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ICTS AND THE HUMAN BODY:
A SOCIAL REPRESENTATION APPROACH

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Rationale

There have long been discussions on Information and Communication Technologies (ICTs), their spread, and their reception in everyday life by different groups within the overall population. There have also been discussions on the artificialization of the human body (Katz 2003), and on the existence of "natural " and artificial technology (Fortunati 2003a, 2003b). It would appear that not only are New Technologies getting closer to the human body, but also that the latter is being penetrated by the former.

Among communicative technologies, we consider the mobile phone and the Internet emblematic of the ever-growing importance of mediated communication. The mobile phone, which unlike other diagnostic or therapeutic technologies, is at present getting closer and closer to the human body, has achieved trans-generational and mass diffusion. Moreover, it is linked to the expansion of communicative needs and expectations and "lives" in direct contact with the human body. The Internet, with its massive spread in the organization of knowledge, work, and health (Rheingold 1993; Castells 1996—1998; Rice and Katz 2001; Wellman 2001; Katz and Rice 2002), seems on the one hand to place the human presence in the foreground and, on the other, to modify perceptions of the body and of its presence (Wallace 1999).

The computer, the Internet, and the mobile phone have entered our everyday lives, our habits, speech, and conversations with remarkable rapidity. The combination of the mobile phone with the Internet will perhaps further strengthen this extension of communicative capacity. Yet, at the same time, it constitutes a greater artificialization of the human body and the much-discussed mediatization of the concept of self (Gergen 1991), mainly in its personal and relational aspects. In this convergence of technologies and the human body, an important encounter takes place, on the one hand, with the complexity of the fashion system (Fortunati et al. 2003) and, on the other, with the regimen of mobility, which is highly developed in Our society (Ling and Haddon 2003).

There is now a considerable corpus of research aimed at understanding the relationship between technologies and concepts such as self, presence, and contact. The initial concern was with the role of the new ICTs in social life, especially with regard to the Internet (Döring 1999). I-Ater, a growing number of scholars began to consider the particular modes of interaction between social actors and technological tools (Nyiri 2003; Kim 2004), either within a cultural psychology framework praising ethnomethodology (Mantovani 2002) or, within a social psychological perspective, moving from the search for simple main effects to more sophisticated and complex analyses (Bargh 2002) and to the relation between personality and the Internet (Hamburger 2005). Various theoretical models have been suggested to enhance the interactive and constructive nature of technology and social life (Joinson 2003; Flick 1995). Social psychological knowledge of these phenomena is expanding at the theoretical and empirical levels, as well as in terms of the use of ICTs in everyday life

(Chiaro and Fortunati 2002).

In the present research we intend to investigate new information and communication technologies in relation to the human body. At a cognitive level, how do individuals deal with new technologies (Livingstone 2002 and in particular the mobile

phone-Internet combination, as regards the human body (Fortunati and Contarello 2002; Contarello et "l. 2003)? Is there concern and resistance to this much-discussed invasion of the body by the inorganic? Or is it welcomed into the sensibility of everyday life as a new opportunity? These are the questions we shall try to answer here.

Aim and Method

As previously mentioned, the aim of the present research is to monitor how the new technologies — mainly the mobile phone and the Internet — and the human body and the self are considered in this highly critical phase of what has been termed "mass prosthetization." To this end, the theoretical framework offered by Moscovici's (1961/76) social representation theory, appears suitable. Social representations are defined as forms "of knowledge which is socially elaborated and shared, and which has the practical aim of constructing a common, social reality" (Jodelet 1989:36). Not every item of knowledge is a good candidate for social representation. There has to be a problem, contextualized in a specific framework, and widely shared (Farr and Moscovici 1984). There has also to be polymorphism, with different aspects and voices given by different groups, so that the "object" has a specific value to specific groups (Moliner 1993). In our case, we explore how different approaches to the access and use of the Internet, mobile phones, and computers; as well as the different importance given to body-to-body presences and different social networks, interact with an emerging view of these technologies.

We thus try to reconstruct the social representations of ICTs,[1] in particular the mobile phone and the Internet, and of the human body. We also explore the social co-construction of the "technological" body that is emerging nowadays. For reasons of space, we will not deal with related topics—i.e. fashion and travel — which will be considered elsewhere. In previous studies, we examined relations new communicative and therapeutic technologies and various features concerning the human body, communication, and emotions (the web, computers, mobile phones, machines, therapy, the human body, prostheses, communication, anxiety, power, intimacy, myself) and the possible convergence between the mobile phone and the Internet (Fortunati and Contarello 2005).

In the present work, we explore the representational field relative to New Technologies and to the Human Body. In particular, we focus on the different components of the representation — information, attitude, representational field — adopting a qualitative-quantitative methodology (Moscovici 1961/76; Le Bouedec 1984).

In order to study the first and the third component (information and representational field), we monitored the symbolic and emotional texture relative to the mobile phone, the Internet, and more generally the new technologies, on the one hand, and to the human body, on the other, via free associations (Di Giacomo 1980; Le Bouedec 1984). In order to measure attitudes towards the mobile phone, the Internet, and the computer, we collected answers to a Semantic Differential scale prepared for our purposes. We also gathered information through specific questions on practices relative to the mobile phone and the Internet and examined opinions on the relationship between these two technologies and the human body. The aim was to detect possible

[1] An increasing corpus of research is developing within this framework: Flick (1995); Capozza et al. (2003); Fortunati and Mnaganelli (in press), Contarello and Sarrica (2005); Contarello et al. (2004).

concerns, discomfort, or resistance that the respondents might express, or what kind of enthusiasm is triggered by this process of approaching the body.

Participants and Procedure

Two hundred and eighty undergraduate male and female students from various faculties (Psychology, Engineering, Pharmacy) of Padua University in Italy took part in the study. They were enrolled in Psychology (43%), Engineering (28.6%), and Pharmacy (27.9%). Forty percent were men and 60% were women. The data were collected in the spring of 2002.

Our instrument consisted of five sections. First, we gave our participants a free association task, with six stimuli: the Internet, computer, mobile phone, journey, fashion, and myself. (Write spontaneously the images and ideas which come to your mind. Then, the participants were asked about two further stimuli, the new technologies and the human body, and responded to the following prompts: they are they are the opposite of; they are similar to; they might be. These two stimuli were presented one per page in diagrammatic form. A third section contained a semantic differential to measure the participants' attitudes towards the mobile phone, computer, and the Internet. This seven-point scale was composed of four bipolar couples derived from Osgood et al.'s research (1957) and the Capozza's Italian adaptation (1977) that measure general evaluation (desirable-undesirable, agreeable disagreeable, worthwhile-worthless, pleasant-unpleasant), and by 13 further pairs taken from a pre-test carried out with 20 students (who were asked to associate adjectives, nouns, or brief phrases to the three stimuli; the most relevant features were then retained and presented in a bipolar scale format). Fourth, a body investment scale (Orbach and Mikulincer 1998) was included to measure the importance given to Body image, Comfort with touch, Body care, and Body protection. This five-point scale, originally created to measure self-destructive behavior, has also been used to measure normal conduct. Finally, the participants filled in the section of the questionnaire monitoring ownership, familiarity, and uses and practices with regard to the mobile phone, computer, and the Internet. Gender, age, education, and residence were the socio-demographic variables asked for, as well as information on the participants' social networks and status of relationships with others. These data were taken into account and entered into the analysis as illustrative variables in the representations in question.

Data Analysis

As mentioned above, we opted for a qualitative-quantitative approach, i.e., we first worked on the associated words, giving extensive space to the exploration of meanings conveyed by the respondents to the stimuli. Then, the distinct lexical forms associated with the stimuli were examined through analysis using the Spad.T package (Lebart et "l. 1989). After reducing the synonyms and fixing the inclusion frequencies threshold, we scrutinized them following the Mocar procedure, to detect common words and words specifically associated with the mobile phone and the Internet. We then submitted the matrixes (participants x words, separately for each stimulus) to Correspondence Analysis (Benzécri et "l. 1976), following the Aspar (participants x words for a single stimulus) and Aplum (stimuli x words) procedures. In the first case (Aspar), we explored the role of some illustrative variables — the use of the ICTs, the importance given to the human body and to body-to-body communication, the extension of the respondents' social network — upon the emerging representational fields. In the second (Aplum), we were able to analyze together the associations given to ICTs, the human body, and

myself. The data from the semantic differentials were submitted to factor analysis, in order to discover the attitude and in particular the emotional temperature of the core stimuli (Internet, mobile phone, and computer).

Results

Ownership and Use of ICTs

Nearly all of the respondents (98.2%) owned a mobile phone and used text messages (97.9%). Most of them (85.4%) had a computer, and more than half claimed they used a computer daily (25.4%) or weekly (26.8%), but some (13.5%) declared they never used it. With regard to the Internet, its use was more varied (16.8% = daily, 29.6% = weekly, 26.8% = monthly, = rarely, 9.3% = never), as was the use of email (5.4% = several times a day,16.8% = daily, 35% = weekly, 18.2% = monthly, 20.4% = never, 4.3% = other).

Investment in the Human Body

The Body Investment Scale, submitted to exploratory factor analysis, showed the predicted pattern with only minor variations. On the whole, the participants appeared to be satisfied with their bodies (Mean = 3.83; median = 4.00), to like an average level of bodily contact during conversation (M = 3.22; m = 3.20), to take good care of their bodies (M —4.09; m —4.33), and to tend to avoid taking risks with it (M = 3.74; m = 3.67). These respondents, therefore, do not show the problematic and unsatisfied relation with their bodies that appears to emerge from the increasing resort, even by young people, to plastic surgery, diets, body modelling, and so on. With the split-half technique, we considered high and low scores on each factor (above and below the median), thus obtaining four new two-level variables.

As mentioned above, gender, ownership and the use of these devices, social networks and relationships, and body investment were entered as illustrative variables into the analysis (Aspar) regarding the Internet, the mobile phone, and the human body. We will first examine the most frequent lexical forms associated with the seven stimuli (which give us nuances of the "information" component as well as the emotional tone of the representation); second, the attitudes expressed towards the key stimuli; and third, the overall correspondence analysis involving the various stimuli (Aplum).

The "Content" of the Representation

The most frequent associations given to the proposed stimuli by at least 8% of the participants are reported in Table I.

We found here that participants gave descriptions, mainly involving parts for the whole, when asked for free associations. The use of metonymy is widespread in all five stimuli, but with regard to the Internet, mobile phone, and computer, this kind of association takes up more space, leaving little room for evaluations and metaphors. The stimulus which prompted the highest number of was the human body, followed by journey. As regards Myself, a long list of lexical forms, mostly idiosyncratic, was produced; only in two of them — nice and shy — did we find some convergence among the participants. There were many other noteworthy aspects. One was the epithet "fundamental" attributed to the mobile and computer as well as, on different grounds, to the human body.

Table 1. Most Frequent Associations to the Proposed Stimuli

Internet	Internet-parts, computer, communication, information, omnipresence, science, usefulness, speed, fun, navigation, up-to-datedness, world, knowledge, notes, pornography, technology.
Mobile phone	Mobile-parts, communication, usefulness, friends, cost, handiness, telephone, annoyance, brands, reachability, Fashion, fundamental, technology, contact, conversation,
Computer	Computer-parts, Internet-parts, fun, usualness, work, technology, fundamental, science, speed, program, knowledge, difficulty, complexity.
The Human	Machine, exceptional, complex, perfect, beautiful, delicate, fundamental,
Body	unique, li&, body-parts, physical, charming, identity, adaptable, functional, mysterious, looked-after, interest.
Myself	Nice, shy.
Fashion	Cost, clothes, shows, models, uselessness, conformity, color, elegance, appearance.
Journey	Fun, feast, holiday, sea, freedom, culture, sun, knowledge, friends, airplane, warmth, rest, discovery, relaxation.

Attitudes

The items included in the attitude scale were submitted to exploratory factor analysis in order to single out the main thematic nuclei. Five factors emerged, accounting for 54.78% of the total variance. The first factor refers to Appreciation and General Evaluation (agreeable, amusing, pleasant, desirable, alpha = .81): all three technologies received positive evaluations as shown by the composite factor scores (Internet = 5.11; mobile = 5.03 ; computer = 5.09).

The further factors point to Specific Evaluations, contrasting information versus communication (the second), enhancing promptness (the third), convenience (the fourth), and artificiality (the fifth). However, as the internal coherence of these four factors did not prove to be satisfactory (alpha < .60), only the general appreciation measured through the first factor was entered in the overall analysis.

Representational Field

In order to explore convergences and divergences among the proposed stimuli, we performed a correspondence analysis (following the Aplum procedure), after a preliminary treatment of the data[2]. In this analysis (on a 5 x 184 table), the first factor opposes the mobile phone, Internet, and computer, on the one hand, to the human body and myself, on the other; the second opposes the Internet and the computer to the mobile; the third the human body to myself; and the fourth the Internet to the

[2] It is an equivalence procedure, in which we put together different forms — singular, plural, and synonyms; and a threshold procedure, whereby we only retained lexica.l forms with at least five frequencies.

computer[3]. On the base of the associations produced (cf. Table 2), we propose to name and interpret the factors as follows:

1. Communication Tools in Everyday Life versus 'De Machine of Marvels.
The factor opposes the three technologies under examination to the human

Table 2. Correspondence Analysis: The Field of Representations

First factor (I. = 36.97%)							
Communication tools in everyday life: factual considerations				**The machine of marvels: evaluative remarks**			
	coord.	**c.a.**	**c.r.**		**coord.**	**c.a.**	**c.r.**
Mobile phone	−.62	13.61	.22	Human Body	1.63	68.75	.89
Internet	−.43	7.26	.19	Myself	.86	6.66	.11
Computer	−.33	3.72	.11	Machine	1.73	8.07	.84
Mobile-parts	−.73	4.73	.20	Exceptional	1.88	6.91	.84
Computer-parts	−.45	2.01	.22	Perfect	1.95	4.73	.84
Internet-parts	−.48	2.58	.22	Beautiful	2.51	3.88	.97
Communication	−.48	1.58	.83	Delicate	1.95	3.78	84
Useful	−.43	1.16	.47	Complex	1.16	3.35	.94
Cost	−.71	1.08	.23	Unique	1.85	3.25	.95
				Human Body-parts	1.80	2.90	.82
				Life	1.57	2.83	.98
				Physicality	1.95	2.27	.84
				Charming	1.80	2.12	.98
				Well-groomed	4.51	1.89	.84
				Adaptable	1.73	1.65	.84
				Functional	1.73	1.65	.84
				Soul	1.84	1.53	.96
				Well-being	1.57	1.48	.96
				Expression	1.95	1.32	.84
				Identity	1.82	1.29	.53
				Interest	1.11	1.24	.83
				Dynamic	1.82	1.15	.98
				Mysterious	1.95	1.14	.84
				Device	1.23	1.05	.76

Second factor (CI. = 65.22%)								
The positive world of information					**The ambivalent support of relationships**			
	coord.	**c.a.**	**c.r.**			**coord.**	**c.a.**	**c.r.**
Internet	−.65	21.61	.43		Mobile	1.15	61.53	.78
Computer	−.59	15.30	.34	VS	Mobile-parts	1.47	25.13	.80
Internet-parts	−.83	10.14	.67		Cost	1.29	4.68	.77
Computer-parts	−.77	7.72	.76		Friend	1.00	3.44	.72
Information	−.80	2.48	.34					

[3] A preliminary Aplum, including associations to journey and fashion, shows that the first factor opposes journey, and to a lesser extent the Internet, on one pole: to fashion, and the human body, on the other, evoking Freedom versus Constraint. The Internet shows a minor contribution to the factor (absolute contribution = 3.70), sharing with the stimulus journey associations such as discovery, fun, and knowledge, while the mobile phone does not enter into the definition of the factor. second dimension opposes journey (and to a lesser extent, the human- body) to the mobile and the Internet, with associations reminding us of a Natural versus Technological distinction. While realizing that interesting but minor connections pertain to the worlds of1CTs, mobility, and fashion in the view of our respondents, we focused specifically on the three core stimuli of the present research — the Internet, mobile phone, and computer — in relation to the human body and oneself.

body and (to a lesser extent) the self, the communication tools mostly being described in their parts and components, and the human body referred to with a great variety of appreciative remarks. The particular blend of descriptions, evaluations, and astonishment associated with the human body evokes a powerful metaphor that seems to have its roots in the culture of classic Antiquity as well as of the Renaissance: it is the idea of a perfect machine. radical opposition of the human body to the machines of communication and information is the point of departure for our entire analysis. Our respondents appear to advance the idea of irreconcilability: a divergence between the concept of communicative technology on the one hand and the human body and the self on the other. In other words, the body is perceived primarily as the opposite of technology, being experienced as the home of the self. The current debate on ICTs has revealed that many new technologies are converging on the human body for the purposes of prevention, diagnosis, and therapy, but also for communication, aesthetics, and fashion. This debate also registers a strong tendency to build a rhetorical stance that overestimates the fall of barriers and distinctions between the human body and technology. Within this debate, metaphors merge with arguments, but especially with empirical research data. By contrast, there emerges from this research project a basic distinction, in common sense terms, between ICTs and the human body. Whereas, to all intents and purposes, computers, mobile phones, and the Internet are seen as machines, the human body is only so on a metaphorical level. The metaphor only captures one of its numerous aspects. The human body is by no means contained within the definition of a machine; it merely includes it, as it includes many other images that serve to define it. For our respondents, the computer, mobile phone, and Internet are the product of science and technology, i.e., a human conquest that is described in its component parts and whose historical development can be traced. The human body refers instead to an idea of perfection, which deals with the transcendent: it is the idea of something marvelous that springs from classical antiquity, linked to the concept of wonder, a marvel of the gods, which causes wonderment.

It might be interesting to further specify how these stimuli — the ICTs and the human body/self— are conceptually integrated by our respondents. On the one hand, the ICTs are described in their parts and components rather than in their functions, affordances, and services, as if there were still a static, inert perception of the communicative instruments. This kind of perception is typical of children or novices who, in order to understand what a machine is and how it works (for example, a watch), have to take it to pieces and then re-assemble it. The practice of de-constructing technologies to better understand and define them probably implies that the object is still in the process of assimilation and domestication. On the other hand, the human body is described as a perfect, marvelous, exceptional, beautiful, charming, and unique machine. In particular, the body is perceived as well-groomed, adaptable, functional and dynamic; an instrument for the expression of one's own identity and interests. But it is also perceived as delicate, mysterious, and complex. This complexity is probably due to the fact that its physicality is regarded as the site of life, the soul and well-being, i.e., of immateriality. Thus, it is experienced as something that is not fully understood (mysterious) and so complex as to be delicate to manage. On the whole, the respondents do not appear to acknowledge the convergence of technologies on the human body that is taking place at present both in science and technology and in everyday life. They remain conceptually anchored to a sharp distinction between them.

2. The World of Information versus lie Ambivalent Support of Relationships.

The second factor distinguishes between communication, linked to the mobile phone, with positive (friends, conversations, convenience) and negative features (cost, noise, annoyance); and information, linked to the Internet and the computer, both encountered in the world of work and play. Our respondents perceive the information society as connected to science but also to fun in a world where computers are everywhere. It is interesting to note that, although the Internet is responsible for a great deal of interpersonal communication (for example, e-mail and chat), it is metabolized by our respondents under the umbrella of information. Instead, at the opposite pole, we find the mobile phone as the emblem of communication with friends (conversation: a.c. = I .78, reachable: 2.43) and as a convenient device. At the same time, the mobile phone elicits the importance of brands and fashion. Through these two elements, it becomes a "status-symbol" in our respondents' perception. There is no lack of negative aspects, however: first of all the cost, but also annoyance and noise. Linked to the mobile phone is the cost of reachability, which is a problem for the individual's income. At the same time, the entry of the mobile phone into public space also implies negative features within the interpersonal framework. On the whole, information and communication are perceived as opposite spheres. However, the interconnection and hybridization between the worlds of communication and information have recently led to a specialist debate, while their conceptualization in common sense terms elicits two very distinct spheres. The mobile phone holds a particular position because of the respondents' references to costs, which are not only monetary but also social psychological, especially in terms of inconvenience and annoyance.

3. The 'Material' Self versus Personal and Social Identity.

In this case, the stimulus Myself gives the highest contribution to the factor and brings with it various associations that refer to personal (e.g., nice, shy, moody) and social (e.g., student, member of a group) identity, whereas the human body at the opposite pole is associated with an exceptional, perfect, and delicate machine. It is noteworthy that while the "material" self is seen as a perfect machine, with only positive connotations, the psychological self is regarded as a more fragile element, in which personal and social identity have positive aspects (nice, disposable, sweet, sensible, curious) mixed with negative ones, such as shyness, moodiness, and insecurity. Thus, we might conclude that human beings (or rather, our participants who are young and students) associate imperfection chiefly with the "immaterial."

4. Openness to the World versus Technology for Work and Fun.

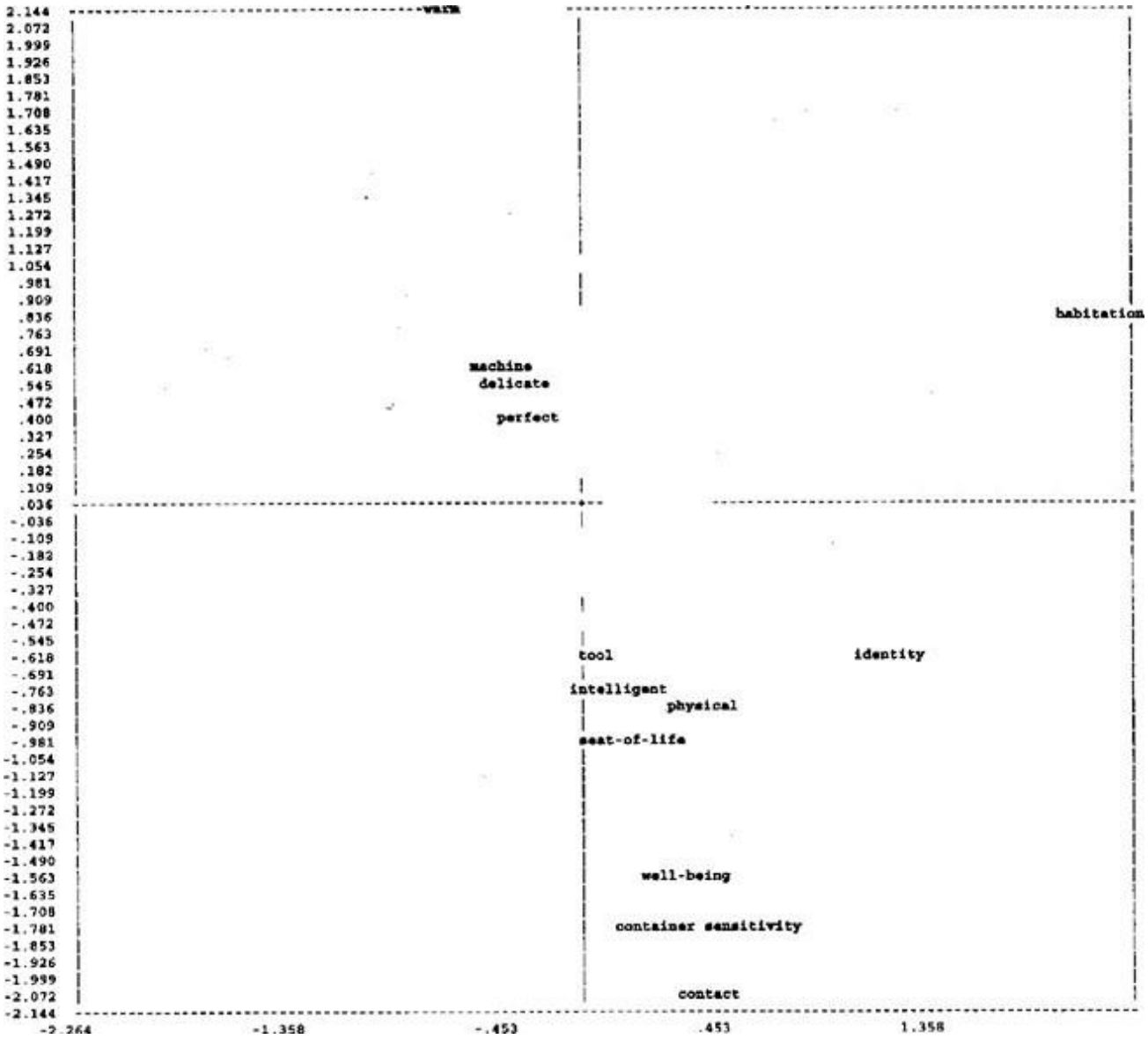
In this case, the opposition is between the Internet and the computer. The Internet seems to be linked not only to information but also to communication. Unlike the computer, communication is seen as specific to the Internet, evidently connected to e-mail and chatting, and it is regarded as having an international and world dimension. By contrast, the computer is considered useful and fundamental, linked both to work and fun, but is also seen as slow and boring. A great help in office life, the computer is particularly useful for writing (not yet for reading). Furthermore, it is seen as important more as software than hardware, as content rather than form, whereas the mobile phone is perceived as having a symbolic and aesthetic aspect. The computer is associated more with its function and performance than with symbolic and aesthetic values, which are attributed instead to the mobile phone — a key device for managing our relationships with others.

While the Aplum procedure enables us to consider the various stimuli together, the Asparm procedure allows us to explore in greater detail, individually, the core stimuli of the analysis — the Internet and the mobile — as well as our "contrast" stimulus — the human body.

The Human Body

To this stimulus 573 lexical forms were associated, 296 of which were distinct ones. After the equivalence and threshold procedures (retaining associations given by at least two respondents), 39 words were obtained, the most frequent of which were perfect (Ill frequencies), machine (51), and unique (36). These words were entered in a 39 x 280 table. Figure 1 show the first and second factors.

Figure 1. The Human Body. Correspondence Analysis: First and Second Factors



The first factor is well represented only at one pole, with the word's habitation (absolute contribution = 79.4) and identity (5.8). These associations were mainly provided by students in Pharmacy, participants with a lower Body Image, and

respondents who do not use a mobile phone or send text messages[4]. The second pole is "naked"; we find in it perfect (1.7) machine (l .0), but with minimal contributions. Based on these associations, the factor might be called: Home of the Self, which is a wonderful definition for the human body. The second dimension presents at the positive pole the terms habitation (11.2), machine (4.2), perfect (3.3), and warm (3.0); and at the negative pole the terms contact (30.0), sensitivity (17.2), well-being (5.5), container (4.2), and seat of life (3.9). The idea of the human body as a Perfect Machines comes mostrly from men, students who uses the PC and the Internet daily, use email weekly, and have a higher Body image. By contrast, the idea of a Means of Contact is mainly given by women, students who rarely use a PC or the Internet, use email either very frequently (daily) or never, and declare a lower Body Image. The gender difference is not surprising, revealing the inclination of women towards contact and relations (cf. Tanner 1990; Wood 2001 An interesting result suggests a U-shaped relation between the use of the Internet as a communicative tool (via email) and views of the human body. Participants who stress the primacy of contact for the human body (the negative pole of the second factor) either use the Internet a great deal (daily) or never. By contrast, those who consider the body to be the perfect cosy "home" of the self-report average use of the Internet as a communicative device.

The Mobile Phone

Participants associated 819 lexical forms with the stimulus mobile phone, 292 of which were distinct, the most frequent being text messages (112 frequencies), communication (48), useful (33), and friends (31). After the equivalence and threshold procedures mentioned above, the resulting matrix 40 x 280 was submitted to a correspondence analysis. The first three factors are considered here (Table 3).

The first factor contrasts descriptive notations (brand names, ring tones, text messages) with evaluative contradictory ones (useless, useful, awkward, stupid, convenient). The former is given mostly by participants who: report medium use of the mobile phone for text messages and conversation; consider it possible to communicate emotions via mobiles; and are students in Psychology. Evaluative comments are expressed by participants who rarely send text messages; never use the mobile phone for conversation; consider it impossible to communicate emotions via mobile phones; reveal lower standards of body care and protection; and are enrolled in Engineering. The second factor counterbalances the ambivalent characteristics of this technology, which we could call "the price to be paid," and the useless presence of brands in mobile telephony. The first pole is characterized by the annoyance that people have to suffer for their reachability; the second features a strong feeling of the uselessness of mobiles brands (but also telephone companies that provide services) and awkwardness, stupidity, harmfulness. From the illustrative variables (Table 3), there emerge various "patterns" based, first of all, on group membership: Engineering students are more likely to see both the positive and negative aspects of the technology, whereas Psychology students are more concerned

with its weaknesses and dangers. It is to note that future engineers, i.e. those who will design and construct the technologies, appear to be keener to see the machine in its ambivalent practical reality, while the future psychologists seem more critical towards

[4] Following Lebart and Salem (1998), only illustrative variables with Value-test>!2! are discussed.

machines, as well as towards the marketing techniques applied to them. Different practices of use are also important in

Table 3. The Mobile: Correspondence Analysis

First factor						
Description				**Evaluation**		
	coord.	**c.a.**	**c.r.**		**coord.**	**c.a.**	**c.r.**
Brands	−2.27	13.4	.19	Useless	4.02	12.9	.21
Telephone companies	−2.78	7.7	.12	Awkward	3.04	7.4	.11
Ring	−1.06	6.9	.13	Stupid	2.94	6.9	.12
Sms	−.47	5.1	.16	Useful	81	6.0	.13
				Fashion	1.06	4.5	.08
				Convenient	.76	3.9	.07
				Slavery	1.10	3.4	.07
Psychology				*Engineering*			
Use of mobile for conversation				*No use of mobile phone for conversation*			
Medium use of sms				*Low use of sms*			
Think it possible to communicate (+/−) emotions via mobile phone				*No (+/−) emotion in communication*			
				Low body care			
				Low body protection			
Second factor							
Pros: The price to be paid				**Cons: A useless impediment**			
	coord.	**c.a.**	**c.r.**		**coord.**	**c.a.**	**c.r.**
Annoying	−1.11	9.6	.15	Useless	5.36	24.7	.36
Reachable	−.74	2.5	.04	Brands	1.89	10.0	.13
				Awkward	3.40	9.9	.14
				Stupid	3.19	8.8	.14
				Telephone companies	2.33	5.8	.08
				Harmful	1.29	4.7	.07
Engineering				*Psychology*			
No mobile phone and sms				*Use of mobile phone for conversation*			
No use of mobile phone for conversation				*Communication of (+/−) emotions via mobile phone*			
No communication of (+/−) emotions via mobile phone				*Low comfort with touch*			
High comfort with touch							

Table 3. Continued

Table 3. Continued.

Third factor						
Practicality				**Status symbol**		
	coord.	c.a.	c.r.		coord.	c.a.	c.r.
Practical	−4.73	21.2	.33	Status-symbol	1.96	8.2	.10
Relations	−3.95	18.5	.27	Awkward	2.68	6.8	.09
Fashion	−1.09	5.6	.08	Annoyance	.56	3.7	.05
Small	−1.65	5.2	.07	Useless	1.69	2.7	.04
Indispensable	−1.19	4.7	.07				
Speedy	−1.95	4.5	.07				
Battery	−1.66	2.6	.05				
Low use of the mobile phone				*Medium or no use of mobile phone*			
Don't often travel				*No positive emotion*			
No use of the mobile phone for work				*Low comfort with touch*			
				Pharmacy			
				Low body image			
				Possess no mobile phone			
				No use of sms			
				Often travel			
				Medium use of the mobile phone			
				Use of the mobile phone for work			

this connection. Participants who do not use the mobile for conversation, and those who do not rely on it to convey emotions mostly mention the reachability offered by the tool (although this is sometimes disturbing); while those who chat and believe that it is possible to communicate emotions through it stress the limits (awkwardness, stupidity, and uselessness) of the technology. An interesting result pertains to the Comfort with Touch subscale of the Body Investment scale: participants with higher scores on it stress the reachability that the means provides (probably seen as a tool-to make contact and thus to help engage in body-to-body interactions), while those with lower scores complain of its uselessness without acknowledging its potential for "keeping in touch at a distance" with their partner. The third factor contrasts the practicality of the technology (practical, indispensable, speedy), particularly with regard to the world of interpersonal relations, to its symbolic (and annoying) aspects. In this case, we again find a U-shaped relation between the uses and views of the mobile phone: the practical and indispensable aspect of the technology is expressed by those who use it at a low level and by those who do not use it for work, while both those declaring a medium/high use and no use of a mobile phone refer to the status-symbol aspects.

The Internet

The Internet evoked 840 words, 280 of which were distinct from each other. After the usual treatment of the words, the most frequent categories being communication (71), computer (66), and information (44), the resulting 47x280 matrix was submitted for a correspondence analysis. The first four factors can be interpreted as follows (Table 4).

First, we find an opposition between a dynamic description and diversified evaluation, the former due to participants with a higher use of the computer and the Internet and of their related functions, the latter with a lower use

Table 4. The Internet: Correspondence Analysis

First factor

Description	coord.	c.a.	c.r.	Evaluation	coord.	c.a.	c.r.
Site	−1.41	11.8	.22	Useful	1.57	11.1	.18
Email	−.87	7.6	.18	Cold	2.31	7.7	.10
Computer	−.70	6.1	.15	Modern	1.58	5.9	.13
Computer-parts	−1.41	5.4	.09	Speedy	1.17	5.4	.11
Navigate	−1.25	4.5	.10	Infinite	1.33	3.9	.08
Chat	−.81	3.1	.07	Difficult	1.23	3.5	.07
				Curiosity	1.18	2.8	.06
				Dangerous	1.45	2.3	.05
Men				*Women*			
Use PC daily monthly				*Pharmacy*			
Use email				*Use PC rarely, never*			
Use email daily				*Use Internet rarely, never*			
Use chat				*No use of email*			
Use Internet daily				*Use monthly*			
Express (+/−) emotions via Internet				*No use of chat*			
				No utility			
Single				*No (+/−) emotions*			
Dates				*Engaged*			

Second factor

Hot	coord.	c.a.	c.r.	Cold	coord.	c.a.	c.r.
Fun	−1.15	5.8	.08	Cold	5.98	62.0	.67
Porno	−1.58	4.9	.07	Work	1.68	4.3	.07
Chaos	−1.11	2.1	.03	Computer-parts	.94	2.9	.04
Men				*Women*			
Pharmacy				*Psychology*			
Use Internet weekly				*Use Internet rarely*			
Low body protection				*High body protection*			

Table 4. (Continued)

Third factor						
Usefulness and danger				**Productivity and destructiveness**		
	coord.	c.a.	c.r.		coord.	c.a.	c.r.
Useful	−1.53	13.0	.17	Chaos	2.93	15.3	.20
Computer-parts	−1.41	6.7	.09	Cold	2.02	7.2	.08
Infinite	−1.39	5.2	.08	Porno	1.65	5.4	.08
Dangerous	−1.86	4.6	.07	Contact-world	1.47	3.9	.06
Modern	−1.15	3.8	.07	Work	1.53	3.6	.06
Colors	−1.75	2.7	.04	Global	.62	3.4	.06
Technology	−.94	2.2	.03	Information	.47	3.2	.07
				Freedom	1.53	2.6	.05
				Hackers	1.45	2.3	.05
Psychology				*Pharmacy*			
Use Internet monthly				*Use PC rarely*			
No use of email				*Use email*			
Express negative emotion				*No negative emotion*			
Often travel				*Don't often travel*			
Use email weekly				*Use Internet daily*			
Never use email				*Use email daily, monthly*			

Fourth factor						
Sex and play				**Study and contacts**		
	coord.	c.a.	c.r.		coord.	c.a.	c.r.
Porno	−2.34	11.5	.15	Time	2.60	15.7	.23
Fun	−1.25	7.3	.10	Chaos	2.50	11.6	.14
Sex	−1.84	4.7	.07	Study	1.87	8.1	.11
Site	−.60	2.8	.04	Computer-parts	1.46	7.5	.09
Sms	−1.54	2.7	.04	Contacts	2.14	4.3	.06
Curiosity	−.97	2.4	.04	Freedom	1.60	3.0	.05
Cold	−1.05	2.1	.02	Far-away-places	1.68	2.6	.05
				Contact-world	1.14	2.4	.04
Men				*Women*			
Pharmacy				*Engineering*			
Use PC for writing and data processing				*Use PC weekly*			
Use PC to play				*No use for writing and data processing*			
Use Internet weekly				*No use to play*			
Use Internet for contacts				*Use Internet monthly*			
Use chat				*No chat*			
Use email daily				*Use email several time a day*			
Don't often travel				*High body protection*			
				Often travel			
				Engaged			

of the PC and the Internet. Second, there is a contrast between the Internet regarded as cold and a mixture of associations such as porno, chaos that make us think of a hot side of the technology. The former is linked with rare use of the Internet and higher scores in Body Protection, the latter with more frequent (weekly) use of the technology and lower scores on Body Protection. Third, two different blends appear that recall some variations on a theme: on the one hand psychologists, participants who rarely (monthly) or never use the Internet and email, and who tend to share negative emotions via the Internet declare its awfulness & danger, on the other, pharmacists, participants using email, and those who do not share negative emotions via Internet mention in double-faced productivity & destructiveness. Fourth, a light versus committed dimension is suggested by associations that refer to sex and play on one the hand and study "d open (or free) contacts on the other. The former is characterized by a medium to high use of the PC and Internet, in its various functions; the latter by a very low (monthly) or quite high (several times a day) level of access to the Internet. This second pole is the expression in particular of students in Engineering, participants who are engaged, and those with higher scores on the Body Protection scale. Moreover, in three of the four factors, gender proves to be an important variable: men are found on the descriptive pole of the first factor, the hot pole of the second, and the sex and play of the fourth; whereas women more often resort to evaluation, mention coldness and refer to study and contacts with the world. Thus, women's perception and views of the Internet would appear to be opposite to men. Although several research studies in the last few years have shown an increasing interest among women in pornography (Asper 1999) and videogames, this is not supported by the present research.

Discussion

From the collected data a rich and varied picture emerges. As regards the information component of the representation, we find that:

a. The Internet, mobile, computer, as well as the other items selected are mostly considered useful, described in their parts, and are less often mentioned in metaphorical terms. On a closer reading, however, several interesting aspects arise, the most striking of which is the ambivalent attitude to these technologies.
b. The Human Body appears to be seen as perfect, wonderful, unique, a splendid "machine", and as being delicate but complex
c. The self-elicits a rich variety of associations, some of them pertaining to social and relational aspects, but most of them referring to idiosyncratic psychological features. It is the element that shows particular fragility with respect to the material part – the human body – which contains it.

As regards the second component, we see that attitude towards the Internet, the mobile phone, and the computer show an overall positive evaluation, with differences in more specific aspects.

The structural analyses aimed at mapping the representational field show a sharp between the description and evaluation of the proposed stimuli. On closer scrutiny, various organizing principles emerge regarding the various stimuli:

Along the poles of the various dimensions, different groups (as regards location, practice, and concerns with the human body) take different positions. Interestingly, some of them trace a highly coherent framework. As regards gender, women see the human body as a means of contact; they perceive the Internet as useful, but also cold,

and mention its use for study and contact with the world. Men, on the contrary, tend to describe various aspects of the Internet, mentioning its "hot" features linked to sex and play. No important difference appears in attitudes toward the mobile phone. As for the faculty affiliations of the respondents, students of Pharmacy show a particular view of the human body and stress the exciting but also potentially destructive facets of the Internet; students in Engineering give evaluations (mostly negative) of the mobile phone, acknowledging the reachability it provides for its users, and stress the expansion of time and space as a result of the web (linking the Internet to study and contact with the world); students in Psychology mostly describe the mobile by emphasizing its negative features, as well as showing some concern about the nvofold nature of the Internet as both useful and dangerous.

Another interesting point is emotional investment. Investment in the human body shows some interaction with the participants' view of the body itself (considered a perfect machine by individuals with a high body image, but a means of contact by those with a low body image). Regarding the mobile phone, its role of reachability is acknowledged by those with a high degree of comfort with touch in interaction, while those less at ease with touch consider the mobile a useless impediment. As for the Internet, participants with higher body protection stress the cold side of the technology, and its usefulness for study and contact with the world; while those with a lower score on that factor mention the "hot" side of the web.

A scrutiny of the other illustrative variables examined indicates that different practices play a considerable role in the representation of ICTs. A medium level of use is often linked to a richer and more detailed description of ICTs, while both rare and very frequent use led to (ambivalent) evaluations. The different ways in which the technologies are used (for work, play, making contact; through text messages, email, data processing, information gathering...) also play a role, indicating different positions and views on the topics investigated in relation to the respondents' various practices.

Conclusion

The theoretical framework and methods we proposed appear to be appropriate for exploring not only the uses, but also the images of and attitudes towards ICTs. Our findings make a contribution to the broader study of the social representations of ICTs, providing interesting considerations on how they are evaluated, judged, and described. More recent data (Confarello et al. 2004), however, show that the picture is changing fast, thus increasing the need to monitor this active phase in the development of ICTs and their perceptions (Flick 1995).

In light of our findings, the answers to our initial research questions can be summarized as follows:

a. Though rich and varied, "social thought" does not seem to have integrated at a conceptual level the ongoing process of convergence between the human body and the technologies. This is perhaps because of the emergence of a clear opposition between the human body and the technology. There are neither straightforward rejections, nor great enthusiasm as regards this invasion of the body by the inorganic. The very existence and development of this process are going unnoticed by our respondents, but this is perhaps due to their youth.

b. The net distinction between communication and information, perceived as distinct and opposite spheres, is another striking result, since information and communication are certainly merged on the Internet and in the mobile phone.

The fact that this hybridization is not perceived may be because the process is very recent. Alternatively, it might mean that young people are unaware of the convergence between these communicative spheres. Further data are needed in order to clarify this issue.

c. Lastly, this research project confirms once again the positive attitude towards technologies on the affective plane, although there is some concern as to specific devices. The Internet is perceived as having a twofold nature: work and play, hot and cold, science and chaos. The mobile phone is associated with a rising "price-to-be-paid," both because of the pointlessness of mobile-phone brands and the way it disturbs social space.

Further research is required using broader samples from different age groups, and educational and social contexts, as it is still unclear whether the youth of our respondents is affecting their answers or whether the "social thought" we have attempted to give voice to is süll at an early stage of elaboration.

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