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Sociology of the Mobile Phone

Pre-teen cell phone adoption: Consequences for later patterns of phone usage and involvement

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1. Introduction

In its present digital version (GSM), the mobile phone has begun its spectacular diffusion about 1995, when it was still predominantly used for business purposes, and possession was mainly restricted to men and women who had completed school and were already earning their own money on a job (Ling 2001a: 7).

Until 2001, cell phones had reached a societal penetration rate of about 60-80%: more than the fixed phone had achieved within a hundred years since its inception (1876). Thus, we can observe an extremely rapid diffusion process needing only about 6 years to come to completion: This breath-taking speed cannot be compared with the diffusion velocity of any other technological gadget during the same period or anytime before (including the spread of PC's and Internet connections). Interestingly, some more traditional regions like Europe and South East Asia had a larger share in this process than the United States (Lorente 2002).

Considering the increasingly homogeneous diffusion of the cell phone among different social strata (as well as countries with rather divergent levels of socioeconomic development), this new technology can be considered a belated argument for Helmut Schelskys thesis that modern consumer society will diminish the importance of social class cleavages, while increasing on the other hand cleavages associated with age cohorts and generations (Schelsky 1957)

As in the case of all communication media, the possession and usage of mobile phones cannot be understood as a sum of independent individual usage patterns, because usage is embedded in social interactions within a setting of bilateral relationships and multilateral group structures. Certainly, early adopters of a new invention always need a special subjective motivation to be in front of others: e. g. a particular interest in boasting or a special liking for the technology. Thus, the first car owners and TV viewers were "freaks" who were ready to adopt the new gadget even at periods when their utility was still drastically low (because of scarcity of streets and TV programs).

Similarly, early telephone users had to pay much for a technology that not very instrumental, because given the low number of owners, the likelihood of receiving calls as well as the opportunities for contacting others were rather low. Empirical studies show that mobile phones were no exception to this regularity. Thus, as late as 1998, Rich Ling has found that mobile phone owners maintained more positive attitudes toward the technology than non-owners (Ling 1998). Interestingly, it was found that ownership was the main differentiating variable, not the degree of actual use.

With increasing diffusion, however, such subjective attitudes lose significance, because there are too many *social* reasons for adoption. (To the contrary, strong subjective convictions may today be needed to *resist* when everybody else conforms). Thus, the mere possession of a cell phone is often dictated by parameters outside the respective individual: by social expectations and social controls emanating from family members, friends and peers. Similarly, the intensity of usage is at least partially independent from subjective preferences, e. g. because incoming calls and text messages have to be answered. As it is well known, consumption patterns of adolescents are especially prone to be influenced by collective norms. Thus, studies show that many adopt a mobile just because "many colleagues already have one" or because it is "cool" (Kunz Heim 2003: 83). On the other hand, social conformity pressures seem to play a surprisingly little role (Kwon and Chida-mbaram (2000), as users consistently say that they are not looking down on anybody just because he or she has no mobile phone (Kunz Heim 2003).

Given this collective nature of communication technologies, it is not possible to follow the diffusion model of Rogers which presupposes that every individual decides on his own about the adoption (Rogers 1995). Instead, the adoption process may be hastened (and especially: made more extensive) by group conformity pressures that cause almost everybody to adopt the new devices - regardless of any corresponding subjective motivation (Ling 2001b).

2. The particular proneness of adolescents to use mobile phones

As it has been shown by a mass of empirical evidence from all world regions., adolescents were most eager to embrace the new communication technologies among all demographic groups.

As Ling reports for Norway, only 3 percent of 13 years old had cell phones in 1997, while this percentage has risen to 50% in Nov 1999 and to over 80% in 2001. For 16 years old, the percentage was less than 20 in 1997, but about 80% in 1999 and almost 100% in 2001. (Ling 2001a: 7).

In Italy, it was reported that in 2004 more than 50% of all children own a phone set when they are nine or ten (ITU 2004: 12).

As a consequence, today's adolescents can be considered to be the real

"digital natives' for whom the Internet and new forms of digital communication are second nature, in contrast to the older 'Digital Immigrants' who may have adapted to new technologies and tools, but don't have the same familiarity, commitment, or comfort level." (Godwin-Jones 2005).

From our knowledge about the personal, social and cultural conditions and developments of adolescents, different hypothesis can be derived for explaining why they have adopted such a pioneering role.

First, it has often been found that adolescents are also highly susceptible to fashions, trends and styles: making them open for adopting any new technological devices and behavioral patterns when these are considered to be "hip" and "cool". (Ling 2001a).

As stated by Hurrelmann, adolescents have a strong inclination for "conspicuous consumption", by using various material objects as status symbols or as indicators of group belongingness (Hurrelmann 1995: 163). Thus, they assimilate the mobile as an object of style: profiled by trendy forms and colours, ring tones and accessories that express the special self-identity of each respective user. As a consequence, ownership as well as usage of mobile phones cannot be reduced to personal needs (instrumental or socio-emotional), because they are additionally fuelled by such symbolic considerations. In fact, the mobile phone has become one of the most intimate and personalized material objects, to be compared with keys or wallets. In a UK survey, almost half of the users said that the loss of their mobile would result in a sort of "bereavement"

„Many are afraid to leave home without it, and feel uncomfortable when others peruse their mobile menus or messages“. (ITU 2004: 7)

Most adolescents carry their phone set with them all the time, many keep it under their pillows or on their bedside table at night (ITU 2004: 7). Thus, there is certainly no other digital device evoking so much emotionality and personalized involvement, certainly not TV sets, digital cameras, VCR's or TV's. No other electronic device is instrumentalized so much for purposes of "identity management" Its evolution goes along with a constant expansion of personalized features: wallpapers, ring tones, coloured covers etc. As a consequence, emotional attachment is a special dimension of mobile involvement that may not be strongly associated with intensity of usage. In fact, we may find individuals who consider their cell phone exclusively as a lifestyle gadget, not as a tool for communication.

On the other hand, however, neither the extensive diffusion nor the intensive usage of mobiles mean that adolescents have become psychologically dependent on the new technology or even "addicted" to it. For instance, Doris Kunz Heim found that most girls and boys would find a life without mobile not too hard to endure (Kunz Heim 2003: 93).

Secondly, it is evident that the mobile phone can support the well-known tendencies of adolescents to emancipate from the local context of parental home and to integrate themselves into (usually trans-local) networks of peers. (Ling 2001a). In the course of modernization, many factors have increased the chances of even very young children to escape from their parents influence and to adopt attitudes and activities shaped by peers and larger society. Thus,

"The rise of a consumer market directed at children has offered pre-adolescents the opportunity to create a specific "child culture" that largely resembles the culture of adolescents." (Meulman 2000).

Given the ubiquitous accessibility to technically mediated forms of play, information and communication, even very young kids are highly empowered "social actors" constantly busy with taking their decisions among a wealth of different alternatives. Thus, they tend to constitute a separate group of society integrated by "peer culture" in a similar way as adolescents: e. g. by sharing patterns of material culture and activity (e. g. based on toys, sport articles, clothes etc.) that may relativize or override influences stemming from their local home environment and their particular parents (Buchner 1995; Seiter 1993; Kline 1993; Steinbergh et. al. 1997; Zinnecker 1995). The cell phone fits nicely into this larger picture by making peer group contacts accessible almost everywhere and every time, even for small kids still living with their parents.

In terms of Dunphy (1963) and Coleman (1978), it could be stated that the cell phone adds another intermediate phase to the step-by step process that releases adolescents from their parents: by opening up a first 'virtual connection' to peers long before tightly-knit peer groups are formed, and relationships to the other sex at times when same-sex groupings are still predominant. Thus, an initial peer group culture is promoted that is based primarily on verbal communication, not on colloquial physical interaction (e.g. more "platonic" forms of erotic relationships).

As the cell phone supports primarily bilateral relationship, it is most useful to teenage girls because girls in this age are most prone to engage in dyadic friendships, while boys prefer more multilateral interactions (Meulman 2000). In addition, it is more functional for females to the degree that their movement in space is more tightly controlled than that of boys: so that they can maintain certain contacts at certain times (e. g. after midnight, when they have to be at home) only by phone. In other words: the cell phone can contribute to a levelling of gender differences even in traditional setting because control over the spatial movement of females is less consequential than in earlier times when it was synonym with total social isolation. Thus, such girls may be less likely to develop a closed "bedroom culture" (McRobbie 1978) together with their most intimate female friends.

Adolescents are often in a fluid social situation characterized by highly volatile social interactions and acquaintanceships, in a kind of extended "trial and error" phase terminating (sometimes) in stable partnership relations and a rather fixed network of friends. The mobile phone certainly supports the initiation and growth of such more ephemeral relationships originating from accidental meetings on parties, in vacation etc. Not surprisingly, Doris Kunz Heim has found that the dependence on mobile communication was highest for teens with highly informal types of leisure time activities: e. g. for those going to private parties or "hanging around" with their friends. Instead, significance is reduced when activities within formal settings (e. g. in club sports or voluntary associations) prevail (Kunz Heim 2003: 94). Evidently, formal settings can reduce the need for mobile communication because more frequent and predictable opportunities for face-to-face communication exist.

The need for ubiquitous mobile communication is especially high when among young people who are forced to live a highly nomadic life (Ling 2001a). For instance, *apprentices* typically develop a translocal network of friends and acquaintances: encompassing individuals they meet in the urban vocational school or in the firm where they work during weekdays: individuals living mostly in other communities. As a consequence, the mobile phone gains in importance for instrumental reasons: e. g. for keeping in touch with such acquaintances and coordinating activities with them during times when they are at another place. For the same reasons, however, more intrafamily coordinations have to be made by cell phone communication when adolescents are in schools and at workplaces far away from home.

This leads to the *third* hypothesis that *the early adoption of mobile phones may also be encouraged by the parents and be functional to support intergenerational relationships* - especially under current conditions of high geographical distances and mobility.

While the peer group influences are thus accelerated, extended and deepened, it is not clear to what degree parental influences are weakened, because parents have also more means at hand to influence or even control their children (e. g. by paying them expensive sport activities or transporting them to courses and leisure events of their choosing by car). Evidently, parents from higher social classes have more resources at hand for directing their kid's behavior and social life (Zinnecker 1995; Meulman 2000). Especially mothers have been found to introduce their children to music, theatre and other cultural spheres (Howard 1990). On the other hand, research has also shown that kids from wealthier backgrounds tend to develop ties with peers earlier in their childhood (Meulman 2000), so that they may also develop earlier needs to contact them by mobile phone.

As recent research results indicate, the relationship between parents and their adolescent offspring is less conflictive and more cooperative than in the past for a variety of reasons. Given the "liberal" attitudes of most current parents (e. g. toward extramarital sexual relations), adolescents have less reasons for revolt than in the early sixties where they had to free themselves from very oppressive normative expectations and social controls. Secondly, the mere decline in the number of children has contributed to a more intimate and longer-term relationship between parents and each kid. And finally, many young adults - especially while studying - still live with their parents because they lack the means to pay their own apartment.

As Putnam remarks, the decay of traditional communal ties and neighbouring interactions can have the effect that the salience of family relationships is increased (Putnam 1995).

"The effects of divorce, dual careers, fewer collegial job relationships etc. mean that the bonds holding the family and the social group are becoming more important. Thus the rituals and celebrations that build this fiber, i. e. birthdays, anniversaries, the provision of moral support, retelling family history, maintenance of local histories etc. are all involved." (Ling 2001a: 4).

Such arguments weaken the conventional hypothesis that with increasing age, adolescents lessen their interactions with family members by shifting communication to peers (Kunz Heim 2003). In fact, Kunz Heim has found that older teens were more likely, not less likely to maintain regular phone contacts to family members (Kunz Heim 2003: 89). This may be explained by the fact that they are more often away from home, so that they have less opportunity to communicate face-to-face.

Under such conditions, parents have cogent reasons to buy mobiles for their youngsters and even to pay most of their bills. *First of all*, they hope to keep a certain control on the whereabouts of their offspring. *Secondly*, they use mobiles for coordination purposes (e. g. by calling them when dinner is ready). And *thirdly*, parents use the mobile for security purposes: for assuring themselves that kids are well, and for allowing kids to phone home whenever they are in need. In the past, such controls and coordinations were only possible when youngsters were known to be in specific places. Today, they are compatible with their unpredictable movement in a wide geographical region, because phone calls always target a specific person, not a specific place (Ling 2000b: 12). Likewise, mobile phone is highly compatible with high mobility of parents: e. g. allowing divorced fathers to contact their children from distant places.

Thus, mobiles make it possible to *combine intensive family bonds with high freedoms of movement for all the participating individuals*: for the adolescents who seek integration into their peer group as well as for working mothers or distant fathers. For instance, Doris Kunz Heim has found many cases where parents gave mobile phones to their kids even against their own will: just to install an "umbilical cord" to keep them under protection and control (Heim Kunz 2003: 85).

3. The consequences of earlier adoption as a focus of research

Earlier cohorts of teenagers have adopted the phone without much family influence, because older siblings, father and mother were not yet acquainted with the technology. Thus, it may be expected that peer influences were dominant. Today, almost all children grow in a setting where adults are already acquainted with the mobile phone. Consequently, they are likely to get into contact with it already very early in life. More and more, girls as well as boys adopt their first cell phone at the age

between 10 and 12. As studies have shown for decades, this is an age where youngsters are still very much embedded in family relations and live most of their leisure time still with their parents.

The factual diffusion process toward lower and lower age groups is not fully in line with adult preferences, because surveys show that parents think that adolescents below 15 should not be in possession of their own phone (Ling 2000b: 9f.). Major reasons for this are financial: kids are supposed to earn first their own money (Ling 2000b: 11). Evidently, the parents seem not to be capable of withstanding the pressures emanating from the peer groups of their children - even when they organize in order to increase their level of control. (Ling 2000b:10)

A major factor for widespread diffusion among young people was the introduction of subsidized handsets and pre-paid subscriptions, because prepaid cards help to keep mobile costs under control - what is especially important for youngsters with a more modest background. (Mante/Piris 2002). Most teens get their first mobile phones as a gift from their parents. Very often, it is an older model no longer used by father, mother or older siblings (Kunz Heim 2003:85). Thus, one reason why mobile possession trickles down to ever younger age groups has to do with the very high replacement rates of hand sets: leading to so many "useless" sets that would be thrown away when they could not be recommissioned to younger kids.

As the cell phone is entering the socialization process at ever earlier stages, the question arises whether this has any significant consequences for personality development and identity formation as well as for the behavioral patterns in later adult years. As it seems premature to formulate too specific hypotheses, the following four points may have to be considered:

1) All educational theory relies on the premise that during ontogeny, human beings pass "formative years" of their personality development during which they are especially prone to be deeply shaped by external influences. These years constitute the "window of opportunity" for pedagogues to exert their influence: e. g. for producing stable values and attitudes or lifelong behavioral habituations. (Bernard 1926).

Following these lines, we may hypothesize that pre-teens may possess a widely open "window of digital learning" in a similar way as two-year old toddlers are extremely disposed to learn any oral language, or similar to some 11 year olds who can be directed toward prodigious sport performances when they are induced to training at this early age. Thus, when mobile phones are adopted with 15 years or even later, usage may well remain lower level because motivations for playful learning and exploration are diminished and the new technology is not assimilated in the same encompassing way.

2) The earlier the age of adoption, the more probable that relatively strong family influences on usage patterns will possibly be exerted. Thus, low adopters may show wider divergences related to the socio-economic standing as well as to the educational styles of their parents, to their siblings or other environmental factors. By studying such relationships, it may well be found that such impacts are especially profound

- On kids of higher social classes: because parents have more means for influencing their kid's environment and activities (Meulman 2000)
- On girls: to the degree that in comparison to boys, they are still subject to stricter parental control.

In addition, mothers should have more influence than fathers, because they exert higher control over their children's telephone usage (Pasquier 2001; Kunz Heim 2003: 81).

3) By adopting a mobile phone, teens enter a process of cumulative self-socialization (Kunz Heim 2003) by becoming habituated to the new medium and developing skills for using it efficiently etc. Skog stresses that younger users are expanding quickly their competences because they are motivated to explore the functionalities of mobiles with a playful attitude. In the course of such explorations, they acquire a "digital capital" they can use for asserting themselves vis-à-vis adults. Thus,

“...it is not uncommon to see citations in qualitative studies of mobile service use that indicate that the younger users of the family have taught their parents how to use their phones, PC's, or services on these platforms.” (Pedersen/Nysveen 2003: 12)

4) A strong self-reinforcing impact on mobile usage stems from social influences. Whenever somebody begins to make mobile calls, receivers will phone back on the same number because the number appears on the display and can be answered by merely clicking a button. As a consequence, lists of numbers are automatically accumulating in the phone archive. So, when I want to contact somebody, I have to use the mobile because the phone number is only stored there. When time goes on, peers, family members and other contact persons expect from me that I'm accessible and that I rapidly answer SMS, so that I have to carry the phone with me and keep it on. Thus, many forces converge to make mobile usage a self-reinforcing and self-expanding activity, so that ever more calls are sent and received and ever higher monthly bills have to be paid.

On the basis of such considerations, it may be hypothesized that the age at first adoption has significant long-term effects on usage patterns as well as subjective attitudes toward the mobile phone. Specifically, early adopters may be more prone to give their mobile a central place in their life even as adults, to maintain longer lists of phone partners, and to emit and receive more frequent calls as well as text messages - even when they have reached adult age. In addition, early adoption may well have the effect of amplifying divergences related to gender and family background, because usage patterns are crystallized at an age where childhood roles and parental impacts are still more significant than influences from peers.

4. Data and Methodology

The following empirical results are based on a survey carried through in September and December 2003 at several vocational schools in Zurich (Switzerland) comprising young apprentices (mostly between 17-21 years old) in the field of construction, office administration as well as fashion and design. Based on the teacher's permission, the standardized questionnaire was applied during classes, so that a very high return rate (of more than 95%) could be achieved. On the average, it took students a mean of 30 minutes of class time to complete the questionnaire. As an incentive to answer the questions thoroughly, students who took part in the survey could choose to have their names drawn for a prize.

The pervasiveness of the new technology is dramatically demonstrated by that fact that out of 1415 respondents, not less than 1356 (=95.8) percent were currently in possession of a personal mobile phone, and among the 59 non-owners, 28 had the habit of borrowing sometimes a set from a sibling or friend.

Among the owners, a rather equilibrated distribution according to gender and age was achieved (Table 1).

Table 1: Frequency distribution of respondents: according to gender and age

	Current age (2003)					Total
	-17	18	19	20	21+	
female	103	185	152	55	56	551
male	165	216	209	109	106	805
Total	268	401	361	164	162	1356

The highly multicultural demographic structure of Switzerland today was mirrored in the fact that more than 30% of all respondents (421) were originating from a foreign country.

5. Empirical results

5. 1. The rapid trend toward ever earlier initial adoption

Table 2 demonstrates that the downward diffusion of mobile phone to lower age groups has proceeded in a similar manner in Switzerland as in other countries (e. g. Scandinavian).

Interestingly, most apprentices have bought (or received) their first cell phone at about 1999-2001: a year was the oldest cohorts have almost reached maturity, while youngsters born in 1986/87 were in their earliest teens. Among the youngest cohort born in 1988, no less than 36% have adopted the mobile already as pre-teens, at an age almost nobody used it three years before.

Within four years, the "window of adoption age" has shifted downwards about four years: from 14-18 years (1984 cohort) to 10-14 years (cohort of 1988).

Table 2: Age at first cell phone ownership for different cohorts of birth

		Year of birth						
		1982	1983	1984	1985	1986	1987	1988
Age at first ownership	8-10	0	0	0	0	1	1	8
	11	0	0	0	1	2	1	8
	12	3	0	1	1	4	10	20
	13	6	3	3	10	23	31	28
	14	0	8	14	20	26	30	22
	15	9	12	24	31	26	19	14
	16	21	34	33	28	16	7	0
	17-18	61	43	25	9	2	1	0
	Total (N =)	100% (100)	100% (84)	100% (162)	100% (357)	100% (396)	100% (228)	100% (36)

Figure 1: Age at first cell phone adoption for different birth cohorts: males (cumulative percentages)

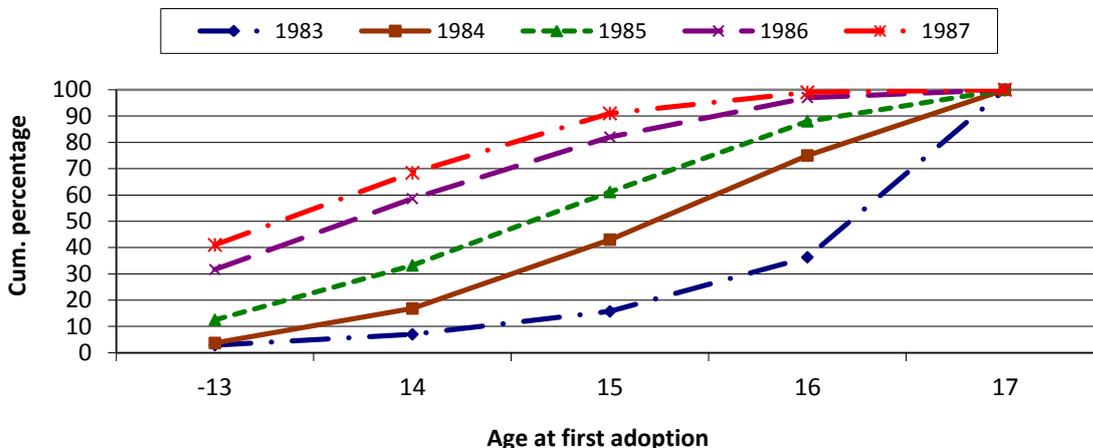
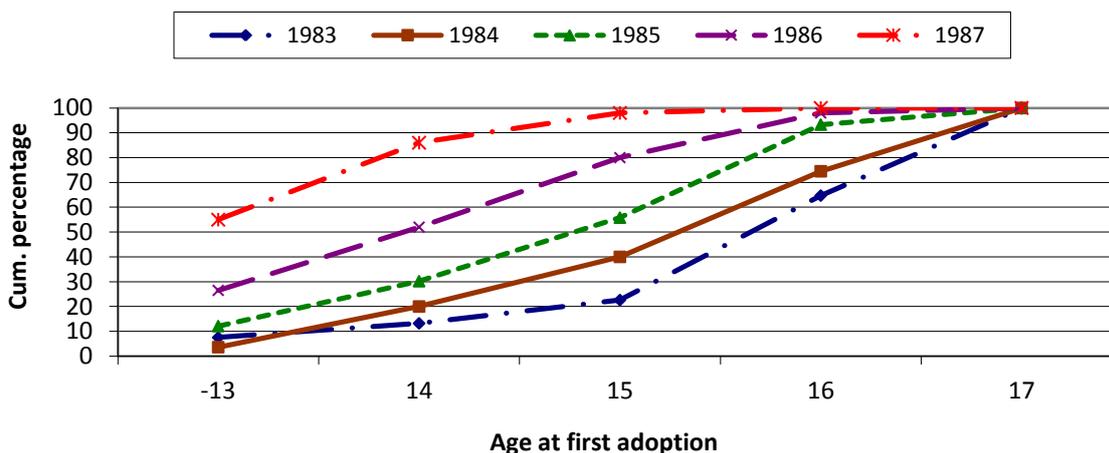


Figure 2: Age at first cell phone adoption for different birth cohorts: females (cumulative percentages)



As shown in Figures 1 and 2, males and females have undergone almost identical evolutions. However, women seem a little quicker; the oldest cohort was more disposed to adopt the mobile phone before 16 years, and the younger females seem a little more prone than males to initiative usage below 14 years of age. Remarkably, no gender-related differences can be observed within the intermediate groupings.

5.2 Intensity of phone usage

The results of Table 3 demonstrate that there is a highly consistent negative correlation between the age of first adoption and all indicators of current usage intensity (in summer 2003). Thus, very early (=pre-teen) adopters of both genders show highest values in monthly phone bills as well as in the average number of monthly outgoing and incoming call and text messages, while very late adopters (17 years of age) rank lowest on all these five scales.

Given the high covariance between adoption age and year of birth, it is important to check whether these correlations also hold when current age is controlled. In fact, all partial coefficients remain on the same level of significance as the bivariate correlations. In the case of monthly bills, controlling for age results in even tighter correlations, because the bivariate relationship masks the regularity that most pre-teen adopters stem from younger age cohorts who have not much money to spend.

Table 3: Usage intensity of the mobile phone: according to age at first ownership

		Age at first ownership						corr.	partial corr.*
		-12	13	14	15	16	17+		
Monthly cell phone bill (in Sfr.)	females	84	83	58	60	62	55	-.15**	-.26**
	males	106	83	69	64	57	62	-.19**	-.36**
Number of outgoing calls per month	females	95	91	61	61	52	36	-.17**	-.19**
	males	160	142	96	90	60	62	-.25**	-.30**
Number of incoming calls per month	females	193	143	117	97	91	52	-.20**	-.18**
	males	284	192	137	128	98	88	-.26**	-.31**
Number of outgoing SMS per month	females	383	338	251	197	231	117	-.25**	-.19**
	males	340	256	211	196	153	129	-.23**	-.26**

*Partial correlation coefficient: with current age controlled.

It is interesting to note that the financial expenses of the highest group are only about 60% above the lowest, while the number of call and text messages varies much more: by a factor of three to four. These divergences indicate that intensive users either discipline their costs by making shorter calls or by opting for more degressive (e.g. flat-rate type) schemes of payment. At least on the level of oral communication, the number of incoming calls is much more affected than the frequency of outgoing calls, so that early adopters show a very high surplus of receivings over emissions. From this regularity, it might be concluded that while early adoption implicate higher levels of active usage, it goes along with even higher embedment in social networks from within which such incoming calls are generated.

Finally, it is remarkable that all partial correlation coefficients are higher in the male than in the female sample. Especially in the case of oral calls, males who have adopted the phone at twelve or before show extremely high usage rates.

Thus, it might be concluded that to the degree that early adoption entails long-term socialization effects; such impacts are affecting the behavior of later adult men more strongly than that of later adult women.

5.3 Extensity and intensity of phone partner networks

The larger amount calls and text messages of early adopters may either be caused by contacting a specific number of partners more frequently or by interacting with a larger total number of partners (or of course by any mixture of these two). For assessing the extension of their networks, informants were asked to count the number of individuals they have contacted more than once during the three preceding months.

The results show clearly that earlier adoption goes along with a larger number of contact persons, especially in the male sample where the network of pre-teen initiators is more than 100% larger than that of very late adopters (48 vs. 23) (Table 4). While the correlations lose some weight when current age is controlled, they remain still significant.

Table 4: Number of phone partners contacted several times during the last three months: according to age at first ownership*

	Age at first ownership						corr.	partial corr.*
	-12	13	14	15	16	17+		
females	37	29	27	25	22	21	-.16**	-.11*
males	48	38	34	29	25	23	-.22**	-.20**

*Partial correlation coefficient: with current age controlled.

5.4 Temporal accessibility

Given that the mobile phone is highly intrusive insofar as it can ring at any inconvenient moments (e. g. while riding the car or being absorbed in local conversations), there is a high need to restrict exposure by switching it off during specific time spans or at particular places (Geser 2003).

Astonishingly enough, almost all informants say that they leave their mobile usually on during mornings, afternoons and evenings, while about two out of three also refuse to turn off during the night. Continuous availability for incoming calls during twenty-four hours may be considered another strong indicator for high mobile phone involvement: because it means that the new communication channel is allowed to penetrate even the most intimate moments and locations in private life. While psychologists may well find a strong covariance with extraversion and other dimensions of personality structure, we look for the social and situational correlates of such a behavior: e. g. the age at which the first adoption occurred.

Table 5: Percentage of users who have their mobile on during nights: according to age of first ownership

Percentage who have their mobile on		Age at first ownership						corr.	partial corr.*
		-12	13	14	15	16	17+		
at workday nights	females	79	63	64	61	55	50	-.11**	-.13**
	males	80	68	59	63	56	62	-.08*	-.14**
at weekend nights	females	91	82	74	76	69	54	-.17**	-.18**
	males	92	83	76	80	74	71	-.11**	-.12**

*Partial correlation coefficient: with current age controlled.

Table 5 shows that the percentage of around-the-clock users is highest among males and females who have adopted the mobile until 12, while it is lowest among latest adopters (at 16 or 17). Controlling for current age is not weakening any of the coefficients, as all birth cohorts show the same inclination for night time exposure.

5.5 Affective mobile phone involvement

While a considerable part of the questionnaire was dedicated to behavioral patterns, several questions tried to tap subjective attitudes toward the new technology, especially the strength of psychological involvement which was measured by a series of four-point Likert-scale items.

On the most general level, it was found that such subjective involvements were mostly quite moderate or even very low, particularly within the male subsample where only 8% fully agreed with the statement that the mobile has become part of their personal style of life, and only 14 % asserted unconditionally that they could not imagine their life without. While females of all ages cohorts showed consistently higher levels of attachment, they were also rather reluctant to consider cell phones an indispensable ingredient of their daily existence.

Table 6: Degree of acceptance vs. rejection of two statements about the subjective attachment to the mobile phone: according to age at first ownership
(Average value on a scale between 100 (total acceptance) and -100 (total rejection).

		Age at first ownership						corr.	partial corr.*
		-12	13	14	15	16	17+		
"The mobile is part of my style of life"	females	42	17	-09	-20	-20	-38	-.26**	-.28**
	males	07	-07	-30	-27	-38	-50	-.21**	-.26**
"I could not imagine my life without a mobile"	females	27	39	04	-07	-08	-21	-.22**	-.27**
	males	10	02	-20	-22	-31	-45	-.20**	-.24**

*Partial correlation coefficient: with current age controlled.

Within both gender groups, attachment levels are almost identical on all levels of current age, but they correlate highly with the age at initial adoption. As shown in Table 6, females take a positive stance toward the two statements only when they had adopted the mobile below 14 years, while the neutral attitudes of early adopting males changes to the negative when ownership began with 14 years or later. Again, controlling for age does not diminish these substantial correlations; to the contrary, three out of four coefficients are even raised. (Table 6)

Thus, we may draw the conclusion that youngsters who adopt the cell phone very early are not only more likely to use it more intensively in later years, but to build up higher levels of subjective attachments and to integrate the mobile more fundamentally into their personal life.

Given these strong impacts on subjective involvements, it may be expected that early adoption also goes along with more positive overall evaluations about how the cell phone changes the quality of one's social life. In fact, we can see in Table 7 that pre-teen adopters are most likely to agree with the statement that the mobile phone has improved relations to friends, and not to disagree with the assertion that it has positively affected intrafamily relations (Table 7).

Again, it becomes evident that females maintain consistently more positive evaluations than males, but that the covariance with adoption age is about the same in both genders. As in the case of all other dependent variables reported, correlations remain highly significant when current age is controlled.

Table 7: Degree of acceptance vs. rejection of two evaluations about the social effects of mobile phone: according to age at first ownership
 (Average value on a scale between 100 (total acceptance) and -100 (total rejection)).

		Age at first ownership						corr.	partial corr.*
		-12	13	14	15	16	17+		
"The mobile has improved my family relations"	females	27	11	-13	-27	-14	-27	-.19**	-.21**
	males	08	02	-20	-11	-23	-25	-.13**	-.15**
"The mobile has improved my relations to friends"	females	77	57	42	30	37	32	-.17**	-.13**
	males	60	55	41	47	33	24	-.16**	-.15**

*Partial correlation coefficient: with current age controlled.

5.6 The changes of early adoption effects with increasing age

The term "socialization" covers a broad manifold of adaptation, learning, and internalization processes that differ widely in the degree to which they shape subsequent (adult) thinking and behavior. On the *first*, most modest level, there are "accelerating impacts" that cause a specific behavior just to be acquired somewhat earlier than it would be without the specific socializing exposure. Thus, kids may learn good orthography and exact calculation earlier when they enter school at a younger age; but somewhat later, other kids will follow them and reach the same level when they leave elementary classes.

Secondly, socialization may cause stronger and more enduring effects in the way of fortifying or habitualizing certain behavioral strands. For instance, kids may be encouraged by their parents to read books, to practice football, to travel to rain forest countries or to spend money for philanthropic purposes - with the result that they may keep such behavior on higher levels than others during all coming years of their life.

Thirdly, there are the most consequential impacts that may be called "inseminative" because they initiate self-sustaining processes of exploration, self-actualization and personal growth. Thus, gifted girls and boys who are pushed to take violin lessons from five on may develop an enthusiastic attachment toward their instrument and a drive of perfection that may well carry them to professional spheres.

How may be the effect of early cell phone adopted be envisaged under this perspective?

We may expect a rather unspectacular accelerating impact: causing youngsters to become acquainted a little earlier with the new technology, but acquiring only a temporary lead that vanishes quickly because others are following and rapidly reaching the same levels of interest and practice. In operational terms: the higher the current age, the less any impact of early adoption will be observed. On the other hand, there are also some reasons to expect that early adoption initiates deeper and more long-term effects of a habitualizing or even inseminative kind. As stated above, the adoption of mobile phones has to be seen as a dynamic process: more like learning to use computers than becoming acquainted with washing machines or ambulant music players. The latter sets are one-person technologies dedicated to a narrow range of fixed functions: so that usage intensity quickly levels off when purely personal needs are fulfilled. By contrast, computers as well as mobile phones are multi-functional devices embedded in social networks: so that their usage may potentially grow without limits when new functions are explored (or added by means of technological innovation), when the networks of interaction partners is expanding or when interpersonal expectations, social group norms and cultural standards exert increasing pressure on the individual to make use the new technology irrespective of purely subjective needs and motivations.

Operationally speaking, such more sustained effects should become manifest in the regularity that differences between earlier and later adopters will not vanish with increasing age, but that they will remain on the same level or widen in scale.

Looking at the usage intensity from the perspective of monthly telephone expenses, the conclusion seems highly warranted that considerable inseminative impacts exist (Figure 3). In fact, the lead of earlier over later adopters is most pronounced for more advanced apprentices who are at least 19-20 years of age: at a stage when first adoption lies already 7-8 years behind. Symmetrically, divergences are smallest in the case of youngsters for which only about 4-5 years have elapsed since they have had their first contacts with mobile phones.

Figure 3: Average monthly mobile phone bill (in Sfr.): according to age of first cell phone adoption and current age: all students

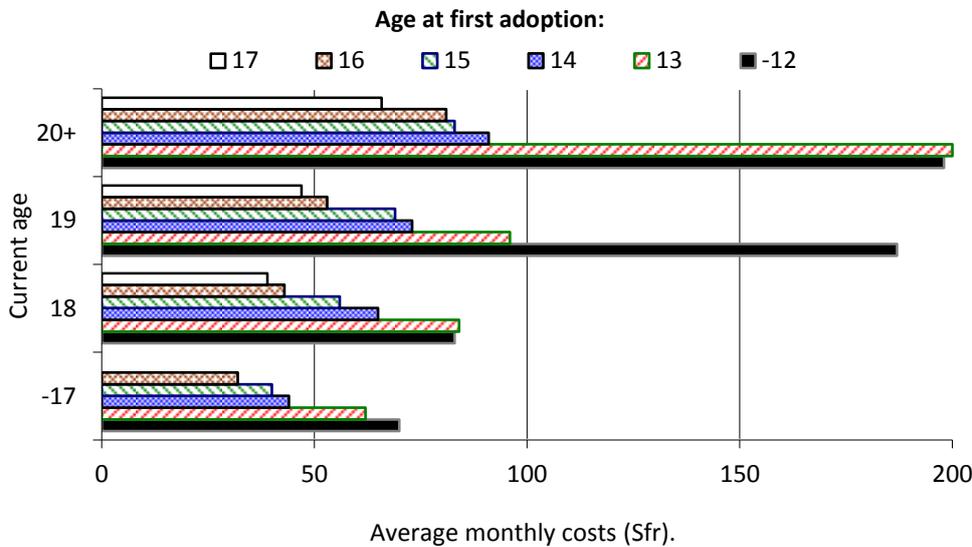
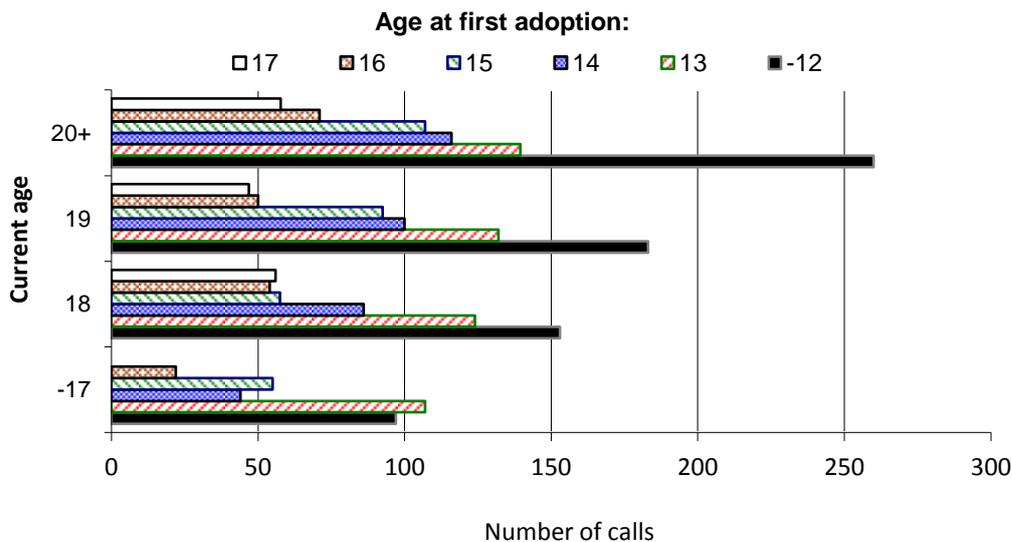


Figure 4: Average number of monthly outgoing calls: according to age of first cell phone adoption and current age: all students

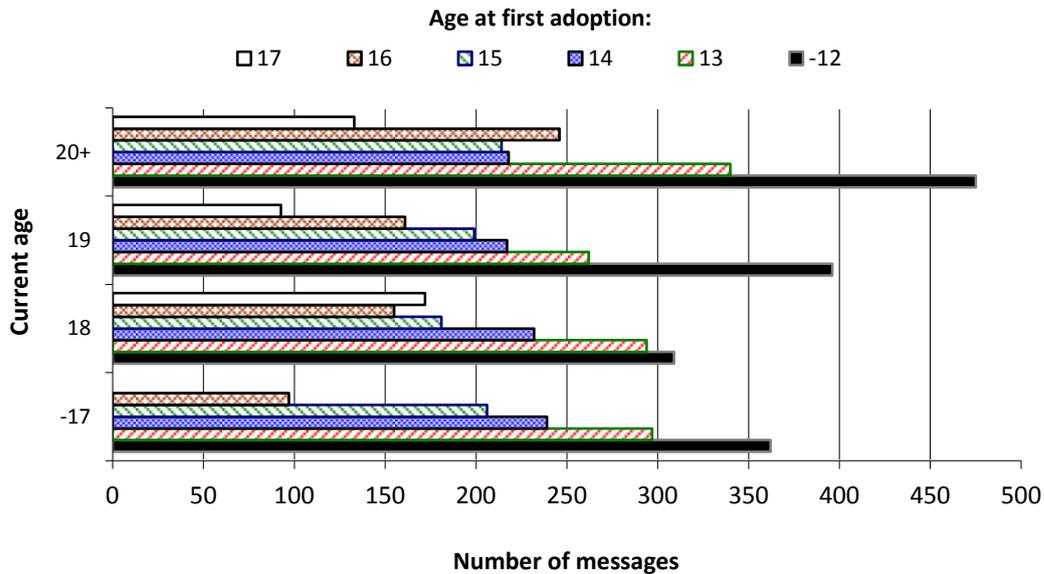


Similarly, the tendency of pre-teen adopters to maintain larger flows of outgoing call messages is most pronounced for the very oldest group of informants (20 or more years), while it is consistently decreasing with each subsequent year of birth (Figure 4). While the older cohorts shows highest dif-

ferences between adoption age 12 and 13, young users demonstrate lower activity only when they have adopted the cell phone at 14 years or even later.

In the case of SMS activity, divergences related to adoption age are somewhat less pronounced. While teens with a very long usage history still show the highest number of outgoing messages per month, high adoption-age differences persist also among all younger birth cohorts (Figure 5).

Figure 5: Average number of monthly outgoing SMS messages: according to age of first cell phone adoption and current age: all students



By summarizing, we can generalize that

- (1) irrespective of adoption age, usage intensity increases with advancing current age;
- (2) irrespective of current age, usage intensity is consistently higher for earlier adopters (especially for those who initiated below 14 years of age);
- (3) the effect of adoption age increases sharply with rising current age.

Inspecting the number of phone partners contacted within the last months, it appears that the extensivities of social networks are not affected in the same straightforward way. While earliest adoption goes along with largest partner lists at least in the three oldest cohorts, these effects are higher for the 18 year olds than for the groups of more advanced age (Figure 6). Thus, it seems that the size of personal networks reacts more to immediate current conditions than to lower-term effects of learning and socialization.

Turning toward the aspect of temporal accessibility, Figure 7 demonstrates that availability for incoming calls is also highly influenced by adoption age in all birth cohorts, and that this effect is also not vanishing, but getting stronger with increasing current age. In all groups, users who initiated use at twelve years or even below are most likely to keep their phone switched on during the night, for the small sample of teens; this proportion reaches even 100%.

Figure 6: Number of phone partners contacted within the last three months: according to age of first cell phone adoption and current age: all students

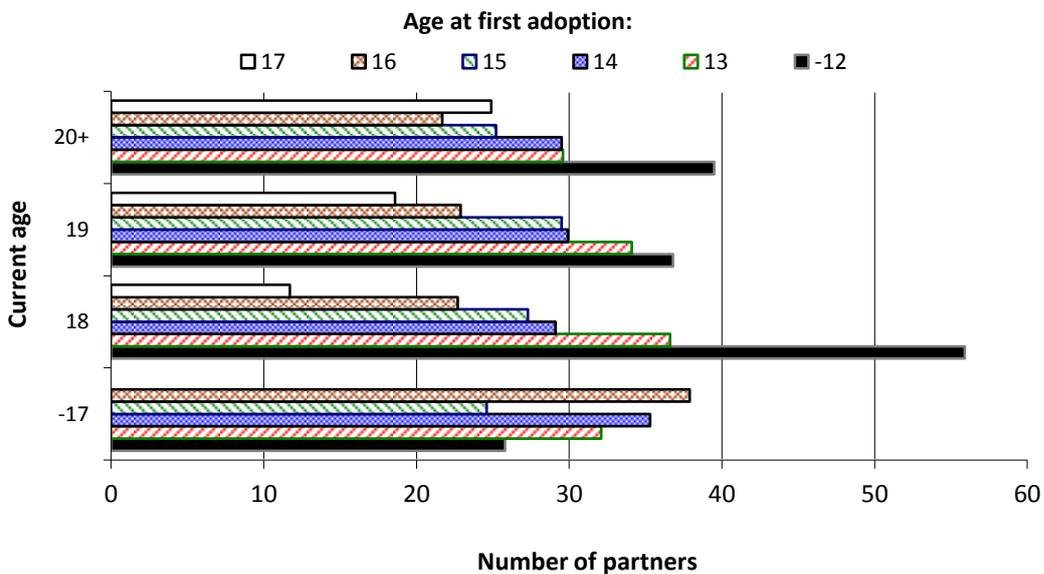
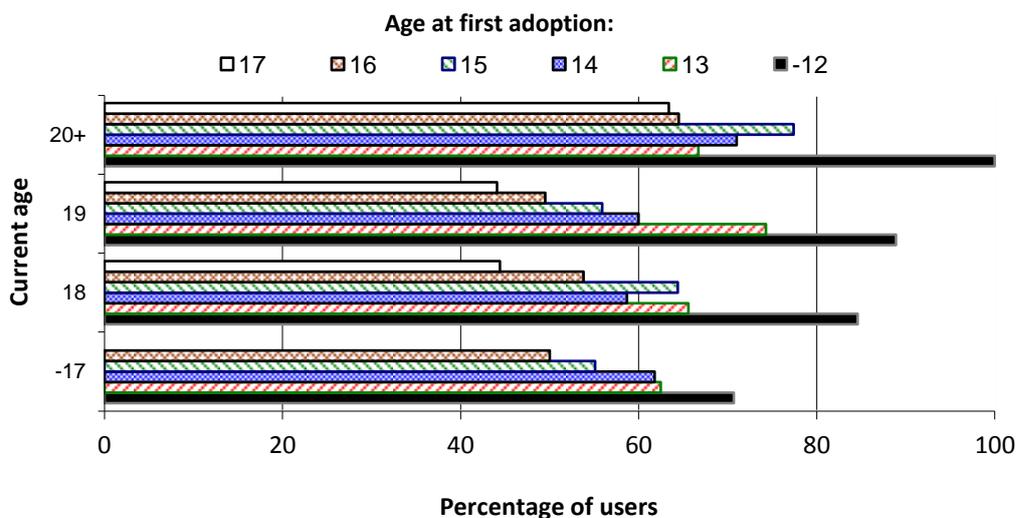


Figure 7: Percentage of users who have their mobile on during weekday nights: according to age of first cell phone adoption and current age



Finally, Figure 8 and Figure 9 clearly show that attitudinal attachments to the mobile phone are subjected to rather similar socialization impacts as behavioral usage patterns. Within all age groups, earliest adopters are most prone to support the statement that their mobile has become part of their style of life, and that it would be difficult or even impossible to live without. Again, such effects relating to pre-teen age are highest for informants who have reached 20 (or even more) years of age. Interestingly, we observe that late adopters are very likely to increase their involvement with increasing age, while the attachment of early adopters remains about the same - maybe because it was fixed on a high level at the initial phases of usage.

Figure 8: Attitude toward the statement: "The mobile belongs to my style of life": according to age of first phone adoption and current age

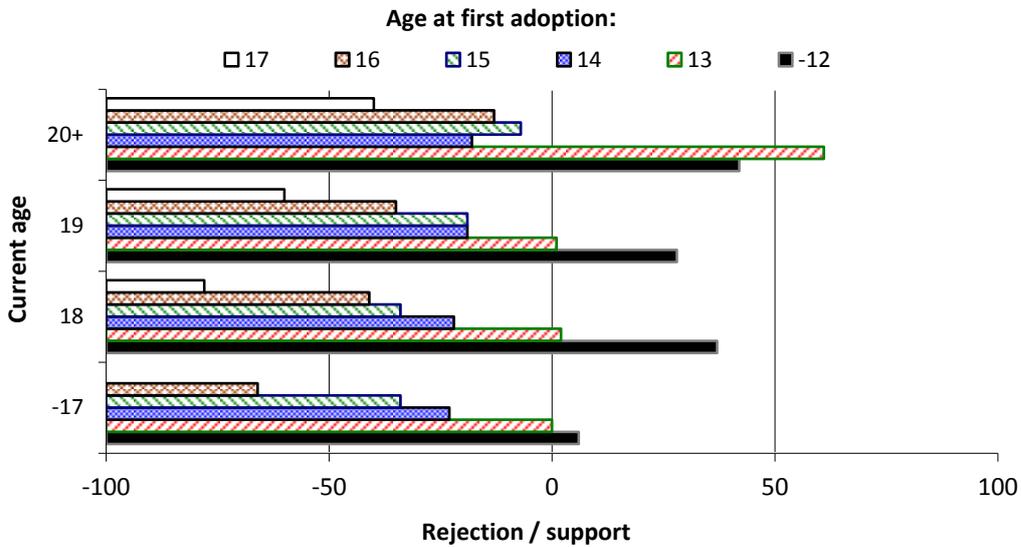
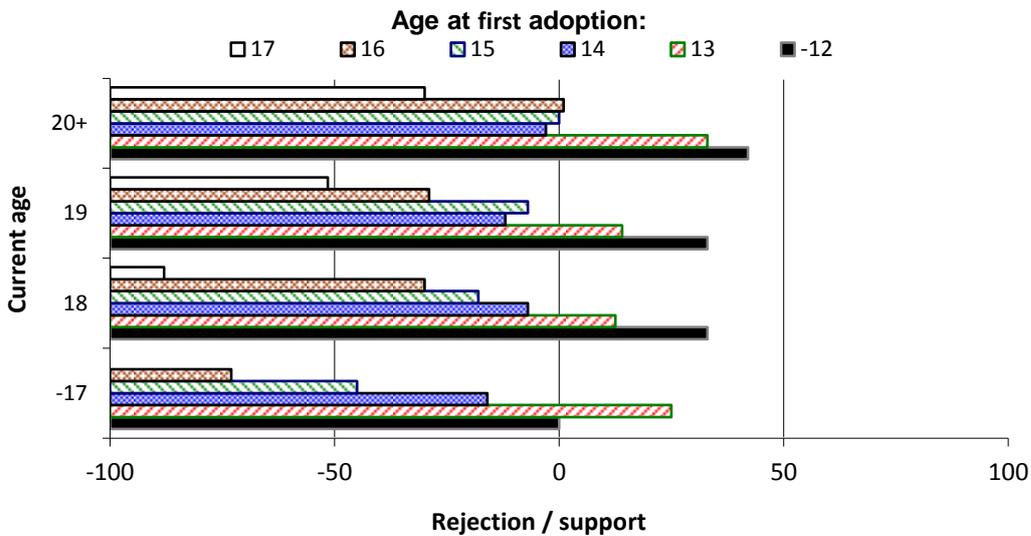


Figure 9: Attitude toward the statement: "I cannot imagine my life without the mobile phone": according to age of first phone adoption and current age



5.7 Early adoption and divergences between genders

The lower the age of first adoption, the more probable that enduring usage patterns and attitudes are shaped at a stage where socialization is dominated by strong gender-related factors. Thus, it is well-known that despite the historical decline of traditional male-centered values and norms, parental influences on sons and daughters still follow quite different lines (Peters 1994; Gecas/Seff 1990; Meulman 2000), and that children usually remain tightly embedded in same-sex peer groups at least until they are 11 to 12 years old (Hibbard/Buhrmester 1998; Maccoby 1990).

Consequently, it could be expected that early adoption engenders deeper gaps between males and females: divergences that may remain on the same level or even amplify with advancing age.

For testing this hypothesis, we return to the gender-related analysis expounded above: but under the revised perspective of comparing the differences between males and females across groups of earlier and later adopters.

As seen from Table 8, our expectations are borne out for the majority of variables. Thus, we find that the lead of males over women in monthly expenses, the number of calls and the range of phone partners is highest among the cohort of earliest adopters, while the symmetrical female lead in the lifestyle question is also most pronounced among pre-teen initiators. However, two other aspects of involvement are not consistently affected: the frequency of outgoing text messages and the indispensability of mobile phone in personal life. As a tentative conclusion, it could be summarized that to the degree that adoption is taking place already in pre-teen phases, at least some usage patterns and attitudes may become more affected by gender roles, while others may remain open for later shaping (e. g. according to new gender identities emerging within adolescence).

Table 8: Gender-related differences in cell phone activities and cell phone attitudes: according to age of first adoption

		Age at first Adoption					
		-12	13	14	15	16	17+
Monthly cell phone bill (in Sfr.)	females	84	83	58	60	62	55
	males	106	83	69	64	56	62
	Diff.	+22	00	+11	+04	-06	+07
Number of outgoing calls per month	females	95	91	61	61	52	36
	males	160	142	96	90	60	62
	Diff	+65	+51	+35	+29	+08	+26
Number of outgoing SMS per month	females	383	338	251	197	231	117
	males	340	256	211	196	153	129
	Diff	-43	-82	-40	-01	-78	+12
Number of contacted partners within the last three months	females	37	29	27	25	22	21
	males	48	38	33	29	25	23
	Diff	+11	+09	+06	+04	+03	+03
Attitude toward the statement " <i>The mobile belongs to my style of life</i> "	females	+42	+17	-09	-20	-20	-39
	males	+07	-07	-30	-27	-38	-49
	Diff	-35	-24	-21	-07	-18	-10
Attitude toward the statement " <i>I cannot imagine my life with-out the mobile phone</i> "	females	+27	+39	04	-07	-08	-21
	males	+10	+02	-20	-22	-31	-45
	Diff	-17	-37	-24	-15	-23	-24

6. Conclusions

Starting with the observation that most kids nowadays get their first cell phone at an age or 12 or before, we ask whether such early adoption has only an *accelerating effect* (by causing a certain usage level to be reached earlier in life), a *habitualizing impact* (by stabilizing higher usage levels that persist later in life) or an *inseminative influence* (by instilling drives and learning processes that trigger self-amplifying processes of ever growing usage and involvement).

The empirical results consistently support the tentative conclusion that *habitualizing* or even *inseminative* influences are at work, because differences between early and later adopters tend to persist or even to widen in subsequent years (at least up to 20).

First of all, we see very strong *behavioral impacts* manifested in heavier subsequent inbound and outbound usage of the mobile phone for oral calls and text messages as well as in an increased passive availability for phone contacts during nights. Astonishingly, such long-term "sleeper effects" on usage intensity are much stronger for males than for females.

Secondly, there are persisting consequences on the *social level*: causing early adopters to have wider networks of active phone partners even seven or eight years after first usage. This effect is also more pronounced among males.

Thirdly, parallel effects on the *attitudinal level* can be observed. Thus, early adopters show higher subjective involvements with the new technology by asserting that they cannot imagine life without mobile handsets and that they consider it as an essential part of their "style of life", or that mobile communication has improved substantially their social life. In contrast to the behavioral and social aspects, both genders are similarly affected by such psychological correlates.

Apart from determining later usage and involvement levels, it has to be expected that earlier adoption also amplifies differences between the genders, because "mobile socialization" takes place at an age where gender-specific role patterns (associated with the nuclear family) are still very predominant. In fact, the data show that pre-teen adopters develop more pronounced gender divergences when they reach later adolescence or early adult age.

Unquestionably, it has to be humbly admitted that all these causal interpretations are tentative or even speculative, because diachronic data would be necessary to prove that socialization effects are in fact responsible for the observed empirical patterns. As a contrasting interpretation, the "selection hypothesis" could be maintained: stating that early adoption is itself caused by the same underlying personality traits that cause later divergences in usage and involvement. In simplified terms: only kids who are highly extraverted "phone freaks" are prone to embrace the cell phone so early, and given this communicative talent and motivation, they will be disposed to give it a dominant place in their whole later life.

While this alternative hypothesis cannot be falsified, it doesn't seem too probable because it supposes that pre-teen kids are in a position to determine autonomously whether and at what point of time they will become owners of their first mobile phone. Given that they are still very much embedded in family life, it seems much more plausible that they adopt the phone because it is made available to them by parents, older siblings or other influential persons.

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