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ICTeCollective introduction

ICTeCollective (*Harnessing ICT enabled collective social behaviour*) aims to develop systematic means of exploring, understanding and modelling2 systems where ICT is entangled with social structures. In particular, we will focus on behavioural patterns, dynamics and driving mechanisms of social structures whose interactions are ICT-mediated, from the level of individuals to the level of groups and large-scale social systems. Our unique approach is based on combined expertise in complex systems and the social sciences. By contrast with the majority of complexity studies that start from extremely simplified assumptions concerning social dynamics and concentrate on diagnosing structural features of social systems, we emphasize that ICT networks are dynamic systems of interacting humans and groups, and fully utilize the theories and methods of the social sciences are to be in ICTeCollective.

We will study and relate high quality datasets on ICT mediated social interactions and groups that have already been acquired, and also create new sets of data by conducting experiments with human subjects to examine the properties of social interactions mediated by technological means. The first source of data, electronic records of interactions, is a by-product of how ICT mediated communities operate. In particular, we will use some of the most extensive ICT datasets available at present, such as time-stamped data sets on mobile telephone communications between millions of users, the editing history of Wikipedia documents, and the popularity of Facebook applications. Secondly, entirely new data will be generated and released into the public domain by conducting laboratory experiments on ICT-mediated human interactions.

This project addresses the goals of the FP7 FET-OPEN call by trying to build an integrated picture of ICT-mediated social systems focussing on some aspects that are

i) critical to social interaction,

ii) can be easily tracked in large datasets and confirmed in experiments, and

iii) have a considerable

chance of improving our understanding and usage of ICT, with the possibility of leading to new and exciting technologies that can shape the future of ICT. The particular aspects that we focus on are *activity patterns, social influence*, and *group dynamics*. This choice helps us to address a large number of practical issues such as the driving mechanisms of social interactions mediated by ICT, and how these mechanisms then shape groups and society. All of these are critical to the goals of ICTeCollective.

We define the above terms as follows: *Activity patterns* are temporal sequences of social interaction and communication events, measurable in electronic communication records and representing the "atoms" of social interaction processes. *Social influence* refers to all processes where individuals affect each others' beliefs, behaviour, activities, and representations of reality. *Group dynamics* comprises processes such as emergence, growth, merging, and splitting of groups, and associated behavioural patterns of individuals.

Executive Summary

The document reports completion of the deliverable 4.2 "Preference for communicating specific content by specific means of communication". We summarize the results of a large survey conducted on the participants of a popular Polish online social networking community "Nasza Klasa" (n= 1027). The primary goal of the study was to find out how the specific goal and context of communication influences the choice of a particular means of communication.

The main part of the survey consisted in decision task, where participants were to assign preferable channel of communication (choice among 7 types: phone calls; sms; fixed phone; e-mail; internet-messages – eg. Skype chat; internet-talks – e.g. Skype calls; social networking – e.g. Facebook, Nasza-Klasa) to a set of hypothetical social situations. The social situations were divided in groups based on the goal of communication (exchanging information, running errands or social bonding), complexity of the communication task (complex or simple) and the type of contact (single individual vs. group). The aforementioned manipulations were conducted in within-subjects design. Also, as a between-subjects design, familiarity of the contacted person was manipulated (close relationship – family, friend or partner; acquaintances – colleagues from work or school; strangers – newly met individuals, new work-mate, new colleague in the class).

Apart from the described decision tasks, participants characterized their familiarity with the media of communication and filled in a battery of personality measures (extroversion vs. introversion, need for closure, prevention vs. promotion, focus, self-esteem, cooperativeness). Questionnaire included also questions on: gender, age, size of the place of residence, education and professional (job) situation.

Contents

Aim of the study and procedure description

Research goals

The internet survey was conducted by the firm „NK Research". 3 groups of individuals responded to statements on the computer screen.

The study consisted of tasks on the choice of medium in a given situations, the task of familiarity with listed media and questions which measured several personality variables: extroversion vs. introversion, need for closure, prevention vs. promotion, focus, self-esteem, social orientation (e.g. cooperativeness vs. competitiveness). Questionnaire included also questions on: gender, age, size of the place of residence, education and professional (job) situation.

Task 1: medium choice

In this research the subjects were choosing from 7 media (listed below): which medium they would use in the first, second and third order as to connect in three different situations (tasks):

- exchanging information
- running errands
- social bonding

Each sentence included 4 situations:

- contact with a single individual (dyad) / simple task
- contact with a single individual (dyad) / complex task
- contact with a group / simple task
- contact with a group / complex task

This task differed in the 3 research groups. In the first group subjects related to contacting a well-known person (friends, family, or partner); in the second they responded to contacting acquaintances (colleagues from work or school); in the third – unacquainted persons (newly met individuals, new work-mate, new colleague in the class).

Media:

- phone calls
- sms
- fixed phone
- e-mail
- internet-messages (e.g. Gadu-Gadu, Skype, MSN, etc)
- internet-talks (e.g. Gadu-Gadu, Skype, MSN, etc)
- social networking (e.g. Facebook, Grono, Nasza-Klasa, etc.)

Tasks:

- **Running errands tasks**

Imagine that you would want to:

1. Invite your family and friends (colleagues from work / school; new neighbors from the opposite block) for a grill-party (simple / group).
2. Tee-up with your friend (colleague from work / school, new work-mate / new student in your class) (simple / dyad).
3. Organize with your friends (colleagues from work / school, new work-mates / new students in your class) fundraising for a chronically ill colleague (complex/group).

4. Together with your brother / sister (colleague from work / school, new work-mate / new student in your class) choose a gift for mom's (friend, boss / teacher) birthday (a complex/dyad)

- **Social bonding tasks**

Imagine that you would want to:

1. Get to know how are your friends doing (or colleagues from work / school, newly met neighbors) (simple/group).
2. Convey to your close friend (colleague from work / school, new work-mate / new student in your class) birthday wishes (simple/dyad).
3. Exchange information with your friends' group (colleagues from work / school, new work-mates / new students in your class) regarding a recent hot number (complex/group).
4. Ask your brother/sister (colleague from work / school, new work-mate / new student in your class) for an advice re. a social problem (complex/dyad).

- **Exchanging information tasks**

Imagine that:

1. You want to inform your group of friends (colleagues from work / school, new work-mate / new student in your class) about the changed timing of an appointed meeting (simple/group).
2. You want to inform your brother/sister (colleague from work / school, new work-mate / new student in your class) about the working hour of an institution (simple/dyad).
3. You are looking among your friends (colleagues from work / school, new work-mate / new student in your class) for help in searching for an apartment to rent (complex/group).
4. You are seeking for your friend's (colleague's from work / school, new work-mate's / new student's in your class) advice on choosing a TV set.

Questions related to the tasks:

What first-choice medium would you use to contact with this person?

1. If the medium which you have chosen would be unavailable at that moment or you wouldn't be able to access it (e.g. you forgot your mobile, no access to internet, you are driving, you are participating in a business-dinner, etc.) then what is the next-choice medium you would choose to contact with this person?
2. Should both: first- and second-choice media be unavailable or you wouldn't be able to access them, then what other medium would you choose to contact with this person?

Task 2. Familiarity with media

The aforementioned media were presented to the subjects and questions related to each of those media were asked:

Question:	Scale:
2. Do you like to use this medium? 1. How often do you use this medium?	• Definitely not • Rather not • Rather yes • Definitely yes • Less often than once a week • Once a week • At least once a day • Many times a day

3. Do you face problems using this medium or some of its features?	• Never • Rarely • Sometimes • Often
4. How broadly are you taking advantage of this medium?	• I am communicating using only one feature • I am using a few selected features • I am using many of its features • I am using all its features
5. Are you communicating with other person in confidential situations using this medium?	• Definitely not • Rather not • Rather yes • Definitely yes
6. In time-pressure situations (e.g.: need to convey a fast reply) are you communicating with another person using this medium?	• Definitely not • Rather not • Rather yes • Definitely yes
7. If the person you want to communicate is located at a walking distance, would you use this medium?	• Definitely not • Rather not • Rather yes • Definitely yes
8. If the person you want to communicate with is located in the same town, would you use this medium?	• Definitely not • Rather not • Rather yes • Definitely yes
9. If the person you want to communicate with is located in another country, would you use this medium?	• Definitely not • Rather not • Rather yes • Definitely yes

Results

The frequency of choosing media.

The participants were divided into 3 groups each of which was asked to think of a different communication partner: friends/family, acquaintances or strangers. Every group was asked to perform similar tasks either organizationally, socially or informationally oriented and in each task the participants were asked to give 3 possible choices of media they found suitable for the task. Furthermore the tasks were divided into simple or complex and dyadic or group. It resulted in 36 within subject categories in which participants were asked to choose 1 of 7 media (phone call, SMS, fixed phone, e-mail, internet messages, internet talks, social networking). Below the frequencies for different conditions are presented.

Overall media usage frequencies

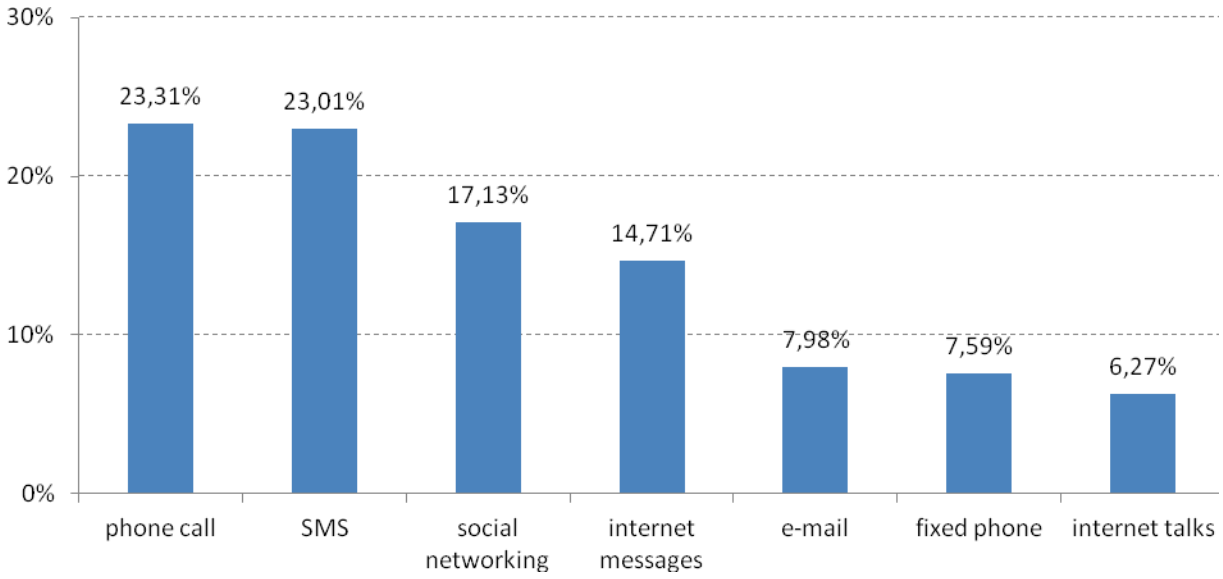

Figure 1. Overall media usage ratio

Firstly the overall frequencies of choosing each medium were counted. The results are shown in the chart below. Bars represent the percentage of cases were each medium was chosen regardless of tasks and groups. It can be interpreted as the general usage ratio.

The age of participants spanned from 13 to 90, so we counted frequencies separately for 3 distinct age groups: below 19 years old (i.e. teenagers), from 19 to 40 years old (i.e. young adults) and over 40 (middle aged and old). As could have been expected, the three groups differed in the frequency of new media usage. The most striking differences can be observed in fixed phone and e-mail that are mostly used by older people and internet messaging – mostly used by young people. The sample in the study is biased towards social networking as it was chosen from the population of a huge polish social networking site. It is the most likely reason for the high score of "social networking" regardless of the age.

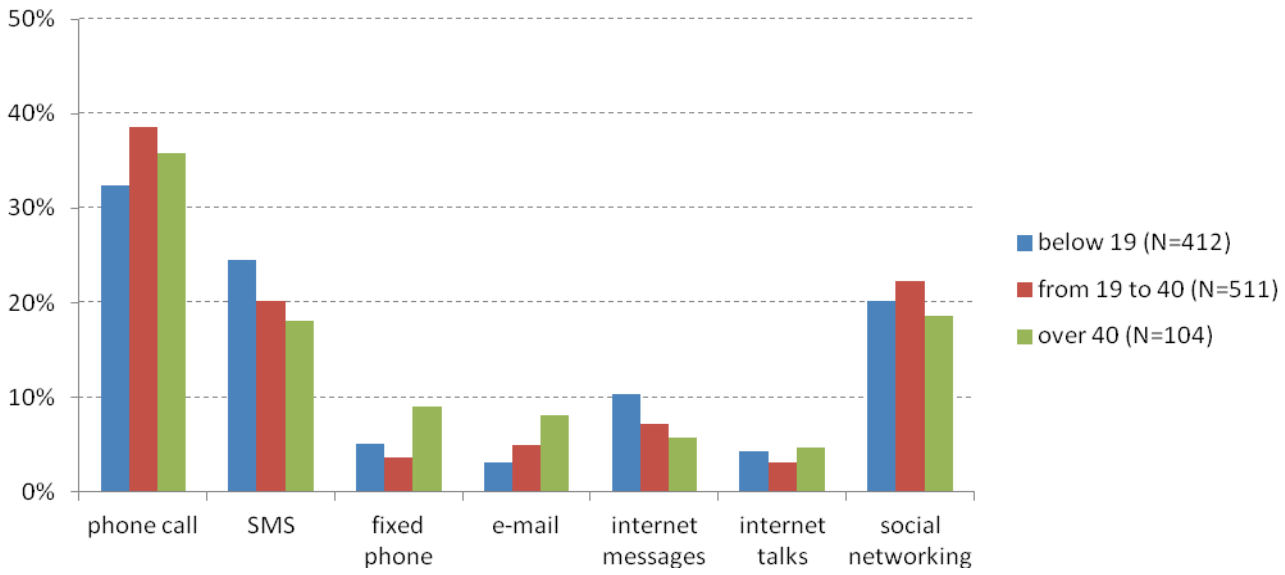

Figure 2.Media usage ratio in 3 age groups

In the following charts the media usage ratio depending on the communication target is shown. It represents the results in 3 distinct experimental groups (between-subjects). For each medium there was a small but significant difference in the results between the groups as measured with the χ^2 test. However the division of media choice depending on the communication target is very similar with cell phone, SMS and social networking being the most frequent.

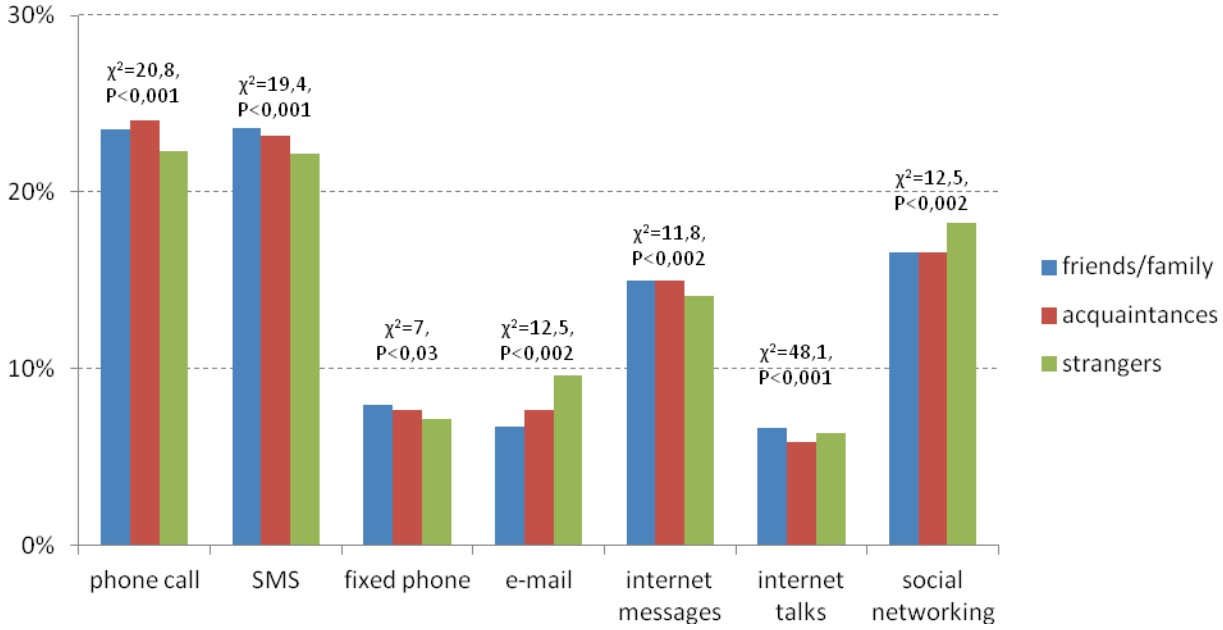

Figure 3. Media usage depending on the communication target

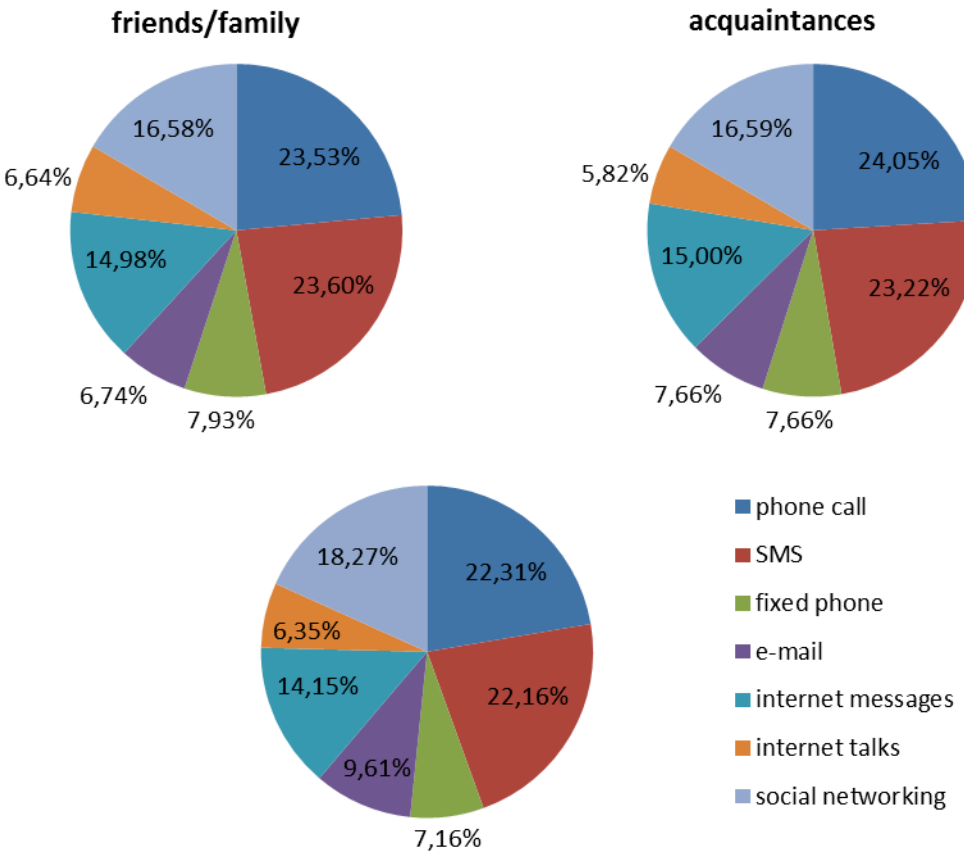

Figure 4. Media usage ratio in communicating with friends/family, acquaintances and strangers

Variance analysis with repeated measurement were also conducted. Main effect of medium was significant ($F(3.3)=537.1$, $p<0.01$). Pairwise comparisons with Bonferroni correction revealed that there are no differences in the usage of text messages and social networking as well as between fixed phone, emails and voice calls, all other differences are significant. The overall medium usage thus follows the order: mobile phone > texting & social networking > chat > phone, email & voice call (fig. 1).

The interaction between medium and closeness of the interaction partner (across subject factor) is significant ($F(6.6)=4.054$, $p<0.01$). Email is more often used when addressing strangers than family members and social networking tools are also more frequently used in communication with strangers than both with family and acquaintances.

In each task the participants were asked to chose 3 media in the order of choice likelihood. The 1st choice reflects the first medium that comes to mind therefore beeing most diagnostic of the real media usage ratio. Here again cell phone, SMS and social networking prevails. In the 2nd and 3rd choice the above mentioned media give way to the rest of media.

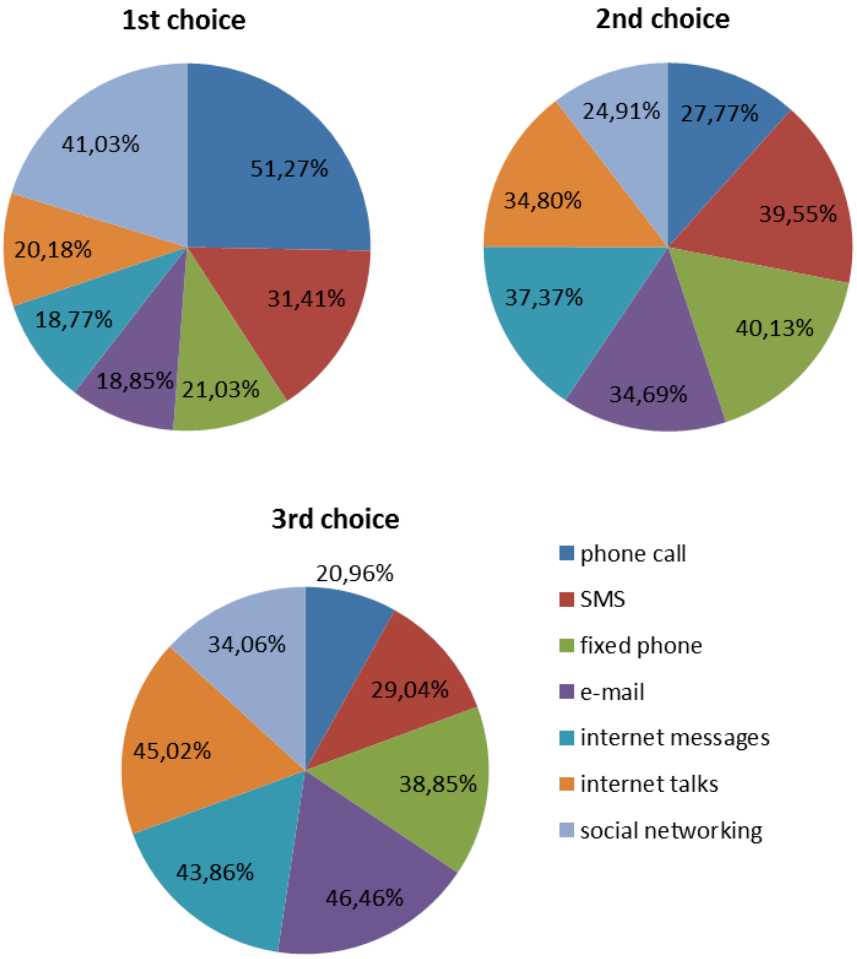

Figure 5. Media choice order.

Media choice in different tasks

The tasks in the study were of 3 kinds: "running errands" (organizational), "social bonding" (social) and "exchanging information" (informational). In the charts below the distribution of media most likely chosen for each task is presented. Here we focus on the first choice only. Except for SMS, all media differ significantly between the tasks, although the differences are rather small. The results for different for different ages are not presented as they were very similar to each other and to the overall group result.

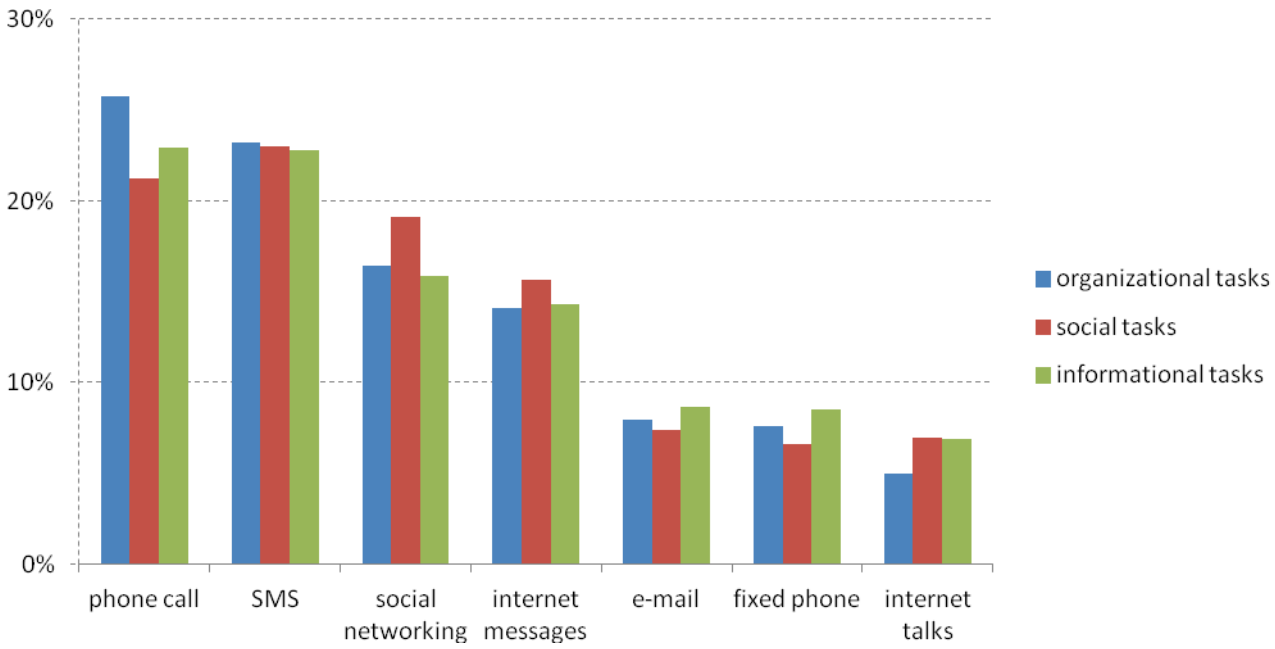

Figure 6. Media usage ratio in different kinds of tasks

Media choice in tasks of different complexity

The tasks differed in complexity. Simple tasks involved resolving one problem or acquiring a piece of information. Complex tasks involved gathering information from different sources and planning future actions.

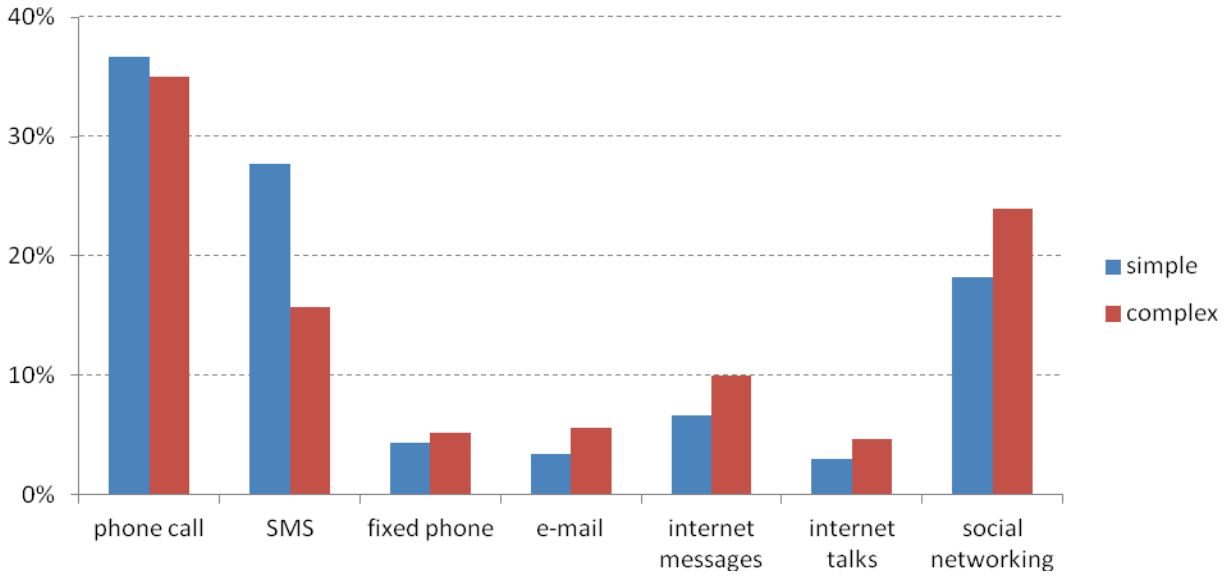

Figure 7. Media usage ratio depending on task complexity

The results for different age groups are very similar, the only difference being SMS and social networking. In general SMS seems to be too simple a medium for conveying complex

messages. Also its usage ratio drops slightly with age. Social networking, on the other hand seems to be well suited for complex communication while being also fairly popular in simple tasks. This effect is consistent across all age groups.

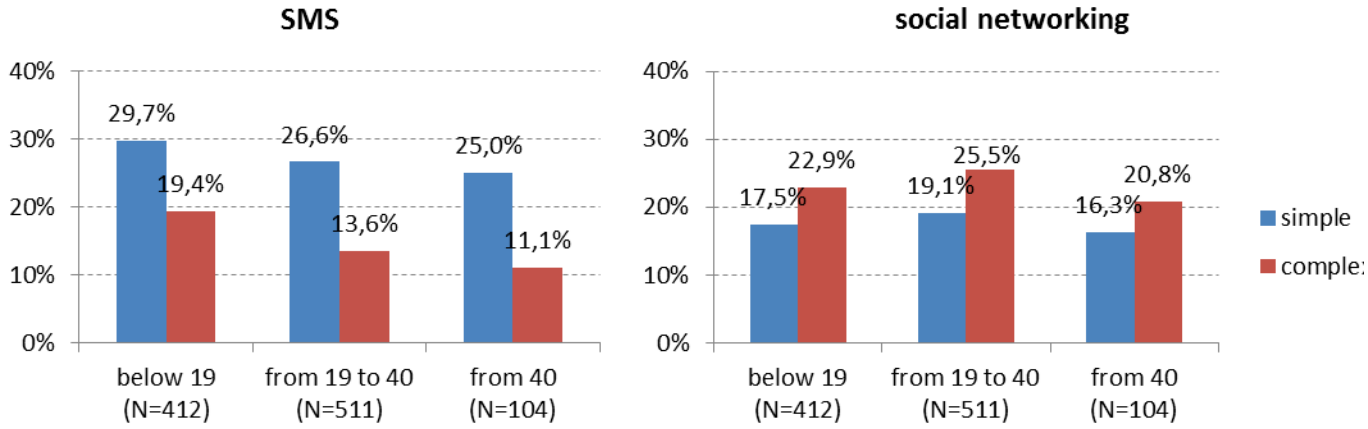

Figure 8. Difference in usage ratio between simple and complex tasks in SMS and social networking in three age groups

Very similar results were obtained for different communication targets. Here again SMS and social networking are the most characteristic cases with all other media usage ratio remaining very close to overall values. Here again SMS is significantly more often chosen for resolving simple tasks, regardless of the communication target. Social networking is chosen for both kinds of tasks, more often for the complex tasks. Also it is slightly more often chosen to deal with strangers, compared to family and acquaintances. It is probably due to the fact that people whom a person does not know are most likely to be found and contacted through the links provided by social media.

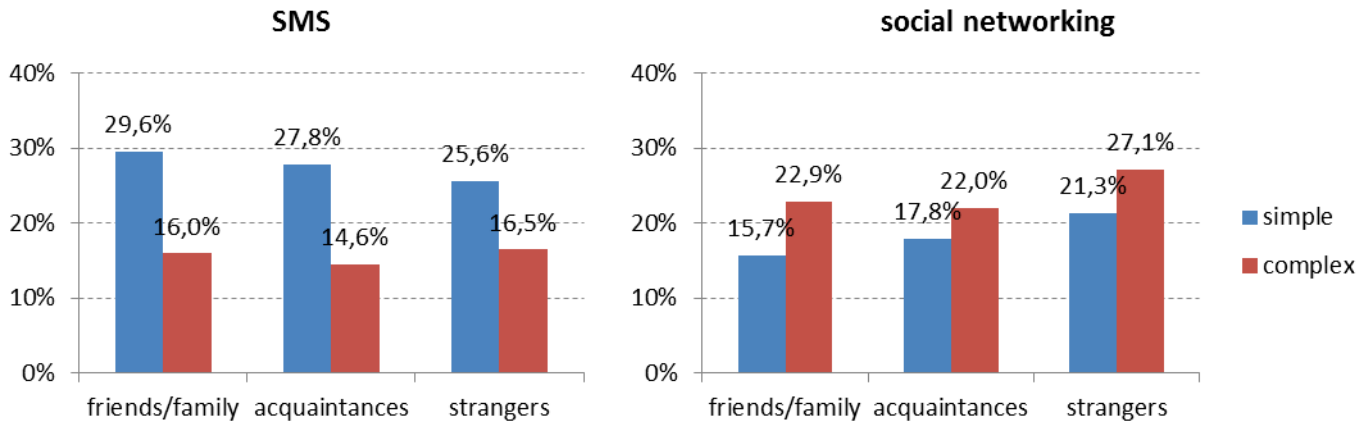

Figure 9. Diference in usage ratio between simple and complex tasks in SMS and social networking depending on the communication target

Media choice in dyads and groups

Half of the task were designed as group task and half as dyadic tasks. As could be expected people choose cell phone more likely for the dyadic task and social networking for the group task. The result is consistent in all age groups and does not depend on the target of communication.

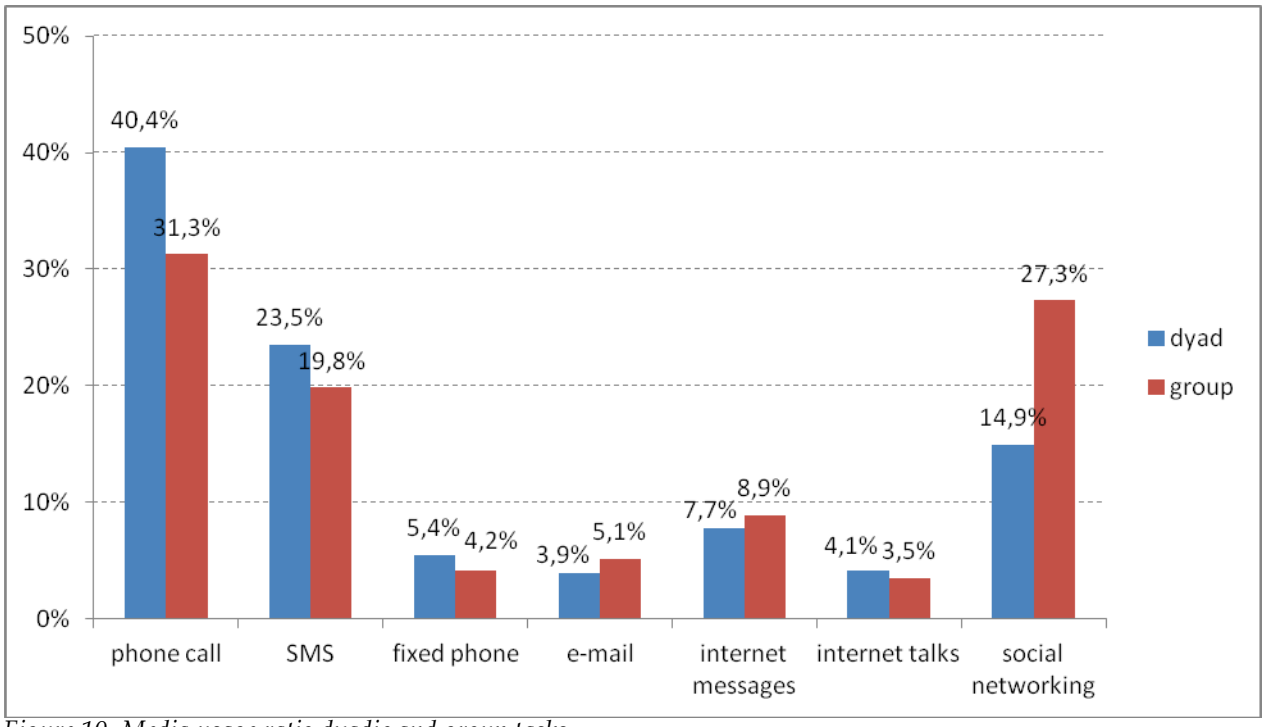

Figure 10. Media usage ratio dyadic and group tasks

Familiarity with various media

One of the goal of our research was to verify if the presented media (listed before) differ from each other as for the following properties:

- frequency of using
- liking
- difficulties (problems) with using
- versatility of using
- using in confidential situations
- using in time-pressure situations
- using with person who is located at a walking distance
- using with person who is located in the same town
- using with person who is located in another country

With this end in view there was a series of variance analysis done with repeated measurement, in which each time the specific properties were the factors. The analysis controlled also the gender and the specific tested group, which were between-objects variables

Frequency of using different media

Analysis showed significant main effect of frequency in using different media ($F(6,6126)=706.3$; $p<.001$). The post hoc testes with Bonferroni correction demonstrated significant differences in the level of liking, in relation to all media.

Analysis showed also significant interaction effect of frequency and gender ($F(6,6126)=3.62$; $p<.01$). To assess the character of interaction several post hoc tests with Bonferroni correction were carried on. It turned out that women more often ($M=3.38$) are using SMS than men ($M=3.25$); moreover, men more often ($M=1.92$) from women ($M=1.74$) use internet-talks. Other media didn't show differences.

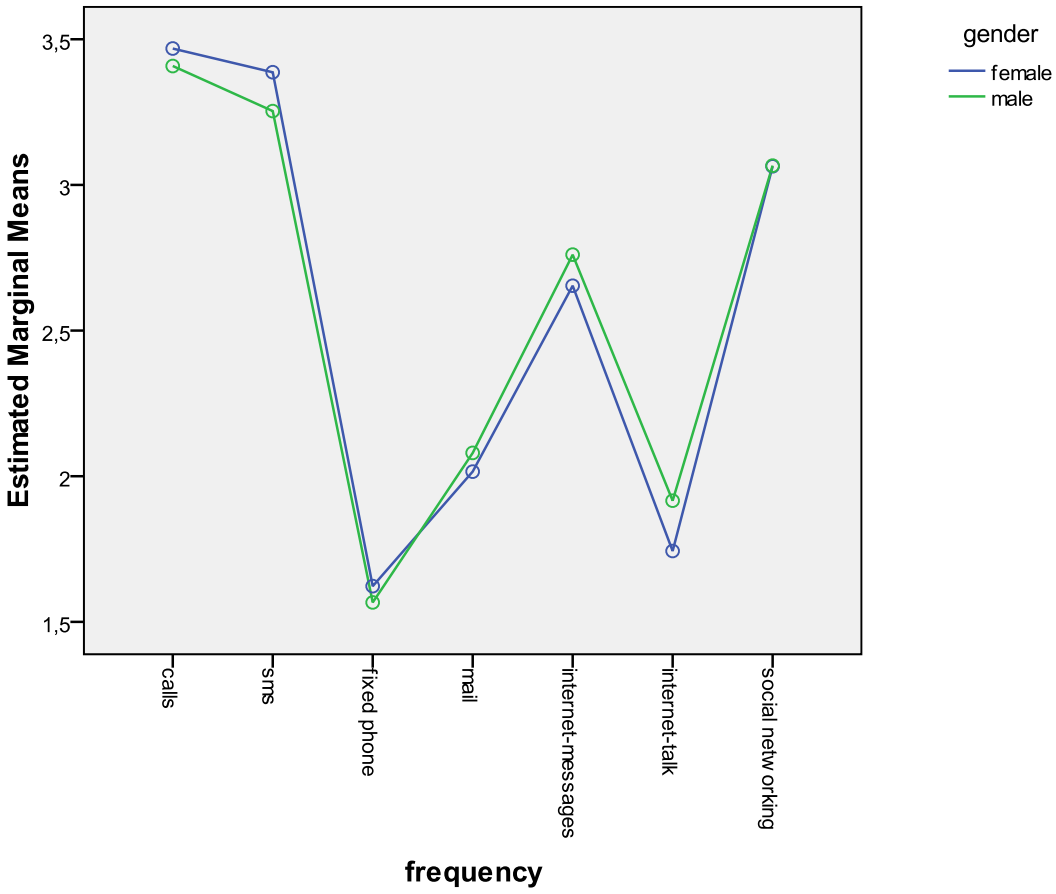

Figure 11. Frequency of using different media separate in gender

Liking of using different media

Analysis showed significant main effect of liking using different media ($F(1,1021)=109.2$; $p<.001$. Post hoc tests with Bonferroni correction showed, that significant differences in the level f liking appear between all media. Analysis showed also significant main effect of gender ($F(1,2)=10,6$; $p<0,01$). Women like using media (M=3.39; SD=0.79) more than men (M=3.31; SD=0.83).

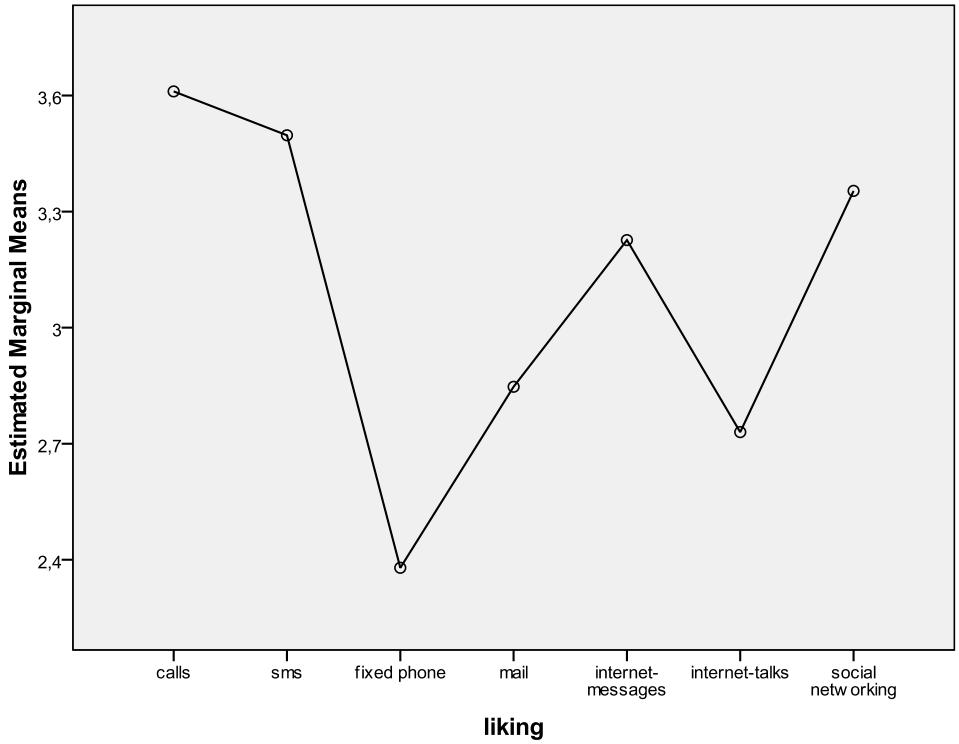

Figure 12. Liking of using different media

Difficulties in using different media

Analysis showed significant main effect of difficulties in using different media ($F(6,6126)=86.19$; $p<.001$). Post hoc tests with Bonferroni correction demonstrated significant differences in the level of difficulties in using media occurring between all media except the following pairs: calls – sms; fixed phone – mail; fixed phone – Internet messages; fixe phone – social networking; mail – Internet messages; mail – social networking; internet messages – social networking.

Analysis showed also interaction effect of difficulties in using media and gender ($F(6,6126)=9.17$; $p<.001$). To delineate the character of interaction there were carried on post hoc tests with Bonferroni correction. It occurred that only when using Internet talks women have more problems ($M=1.75$) than men ($M=1.55$). In remaining media there were no differences noticed.

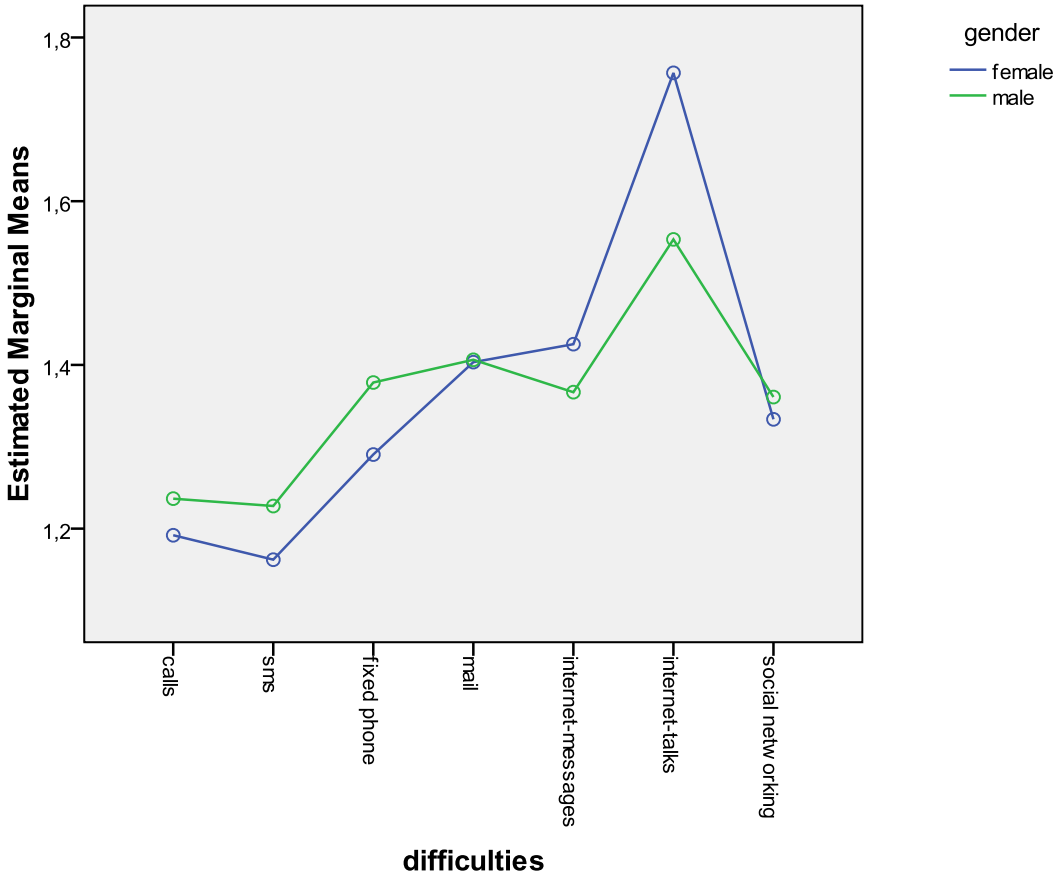

Figure 13. Difficulties of using different media separate in gender

Versatility in using different media

The analysis showed significant main effect of versatility in using different media ($F(6,6126)=211.8$; $p<.001$). Post hoc tests with Bonferroni correction showed significant differences in versatility between all media except calls – SMS.

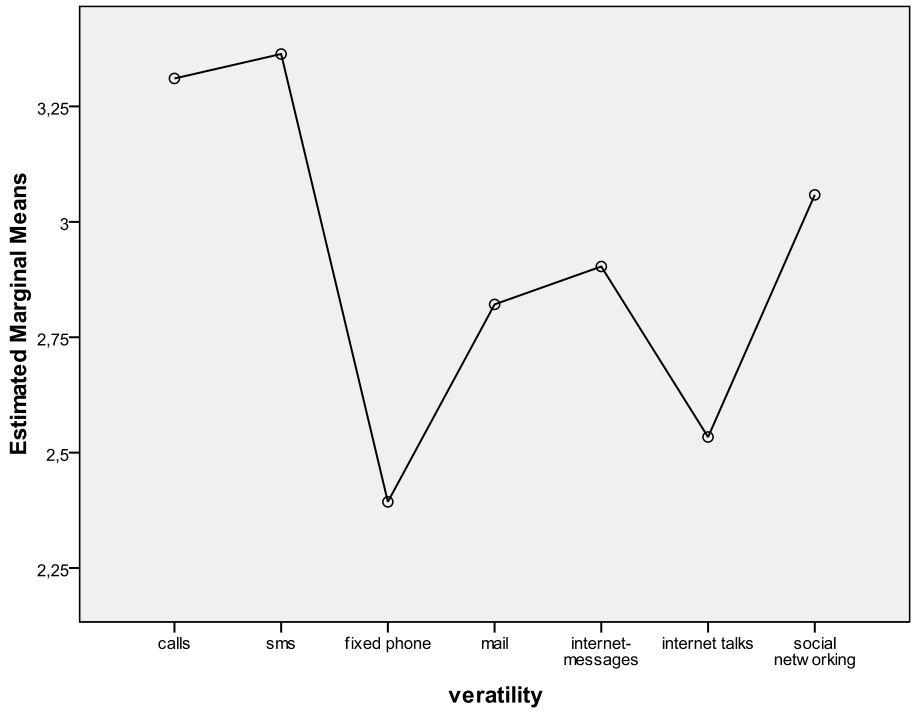

Figure 14. Versatility of using different media

Using in confidential situations

Analysis showed significant main effect of using different media in confidential situations ($F(6,6126)=587.28$; $p<.001$). Post hoc tests with Bonferroni correction showed significant differences in using various media in situations requiring discretion, except the following pairs of media: internet messages – social networking; internet messages - calls

Analysis showed also significant main effect of gender ($F(1,2)=10,6$; $p<0,01$). Women in situations requiring discretion more rarely use media ($M=1.67$; $SD=0.95$) than men ($M=1.77$; $SD=0.99$). Interaction effect of using different media in confidential situations and gender ($F(6,6126)=3.41$; $p<0,01$) was significant. To determine the character of interaction post hoc tests with Bonferroni correction was carried on. It turned out that in situations which require discretion:

- Fixed phone is less often used by women ($M=1.27$) than men ($M=1.89$).
- Mail is less often used by women ($M=1.72$) than men ($M=1.87$).
- Internet messages is less often used by women ($M=1.32$) than men ($M=1.51$).
- Social networking is less often used by women ($M=1.67$) than men ($M=1.77$).
- In the remaining media no differences were noticed.

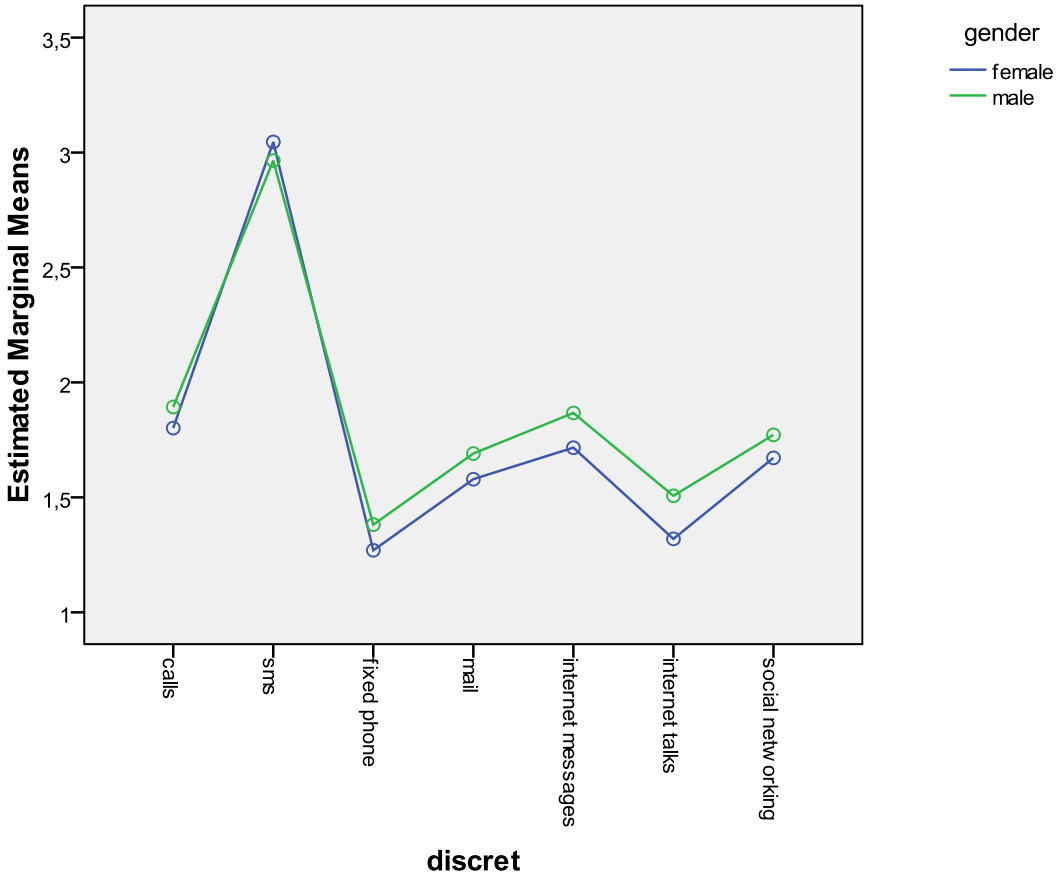

Figure 15. Using different media in confidential situations separate in gender

Using different media in time-limit situations

Analysis showed significant main effect of using different media in time limit situations ($F(6,6126)=518$; $p<.001$). Post hoc tests with Bonferroni correction showed significant differences in using various media on time-pressure situations.: fixe phone – social networking; internet talks – mail. Interaction effect of using different media in time limit situations and gender ($F(6,6126)=3.88$; $p<.01$) also was significant. To determine the character of interactions the post hoc tests with Bonferroni correction was carried on. It turned out that in situations requiring discretion women significantly often ($M=3.36$) than men ($M=3.18$) used SMS. In remaining media no difference were noticed.

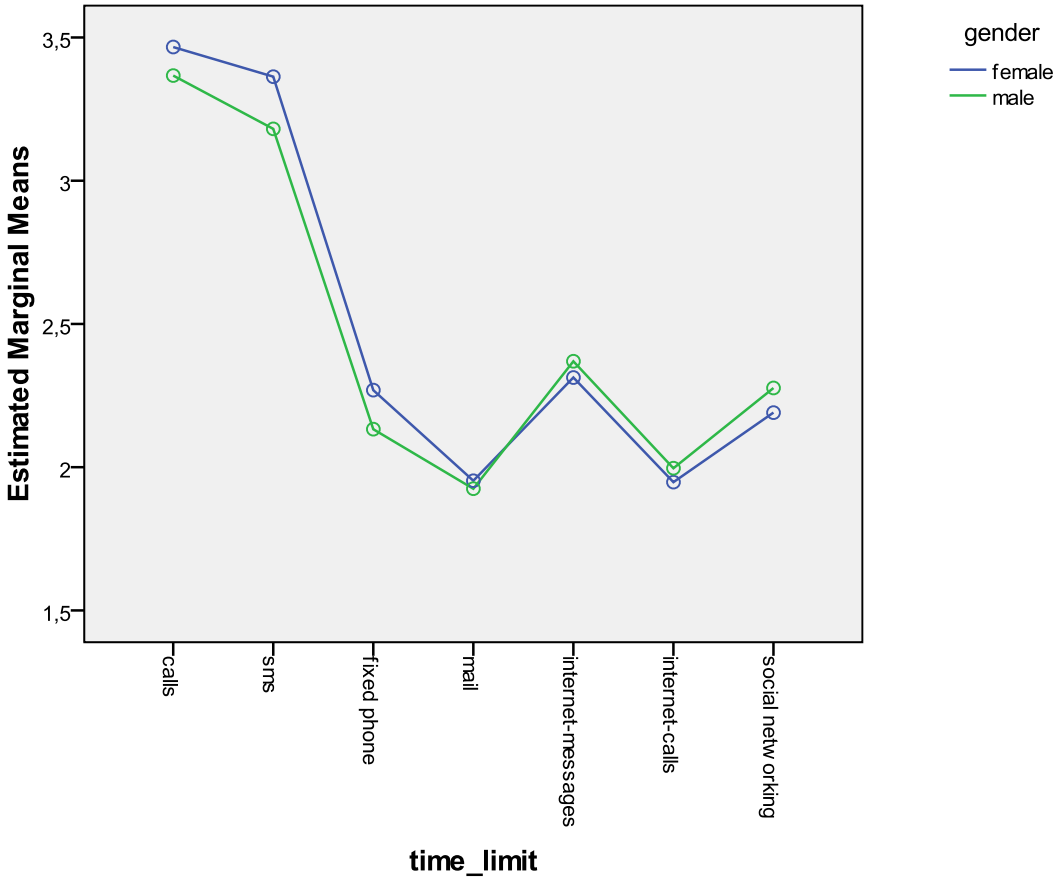

Figure 16. Using different media in time limit situation separate in gender

Using different media in different distance situations

This analysis was carried on in the scheme: 7(media) x 3 (distance: communication with person who is located at a walking distance, at the same town, in another country) within subject and 2(gender) x.3(group) between subjects.

Analysis showed significant effects:

- main effect of distance ($F(2,2042)=574.2$; $p<.001$). Post hoc tests with Bonferroni correction showed significant differences in frequency of using media in 3 different distance situations: communication with person who is located at a walking distance (M=2.28), at the same town (M=2.91) and in another country (M=3.08).
- main effect of medium ($F(6,6126) = 303.85$; $p<.001$). Post hoc tests with Bonferroni correction showed significant differences in frequency of using various media: calls (M=3.08), SMS (M=3.2), fixed phone (M=2.31), email (M=2.53), internet messages (M=2.82), internet calls (M=2.51), social networking (M=2.83).
- main effect of gender ($F(1,1021)=11.78$; $p<.01$). Women more often (M=2.81) than man (M=2.69) use various media to communicate.
- interaction effect of medium and gender ($F(6,6126)=2.97$; $p<.05$). Analysis of straight main effects showed significant differences in frequency of using various media by woman and man. Women more often than man use such media as phone – calls, SMS, fixed phone, email and social networking to communicate. There was no

differences between female and male in communication with using internet messages and talks.

- interaction effect of distance and medium (F(12, 12252)=449.73; p<.001). Analysis of straight main effects showed significant differences in frequency of using various media in different distance situation. There was no differences in using SMS, between communication with person who is located at a walking distance and with person who is located in another country.
- second -order interaction of distance, medium and gender (F(12,12252)=2.8; p<.01).

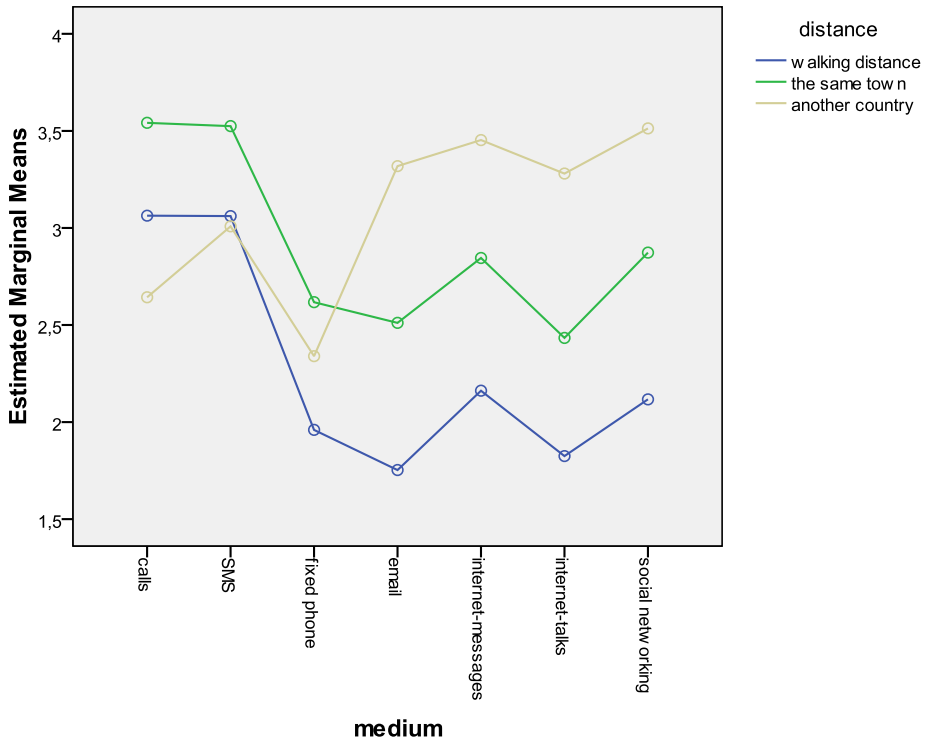

Figure 17. Using different media in different distance situation (woman and man)

Analysis of straight main effects showed significant differences in most measures, despite of:

- Firstly, in both groups (men and woman) there was no differences in using SMS, between communication with person who is located at a walking distance and with person who is located in another country.
- Secondly, in communication with person who is located at a walking distance, where was no differences between men and woman in using email, internet messages and talks. But in communication with person who is located at the same town where was no differences between men and woman in using internet messages and talks. And in communication with person who is located in another country where was no differences between men and woman in using phone – calls, fixed phone and internet messages talks.
- Remaining main and interaction effects were no significant.

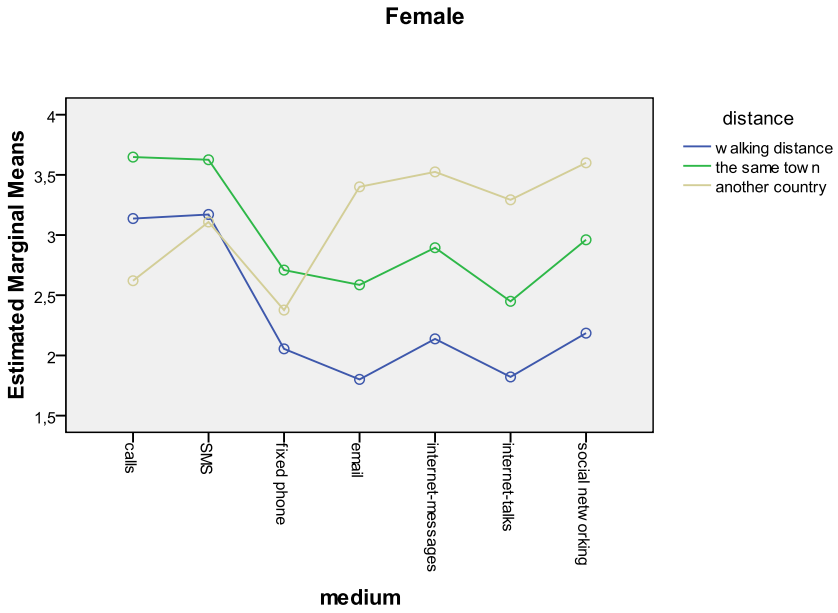

Figure 18. Using different media in different distance situation (woman)

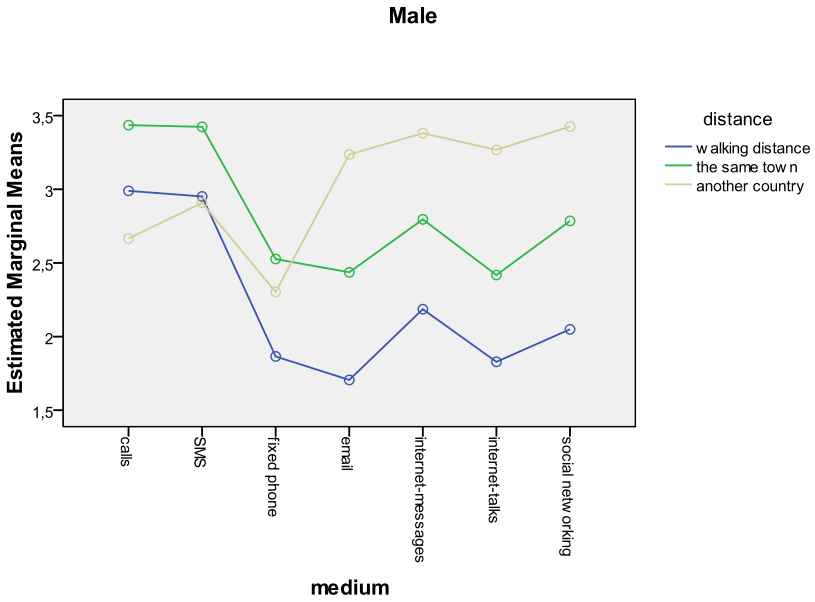

Figure 19. Using different media in different distance situation (man)

Versatility of use scale and task first choices

The versatility of use scale score was computed by adding the scores of 9 questions (4 point scale each) dealing with such issues as: familiarity with the media, liking, versatility of usage and appropriateness for using in a variety of situations.

The versatility of use scale computed separately for each medium shows the general willingness of choosing the medium, that stems from the individual's familiarity with it, lack of difficulties in use, flexibility of usages and subjective appropriateness for a variety of

situations and constraints. The generally positive cross-correlations in the table above show that the ability to use a certain new medium in a versatile way predicts that the individual will be generally apt in the use of other media and vice versa – if he or she encounters problems with one medium, they will be more susceptible to having problems with other media as well.

The correlation matrix suggests that we can group the investigated media into 3, somewhat overlapping groups. First group is for mobile phone usage – calls and text messages. Versatile use of the mobile phone calls explains around 30% of the variance in the flexibility of use of texting (r=.55, p<0.01). Second group consists of more 'official' communication: fixed phone calls and emails – around 20% of variance in email usage versatility is explained by the score on the fixed phone call scale (r=.45, p<0.01). The third group joins some of the internet based socializing media: chat, communicator voice calls, social networking portals and again email. Voice calling ease predicts chat usage (r=.57, p<0.01), emails (r=.47, p<0.01), and social networking (r=.53, p<0.01). Additionally, social networking is a good predictor of chatting as well (r=.61, p<0.01).

Table 1. The cross-correlation matrix of versatility of use scale (N=1027)

		Total mobile versality	Total text versality	Total phone versality	Total email versality	Total chat versality	Total voice call versality	Total social networking versality
Total mobile versality	Pearson Correlation	1	,552**	,264**	,301**	,245**	,217**	,306**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000
Total text versality	Pearson Correlation	,552**	1	,069*	,168**	,371**	,091**	,336**
	Sig. (2-tailed)	,000		,027	,000	,000	,003	,000
Total phone versality	Pearson Correlation	,264**	,069*	1	,447**	,147**	,332**	,168**
	Sig. (2-tailed)	,000	,027		,000	,000	,000	,000
Total email versality	Pearson Correlation	,301**	,168**	,447**	1	,304**	,466**	,334**
	Sig. (2-tailed)	,000	,000	,000		,000	,000	,000
Total chat versality	Pearson Correlation	,245**	,371**	,147**	,304**	1	,569**	,612**
	Sig. (2-tailed)	,000	,000	,000	,000		,000	,000
Total voice call versality	Pearson Correlation	,217**	,091**	,332**	,466**	,569**	1	,531**
	Sig. (2-tailed)	,000	,003	,000	,000	,000		,000
Total social networking versality	Pearson Correlation	,306**	,336**	,168**	,334**	,612**	,531**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The versatility of use scale – which explains the ease of use of the given medium – is weakly correlated with actual choices of the media in each task. The score on the versatility scale explains from 3,8% (texting) to 12,5% (social networking) of the variance in choosing the media for particular tasks – the ease of use of the medium makes individuals slightly more inclined to communicate via it for the tasks designed in the first part of the study. Cross-correlations among the media are generally weak and in majority negative, which points to the fact that versatility of use of one media inhibits the use of others. This is specifically true for the use of texting and mobile phone calls (r=-.23, p<0.01), even though the previous analysis showed that aptitude in these two media usage is positively correlated

- the unwillingness to choose one does not stem from a lesser flexibility with it. The internet socializing media are however in general positively, although weakly cross-correlated, meaning that the versatility of use of one media from this group generally predicts eagerness to choose any one of them in the tasks.

Table 2. The correlation matrix of versatility of use scale and task first choices (N=1027)

		First choice mobile	First choice text	First choice phone	First choice email	First choice chat	First choice voice call	First choice social networking
Total mobile versatility	Pearson Correlation	,212**	-,097**	-,134**	-,062*	-,100**	-,093**	,019
	Sig. (2-tailed)	,000	,002	,000	,047	,001	,003	,548
Total text versatility	Pearson Correlation	,004	,196**	-,227**	-,074*	-,046	-,124**	,025
	Sig. (2-tailed)	,908	,000	,000	,017	,140	,000	,429
Total phone versatility	Pearson Correlation	-,064*	-,093**	,208**	,071*	-,004	,094**	-,001
	Sig. (2-tailed)	,041	,003	,000	,024	,907	,003	,964
Total email versatility	Pearson Correlation	-,039	-,113**	,002	,252**	-,034	,057	,039
	Sig. (2-tailed)	,210	,000	,950	,000	,275	,067	,209
Total chat versatility	Pearson Correlation	-,152**	-,061	-,084**	-,089**	,272**	,069*	,143**
	Sig. (2-tailed)	,000	,051	,007	,004	,000	,028	,000
Total voice call versatility	Pearson Correlation	-,098**	-,174**	,017	,051	,082**	,243**	,115**
	Sig. (2-tailed)	,002	,000	,588	,105	,008	,000	,000
Total social networking versatility	Pearson Correlation	-,198**	-,104**	-,111**	-,054	,043	,077*	,354**
	Sig. (2-tailed)	,000	,001	,000	,083	,171	,013	,000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The cross-correlation matrix of the task choices of various media provides the last part of the picture. In general, the correlations are negative (weak to moderate) suggesting that individuals tend to favor a single way of communicating rather than choosing various media for different tasks. This is especially true for mobile phone calls – a high number of choices of this media predicts a low score for all others, specifically social networking ($r=-.45$, $p<0.01$), but also texting ($r=-.33$, $p<0.01$) and chatting ($r=-.31$, $p<0.01$).

Table 3. The cross-correlation matrix of the task choices of various media (N=1027)

		First choice mobile	First choice text	First choice phone	First choice email	First choice chat	First choice voice call	First choice social networking
First choice mobile	Pearson Correlation	1	-,329**	-,165**	-,176**	-,312**	-,268**	-,451**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000
First choice text	Pearson Correlation	-,329**	1	-,137**	-,074*	-,158**	-,128**	-,311**
	Sig. (2-tailed)	,000		,000	,018	,000	,000	,000

First choice phone	Pearson Correlation	-,165**	-,137**	1	,016	-,028	,036	-,165**
	Sig. (2-tailed)	,000	,000		,610	,366	,243	,000
First choice email	Pearson Correlation	-,176**	-,074*	,016	1	-,065*	,029	-,138**
	Sig. (2-tailed)	,000	,018	,610		,037	,357	,000
First choice chat	Pearson Correlation	-,312**	-,158**	-,028	-,065*	1	,186**	-,048
	Sig. (2-tailed)	,000	,000	,366	,037		,000	,123
First choice voice call	Pearson Correlation	-,268**	-,128**	,036	,029	,186**	1	-,054
	Sig. (2-tailed)	,000	,000	,243	,357	,000		,083
First choice social networking	Pearson Correlation	-,451**	-,311**	-,165**	-,138**	-,048	-,054	1
	Sig. (2-tailed)	,000	,000	,000	,000	,123	,083	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Personality scales and choice of preferred cannel of communication

The participants filled in a series of personality questionnaires that measured several traits: self-esteem, extraversion, need for cognitive closure, promotion and prevention orientations and tendency for cooperation. In this section of the report, first we characterize the meaning of those psychological constructs. Next, we describe the analyses assessing how the level of each personality trait was related to people's preferences of different communication channels.

Description of personality scales used in the study

Self-esteem.

Self-esteem reflects a person's overall evaluation of his or her own worth. The Rosenberg self-esteem Scale (RSES, Rosenberg, 1965),consisting of 10 items, was the measure used in the study.

Extraversion.

Extraversion is one of the five most basic personality traits (e.g. Costa & McCrae, 1992). It reflects a person's energy, positive emotions, surgency and the tendency to seek stimulation in the company of others. When his or her extraversion is low, a person is described as an introvert: introspective, stimulation avoidant, quiet and less sociable. Participants' extraversion was estimated with the subset of 10 items from the 50-item scale published by International Personality Item Pool (http://ipip.ori.org/, c.f. Goldberg at al., 2006).

Need for cognitive closure.

Need for cognitive closure is a trait that reflects a person's desire to eliminate ambiguity and arrive at definite conclusions (Kruglanski & Webster 1996). In the study, we used the questionnaire developed by Kossowska at al. (2002).

Promotion and prevention.

Promotion and prevention are motivational orientations predicted by Regulatory Focus Theory (Higgins, 1997), which claims that people, in general can either represent and experience basic needs for advancement (*promotion concerns*), or basic needs for security (*prevention concerns*). This two motivations cause them either to strive toward the presence of positive outcomes, i.e., gains (in case of high promotion individuals) or to avoid the absence of positive outcomes, i.e., unrealized opportunities, or *non-gains* (in case of high prevention

individuals. In the study we used a preliminary version of the tool measuring these two types of motivation orientations, that is being developed in our team.

Cooperation.

Cooperation is a social skill describing a person's tendency to be empathetic and willingness to work with other people for common benefit. In the study we used the tool developed by Praszkier, Nowak & Zabłocka-Bursa (2009).

Preparation of personality scales for further analyses

All of the six variables describing participants' personality traits were normalized before further analyses were conducted. In order to estimate the relationship between the levels of personality traits and usage of different communication channels, we changed all the six quantitative scales into ordinal scales reflecting low, medium and high levels of each personality trait. The division was performed according to standard deviations – all the participants whose scores placed within more than one standard deviation below the mean were categorized as low on that trait. All the participants whose scores located within the range of 1 standard deviation below or above the mean were categorized as medium on that trait. Lastly, the participants whose scores were more than one standard deviation from the mean were categorized as high on that trait.

The divisions did not create equal samples of the participants. In each variable, the number of medium trait level individuals was the highest. In order to perform reliable analyses of variance, for each ordinal personality variable we randomly chose equal samples of observations within each category (low, medium and high). Table XXX shows the number of observations for all personality traits that were used in the analyses described further.

Table 4. Number of observations random-sampled for each level of the ordinal personality variables.

Personality ordinal scale (3 levels: low, medium, high)	**Number of observations in each cell**
Self-esteem	
Extraversion	150
Need for cognitive closure	140
Promotion	120
Prevention	130
Cooperation	120

In the analyses relating to personality scales we concentrated on the first choice of the medium declared by participants (which medium they would choose for communication in the first place). In this paper we report only how the levels of personality traits were related to *overall* preference for a given medium (summed up for all experimental conditions: dyad/group, running errands/social bonding/information exchange and simple/complex tasks).

All the analyses involving personality traits and their relation to medium preference were conducted in the scheme: 7 (media) within subject x 3 (level of a personality trait: low, medium, high) between subjects design.

Self-esteem and choice of preferred medium channel

The analysis revealed that the interaction effect of medium and level of self-esteem is significant, $F(12, 2502) = 2.12$, $p < 0.05$. Post hoc analysis with Bonferroni correction showed that people with low levels of self-esteem use significantly less mobile phone than high self-esteem individuals ($M = 3.84$ and $M = 4.72$, respectively) and more fixed phone than high self-esteem individuals ($M = 0.67$ and $M = 0.36$).

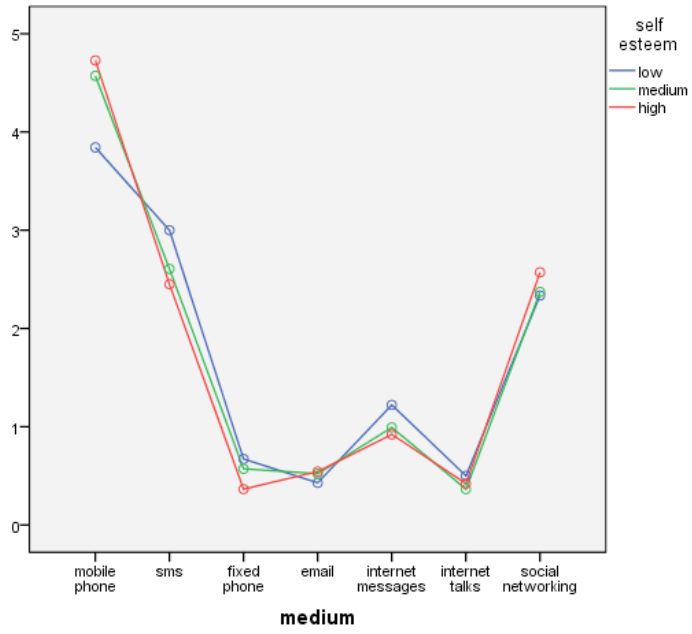

Figure 20. Levels of self-esteem and choices of preferred communication channel.

Extraversion and choice of preferred medium channel

The analysis showed a significant interaction effect between medium and level of extraversion: $F(12, 2682) = 2.19$, $p = 0.01$. Post hoc analysis with Bonferroni correction showed that people with low extraversion (introverts) use mobile phones less often than people with high extraversion ($M = 3.81$ and $M = 4.82$, respectively).

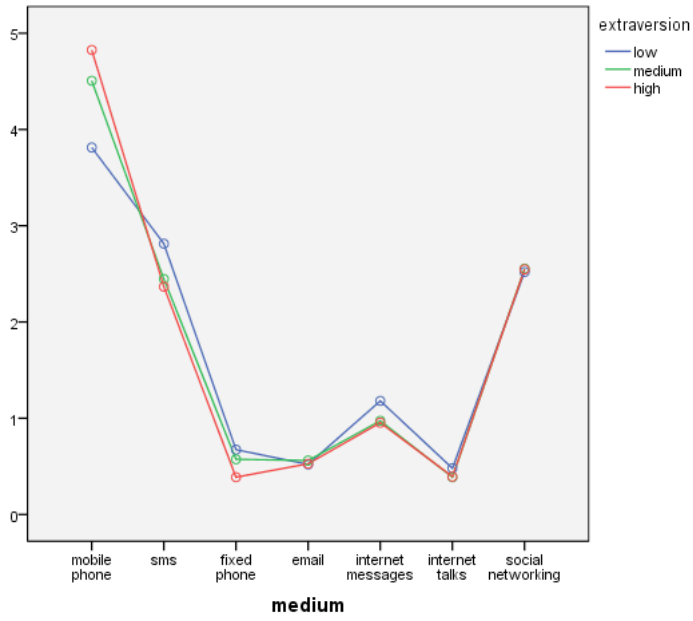

Figure 21. Levels of extraversion and choices of preferred communication channel.

Need for cognitive closure and choice of preferred medium channel

The analysis showed a significant interaction effect between medium and cognitive closure level: $F(12, 2502) = 4.82$, $p < 0.001$. Post hoc analysis with Bonferroni correction showed that participants with low need for cognitive closure chose phone as a preferred medium less frequently than others (low need for closure M = 3.4 medium M = 4.34, high M = 4.47). Persons with high need for cognitive closure use sms less frequently than others (low need for closure M = 2.85 medium M = 2.96, high M = 1.96).

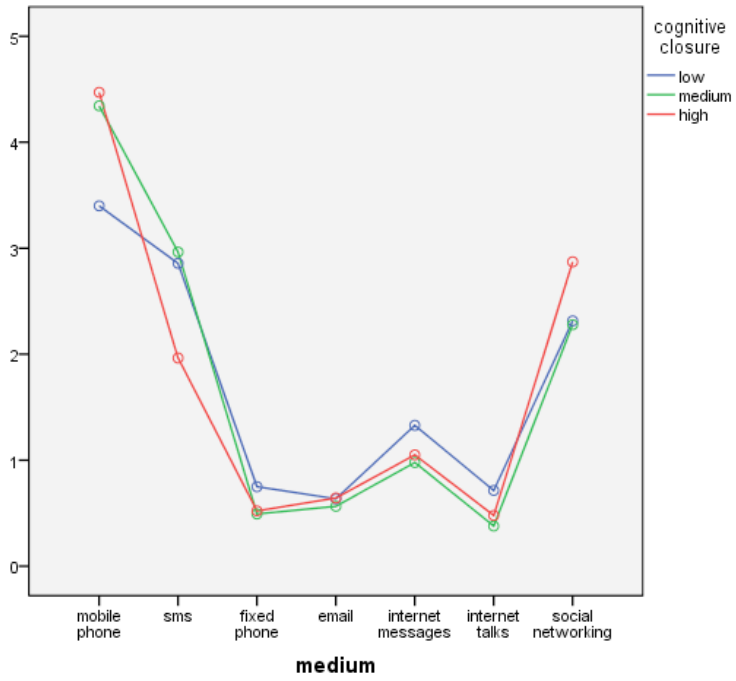

Figure 22. Levels of need for cognitive closure and choices of preferred communication channel.

Promotion and choice of preferred medium channel

The analysis showed that interaction between medium and promotion level is significant: $F(12, 2142) = 3.47$, $p < 0.001$. Post hoc analysis with Bonferroni correction were conducted. It showed that participants with low levels of promotion use mobile phone significantly less frequently than participants with medium level of promotion. Also, the usage of internet talks by participants with medium level of promotion is significantly lower than in rest of the sample, but the difference is very low. Interactions of prevention x medium and cooperation x medium turned out to be insignificant.

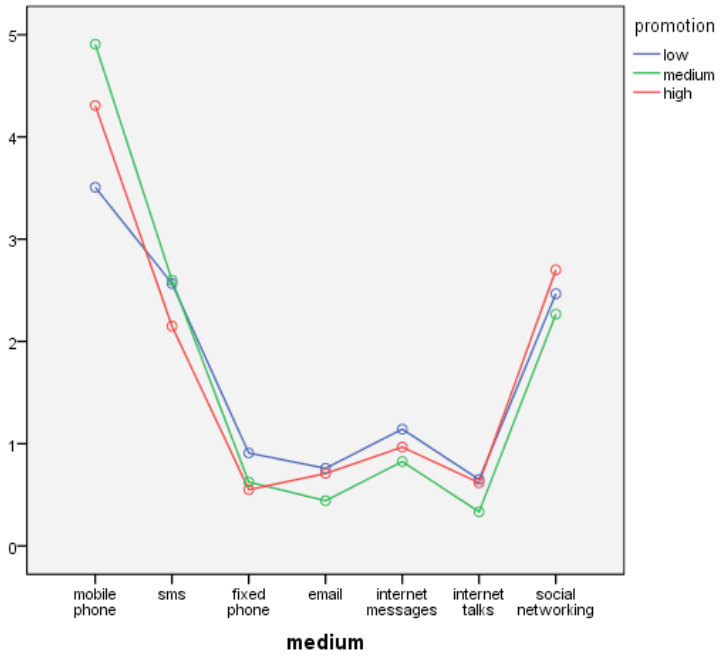

Figure 22. Levels of promotion and choices of preferred communication channel.

Summary of personality traits

Low extraversion (high introversion) was shown to relate to the decreased usage of mobile phone in various social situations, which corresponds with the definition of introversion – being less assertive, less self-confident in social situations and less sociable. People with high self-esteem use mobile phone and less fixed phone than low self-esteem individuals. Low self-esteem is often associated with lessened mobility and preference for staying home, which can explain the results.

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