and found that there was some increase in time devoted to reading in the UK and Norway and some decrease in the USA and the Netherlands.

Theoretical background

On the basis of the foregoing text the idea of this paper is that reading covaries with generation or cohort. The *generation* or *cohort* effect is one of the three *time* effects. The others are the *age* (sometimes called *life cycle*) effect, and the *period* effect. The term *generation* is used typically in texts where generation is used more or less as a frame of interpretation for different phenomena in society. *Cohort* has been used in studies where efforts have been made to find some kind of parameter for measuring cohort effect. The generation effect can be connected with the classical German sociologist, Karl Mannheim (1928/1952). According to him, those people who are born *both* during the same historical period *and* have the same experiences or so-called *key experience(s)* in their sensitive periods or formative years, i.e. in their youth, are generation *sui generis*. Life sphere defines the formative years. For instance, in the case of musical taste, a person can have a key experience when he/she is 10 years old; in the case of politics, key experiences usually occur a little later in life.

Most often the cohort effect is presented so that, for instance, a person's political attitudes do not change during the person's life time. The idea of cohort effect has also been presented in this way in many textbooks. For instance, in the hypothetical example of Glenn (1977; 2005), the increasing support for the Democrats in US politics (in the 1970s) was explained by the fact that each later cohort more often votes for the Democrats than its predecessors, but cohorts as such do not change their voting behaviour during their life. However, evidently, in no empirical study has this kind of clear or "strict" cohort effect been found. On the contrary, for instance, in a careful study, where the topic was the decline in voting, this kind of cohort effect could not be found (Wass, 2008). In any case, this type of cohort effect is sometimes called the *inter-cohort effect* (Pennington-Gray & Spreng, 2002, 110), meaning that there are behavioural differences between cohorts, and cohorts do not change their behaviour, differences between cohorts remain permanent.

However, it is not necessary to understand cohort effect only in this strict sense. We can talk about cohort effect even when the attitudes or behaviour of a known cohort change, if the changes between cohorts are different. For instance, in the above-mentioned hypothetical situation, this could mean that all cohorts had voted in their first election in a similar way, i.e. the Democrat party support was the same in all cohorts. But if younger cohorts – when they grew older - changed their support more quickly toward the Democrats than older ones, this is also a cohort effect. Therefore, we can also talk about *intra-cohort* effects, which mean that there are differences between cohorts, but these are not permanent. It seems that if the cohort effect is studied with empirical data, it is more sensible to understand the cohort effect in this way than to search for "strict" effects. The behaviour and attitudes of a known cohort can vary during its life cycle, but in the case of the intra-cohort effect this variation must differ from the variation in behaviour and attitudes of some other cohort. Thus, the impact of cohort effect should be studied flexibly. Thus, although cohort effect is usually understood as the inter-cohort effect, the intra-cohort effect is in many cases more likely.

However, cohort is by no means the only variable to have an impact on time used for reading. Therefore, we used several control variables. Education is a necessary background variable, because it was found already a long time ago in several studies that education and reading covariate positively. Those with more education read more than those with less education (e.g. Berelson, 1957). Several mechanisms can be presented to explain the positive connection between reading and education. One mechanism is that educated people have more *competence* to read than less educated people. Another explanation is that people with a long education have adopted a way of life in which it is typical for a well-educated person to read a great deal. Gender has also been found to be a significant variable: women read more than men.

Employment status has an evident impact on time used for reading. Those who are not in working life – the unemployed, students, the retired, i.e. the economically non-active - have more time for reading than those who are in working life, i.e. are economically active. There are supposedly also considerable differences within the economically active population. For instance, it has been found that farmers and entrepreneurs have less leisure time than others (Robinson & Geoffrey, 1997). Therefore, socio-economic position is a self-evident control variable.

Finally, we also included two life cycle variables in the analysis. These were connected with parenting. Firstly, we can expect that single providers (with a child under 17 years) have less time to read than others, and secondly, also parents of families with children (under 17 years) as a whole have less time to read than people without children.

Because one day includes only 1440 minutes, we must also take time constraints into account. One time constraint is obviously paid work. The second constraint is of course domestic work. Thus, the variable "paid work and domestic work" consists of time used for paid work, for household and maintenance work, for childcare, and for shopping and errands. It is clear that if a person works very long hours; it necessarily diminishes her/his time devoted to reading. But it may happen that among people who work only moderate hours, there is no correlation between time used for work and time used for reading, or the correlation is even positive. Then, we can hypothesize that the possible negative correlation appears in quite extreme cases: when time used for paid and domestic work is very substantial. Therefore, the models contained both linear relationship between reading and work and relationship between reading and work squared. If our reasoning is correct, there should be a positive linear correlation between reading time and work time or no correlation, and on the contrary, a negative correlation between reading

time and work time squared.

The diversification of possibilities to use leisure time was mentioned above. Some indicators of diversification are alternative media uses to reading, such as watching TV and the Internet use. Are they exclusive to reading? There has been a lot of discussion on the impact of watching television on reading. The reasons for the diminishing development in reading are manifold, but according to Knulst and Kraaykamp, the most important reason for this was the increase in television viewing (1998, 39–41). Very often reading and watching television have been assumed to have an inverse relationship, but in empirical studies this assumption has not always been verified: on the contrary, time devoted to television does not have any effect on reading time (e.g. Knulst & van den Broek, 2003, 230). It has even been observed that time used watching TV and time used for reading are positively correlated (Toivonen, 2005, 44–45).

Another medium which is competing with reading is the Internet, as mentioned above. However, the Internet does not seem to be displacing reading; on the contrary it has been found that the heaviest Internet users are also the heaviest readers (Griswold & Wright, 2004). Griswold, McDonnell and Wright (2005) give two explanations for this. According to the first explanation the Internet supports reading and vice versa. For instance, people who read online also read printed material. The second reason is the enhancing effect of the Internet. According to this explanation, some people simply have many activities than others (Griswold & Wright, 2004, 137). Therefore, it is be reasonable to presume that also in this study the correlation between reading and Internet use is not negative.

In respect to both TV viewing and a computer hobby and/or the Internet, the analogous reasoning as in the case of paid and domestic work is appropriate. The possible negative correlation appears in quite extreme cases: when time used for TV viewing and/or computer use is very substantial. Therefore, the models contained both linear relationship between reading and work and relationship between reading and work squared. The linear relationship should be positive or nil, and the non-linear relationship negative. Thus, we can suppose that people in their media use are omnivorous: people, who read, also watch TV and use the Internet. This term was perhaps first proposed by Peterson (1992); he meant that people, who are music enthusiasts, are usually not snobbish: enthusiasts follow all kinds of music.

Method

The dependent variable in this study was reading, in total. In time-use data, it is a sum of four categories: reading newspapers, reading periodicals, reading books, and unspecified reading. The reading total does not include reading studies or reading for work. It would have been too complicated to study all categories of reading separately. On the other hand, we did not want to study only one category of reading, for instance, book reading, because it would have been too narrow an approach to reading.

The main problem in studying time effects – age, cohort, and period (APC) – is that the identification of each effect is extremely difficult. The source of the problem is that there is an exact linear relationship between age or life-cycle, period, and cohort or generation. This means that age is precisely the difference between period and cohort. Cohort is precisely the difference between period and age, etc. One variable is always nested in the other two. It is logically impossible to hold the effect of, say, both age and period constant, and then vary the birth cohort. This is called the *identification problem*.

Several methods have been proposed for a statistical and/or analytical solution to the identification problem, but there is no final solution. A classical and conventional approach has been to keep the effect of at least two coefficients of age, period or cohort equal (Fienberg & Mason, 1985). A modification of this approach is to measure age, period, or cohort with different intervals than the other two, for instance, to measure five-year periods and cohorts but one-year ages. New suggestions for the solution of the identification problem are been presented all the time. Of the developments in recent years are at least two are worth mentioning. One of them is the *intrinsic estimator approach* (Yang et al., 2008) and the other the *multilevel approach* (Yang & Land, 2008). The latter seems to be clearly a new attempt, and we also tried to test it here.

The reasoning for the application of *multilevel regression models* to APC problems goes as follows. In the usual linear regression model, different cases are assumed to be independent. However, in analyzing time variables, the cases are clearly not independent from each other because time variables are not independent from each other as already noted. For instance, a person who belonged to the birth cohort let us say 1985–1994, could not be a respondent in the time use study of the year 1979, because this person was not born at that time. Multilevel regression models allow this kind of non-independent relationship. Here we applied here two-level regression models. Analyses were conducted using SPSS *Mixed models* software[1].

However, we were not satisfied with the analyses. Firstly, the Wald Z-test statistic has an important role in the analysis. However, "for random parameters especially, it can be quite unpredictable (for fixed effects it should be OK)" (Field, 2009, 52; see also Heck et al., 2010, 80). Secondly, it was difficult to interpret the results of the analyses. For instance, why did the random effect intercept variance of total variance sometimes grow and sometimes decrease, when new fixed variables were added to the model? Evidently, multilevel models could not remove multicollineary problems. And thirdly, age, period, and cohort impacts were difficult to compare if one or two of them were fixed variables, and the other or others were random variables.

Therefore, we returned in this study to conventional one-level regression models by using ten-year birth cohorts

[1] "SPSS is not the best program in the world for multilevel modeling" (Field, 2009, 741), but evidently with the help of SPSS we could do here same operations as with the help of some other software (although a little more tediously, perhaps).

(1975–84, 1965–74 etc.) and approximately ten-year periods (1979, 1987, 1999, and 2009), but only one-year ages (15,16, 17 etc.). In this way, the exact linear relationship APC was broken. The results were easy to interpret and these – as far as they were comparable – were rather identical both in one-level and in two-level analyses. Finally, it must be remembered that these new attempts, mentioned above, are not complete solutions to the structural identification problem (Yang et al., 2008, 1733), because a complete solution cannot exist.

Research questions

On the basis of the discussion above, we can formulate the research questions as follows.

1. Has time devoted to reading diminished in the course of years?

2. Has time devoted to reading varied

A) with age?

B) between cohorts but time used for reading within cohorts remained unchanged in the course of years (inter-cohort effect)?

3. Has time devoted to reading varied with socio-demographic and other time use (control) variables?

4. Has time devoted to reading varied within cohorts in the course of age in a different way (intra-cohort effect)? This can also be formulated in another way: Has there been interaction between cohorts and age i.e. does the time devoted to reading in different cohorts depend on the age in question? This last question means, for instance, is it the case that cohorts which read less when young have increased their time used for reading more when they become older than cohorts who already read more when they were young? And if this happens, what is the explanation?

Data

This study was based on the original data from four Finnish Time Use Surveys covering the population aged from 10 to 64. Samples from 1979 and 1987 were stratified random samples according to region, gender, and age. Respondents were asked to fill in a diary for two days (one weekday, one weekend day) running. They were asked to record, in their own words, their primary activity, and what else they were doing at the same time. Record keeping was on a 10-minute basis (Niemi & Pääkkönen, 1990, 11–12; 97–101). The number of cases (days investigated) was approximately 8 100 in 1979 and 15 400 in 1987–1988 over the whole year. The data collection period in the 1979 study was from the beginning of September to the end of November 1979, and of the second set of data from the first April 1987 to the end of March 1988.

The data of the 1999–2000 study were collected essentially in the same way as in the earlier time-use studies, but there were also differences. The bottom line of age was 10 as in earlier studies, but no upper limit was set for age. The sample design was also a little different from the design of the earlier studies. The earlier studies were based on a stratified random sample. In the 1999–2000 study, there were two phases. In the first phase, the random sample was drawn from persons living in Finland aged 15 and over. In the second phase, also all other persons, at least 10 years old and belonging to a selected person's household, were included in the final sample. The collection was completed over the period between the first March, 1999 and 12th March, 2000 (Niemi & Pääkkönen, 2002, 111). The number of cases (time-use diary days) was 10 500. The data of the 2009–2010 study were collected in the same way as in the study of 1999–2000 between April 23, 2009 and April 22, 2010. The number of diary days was 7 480 (Pääkkönen & Hanifi, 2011, 97).

However, we could not use the total number of time diaries from 1987–1988, 1999–2000, and 2009–2010 because the first time-budget survey from 1979 covered only September, October, and November in 1979. As seasonal variations in time use are great, especially in the case of leisure time, only the autumn data from 1987, 1999, and 2009 were used.

There is no such time-use category in the data of 1979 as "computer hobby", "automatic data processing", "the Internet" etc. simply because at that time there were no personal computers. A category which is perhaps close to computer hobby is "technical hobbies, collecting". In 1987 data, there is a category "ADP hobby". In the data of 1999–2000 there are already several computer use categories, and in the data of 2009–2010 the following categories are connected with computer hobbies: computer programming, information searching with computer, communication in real time, other communication with computer, and other use of computer. We summed up all these categories in order to get the time-series on time devoted to computer use. From 1987 onward, computer use has clearly been dominating activity in this broad time-use category.

We excluded from the original data those under 15 years of age. This was because 10-14-year-olds are children. For instance, they cannot in Finland be employed or unemployed, they cannot have any other socio-economic status than student or pupil, they cannot have children etc. Thus, the final number of cases from 1979 was about 7 310, from 1987, 7 775, from 1999, 2 036, and from 2009, 1 450. The total number of cases was thus 18 570. However, the number of cases varied somewhat depending on the type of activity and cohort.

Results

Evaluation of models

The basic descriptive statistics can be seen in Table 1. Variables such as self-employed and other entrepreneurs, as well as people without children were left out because otherwise the identification of models would have been impossible (singular matrix). The means of dichotomous variables show percentage divisions. For instance, the mean of gender 1.51 shows that 51 per cent of respondents were women, the mean of worker .26 shows that 26 per cent of respondents were workers.

The most interesting descriptives are those connected with time variables because one day contains only 1 440 minutes, as mentioned above. The maximum value of the time de-

Table 1
List of variables and descriptives

	Range	Minimum	Maximum	Mean	Std. deviation
Time variables					
year	30	1979	2009	87.25	9.24
age	77	15	92	38.28	14.52
cohort	5	(1=75-84)	(6=-34)	3.84	1.35
Other background variables					
gender	1	1(=man)	2(=woman)	1.51	.50
type of municipality	1	1(=town)	2(=other)	1.36	.48
white collar	1	0(=no)	1(=yes)	.32	.47
worker	1	0(=no)	1(=yes)	.26	.44
economically non-active	1	0(=no)	1(=yes)	.32	.47
education	1	0(=other)	1(>11 years)	.20	.40
single provider	1	0(=no)	1(=yes)	.02	.16
couple with child	1	0(=no)	1(=yes)	.35	.47
Time use variables					
reading	740	0	740	47.65	56.17
paid + domestic work	1420	0	1420	421.16	250.4
computer and the Internet	710	0	710	4.21	23.90
TV	800	0	800	97.31	92.72

voted to reading was 740 minutes which means that somebody in the sample used as much as 12 hours 20 minutes for reading. The maximum of computer use as the main activity was 710 minutes or 11 hours and 50 minutes. It is very important to recognize that the standard deviations in time-use categories are very large. For instance, in the case of reading, the mean of time used for reading was 47.65 but the standard deviation even 56.17 which means, for instance, that there are many people who did not read at all (24.4 % in our sample) and people who read very much. This also means that the explanation percentages remain low.

The maximum time used for paid and domestic work was, according to Table 1, as high as 1 420 minutes. The profile of this person who had used 1 420 minutes for work was a man, 21 years old, a worker with no family. More precisely, he had spent 1 410 minutes on paid work, 10 minutes on shopping, and 20 minutes on eating. Perhaps this is an outlier but in the data there are also some other individuals (39 out of 18 880) who had devoted a huge amount of time to paid and domestic work, i.e. over 1 000 minutes or 16 hours 40 minutes per day.

Table 2 (panel A) reveals that the time devoted to reading in the population between the ages 15-64 years has decreased from 48 minutes in 1979 to 37 minutes in 2009. This seems to be the situation especially in the youngest age classes. In the age class 15-24 there has been a secular trend from 46 minutes per day in 1979 to 20 minutes in 2009, and in the age class 25-34 from 43 minutes in 1979 to 24 minutes in 2009. The trends of time devoted to reading by age variables seem to be quite clear. Time increased with age even to the extent that the growth seems not to be linear. The growth was quite modest from the age group 15-24 to the age group 25-34 but accelerated to the following age groups. However, every age class seemed to devote less time to reading year by

Table 2
Reading by year, age class, and cohort (minutes per day)

		Year of research			
		1979	1987	1999	2009
A	***age class***				
	15-24	47	38	28	20
	25-34	43	40	30	24
	35-44	45	49	34	31
	45-54	49	55	51	48
	55-64	62	74	73	56
	65-74	..[1]	..	74	80
	75-	..	..	69	84
	Total[2]	48	49	42	37
	Total	48	49	46	45
B	***cohort (born)***				
	1975-84	.[3]	.	28	24
	1965-74	.	38	30	31
	1955-64	47	40	34	34
	1945-54	43	49	51	56
	1935-44	45	55	73	80
	1925-34	49	74	74	84
	Total	46	49	46	50[4]

[1]data not available
[2]without age classes 65-74 and 75-
[3]catetory not applicable
[4]This figure is bigger than the corresponding Total figure (45) from panel A. This because cohort born 1985-94 (age class 15-24) is not included in panel B.

Table 3
Regression (OLS) models time used for reading total per day (in minutes) as dependent variable

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	B	beta	B	beta	B	beta	B	beta
constant	124.93***		103.69***		101.87***		104.49***	
year	-.72***	-.15	-.87***	-.14	-.99***	-.15	-1.00***	-.16
age	-1.53***	-.36	1.47***	.35	1.30***	.31	1.44***	.34
age2	.03***	.59	-.00	-.07	.01***	.07	.01*	.17
cohort	-2.39***	-.06	-2.71***	-.07	6.06***	.15	4.45***	.11
gender			-3.84***	-.04	-3.82***	-.04	-3.71***	-.03
white c			10.99***	.09	10.54***	.09	10.16***	.09
worker			2.05	.01	1.67	.02	1.63	.01
e. non-act			5.84***	.05	6.01***	.05	6.11***	.05
education			3.70***	.03	3.51***	.03	-4.25*	-.03
lone provider			-4.68	-.01	-4.96*	-.01	-5.64*	-.02
c with child			-5.70***	-.05	-6.18***	-.05	-6.56***	-.06
paid + dom work			-.01*	-.06	-.02**	-.08	-.02**	-.08
(piaid+dom. work)^2			-.00***	-.20	-.00***	-.17	-.00***	-.17
comp+internet. time			-.01	-.01	-.01	.00	-.01	.00
(comp. time)2			-.00	-.02	-.00	-.02	-.00	-.02
TV time			.06***	.09	.06***	.10	.06***	.10
(TV time)2			-.00***	-.09	-.00***	-.09	-.00***	-.09
cohort*age					-.26***	-.46	-.23***	-.40
cohort*age*education							.06***	.07
Adjusted 100R^2	3.9		10.9		11.2		11.3	
sig. F change	.000		.000		.000		.000	

year than in the previous year of research. However, if we take into account the oldest age classes (65-74 and 75 and over) the situation is quite different. These classes seemed to devote more time to reading than before: e.g. the age class 75 and over devoted 69 minutes to reading in 1999, but in 2009, 84 minutes. Unfortunately, information on these changes in the oldest age classes was not available in 1979 and 1987, and therefore we could not study completely this possible acceleration in the following multivariable analyses.

It is even more interesting to observe the development by cohorts. On the basis of Table 2, time spent on reading also increases by cohorts but the inter-cohort effect (time use does not change when a cohort becomes older) can be seen only in the younger cohorts (born 1975–84, 1965–74, and 1955–64). For instance, in the cohort born between 1965 and 1974 the reading time has not increased when the cohort has grown older. In 1987, this cohort devoted 38 minutes to reading, in 1999, 30 minutes, and in 2009, 31 minutes, whereas in the oldest cohort (cohort born between 1925 and 1934) the development seems quite even and the slope of the cohort seemed to be clearly upward. In 1979, this cohort devoted 49 minutes per day to reading, in 1987 49 minutes, in 1999, 46 minutes, but in 2009, already 84 minutes per day.

In Table 3 the OLS regression models are presented. Models can be evaluated both by the force of explanation percentages (adjusted $100R^2$), significance of B- and beta-coefficients, and by the force of the change in the F-test between models. Model 1 contains only time variables. Because, according to Table 2, time devoted to reading seemed to increase at an accelerating pace with age, also age-squared was included in the model. In Model 1 B-coefficients were significant but the signs of age and cohort were unexpected: time devoted to reading seemed, on the basis of this table to be less among older people and older cohorts than among younger people and younger cohorts. An explanation can be that age squared "ate" both linear age and cohort effect. The explanation percentage remained quite low (3.9 %). However, the low explanation percentages are typical in time use studies and are due to the large variation in time use between people, as was recognized in Table 1.

In Model 2, socio-demographic and other time use control variables were added to Model 1. This improved the model as was expected. The explanation percentage rose to 10.9. The sign of age turned in the "right" direction or was positive, but the coefficient of age-squared was no longer positive. Signs of control variables seem to be as expected, and all coefficients are statistically significant. The signs of B-coefficients of time devoted to paid and domestic work and the same squared were also as expected: both signs were negative, and the negative coefficient of work squared was clearly more significant than the negative coefficient of linear relationship, and there was also a large difference in beta

values (-.06 and -.20).

The linear relationship between time used for reading and time used for watching TV was positive and significant, and the relationship between time used for reading and time used for watching TV squared was negative and significant. These results were as expected. Correlations between time used for computer hobby and the Internet and for reading, and for computer hobby and the Internet squared and for reading were not at all significant.

In Model 3 an interaction term between cohort and age was added. This addition was conducted because of research question 4. The explanation percentage of Model 3 was higher (11.2) than in the previous model, and the beta-coefficient of the interaction term was as high as -.46, which was the highest beta-coefficient of all betas.

Answers to the research questions

We answer to the research questions mentioned above first of all on the basis of Model 3 and Model 4, which contain all the variables mentioned in the theoretical part. The answer to research question 1 (Is time devoted to reading diminished in the course of years?) seems to be quite clear. In every model the B-coefficient was negative and significant at .001 level, reading has decreased year by year.

In respect to the research question 2a (Does time devoted to reading vary with age?) the answer is also positive. The relationship between age and time used for reading seems to be strong and positive (beta = .31, Model 3), as was expected. Also the relationship between age square and reading was clearly positive: thus, time used for reading accelerates along with age. The answer to research question 2b (Does time devoted to reading vary between cohorts but time used for reading within cohorts remains unchanged in the course of years, the inter-cohort effect, is ambivalent) because coefficients were not robust. In Models 1, and 2, B-values of cohort were significant and the signs were the opposite what was expected or minus (the older was the cohort the less time it devoted to reading). Beta-coefficients were low and varied between -.06 and -.07. However, in Model 3 (and 4) the sign was positive and substantial, or .15, i.e. the older cohorts read more.

The answer to research question 3 (Does time devoted to reading vary with socio-demographic and other time use (control) variables?) is clearly positive, as far as gender, white collar, economic non-activity, education, and couple with a child are concerned. Females spent more time on reading than males, white collar workers more than people on average, the economically non-active more than the economically active, people with tertiary education more than others. Couples with at least one child under 18 years used less time for reading than people on average. These results were as expected. On the other hand, B- and beta-coefficients of worker and lone provider were not significant and/or substantially low.

The time devoted to reading varied with time spent on paid and domestic work. The beta-coefficients of paid and domestic work were in Models 2–4 negative but quite low, whereas the beta-coefficients of paid and domestic work squared were stronger and almost identical (-.20, -.17 and -.17), and thus robust. The results were as expected in respect of coefficient of work squared. But in any case, the slope seemed to be a rather gentle one. We can calculate the exact marginal change by deriving the equation:

$$t_r = a_{rk} * X + b_r * t_w + c_r * t_w^2 \quad (1)$$

where t_r is time used for reading on average, X is a vector of k other independent variables than time used for paid and domestic work, b_r and c_r B-coefficients from Table 3 (Model 3 and Model 4), and t_w and $t_w{}^2$ are time used for paid and domestic work on average (250.98), and the same squared on average (242,601.26, 76).

The derived equation is:

$$\frac{\delta t_r}{\delta t_w} = b_r + 2 * c_r * t_w \quad (2)$$

The value of b_r is -.02, and the exact value of c_r is -.000045. Substituting we get

$$\frac{\delta t_r}{\delta t_w} = -.056$$

This means that when time used for paid and domestic work decreases by 100 minutes or 1 hour 40 minutes, the time used for reading increases by only 6 minutes.

Time devoted to reading varied with time spent on TV viewing and computer use as we saw already above. Computer hobby and/or Internet use and reading do not correlate with each other. We can see that in the case of reading and watching TV the previous hypothesis was confirmed in the analysis. There is a significant linear relationship between reading time and TV time, but a negative one between reading time and TV time squared. This means that in "normal" cases, people who are interested in media are omnivorous, i.e. follow all kinds of media. Only in extreme cases are reading time and TV time in opposition with each other.

Research question 4 was: Does time devoted to reading vary within cohorts in the course of years in a different way (intra-cohort effect), or whether time devoted to reading in different cohorts depends on age. The interaction term cohort*age was added to Model 3. This change significantly improved the fit of the model, and an intra-cohort effect was evident. The most important observation is that both B- and beta-coefficients were negative with beta being even -.46. Thus, time spent on reading turns more steeply upwards among younger cohorts as they grow old than in older cohorts. This observation could not be inferred from Table 2.

One explanation for this interaction is the longer education of younger cohorts in comparison with older cohorts. Although younger cohorts read less when young than their predecessors, they have, however, more competence to read than their predecessors because of their longer education. But this competence is latent when younger cohorts are young: competence blossoms out as time goes by! This idea was tested by Model 4. A second-degree interaction term cohort*age*education was added to Model 4. Education was 1,

if person was student, 0 otherwise. If this term is significant, it means that interaction between age and cohort depends on education. The added term had positive sign and was significant at .001 level. This means that time used for reading increased with age steeper in those younger cohorts which were at least students by education than in those younger cohorts which were less educated. Thus, the idea was endorsed.

Discussion

The time used for reading seems to have diminished age by age, year by year and cohort by cohort. However, a more careful study shows that things are not so simple: there are also many counter-tendencies against diminishing reading. Perhaps the most surprising result on the basis of the Finnish time use data from a 30-year period is that cohorts which read less when they were younger, increase their reading more steeply as they get older than cohorts which read more when they were young. This is perhaps due to the latent reading competence of younger cohorts. This study also indicated that the time used for computer and/or the Internet is not taken away from reading time. In respect to watching TV and reading, these are positively correlated except in extreme cases. People who use time for reading, also use time for watching TV. It seems to be that media followers are omnivorous in their media use. This finding can be considered a side result of this study.

It is a pity that we could not take into account the time use of the household to which a person belonged, because a person's household was left outside the samples from the years 1979 and 1987. However, many recent studies show, for instance, that the impact of family on the reading of children is strong (e.g. Nagel & Verboord, 2012; Kraaykamp & Van Eijck, 2010). Moreover, on the basis of some experiments with Finnish time use data from 1999 and 2009, the household impact on time used for reading is substantial.

Methodologically, we can make a reservation. Because of the identification problem of the APC analysis, the results of these analyses are always very sensitive to alternative solutions to the identification problem. In this article, after many experiments, we decided on a conventional solution. Perhaps some other solution would have given different results.

Here we studied the time used for reading in general. However, many respondents probably have understood the time used for reading to mean reading printed media, so a lot of time spent on reading remained concealed. Perhaps it would have been better to study book reading because people usually read books in a printed version. In addition, a lot of reading can remain concealed because in this merged data it was not possible to study multi-tasking. For instance, many people read a newspaper when they eat breakfast, so they can write down that they "ate breakfast" or "read newspaper". However, we did not want to limit our study only to book reading because there are different types of readers: some people read newspapers voraciously, others read novels voraciously etc.

We must also leave out reading at work, because it is included in working time. This is regrettable because the contents of work tasks have changed so that probably they involve more and more reading (and writing). One additional reason to suspect the decrease in time spent on reading in the future is that reading is necessary for acquiring cognitive competence. For instance, a strong correlation has been found between time spent reading for pleasure and academic success (Halford, 2011).

In any case it is evident that it will become more and more difficult to study time used for reading because of the Internet, as well as the consumption of culture in general. The media landscape has changed a lot in all areas of life during last decades. When somebody is making dinner, he/she is looking up a recipe online, not necessary a recipe book. This landscape change perhaps explains also the delay in increase of reading of younger cohorts when they grow older. But it is probable, even on the basis of this study, that people who read, do so by means of various media: they are omnivorous in media use. Printed media and the Internet are not exclusive.

References

Berelson, B. (1957). Who reads books and why? In B. Rosenberg & D. M. White (Eds.), *Mass culture* (pp. 119–125). Glencoe: New Press.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage publications.

Fienberg, S. E., & Mason, W. M. (1985). Specification and implementation of age, period and cohort models. In W. M. Mason & S. E. Fienberg (Eds.), *Cohort analysis in social research* (pp. 45–88). New York: Springer-Verlag.

Glenn, N. D. (1977). *Cohort analysis. Series on quantitative applications in the social sciences*. Beverly Hills: Sage Publications.

Glenn, N. D. (2005). *Cohort analysis. Series on quantitative applications in the social sciences* (2nd ed.). Thousand Oaks: Sage Publications.

Griswold, W., McDonnell, T., & Wright, N. (2005). Reading and the reading class in the twenty-first century. *Annual Review of Sociology*, *31*, 127–139.

Griswold, W., & Wright, N. (2004). Wired and well read. In P. N. Howard & S. Jones (Eds.), *Society online: The internet in context* (pp. 15–25). Thousand Oaks: Sage Publications.

Halford, M. (2011). *Reading and the 2010 time use survey.* Retrieved 2013-08-05, from `http://www.newyorker.com/online/blogs/books/2011/06/reading-and-the-2010-time-use-survey.html`

Heck, R. H., Thomas, S. L., & Tabata, L. N. (2010). *Multilevel and longitudinal modeling with IBM SPSS*. New York: Routledge.

Knulst, W., & Kraaykamp, G. (1998). Trends in leisure reading: Forty years of research on reading in the Netherlands. *Poetics*, *26*(1), 21–41.

Knulst, W., & van den Broek, A. (2003). The readership of books in times of de-reading. *Poetics*, *31*(2), 213–233.

Kraaykamp, G., & Van Eijck, K. (2010). The intergenerational reproduction of cultural capital: A threefold perspective. *Social Forces*, *89*(1), 209–231.

Mannheim, K. (1928/1952). *The problem of generations. Essays in the sociology of knowledge*. New York: Oxford University Press.

Nagel, I., & Verboord, M. (2012). Cultural capital formation from adolescence to early adulthood. the impact of family and education on book reading. *Acta Sociologica*, *55*(4), 348–362.

Niemi, I., & Pääkkönen, H. (1990). *Time use changes in Finland in the 1980s. Studies 174*. Helsinki: Central Statistical Office of Finland.

Niemi, I., & Pääkkönen, H. (2002). *Time use changes in Finland through the 1990s.* (No. 2). Helsinki: Statistics Finland.

Pennington-Gray, L., & Spreng, R. A. (2002). Analyzing changing preferences for pleasure travel with cohort analysis. *Tourism Analysis*, *6*(2), 109–121.

Peterson, R. A. (1992). Understanding audience segmentation: From elite and mass to omnivore and univore. *Poetics*, *21*(4), 243–258.

Pääkkönen, H., & Hanifi, R. (2011). *Ajankäytön muutokset 2000-luvulla. Elinolot 2011*. Helsinki: Tilastokeskus.

Robinson, J. P., DiMaggio, P., & Hargittai, E. (2003). New social survey perspectives on the digital divide. *IT & Society*, *1*, 1–22.

Robinson, J. P., & Geoffrey, G. (1997). *Time for life: The surprising ways Americans use their time*. Pennsylvania: Pennsylvania State University Press.

Toivonen, T. (2005). The time of de-reading: Explanations and interpretations on the basis of Finnish time use surveys 1979-1987-1999. In T.-A. Wilska & L. Haanpää (Eds.), *Essays in Economic Sociology.* Turku: Turku School of Economic and Business Administration.

Toivonen, T. (2006). *Trends in leisure time use of different cohorts in Finland* (Discussion and working papers No. 5). Turku: Turku School of Economic and Business Administration.

Verboord, M. (2005). Long-term effects of literary education on book-reading frequency: An analysis of Dutch student cohorts 1975–1998. *Poetics*, *33*(5-6), 320–342.

Warde, A., Southerton, D., Olsen, W., & Cheng, S.-L. (2004). The changing organization of everyday life in UK: Evidence from time uses 1975-2000. Copenhagen, August 26-28.

Wass, H. (2008). *Generations and turnout: The generational effect in electoral participation in Finland* (No. 35). Helsinki: Department of Political Science. University of Helsinki.

Yang, Y., & Land, K. C. (2008). Age–Period–Cohort analysis of repeated cross-section surveys: Fixed or random effects? *Sociological Methods & Research*, *36*(3), 297–326.

Yang, Y., Schulhofer Wohl, S., Fu, W. J., & Land, K. C. (2008). The intrinsic estimator for Age–Period–Cohort analysis: What it is and how to use it. *American Journal of Sociology*, *113*(6), 1697–1736.