Sound of Silence: Comparison of ICT and speech deprivation among students

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Abstract

The aim of the study was twofold: to describe self-reported habits of ICT use in every-day life and to analyze feelings and behavior triggered by ICT and speech deprivation.

The study was conducted on three randomly selected groups of students with different tasks: Without Speaking (W/S) group (n=10) spent a day without talking to anyone; Without Technology (W/T) group (n=13) spent a day without using any kind of ICT, while the third group was a control group (n=10) and had no restrictions. The participants' task in all groups was to write a diary detailing their feelings, thoughts and behaviors related to their group's conditions.

Before the experiment, students reported their ICT related habits. Right after groups were assigned, they reported their task-related impressions. During the experiment, participants wrote diary records at three time-points.

All participants used ICT on a daily basis, and most were online all the time. Dominant ICT activities were communication with friends and family, studying, followed by listening to music and watching films.

Speech deprivation was a more difficult task compared to ICT deprivation, resulting in more drop-outs and more negative emotions. However, participants in W/S expected the task to be difficult, and some of them actually reported positive

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experiences, but for others it was a very difficult, lonesome and terrifying experience. About half of the students in W/T claimed that the task was more difficult than they had expected, and some of them realized that they are dysfunctional without technology, and probably addicted to it.

Key words: ICT; communication deprivation; face-to-face communication; Internet addiction; field experiment; diary record; content analysis;

1. Introduction

Communication is an essential and fundamental part of human life. During human history various changes and improvements have been made in order to enhance communication. Origins of language and speech date about half a million years to the past, and symbols were developed about 30.000 years ago. First writing symbols from the Bronze Age about 6.000 years ago meant that people were able to send messages without direct contact with the recipient. The first true alphabet is the Greek script that was developed 3.000 years ago. From that time on, humans were intentionally writing and sending messages to each other, overcoming barriers of space and time. First printed word (1215), first telegraph (1774) and the first telephone (1860) opened new possibilities of human communication, to be continued with the invention of the radio (1878) and television (1925). Computer revolution started in the first half of the 20th century, and resulted with a massive progress of communication devices, culminating with the World Wide Web.

This communication transformation led us to the age where ICT and face-to-face communication are equivalent in both business and private life, formal and informal setting. We are not exaggerating when we say that, especially for young people, ICT is a natural part of all daily activities, including family, friends, education, work, and different types of entertainment. It is virtually impossible for a student to manage his tasks without the internet, as most of the information, tasks and instructions are published only on the web. Ten years ago, Williams and Bryant (2007) argued that TV, internet and mobile phones have so high penetration ratios that they became essentials with crucial relevance on people's lives. This was further confirmed by Pew Research Center (2014) reports finding that 90 percent of adult Americans, and 98 percent of those between 18 and 29

years of age, have a cell phone Furthermore, 87 percent of adult Americans use the Internet (97 percent of young adults: 18-29). In the same year, 99% of Croatian students were using the Internet (Pugar & Markuš, 2014).

1.1. Comparison of ICT and face-to-face communication

Many research compared face to face and ICT communication in different settings such as private life, team work or education. Although it is well known that ICT devices help establishing and maintaining communication among physically distant persons, and facilitate business communication, research of effects of online communication on personal relationships and individual well-being produces ambiguous results.

There are two broad theoretical views explaining possible relationship between online and face to face communication. *Displacement theories* argue that online communication takes time that would be otherwise spent in face-to-face communication. Since online communication is more superficial and trivial, it is not supposed to be adequate substitution for face-to-face communication. On the other hand, *stimulation theories* propose that online communication enhances face-to-face communications since it enables continuous communication.

Many authors stress the importance of face-to-face communication, and argue that online communication takes away time that would be otherwise used for live interactions. For example, Mallen, Day and Green (2003) found that people are happier after face-to-face communication, probably due to an additional feeling of closeness that online interaction does not provide. Similarly, Lee et.al., (2011) found that face-to-face time with friends and family was associated with better quality of life while no such relation was found for online interaction. Przybylski and Weinstein (2012) found that mobile devices have negative effects on closeness, connection, and quality of conversation people engage in personally meaningful topics. Drago (2015) reported negative effect of technology on both the quality and quantity of face-to-face communication. Moreover, in her research, despite individuals' awareness of the decrease of face-to-face communication as a result of technology, more than 60% of participants continued to use mobile devices in the presence of others.

On the other hand, some research found positive effect among Internet users. For instance, Penard, Poussing and Suire (2013) found that people who didn't use Internet were less satisfied in their life than Internet users,

while positive influence of Internet use was stronger for younger persons and those not satisfied with their income.

Systematic review of Best, Manktelow & Taylor, 2014 has revealed contradictory evidence while revealing an absence of robust causal research regarding the impact of social media on mental wellbeing of young people.

1.2. Deprivation method

To test indispensability of a certain activity, scholars use different methods, most poplar being assessment of frequency and duration of the activity in question. However, this method has some obvious problems:

- it presumes that the quantity of time spent in a certain activity is proportional to its indispensability, which is not necessarily true (e.g. we may use the Internet just once per day for one an hour, but it is extremely important to us, or it is part of daily ritual that can't be avoided);
- it is extremely difficult to observe directly and in a long-term someone's daily behavior in a natural settings, and therefore…
- results mostly depend on participants' reports, often with a time delay, and those are not always reliable. Even if the respondents give their best guesses, there are always human errors of judgment, and such estimates are prone to distortion by social desirability.

Method of deprivation is not new to psychology research. In the context of media deprivation, some famous studies were conducted during the 20th century, exploring both voluntary and involuntary deprivation (such as New York newspaper strike in the 1940s, reported by Berelson, 1949). Petrovic, Platzer and Maxl (2011) used the deprivation method to investigate indispensability of mobile phones, internet and TV. This research showed that all three media were indispensable, but mobile phones were more indispensable than internet or TV. There is little research on the indispensability of face-to-face communication, as it is obvious by itself, and part of everyone's daily life for about half a million years.

Vrasidas and McIsaac (2000) claimed that in comparison to the face-to-face mode of communication, a major disadvantage of text-based communication is the lack of visual and audible cues. However, a lot has changed in last 16 years, so fewer contextual cues and slower feedback, once connected to virtual communication, are now bypassed via recent advancement of new technologies.

To the best of our knowledge there was no research so far to compare reactions to deprivation from ICT and face-to-face communication.

1.3. Current study

In this study we are exploring communication related habits among young people. This research was conducted in a form of a field experiment combined with a questionnaire and diary records (form of introspection). In field experiments, experimenter still manipulates the independent variable but in the everyday (i.e. real life) environment of the participants. Our experimental design, combined with qualitative methodology (diary entries) enables us to describe communication habits, but also to compare situations when communication devices are somehow restricted.

The aim of the study was two-fold:

- To describe ICT related habits in daily lives of students
- To describe the feelings, thoughts and behaviors in situation where ones communication is limited to:
  - Only face-to-face communication (not using any technical devices)
  - All technical devices, but restricted face-to-face communication (not speaking at all)

2. Methodology

Before the experiment students reported their ICT related habits. Then, participants were randomly assigned to one of the groups: Without Speaking (W/S) group spent a day without talking to anyone; Without Technology (W/T) group spent a day without using any kind of ICT, and Control group. Then, participants reported their task-related impressions. During the experiment day participants wrote diary records diary detailing their feelings, thoughts and behaviors related to their group's conditions at three time-points (Table 1).

Table 1: Research Design

In the classroom, not aware of the task	Self reported ICT related habits – open question		
	GROUP ASIGNMENT (N=38)		
Condition	Deprivation		No Deprivation
Groups	Speech (W/S)	ICT (W/T)	Control (CG)
Initial n	14	14	10
Final n	10	13	10
In the classroom, aware of the task	Impressions of the task – open question		
EXPERIMENT			
At home: After waking up	Feelings, thoughts and behaviors regarding the task - Diary		
At home: 8 hours later	Feelings, thoughts and behaviors regarding the task - Diary		
At home: Before sleep	Feelings, thoughts and behaviors regarding the task - Diary		

Source: Authors' own work

2.1. Participants

Initial sample consisted of 38 psychology students, mostly women (35) undertaking field work for the course "Qualitative Methods", at the Department of Psychology, within the Faculty of Croatian Studies at the University of Zagreb. The participation in this study (writing diary reports) was a part of class obligations, while participation in any deprivation situation was voluntary. Participants were randomly assigned to one of three groups (Table 1): Speech deprivation (N=14), ICT deprivation (N=14)

and control group (N=10). Participants could immediately move from experimental to control group if they wanted to, but they still had to write diaries as a class assignment. One participants from W/T group and four participants from W/S group chose this possibility (difference between initial and final n). All participants were informed about tasks of all three groups. Diaries of the participants (n=5) who moved to control group were not analyzed in this study.

Consequently, we studied these groups: Speech deprivation (final n=10), ICT deprivation (final n=13), control group (final n =10).

2.2. Variables

As the Dependent variables in this research were used:

- Drop-out rate
- Time spent in the experiment before dropping out
- Information from diary records

On the other hand, independent variable was mode of communication deprivation with 3 categories:

Experimental group 1 (W/S) Participant's task was to spend one day without talking to anyone (including phone talks, including talking to themselves while alone). They were allowed to chat or e-mail using ICT, but not with persons who are physically close. Also, they were allowed to write, but again only to physically distant persons.

Experimental group 2 (W/T) Participant's task was to spend one day without using any kind of technical devices for communication purposes, including watching TV or listening to radio or music from internet. Only if they were in situation where radio couldn't be avoided (e.g. music in the shop, or in the bus), was it allowed.

Control group (CG) Participants were instructed to do whatever they would do if they weren't part of the experiment.

2.3. Procedure

Participants in all three groups got the same instructions. First, they reported their habits regarding the use of ICT in daily lives. As soon as they were assigned to a group they reported on their feelings and thoughts about the assignment. On the day of the experiment, they had to monitor and record their feelings and thoughts at 3 time points (right after waking up, 8 hours after waking up, and before going to sleep). They also had a

possibility to enter an additional diary record if they wanted to. Students were instructed that they can abort the experiment at any time. However, they were asked to continue with the diary writing even if they decided not to continue with the experiment.

Experiment took place on a day when most participants were free (Saturday before Easter), and were not obliged to work or to communicate due to studies. Also, most students spent the day with their families and friends, so there were plenty of challenges regarding restricted communication.

2.4. Data analysis

Data analysis employed both quantitative and qualitative methods.

Quantitative methods: The number of dropouts and duration of non-usage (for dropouts) are objective measures of indispensability.

Qualitative methods: Conventional content analysis was performed to analyze a phenomenon. In this procedure researchers don't use preconceived categories (Kondracki& Wellman, 2002), but allow the categories to emerge from data. This design is appropriate when existing theory or research literature on a phenomenon is limited, as we believe it is in this case.

Data analysis started with reading all of the data repeatedly to achieve immersion and obtain a sense of the whole (Tesch, 1990). The next step was highlighting the exact words from the text that appear to capture key thoughts or concepts, and adding codes. Then, codes are sorted into categories. These emergent categories are used to organize and group codes into meaningful clusters (Coffey & Atkinson, 1996).

3. Findings and discussion

We will first analyze data on participants habits regarding ICT habits, and their reactions to the experimental task, and then we will present findings gathered during the experiment.

Pre-experimental information included data on ICT related habits and participants' reactions regarding the task. Both sets of data were analyzed using content analysis and open-coded system was applied.

3.1. Content analysis of descriptions of ICT use in ever-day lives.

Before the start of the experiment we asked participants to describe their habits related to the use of communication technology. Content analysis resulted in 37 key concepts that were merged into 10 categories. Finally, these categories were combined to get 4 distinct clusters: ICT-behavior, ICT-emotions and thoughts, ICT-conditions, and TV related habits.

ICT-Behavior:

(1) Frequency of ICT behavior

"I use mobile and laptop all day for communication, study and entertainment." (High)

"I like to always be available and I expect that from others." (High)

"I don't use ICT too much: it often happens that I don't even take my cell phone with me." (Low)

"I use ICT to communicate with friends, but at most 1-2 hours a day." (Moderate)

(2) "Checking" social networks or messages

"Checking messages is the first thing I do in the morning." (High)

"I check messages whenever I can." (High)

"I check messages few times per day." (Low)

(3) Decreased use of ICT when it is not necessary

"I use ICT less when I am on holidays."

"I forget about my cell phone when I am preoccupied with something."

ICT-Emotions and thoughts:

(4) Awareness of obsessive use

"I check messages very often, so this became an extremely important part of my life."

(5) Attempts to limit his/her own use of ICT

"I think of myself as person between regular and manic user, but I really try to avoid cell phone when I am with someone, since I think it is very rude and inappropriate behavior."

"When I have a free morning, I usually fiddle with my cell phone, until I find out that I am going beyond normal activity, and that I am not doing anything productive…"

(6) Negative feelings in situations when ICT is not available.

"I think that ICT is irreplaceable part of my life, and it would be very hard, if not impossible to live without it."

"I don't feel well if my cell phone is not close."

"I can't live without technology."

Conditions of ICT use were described by categories related to:

(7) Persons - Most often students use ICT to communicate with friends, family members, partner and teachers. Communication with parents is dominant when they don't live together. Most of students at least sometimes talk with parents on social networks or similar applications.
"*I have a family group on FB with my mother, brother and sister, where we talk a lot.*"

(8) Reasons - Students use ICT for studying, communication, surfing, watching/taking photos and videos, and listening to music. Most of students employ all these activities, and some on daily basis (communication, education). E-mails are most popular for formal communication related to studies, phone calls for communication with family members, while messages are most frequent among friends.

TV-related habits:

Among our participants, TV habits vary from few times per month to few hours (or more) per day.

(9) Conditions - Students watch TV more in the evenings, during weekends, and when they are in their parent's house. If they don't watch TV, it is because of lack of time, or because they rather watch films on computer.

(10) Specific habits - Only 7/33 students mentioned TV as a part of their daily routine. Some of them are used to have TV on all day although they aren't really watching, while the others like to go to sleep with TV on. Two students reported they are watching specific TV-series on a daily basis.

"*My TV is almost always on, even when I don't watch, because I don't like it when it is too quiet in my apartment.*"

In summary, all participants (38) used ICT on daily bases, and many reported that they were online and available all the time. Dominant activities were communication with friends and family (using chat applications on mobile phones mostly), studying, followed by listening to music and watching films. Surfing, playing games, and news-searching were rarely mentioned. In their descriptions of typical ICT behavior, about half of the students stated that ICT is an extremely important part of their lives. Most of the students didn't watch TV regularly, less than ¼ reported

on daily habits related to TV. Regarding ICT related habits three groups were very similar.

3.2.Reactions after the announcement of the tasks

Content analysis of reactions towards the experiment, produced 23 key concepts, that were merged into 10 categories. Finally, these categories were combined to get three distinct clusters: Emotions, Evaluation of the task, Predictions.

Emotions:

(1) Positive emotions were found in all three groups. Participants in CG most frequently reported happiness (5/10), and it was always related to the fact that they are assigned to the control group. In both experimental groups most frequent positive feeling was excitement related to challenge of the task (3/10 in W/S group and 4/13 in W/T group).

(2) Negative emotions were observed in all three groups. In the CG these were mainly related to the disappointment that they are not in the experimental groups (often combined with relief). In both experimental groups participants were mostly worried, but we also recorded reactions of frustration, anger, nervousness and fear.

(3) In all three groups some participants reported ambivalent feelings.

"I feel strange and not really pleasant. I am nervous. Partially I am looking forward to it, but I would prefer to be in the control group"

"My feelings regarding this task are divided. I feel anger and disappointment (…), I think that the task is very interesting and useful (…)"

"If I exclude skepticism and uncertainty in my capability to perform this task, I am excited about it (…)"

Evaluations of the task:

Participants thought that the task is difficult, but interesting and challenging.

(4) Unknown situation

"This whole situation is unfamiliar to me." (about diary writing – Control group)

(5) Various obstacles- Some participants expressed special worries because of plans for that day (meeting someone, studying using ICT, etc.)

(6) The group to which they were assigned to- In every group there were participant who would preferred if that they had been assigned to another group.
(7) Difficulty of the task
(8) Interest in the task and the results was present in almost all participants.

Predictions:

(9) Positive predictions
"I believe that the task will have positive effect on me. (W/T)"
"It will be nice to have a one day break from all technologies" (W/T)
"It is a chance to be on your own for one day, to move away from social interactions that can be exhausting." (W/S)
(10) Negative prediction
"It will be like disconnection from the rest of the world" (W/T)

In summary, participants in the control group were mostly happy and relieved, but half of them were at least a bit disappointed that their task is not challenging. In both experimental groups, there were more negative emotions compared to the control group, and members of W/S group expressed strongest negative emotions such as frustration and fear.

In W/S group 6 students expressed mostly negative feelings, one mostly positive and 3 were ambivalent. In W/T group 5 of 13 students expressed mostly negative feelings, 3 mostly positive and 5 were ambivalent. In CG 3 of 10 expressed mostly negative feelings, 5 mostly positive, and 2 were ambivalent. All students were instructed that they were allowed to dismiss the experimental task at any time they liked, and that these would not influence their grades, as long as they continue to write a diary.

3.3.Experiment

Regarding experimental part of the research we will first present statistics of drop-outs and then we will proceed with qualitative analyses of the personal diaries.

3.3.1.Quantitative results of the research: Drop-outs

From 10 participants assigned to W/S group, 6 didn't manage to accomplish the task. The time between waking up and dismissing the task varied from 3.5 to 6.3 hours with average value of 5.1 hours. From 13

participants in W/T group 5 dropped out. The time of endurance varied from 2.7 to 16 hours, with average value of 10.3 hours.

Although our sample is too small for reliable statistical analysis, these data suggests that W/T group had less dropouts, and that those who dropped out endured twice longer in W/T group (over 5 hours longer).

Table 2: Summary of main findings: Frequency of participants who reported certain condition.

Groups		**Speech (W/S)**	**ICT (W/T)**	**Control (CG)**
n		10	13	10
Dropped out		6	5	0
Emotions				
	Positive	9	10	all
	Negative	all	all	3
	Ambivalent	8	6	2
Needs				
	General need	10	13	0
	Specific needs	2	4	0
Behavior change				
	Compensation	6	7	0
	Substitution	3	3	0
	Avoidance	5	3	0
	Automatic moves	7	4	0
Perception change		2	4	0
Conditions		7	8	0
Awareness		3	7	4

Source: Authors' own calculations

3.3.2. Qualitative content analysis of feelings and thoughts

We conducted qualitative content analysis on each group separately, identifying concepts related to communication deprivation (Table 2). Feelings, thoughts and behaviors not related to communication deprivation were not analyzed (e.g. "I am hungry.", "I am worried because of my studies.").

3.3.2.1. W/T group

Content analysis of thoughts and emotions during three time intervals, produced 54 key concepts, that were merged into 12 categories. Finally, these categories were combined to get 7 distinct clusters: Emotional reactions, Needs, Behavior change, Perception change, Conditions and Awareness. Last cluster (Drop-outs) described motives of those who dismissed the experiment.

Emotional reactions

(1) *Negative emotions*. All participants in W/T group experienced negative emotions at least at some time during the day. Negative feelings were nervousness (most common), lost of control, frustration, anxiety, loneliness, upset, boredom, restlessness and discontent.

(2) *Positive emotions*. Three out of 11 participants didn't report any positive emotion during the deprivation period, and two of them dropped out at some point. Other participants (9 out of 12) reported positive emotions such as: curiosity, interest, peacefulness, happiness or general good mood and satisfaction.

(3) About half of the participants reported *ambivalent feelings*.

Needs

All participants reported that they were missing ICT devices at some point.

(4) *General need*. Half of the participants felt strong urge to check mobile phones and social networks as soon as they woke up. This need kept repeating during the day for most of the participants, usually accompanied with feelings of boredom or nervousness.

(5) *Specific need*. Some participants were missing only specific ICT activity (e.g. to call boyfriend, to listen to music while cleaning, to watch TV before sleep, to search internet for specific information).

Behavior change

(6) *Compensation.* Half of the participants reported that they spent more time with their family (helping parents, playing games or talking to siblings) than they would without deprivation.
(7) *Substitution*. Some of the participants reported choosing alternative behavior when they would normally use ICT (e.g. visiting someone instead of calling, asking parents to search the internet for them).
(8) *Avoidance.* Three participants decided to go to bed earlier to avoid technology (watching TV).
(9) *Automatic moves.* Four participants reported on instinctive moves toward technology devices.

Other clusters

(10) *Perception change.* Participants felt that time passes slower than usual. One participant reported on disorientation (used to check time on cell phone). One participant reported on shifting focus to her inner self, paying more attention to her own thoughts. Some reported impression of missing something important, and losing control over their life.
(11) *Conditions.* Participants claimed that they their need for ICT devices was stronger when they were not busy, and when they saw others use technology. Use of ICT also seems to depend on whether conditions, some participants arguing that this need is weaker when the weather is nice (because they can spend time outside). Need for ICT was greater when it was part of daily routine (e.g. watching TV while having breakfast, listening to music in a bus).
(12) *Awareness.* At the end of the day three participants reported that they didn't miss technology, and felt peaceful, productive and happy. All other participants reported at least some negative thoughts including awareness of addiction and dysfunctionality without ICT. Half of participants claimed that the task was more difficult than they expected.
(13) *Drop-outs.* Three out of five participants dropped out because they "had to" contact someone. All three were unsatisfied and felt bad about dismissing the task, but all were relieved and happy in the same time. The reason for the fourth drop out was that the participant was not aware that although it was after midnight the experiment was still going on.

In summary, participants in W/T group experienced more negative than positive emotions, but most of them felt both. Most common negative emotion was nervousness. Positive emotions varied from excitement (in the morning) to peacefulness and positive mood that developed during the day in some of the subjects. Participants who spent more time with family or engaged in different off-line activities felt less need to use ICT. Crises usually happened when participants were alone and bored, when their daily routine was broken or when others used technology devices. In these situations avoidance behavior (going to bed to avoid TV) and automatic moves towards technology devices were observed. However, none of the participants dismissed the experiment for those reasons, but because they "had to" contact someone for different purposes (to arrange an appointment, to check if another person is safe).

3.3.2.2. W/S group

Content analysis of thoughts and emotions during three time intervals, produced 57 key concepts, that were merged into 12 categories. Finally, these categories were combined to get 7 distinct clusters, corresponding to W/T group: Emotional reactions, Needs, Behavior change, Perception change, Conditions and Awareness. Last cluster (Drop outs) described motives of those who dismissed the experiment.

Emotional reactions

(1) *Negative emotions*. All participants in W/S group experienced negative emotions at least at some time during the day. Negative feelings were: troubled (most common), worry, stressfulness, upset, sadness, helplessness, nervousness, isolation, loneliness, fear and anger.

(2) *Positive emotions*. Only one participant didn't report any positive emotion during the deprivation period. Reported positive emotions such as: curiosity, interest, peacefulness, relaxation, comfort, relief, happiness or general good mood and satisfaction.

(3) *Ambivalent feelings*. 8 of 10 participants reported ambivalent feelings, and majority indicated they felt strange or weird, especially at the beginning of the experiment.

"Despite anxiety and fear, I feel surprisingly relaxed and calm"

Needs

All participants reported that they were missing speaking.

(4) *General need*. A need for talking per se was observed in all participants during family and friends meetings, where there was no

need for specific information exchange, but just to communicate with significant others.

(5) *Specific need*. Some participants reported the need to communicate particular information (e.g. order a meal).

Behavior change

(6) *Compensation*. We found cases of excessive use of ICT, music listening, schoolwork and domestic work as well as physical activity to compensate for speech deprivation.

"I find comfort and happiness in talking (via ICT) with friends who are not close to me, and that will compensate for not being allowed to talk with my family".

(7) *Substitution.* Participants reported using gestures to explain something without talking.

(8) *Avoidance.* Different types of avoidance behavior were observed: staying in the room instead of being with family, going to bed earlier to avoid talking to family members, avoiding meeting friends, trying to avoid being approached by a stranger or acquaintance (on the street or in the bus).

"Yes, I am already in bed. There is no point in being in the living room when I can't talk with my family."

(9) *Auto-reminding.* Participants reported that they had to constantly remind themselves that they are not allowed to talk.

Other clusters

(10) *Perception change* -Participants felt that time passes slower than usual. Some reported feeling like they will never be allowed to talk again.

(11) *Conditions* -Participant's need for speaking was stronger during the meals when they usually talk with their family members, as a part of a ritual. Social support played a significant role in a decision to dismiss the task, since three participants dropped out because of the pressure of significant others.

(12) *Awareness*- At the end of the day three participants reported that the task was less difficult than they thought it would be, and they were happy and content. Almost all participants considered the task interesting, and half of them stated that they would like to try this task again. Some participants described deprivation experience as fulfilling, interesting and detoxicating, while for others it was very difficult, lonesome and terrifying experience. Three participants

claimed that they became aware of the indispensability of face-to-face communication.

(13) *Drop-outs* -Four out of six participants dropped out because they wanted to talk to family or friends during gatherings.
"My extended family (aunt, uncle and nephew) came for lunch at 2 p.m., so it was impossible for me to continue with the experiment"

Two participants dismissed the experiment because they needed to communicate specific information. Most of participants who dismissed the task, felt bad about it at first, but also reported relief.

In summary, participants in W/S group experienced a lot of negative emotions, but mostly perceived situation as unusual and curious. Participants tried to compensate face to face communication with ICT devices, and engaged in different activities that kept them busy. However, they reported the feeling that times passes slower. To resist the temptation some participants voluntarily isolated themselves and avoided social gatherings and happenings. Most difficult situations were related to family and friends meetings. Additional obstacle for some participants was attitude of their significant others who asked or even demanded to stop the experiment. At the end of the day, most participants evaluated deprivation experience as difficult, but valuable, and they wanted to repeat it at some time in the future.

3.3.2.3. Control group

Participants in the control group described their daily activities and their feelings, but thoughts and feelings regarding experimental condition, or generally regarding communication tools, were rare. They all mentioned positive emotions, and some mentioned also negative and ambivalent. They spent majority of time communicating with family and friends, and all of them mentioned using ICT devices for various reasons, occasionally during the day. Almost half of them reported being aware of the ability to communicate (while mentioning their friends in experimental groups).

3.3.2.4. Comparison of the two experimental groups

On the basis of drop-out rates and average time spent in deprivation, we may presume that face-to-face communication is more indispensable than ICT.

In the process of content analysis we were trying to follow rules of simplicity and logic, yet to cover all basic concepts. It is interesting how diary records produced very similar (practically same) pattern of concepts for both experimental groups. Participants of both groups reported on feelings, needs, conditions, awareness, and changes in behavior and perception. As instructed by experimenter, those who dropped out described the reasons for doing so, and those responses were gathered in additional cluster (drop-outs).

The only difference was in cluster Behavior/Automatic responses and Behavior/Auto-reminding. In W/T group participants reported on instinctive (automatic) moves towards technology devices, while in W/S corresponding behavior was continuous self-reminding about the task. These concepts are similar but still distinct, since automatic responses presume behavior (move of the hand), while reminding is just mental activity (opening mouth to say something would correspondent with automatic responses – but this was not detected).

3.4. Limitations of the study and guidance for further research

Obvious limitation of our study is the sample size. The small number of participants in this study limits the validity of quantitative data analysis related to drop out rates. Further limitation, related to the sample is the fact that it consisted of psychology students only. Related to that, the number of female participants was significantly higher compared to male participants.

However, convenient sample employed in this research enabled us to get more precise and in-depth information, since students of psychology were trained in introspection, and, could therefore better monitor their own feelings and thoughts. Traditional data collection methods are heavily reliant upon respondents' ability to reflect on their own experiences, and then express these memories in a research context (Zaltman, 2003). Our method of immediate diary records, done by experienced persons, is supposed to minimize this limitation of self-reports. Since we presume that students of psychology use ICT similarly to other students, we believe these results, with gender limitations, can be generalized to any student population.

Another problem with this study is that deprivation took place for just one day. Since it was full deprivation of a certain communication mode, it was not possible for the researcher to persuade participants to endure for a longer period. The fact that participants were randomly assigned to a

certain group, and motivation was induced only after assignment, is a strong advantage of this study, as it is not biased by participant's wish to try deprivation.

4. Conclusion

Unlike typical studies on technology usage, this project went beyond the measurement of access and usage; specifically, the key objective was to uncover emotional reactions related to specific communication deprivation, and consequently analyze underlying processes in more detail. Our findings indicate that ICT and speech deprivation produce very similar patterns of emotions and behavior. In both groups participants reported positive and negative emotions related to the communication obstacles and they expressed urge to use deprived communication tool. In both cases this need appeared as soon as participants woke up in the morning, and persisted throughout the day. Participants practiced certain behavior changes in order to deal with deprivation: compensation, substitution, avoidance were observed in both groups. In both experimental conditions, participants, at least to some extent, compensated for deprived type of communication by increased usage of allowed communication. In W/T group participants showed automatic movements toward technology devices, while in W/S group they were frequently reminding themselves regarding the task. In both groups, few participants reported on perception change (usually slower time passage).

Need to talk or to use ICT was dependent on certain conditions. Being with people, and especially dining, increased the urge to talk. On the other hand, the need for ICT was triggered during leisure time when participants weren't busy with other things, and it was especially strong when ICT was part of daily routine. In all three groups we found examples of awareness of necessity of communication tools, triggered by deprivation in experimental groups. In the control group awareness was the result of knowledge that their colleagues are in the process of deprivation.

Almost all participants who dismissed experiment at some point of time felt bad or guilty about it, but thought it was not possible for them to continue. They all recovered by the next diary entry, and mostly felt happy and relieved.

This study revealed similarities in responses related to ICT and speech deprivation. Although speech deprivation resulted in somewhat more

negative feelings and more drop-outs, both conditions produced similar reactions. For majority of students ICT is indispensable, and they show various manifestations of addiction.

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