Social Psychological Influence of ICT's on Society and their Policy Implications

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VOORWOORD

Vanuit verschillende wetenschappelijke disciplines is de afgelopen jaren onderzoek gedaan naar de mogelijke structurele veranderingen in de samenleving door het toenemend gebruik van ICT. Infodrome heeft afgelopen zomer een aantal wetenschappers uitgenodigd om vanuit hun eigen discipline dergelijke studies in kaart te brengen en om aan te geven wat de bevindingen betekenen voor de rol van de overheid in de informatiemaatschappij.

Dit heeft geleid tot vijf overzichtsartikelen: recht, sociale psychologie, culturele sociologie, economie en genderstudies. Hieruit blijkt dat de nieuwe ontwikkelingen zeer wezenlijke vragen voor de overheid oproepen. Deze vijf studies hebben tot doel om de politiek en beleidswereld te informeren over de stand van wetenschappelijke kennis over de informatiemaatschappij en dienen tegelijkertijd als input voor het programma van Infodrome.

De studie van Russell Spears en Tom Postmes e.a. geeft een gebalanceerd overzicht van wetenschappelijke inzichten op het gebied van de sociale psychologie. De belangrijkste bevinding van de studie is dat vele informatie- en communicatietechnologieën verschillende en soms zelfs tegengestelde effecten sorteren. Door een volledig en nauwkeurig overzicht van de invloeden van ICT op de maatschappij te geven ontkrachten Spears en Postmes e.a. veel van de moderne mythen en sagen van de informatiesamenleving, zoals bijvoorbeeld dat ICT sociale cohesie zou ondermijnen of asociaal gedrag zou bevorderen. Op basis van hun gebalanceerde uitspraken op velerlei terreinen, zoals tweedeling, politieke participatie, onderwijs, enzovoorts, komen de auteurs uiteindelijk tot een aantal wezenlijke beleidsimplicaties en -aanbevelingen.

Bovenstaande en andere vragen over de identiteit van individuen en gemeenschappen in het digitale tijdperk worden behandeld in onderhavige sociaal-culturele studie. Infodrome hoopt hiermee uw interesse in de sociale gevolgen van ICT gewekt of versterkt te hebben. Bent u op zoek naar meer leesvoer of wilt u meediscussiëren over het onderwerp, kijkt u dan op onze website www.infodrome.nl.

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EXECUTIVE SUMMARY

This survey reviews the social-psychological effects of the new information communication technologies (ICTs). Although ICTs are increasingly a part of everyday life, its social consequences ICTs are invisible or unknown to many. Nonetheless, knowledge about this topic has accumulated over the past two decades. The importance of a survey of this literature is (a) to describe some social-psychological consequences of ICTs (b) to explain why these effects occur, and (c) to suggest the best ways of dealing with the social opportunities and problems that arise as a result.

It quickly becomes clear ICTs do not have simple and straightforward effects in the research we surveyed. Many of the features of these technologies have multiple effects, often contradictory ones. Indeed, a recurring theme of this survey is that it is problematic to talk of generic features or effects. Nevertheless we can delineate the following 'net effects':

1. *Social cohesion, isolation, exclusion* It has been argued that "the internet is a socially connecting device that's socially isolating at the same time." Indeed, social effects of the internet on interpersonal attraction and social cohesion are mixed. Some research has shown that ICTs threatens existing social relations. Other research suggests ICTs sustain existing relationships and help building new ones. Similar issues resurface in the literature on groups and larger social organisations: New virtual communities emerge and existing social structures are strengthened according to some studies. Conversely, other studies have shown that ICTs fosters individualism, and social exclusion of less powerful sectors of society. In short, there is evidence that ICTs sometimes promote social cohesion and sometimes erodes it. Indeed both occur in parallel and in different ways.

2. *Social norms and antisocial behaviour* Similar to the social cohesion outcomes of ICTs, some studies have suggested that ICTs diminish normative behaviour (leading, in the extreme, to antisocial behaviours such as hacking), whereas other evidence suggest that anti-social aspects may be overstated. In fact, much of the research suggests that ICTs foster normative behaviour and behaviour that is not necessarily of a different nature or order to that outside of ICTs. However, the internet does provide new possibilities and powers that mean that the effects of cyber-sabotage (for example) can be wide-ranging and consequential.

3. *Identity manipulation and self-management* One of the much-lauded features of the web is that it allows people to manipulate and play with their identity, suggesting that "the internet is *the* identity technology." However, this possibility can be easily overestimated, idealised or romanticised. In fact, recent research reveals that people online are more likely to use the opportunities for identity-manipulation provided by the internet to present what they see as their "real" selves, rather than to dissimulate and escape everyday identity.

4. *Power and politics* The developments of ICTs provide new freedoms with political implications. The survey shows social psychological effects of ICTs have important political implications. At the macro level, the power of the net to transcend not only locality but also nationality provides new freedoms to the users, but also to the owners of technology and websites. At the micro level there are benefits from anonymity in breaking down social barriers.

However, there is also evidence that these barriers evident in the real world are not eliminated, but sometimes are reproduced and accentuated in its virtual counterpart.

5. *Cognitive consequences, mental health, addiction* The use of ICTs also raises issues of their direct psychological and physiological effects on health and well being. Once again, research evidence is mixed. On the positive side, the internet is a realm for enlightenment, social support, and self-help. On the negative, there are hazards for mental health due to cognitive overload, uncertainty and boundlessness.

6. *Education*. Although the use of ICTs in education is much applauded (and we do not dispute its necessity), research has shown problems with implementation and uses in educational practice. Some of these problems occur if opportunities of ICTs for collaboration are ignored, when tools provided are inadequate, or when students and staff are poorly trained. As a result expectations of increased achievement with ICTs in education are often not met or, even worse, the quality of education may deteriorate.

7. *Work and organisations* There is mixed evidence on whether ICTs have increased productivity or innovation. Organisations tend to view innovation as an end in itself, without always making a careful analysis of the gains and pains of ICTs. As a result, organisations are frequently disappointed with the effectiveness of their investments. These macro-level observations generalise to *in situ* effectiveness of specific tools used in organisations, such as groupware, group decision support systems, and intranets.

8. *e-business, e-commerce, and entertainment* In this domain, the internet has clearly been effective and is fast adding to as well as replacing other traditional domains. It has simultaneously accelerated the twin trends to globalisation and individualisation in the consumer society. From a social psychological angle, the power of rumour to affect reputation increases the power of the individual to affect global markets, while introducing a new instability to these markets' behaviour.

These net effects question raise some *theoretical concerns*. What this survey illustrates is that 'simple' theories, which over-generalise ICTs' social effects, are not well placed to describe and predict the diverse social effects observed. Two kinds overgeneralization are common: many theories are singularly optimistic or pessimistic about technology (utopian vs. dystopian). Also, theories tend to assume that ICTs' effects are due to characteristics of the technology, or that these are constructed by social factors (technological vs. social determinism). For the interested reader, the survey provides an extensive discussion and critique of these theoretical perspectives. In short, the diversity of social effects preclude that technology is singularly good or bad, and that technology determines the social effects. Conversely, social determinism cannot account for invariable technological effects: not every use of ICTs is as flexible as these theories claim. Moreover, social determinism often is relativistic, which restricts its powers of prediction and practical use.

Thus, a theory of the social effects of ICT must emphasise that the use and effect of the new technologies are *co-determined* by technological features (anonymity, isolation, asynchrony) and social psychological factors (identities, social

relations and social practices). The instantiation of technology can not be understood without knowledge of the people using it and the contexts of its use.

Grounded in a theoretical perspective on explaining the diverse empirical results, we come to some principal conclusions about the social-psychological effects of ICTs:

1. *Don't believe the hype* The first general conclusion is that it is misleading to draw *general* conclusions about ICTs at all. The same ICT may have different effects in different circumstances, and in the same circumstances we will find different social effects with different ICTs. ICT has no generic effects: features of the technology (e.g., anonymity, isolation, asynchrony) combine and interact with social features (culture, norms, identity, task). Moreover, media are populated by people, and people are not created by the media: they use it for a range or reasons arising from their everyday lives. The temptation to generalise is understandable, given the tremendous hype surrounding ICTs. However, generic statements about the effects of technology are a common danger in evaluating new media.

2. *Beware evaluative closure and determinism* Closely related to this first principle are its specific forms, such as the tendency to overemphasise the positive or negative consequences of aspects of the technology (utopian versus dystopian visions), or to emphasise the driving force as either technology or society (technological versus social determinism). These tendencies are oversimplifications: ICTs offer many possibilities but they are unlikely to form either panaceas or plagues.

3. *ICTs are not "less social"* The notion that ICTs such as CMC and the internet are less "social" media is something of a myth. Research and theory suggests that these media can sometimes be *more social* in important ways than FtF communication. This has implication for two major assumptions that plague research, namely that ICTs a) undermine social relations, and b) foster anti-normative and asocial behaviour. Our review suggests that neither of these concerns is well grounded. Social and group identities take on a renewed importance in the network society, partly as resources to resist the de-individualising and alienating tendencies of ICTs. People *need* social structures, and they re-create and create them in the virtual world.

4. *ICTs add to rather than replace existing technology and social arrangements* Related to the previous, ICTs do not generally replace or threaten either existing technologies of communication, or the social relations in which these are embedded. Rather, social factors and earlier communication technology form a context in which the new technologies are embraced, shaping their use. Indeed, technologies that build on existing social arrangements tend to be more successful than those that do not.

5. *ICTs affect power and potency* While it is problematic to associate ICTs with specific effects, it may be true that they increase their *potency*. First, research has shown that the impact of various aspects of social identities (e.g., status, gender, age, race, nationality) is sometimes accentuated in ICTs, making them more influential. Second, the internet offers unprecedented access to information, which can be empowering to those with access. This can have positive and negative effects (e.g., medical self-help vs. bomb-making). Third, the internet offers new powers in terms of the willingness to share knowledge, the ability to reach others, to organise, to resist powerful authorities, and to

undermine the very medium itself. Conversely, ICTs can be used for surveillance and monitoring by the state and commercial organisations.

Going beyond these conclusions, we draw the following policy implications and recommendations from this survey:

1. *Social division and social exclusion* Where divisions become accentuated (race, gender, and age) by communication technology this gives cause for concern. The problems of the future are better anticipated now in education and other domains: Policy needs to bridge digital divides by focusing resources and opportunities on the disadvantaged in the network society. Left alone the gaps between the advantaged and deprived sectors are likely to become accentuated by uneven access to and use of these new technologies.

2. *Identity* Perspectives on identity need to change. People are not mere individuals, nor are they rigidly categorised (or stigmatised) as in the days of the 'verzuiling'. Instead, ICT reinforces the flexibility of individuals to take on *different* social identities. It is important to question the idea of "homo economicus", the idea that we are fixated at the individual level of self-definition, acting on the basis of individual interests. The open source movement is a good example of they types of identity-based collective behaviour that ICTs have fostered which transcend self-interest. The survey shows that people often act for the good of a group or in terms of a common ideology, but that they flexibly shift their group affiliations from context to context. Thus, while patterns of social identifications are complex and changeable, taking the collective motives of people into account is a prerequisite for dealing with collectives on the internet.

3. *Political participation* ICT is increasingly used for grassroots organisation. Technology will serve as a platform for collective/civil action, and in this capacity it surpasses the somewhat narrow conceptions of ICT as a carrier of information. This stands in contrast to the governments' present initiatives of electronic democracy (top-down models of 'inspraak'). Bridging the divide between the grassroots initiatives and electronic democracy are an opportunity and necessity for increasing future contact between governments and people who are willing to play an active role. Being connected to the net is likely to be an important feature in participation and citizenship at the supranational as well as at the national level (the European Community).

4. *Mental health* It is not easy to limit access or use of ICTs where these are causing problems for mental health (stress, addiction). However, the government can provide information to warn of the dangers of overuse, particularly directed at parents and educators, and even integrate this on-line. In addition, the government could play an active role in stimulating the development of high-quality content. Codes of practice, especially in work environments, may help to guard against the dangers of overuse and overload.

5. *Education* Going beyond the issues of access through education addressed in (1) above, there is the question of how ICTs can facilitate education. More research is needed in the context of learning with the aid of computers. The challenge for this research is to provide concrete guidelines to shape design of ICT environments for collaborative learning: evidence suggests that targeted design will be more fruitful than the present practice transposing existing ICTs into the realm of education.

6. *E-commerce, e-business* The volume of commerce on the internet, and the difficulty of policing this domain, raise issues of consumer and business protection. Awareness of client profiles and the social psychology of marketing and consumer behaviour will acquire increasing importance. Social psychological factors such as perceived trust, security, privacy issues and identity concerns will need to be analysed and taken into account at the policy level. At the same time government has to be sensitive to how these developments will affect existing social arrangements and communities.

7. *Surveillance, security and privacy* We live increasingly under the scrutiny of CCTV and private personal information becomes increasingly public (databases on economic activity, creditworthiness, etc). Protection of civil and citizens rights is therefore a major concern, especially because legislation has barely kept pace with the technological changes. Social psychological research highlights some of the adverse effects of surveillance technologies, suggesting that increasing visibility is not the best way to prevent crime. However, surveillance of the internet may be necessary to monitor and challenge extremist activity.

1. INTRODUCTION AND OVERVIEW

In this survey we review the effects of the new information communication technologies (ICTs) on the individual and society, with particular emphasis on the social psychological dimensions of their impact. The changes in society brought about this information revolution are undeniable. A recent survey in the Netherlands indicated that 64% of people found communication on the internet as normal as reading (NOS, 2000), and the Minister for Education recently announced the provision of email for children from the age of eight. Such dramatic social changes demonstrate that what some have called the virtual society is increasingly a reality of everyday life. Much less well understood are the specific social consequences of the ICTs. For example, do these new media signal the breakdown of social relations, as producing a fragmented and divided society, as some have proposed? Or do they provide a panacea for to a more egalitarian society transcending intergroup differences and divisions, as others have claimed? These issues and many others are the subject of hotly contested debate. A social psychological analysis of the effects of ICTs tries to answer such questions of interest to the public and policy makers alike. The importance of a this approach is to describe the effects that these technologies have on us, and on our behaviour, especially in relation to others. This approach promises to explain why these effects occur, and to suggest the best ways of dealing with any social problems that arise as a result. The positive and negative consequences of these technologies invite special attention from a social psychological viewpoint, precisely because of the potential severity of the social and psychological impacts. A social psychological approach has particular relevance for a number of issues of general concern. These include (among other things) the role of social influence both "in" and "of" ICTs, the forms of self-definition and social and economic organisation that these technologies support or promote, and public reactions to these new technologies. Although the information revolution has been so fast as to leave research aimed at understanding its effects in its wake, researchers have also begun to wake up to the importance of these issues. A research explosion of these issue has started to flow. In sum, the social psychological consequences of ICTs are at the centre of the debate about their social impacts generally. Even where their effects seem to have more direct implications for other domains (e.g., legal issues of privacy, economic questions of e-commerce), where these have implications for social behaviour, they invariably have a social psychological dimension.

The survey is structured according to the following headings:
1. ICTs: Forms and features
2. Net effects: Themes and domains
3. Explanation and analysis: Theories and metatheory
4. Implications: Relating effects and theory to policy and practice

We begin with a brief overview of what the ICTs are, followed by a short analysis of the features that they have that distinguish them from other media and face to face (FtF) communication in particular. We then provide a more detailed analysis of the social effects of ICTs, with particular emphasis on the social psychological dimensions and implications for society and social relations. In the third section we move to a more theoretical level of analysis and examine how social psychologists have tried to understand and explain and the effects of these com-

munications media in terms of underlying processes and mechanisms. Finally, in the last section we draw things together by summarising the general principles and lessons that emerge, before proceeding to suggest concrete implications for policy and practice.

1.1 ICTs: forms and features

Here we briefly describe some of new communications technologies ICTs (their forms), and the features these technologies have that distinguish them from earlier communication forms. The social effects of these forms and features are further elaborated in the following section.

1.1.1 Forms

The new communications technologies considered in this survey include the internet, together with "intranets" and "extranets" (more circumscribed systems of communications usually restricted to a particular organisation or institution), which make use of email or computer-mediated communication (CMC). While the World Wide Web has been hugely popular for some time, it is only more recently that it has become a site for interaction. In its original incarnation, the Web served as a powerful way of accessing and linking documents. Web sites can now support both asynchronous and synchronous communication. Through the use of various software tools, web sites can host asynchronous discussion groups as well as real-time text chat.

Various kinds of media are increasingly being integrated. New uses of television that involve interaction between the consumers both of programs (as in web TV/Radio, multiple/digital channel TV, customised TV), and also products (as in tele-selling and TV shopping) can also be considered as part of the broader developments covered under the internet that share many of the attributes of this medium. Applications such as web TV and radio do not replace more conventional means of communication, but it is becoming ever more difficult to distinguish between them. Moreover, a variety of systems allow viewers to access the world wide web and read and write e-mail on their television sets without the use of a computer.

The use of software to support communication and decision making within groups and organisations (GroupWare, to allow individuals to share applications; Computer Supported Co-operative Work, to collaborate on tasks; Group Decision Support Systems, to support such collaboration) are also important new developments that employ electronic text-based communication. The integration of these communications media with intelligent software systems (as in GDSSs) is also a growing feature, reflecting the increasing integration between communication and tools/technology. Communication features associated with the internet, or the internet itself, have also penetrated commerce and finance markets (e-commerce, share dealing) transforming these domains. Electronic communications technologies have also been introduced into the work domain (teleworking) and the educational realm (distance learning, the virtual classroom).

The use of mobile telephones add a new dimension to earlier forms of this medium, not just in terms of the mobility of the user, but also through connections to fax, email and the internet (e.g., through WAPs: Wireless Application

Protocols; IP phones: internet Protocol phones). New forms of communication can have a visual dimension as well as being text-based text (e.g., SMS: short message service) or voice based. On-line video is increasing a part of both Intranets and the internet, and will increasingly become part of interpersonal telecommunication (videophones).

Video and closed circuit television are growing features of everyday life as part of the surveillance and security systems used in public as well as private spaces. The activities of people are increasingly recorded not just through explicit surveillance but also through automated and informationalised financial transactions and consumer behaviour (credit card use, e-commerce).

1.1.2 Features

These technological advances have a range of *features*, which in turn signal a range of social changes. These features are not uniform or homogeneous, and their social effects even less so as is discussed in detail further below. In fact, as we shall see a recurring theme of the features and effects of these new communications technologies is that these often appear to be "contradictory" in the sense that they often imply apparently opposite tendencies.

A common characteristic of these technological tools, is the shift from *information* to *communication*. Whereas ICT use and design in the 70s and early 80s reflected a concern with information, it is increasingly the case that the power of the modern ICTs (in terms of intensity of current use, the popular growth, and the continued attraction for users) is its capacity for communication. This emphasises the importance of social functions and social psychological analyses. As such we argue that the explanation for ICTs current popular boom resides more with the communication side of these media rather than merely with their information side.

An overriding feature of these new technologies is that they allow communicators to transcend the limits of time and space in new ways. They allow for *instantaneous* communication (as in synchronous text chat on the internet or ICQ). They also enable *asynchronous* communication (as in email, SMS, voice mail) allowing people defer responses, reducing the significance of time differences in communication. The collapsing of traditional limits of space/time mean that space is becoming far more integrated while remaining territorially fragmented. Within the internet places seem to be 'out there', and yet do not exist beyond the digital code and metaphor/human construction. Moreover, because it does not exist in a particular place, the internet does not readily come under the jurisdiction of any single state.

Communication is more distributed and widely available: we can reach more and more people. The "global village" also means that there are greater levels of *standardisation* and fewer local differences. The internet can have a profound impact as a means of cultural transmission, potentially homogenising culture and cultural experience and undermining local differences. On the other hand communication can be highly *personalised* and targeted: we can reach virtually anyone from any place. Standardisation and personalization are sometimes combined, as in use of personal information for approaching potential clients in personalised forms of address. As well as reaching a wide range of people, the use of databases and profiles allows for the increasing segmentation and targeting of specific audiences. The global village is not a one viewing a common screen, but

it is a society increasingly fragmented and individualised by customisation, not only in the way individuals approach the services it provides, but also in how the services approach them.

The new networked forms of communication allow for greater *connectedness* that transcends traditional boundaries, but at the same time reinforces aspects of *isolation*. Individuals and organisations increasingly participate in new forms of social networks – via the internet or intranets. When 'enough people' carry on these relationships in virtual reality with 'sufficient feeling', and for a 'long enough' period of time, 'virtual communities' emerge that are only accessible via a computer screen (Rheingold, 1993). Virtual communities may resemble real-life communities in the sense that support is available, often in specialised relationships. Observations of such groups suggest that many online interactions are what Wireman (1984) calls 'intimate secondary relationships': informal, frequent and supportive community ties that nevertheless operate only in one specialised domain (Wellman & Gulia, 1999, p. 181).

ICTs provide a form of communication that is in one sense more mediated and less direct, for example than real time face to face communication. On the other hand, in another sense these communication technologies can be seen as allowing for more direct and unmediated communication in the sense that they by pass gate-keepers, third parties, mass media and are more individually targeted and personalised.

Another paradox of the internet is that whereas it has the power to *connect* people in unprecedented ways, those who are not able to use it will likely become further *excluded* and alienated. Although writers have celebrated the "triple A" of access, affordability and anonymity (Cooper, 2000), access and affordability cannot be taken for granted for all sections of society. The skilled and the educated will also have privileged access to but also within the ICTs. An important question then is to look at the groups in society and the regions of the globe that are included and those that are excluded, not only by access to the ICTs, but also to the opportunities that flow from this.

The developments in telecommunications and increases in bandwidth mean that visual and audio transmission will also increasingly extend the possibility for people to communicate "face to face" (FtF) at long distance. However, an important feature of email and the internet is the relative *anonymity* of this medium compared to face to face interaction, allowing people to hide their identities or present alternative ones. On the other hand, the traces that we leave in informational systems mean that despite this anonymity we are increasingly known to these systems and those who have access to them (Gandy, 1993). This results in the paradox that although users may often feel more anonymous, they actually become more *identifiable*, traceable, and open to surveillance. Although digital information has an *ephemeral*, disposable ("virtual") quality (e.g., in comparison with ink on paper), it also has a resilience and *permanence*: it is hard not to leave traces in the informational society, and the evidence is not localised but widely distributed in the system. These possibilities focus renewed attention on the consequences of anonymity and identifiability and show these properties combining in new ways (e.g., anonymity with co-presence, identifiability with isolation).

A closely related theme is the increasingly blurred distinction between *public* and *private* spheres the information age. Traditionally these have been clearly separate domains. However in the age of the internet they can be come closely inter-

twined and even confused. We can engage in quite intimate interactions with strangers from the privacy of our homes. Intimate personal conversations are conducted on mobile phones in public spheres (on the train, bus, in the street). Highly personal information is displayed for all to see on self-made homepages. CV's are put into databanks on the internet where companies can have free access to them, and private emails can be relatively easily traced and opened by hackers. This may lead to new conceptions of what exactly 'private' as opposed to 'public' means. Laws need to take account of these new possibilities in relation to privacy (Raab, 2000).

Another important feature of the new communications media is the explosion of accessible information: the internet provides a virtually infinite resource with few limits. The proliferation of other media (cable, digital TV) as well as communication opportunities (email, mobile telephone, voice-mail, etc.) means that we have unprecedented access to useful knowledge. We are also being bombarded more than ever before by information, much of which may be irrelevant and unwanted (home pages, junkmail, spam). However, because of increasingly sophisticated segmentation, targeting and customisation, much of this information, even when it is not actively sought, is likely to be relevant to our interests and needs. The internet therefore provides an environment of potential *information overload* exacerbated by ambivalence towards this information.

We are also likely to entrust in others for the range of transactions we conduct over the internet, fax and so forth. The replacement by interpersonal relations in the provision of services with automatic and informational ones (self-help on the web, e-commerce) provide the capacity for greater anonymity and discretion. However, they may also reduce accountability and require greater trust as a result. Trust is necessary to ensure the propriety of transactions that are less visible and interpersonal than before, to guarantee that personal or consumer information is not misused or exploited. These media therefore make us more dependent on technology, and require that we defer aspects of control to others. These are some of the most important features of the new communications technologies which clearly have implications for society and the users of this technology. Although some clear themes can be detected in analysing these features, these often have a double edged, even contradictory character. A recurring theme of this review is that it is therefore difficult to talk of generic features, and this is likely to be no less true of the social effects generated. An important part of our argument will be that effects of ICTs have to be looked at in context, in terms of specific task features, identities, goals and so forth. Before we turn to a theoretical analysis of these issues, however, we first review the range of effects that have variously been documented in the literature, that have been associated with some of the technologies and their attributes introduced above.

2. NET-EFFECTS: THEMES AND DOMAINS

We now consider the social-psychological effects of ICTs by examining how these technologies and their features impact in a number of areas of social and mental life, on feeling, behaviour, and forms of organisation. In order to understand the policy implications we need a clearer understanding of what these effects are. In this section we provide a representative review of these effects, structured according to a number of important themes that have emerged (specifically relating to questions of social cohesion, antisocial behaviour, power and politics, identity, and consequences for mental health), and also key domains in which the implementation of ICTs are of particular interest for policy makers (education, work/organisations, and business/commerce). We consider these themes and domains in turn, and stress both positive and negative social and psychological effects of the technologies where these have been highlighted by research. In the subsequent section we then consider attempts to integrate these research findings within theoretical frameworks that try to specify underlying processes, and thereby promise to provide a basis for explanation and prediction of the effects obtained. Finally we turn to the policy implications in the final section.

2.1 Social cohesion, isolation, exclusion: connectedness cuts both ways

> "The internet is unlike anything we have seen before. It's a socially connecting device that's socially isolating at the same time" (Greenfield, 2000).

This quote expresses one of the basic paradoxes of the internet, and the networked society in general. Although email, the internet, and related technologies allow people who might not otherwise be so to get connected, this possibility simultaneously highlights their physical separation. The question therefore arises of whether these communication forms facilitate social contact or actually reinforce isolation. A recurring theme of the new communications technologies concerns the notion that the isolated and dispersed communication, associated with email and the internet in particular, can affect existing social relations in critical ways. Some scholars have argued that the internet actually facilitates social relationships by overcoming limits of geographical isolation, isolation caused by stigma, illness, shyness lack of mobility and so forth (e.g., Katz & Aspden, 1997; McKenna & Bargh, 1998; Rheingold, 1993). Others have argued that it can have deleterious consequences by cutting people off from the "genuine" social relationships in their offline interactions (e.g., Stoll, 1995; Turkle, 1996; Kraut et al., 1998). There is also a need to look at how the internet can promote new kinds of relationship "which assist rather than obstruct… attempts to make sense of a world in which the most intimate and the most distant have become directly connected." (Slevin, 2000).

There is a long history of research predating the advent of the internet on how restricted channels of communication with narrow "bandwidth" can reduce the degree of "social presence", and therefore provide less basis for social attraction and cohesion (Short, Williams, & Christie, 1976; see theoretical section for more details). This tradition has had a strong impact on evaluations of CMC and has led to a general conclusion among many researchers that the CMC and the internet is less social, or at least less well equipped to support socially rich

communication than broader bandwidth communication channels. One dominant concern, then, is that the nature of the system, in terms of isolation and the impersonal aspects of the medium, will lead to a weakening of social ties. Time spent communicating on the web may be less time spent communicating with family and friends in our local environment. Closely related to this point (but distinct from it) is the issue of whether communication using these media forms an adequate substitute for face to face (FtF) communication. Unfortunately conclusive research addressing these issues has been limited although empirical studies are starting to emerge. This research has produced a mixed picture of both the beneficial and deleterious consequences of the internet.

On the more critical side, Kraut, Kiesler and their colleagues (1998) concluded in their "Homenet" study of a large and diverse sample of participants, that using the internet tended to result in less social engagement and poorer psychological well-being. The picture that emerges from this influential study is of the communicator forsaking the strong and more important social relations of the everyday face to face world ("strong ties") for more trivial, impersonal, ephemeral contacts made on the internet ("weak ties"). Thus ironically greater connectedness may lead us to neglect our more central social relationships. In a later section we also address some of the dangers of addiction to the net, that this technology might actually compound some of the dangers of social isolation to those who are vulnerable to this.

Other commentators have contested these recent findings both in conceptual and empirical terms. For example McKenna and Bargh (2000) question the interpretation of the Kraut et al. study and also aspects of its methodology. Ethnographic studies and surveys suggest that the internet can be used to enhance social contact and well being (Jackson, 2000). These mixed findings raise some questions about the conclusions of the Homenet study. First, there is the question of whether social relationships developed over the internet do necessarily reflect "weaker ties" than those developed in our FtF lives. Sometimes this seems to be almost assumed rather than proven (see further below for a critique of the assumption that the intensity of social relationships necessarily lies in physical contact or proximity). Much research suggests that email communication can be a medium that is not necessarily confined to superficial relationships. Indeed many people develop lasting personal relationships on the one that are later followed up in FtF, often leading to stable relationships and even marriage outside of the web (e.g., Lea & Spears, 1995).

Moreover, some have argued that communication using email or on the web can be *more* intimate than FtF, precisely because of its anonymity. It can lead to deeper and more meaningful contact because people are not evaluated according to superficial physical characteristics that are so important as gatekeepers in FtF social attraction (McKenna & Bargh, 1998). In short, it may be a better medium to present the "real" self as well as the ideal self (see Rutter & Smith, 2000). For such reasons, Walther (1995) has proposed that this medium can actually be "hyperpersonal" – that is an even more personal medium than FtF interaction. This is also true of the telephone, originally devised as a rather impersonal business medium (Fischer, 1992). Today the social use of mobile telephones probably outweigh their business uses making it difficult to think of this as an impersonal medium of superficial contact. In short, there are reasons to question whether the social relationships or social solidarity formed on the web and with other new communications forms are necessarily less intense or important than

those following from FtF interaction. Moreover, evidence suggests that this unlikely to be an "either or" situation – these two domains often complement and feed into each other. The web can form a meeting place where more long-term FtF relationships and friendships start, and also provide a means for seeking social contact in the locality as well as making long distance contacts.

Perhaps even more fundamentally, there is the question of an evaluative bias against weak ties, and whether these should be seen as "worse" in blanket terms. There is considerable evidence of the usefulness of accessing new information, and getting aid from weak ties on the internet rather than from strong ties (Constant et al., 1996; Garton & Wellman 1995; Harasim & Winkelmans, 1990). The willingness to communicate with strangers online contrasts with non-virtual situations where bystanders are often reluctant to intervene and help strangers (Latané & Darley, 1970). Even if an online request is to a newsgroup and not to specific person, as far as the recipient knows, he or she may be the only one available who could provide help and may feel compelled to do so. Yet such online assistance will be observed by the entire newsgroup and positively rewarded by its members (Kollock & Smith 1996). A lack of status or situational cues can also encourage contact between weak ties. Online and offline, weak ties are more likely than strong ties to link people with different social characteristics. Such weak ties are also a better means than strong ties of maintaining contact with other social circles (Granovetter, 1973). The accumulation of small, individual acts of assistance or co-operation can sustain a large community because each act helps perpetuate an image of generalised reciprocity and mutual aid. A prime example is the occurrence of mp3 (music track)-swapping over the internet. People join internet-based communities to download mp3s from total strangers and will give access to their own hard discs to members in the community. Following the principle 'the person I helped may never be in a position to help me, but someone else might be', mutual swapping can prosper and sustain a large community.

One of the virtues of the virtual world is that this domain gives people the freedom to seek the social contacts that fulfil their needs, and preferences, rather than these being predetermined by locality or kinship. Historically we have been restricted to the social networks in which we are physically located such as the family and the local community (Slevin, 2000). The new communications technologies permit us to transcend these boundaries of space and therefore to customise our social networks much in the same way we can increasingly customise entertainment choices. Whereas this may mean spending less time interacting with family and the local community, this can also mean more time interacting with others of choice. This may weaken proximal ties, but it can strengthen more distal ones. The evaluation of whether this is good or bad may ultimately be a question of ideology. It may mean undermining the strong ties within the family, which may be problematic from the viewpoint of 'family values'. However, these new social relations may also form the basis for breaking down artificial boundaries in society (class, race, gender) that can be divisive. In short it help to integrate, and increase choice in social as well as commercial and entertainment domains.

The question of whether the internet actually threatens strong ties by replacing them with weak and trivial ones can also be questioned in empirical terms. The research by Kraut et al. tended to focus on particular forms of technology (e.g. IRC) that promote rather superficial social contact. However, much depends on

how a communication technology 'shapes the balance of strong and weak network ties that people maintain' (Wellman & Gulia, 1999; Kraut et al., 1998). Generally, Kraut et al. argue that strong personal ties are supported by physical proximity. However, people often use the internet to keep up with those with whom they have pre-existing relationships, and they also develop new relationships online. While it is true that most of these new relationships are weak, this tends to depend on the precise forms of technology used. The forms of internet technology available in the Homenet study (such as IRC) do not necessarily foster the close social ties or deeper relationships of some of the more targeted forms of communication available on the net. Specifically, the strength of ties developed may depend on the nature of the internet context, and whether the chat programs allow for more personal targeting of net relationships. For example, the ICQ-tool: ICQ ("I Seek You") is a program that lets users find their friends and associates online in real time. Users can create a Contact List containing only people they want to have there. Using ICQ, they can chat, send messages, files and URL's, play games, or just hang out with their fellow 'Netters' while still surfing the Net. ICQ allows users to choose the mode of communication (chat, voice, data) they wish to employ in real time.

Research that has evaluated the question of whether the internet undermines social ties and is isolating not only privileges FtF ties. It also tends to privilege interpersonal bonds, or relationships between individuals at the expense of their loyalties to larger social groupings. People have important relations not only with individuals, but also with whole groups or even communities, and these can form important sources of identification, solidarity and social support. The internet provides access to such groups, once again transcending the need for co-presence or proximity. Such "virtual communities" can be described as self-defined networks of interactive communication organised around particular interests or agendas. Virtual togetherness has many variations, not all of them living up to the term of "community" in a traditional sense. However, here are many meanings of community (Potter & Reicher, 1987) and these do not necessarily have to be grounded in space ("community without propinquity"). There is no doubting possibility of collective life in cyberspace (Bakardjieva, 2000). Indeed the architecture of the Net may encourage significant alterations in the size, composition, and structure of communities (Wellman & Gulia, 1999).

At first sight virtual communities might be seen as being in competition with the communities of the FtF world, threatening these ties and our links to locale. However, writers and researchers on this topic have found that, perhaps even more than in the interpersonal sphere, there tends to be comparability and complementarity rather than competition with the offline world. Rheingold (1993) noted that people in virtual communities, 'do just about everything people do in real life' and other commentators have stress that virtual communities do not replace but are in addition to the sense of community (Rutter & Smith, 2000). Rather than replacing 'real' communities, the internet may offer new ways of sustaining old ones. Moreover, people do not neatly divide their worlds into two discrete sets: people in-person and people contacted online. Many community ties connect offline as well as online; the relationship is the important thing, and not the communication medium (Wellman & Gulia, 1999). The tendency of the internet is to foster participation in multiple, partial communities. People often subscribe to multiple discussion lists of their own making, perhaps keeping different lists for different kinds of conversations. Moreover, they can vary in their

involvement in different communities, participating actively in some, occasionally in others, and being silent 'lurkers' in still others (Wellman & Gulia, 1999, p. 184).

The Net's relative lack of social richness can foster contact with more diverse others and a focus on shared interests rather than on similar characteristics can be empowering. Online and offline relations seem to feed into each other synergistically rather than competing. Castells (1997) has suggested that the increasing fragmentation of the post-modern world mean that social identities tied to locality, culture and religion are becoming *more* important as a source of meaning, partly in contrast to the new world of informational capitalism. This analysis would also seem to confirm that the sense of community based around such identities is not diminishing with individualisation and urbanisation, but is being reinvigorated and reinvented. On this analysis the internet provides a medium for sustaining these bonds of identity at a time when the developments in society may be undermining the sense of community grounded in neighbourhood, and economic relations based around class. Just as the internet can be a resource to deal with personal problems through self-help, access to specialised information, at a more collective level virtual communities also provide support networks that can provide a sense of solidarity, and even foster collective action on behalf of interests groups. Power minorities in society have regularly used the net to communicate, raise consciousness and organise (as we discuss in more detail below).

For many of these reasons the internet can form a basis of social inclusion for people who have previously been marginalised or isolated. For example the internet may provide an ideal medium for the elderly whom for reasons of mobility and perhaps expense might find it difficult to sustain social contacts or develop new social relationships. Evidence from Age Concern in the UK suggests that the elderly are increasingly getting on-line and are not necessarily being left behind by this technology (1 in 5 connected in the UK). They have the time to learn the skill and log on regularly, and can generally afford to use it.

National surveys of the seem to confirm that more people emphasise the positive than negative aspects of the internet for their lives and indicate that more than 50% of social relations formed on the net had led to actual meetings (McKenna & Bargh, 2000). However, there is a danger of painting a rosy picture of the ability of the web to connect people both interpersonally or via wider groups and communities. The evidence is that the use of the internet is not evenly distributed across groups in society and is more characterised by social exclusion than social inclusion: the so-called "digital divide" (e.g., Burrows, 2000; Liff, 2000; Wyatt, Thomas, & Terranova, 2000). Research reveals that internet use tends to be concentrated in males from 15 to 35. Women, ethnic minorities, the poor and uneducated tend to be relatively excluded, reinforcing patterns of social exclusion in the broader society (Wyatt et al., 2000). Statistics indicate that more and more women go on-line, but that men remain the dominant group in terms of both usage and contribution (Herman, 1999). Evidence from the US Department of Commerce indicated households with annual incomes of $75,000 or more were 20 times more likely to have internet access than were low-income households. This pattern is repeated on an international scale, with the industrialised western states clearly accounting for much higher proportions of their populations on line than poorer and third world countries.

These observations are supported by a recent report of the Dutch SCP (Sociaal Cultureel Planbureau) about the situation in the Netherlands. According to this report's final conclusions: "A striking and unexpectedly large inequality [in access and use of ICTs] is that between men and women. New information technology is not only expensive and complex, but remains a technology, and is therefore of for this reason of less interest to women. On the other hand, there are some indications that the gap is not so wide for younger generations" (Van Dijk, de Haan, & Rijken, 2000, p. 211).

Unfortunately, the report does not consider racial and other minority groups, but does point out that similar (although smaller) gaps exist for age, income, and educational levels. Across the board, this report has found surprisingly large 'digital divides' especially for novel ICTs. Nonetheless, the researchers' projections for the future are optimistic: Their belief is that some of the gaps (especially those of income and educational level) will diminish over time. In addition, they note that the divides of income and educational level 'merely' replicate existing divisions in other domains. Setting aside the optimistic interpretations of results, the digital divides which can be observed *at present* (i.e., rather than at some unspecified future moment in time) are blatant and disconcerting. Moreover, an analysis in terms of access and ability underestimates the extent to which the current designs of ICTs will shape our future uses and abilities. Inevitably, the existing digital divides shape and structure (for example) the design of the internet, where resources and opportunities are intended, explicitly or implicitly, to accommodate particular groups in society. This trend notonly favours the dominant groups in society, excluding all those who do not belong to this e-elite (Castells, 1996), but also fosters segregation along the lines of existing divisions in society. In sum, digital divides remain prominent and problematic.

Net knowledge can itself form a basis of social categorisation, social exclusion and alienation. Those who cannot develop the skills necessary, or follow the language and conventions associated with it may become excluded from the social networks inside and outside the net (Thomas & Wyatt, in press). Internet use depends not just on technical competence but of course also literacy. Although we take this for granted, literacy rates are much reduced in deprived sections of society and parts of the globe (e.g., the third world). So although many have celebrated the internet as eliminating boundaries to status and power, use and access can to be determined by such factors. In short the "triple A" vision of affordability, access and anonymity (Cooper, 2000) is overstated. Not all people or groups in society have the resources, expertise or time (or the combination of these) to get connected. Moreover, marginal groups when they *are* connected may be relatively marginalised within the web itself and can be excluded by lack of knowledge and skills (Burrows, 2000; Thomas & Wyatt, in press). In short the problems of social exclusion do not stop with access to internet technology.

Issues of social exclusion are not restricted to the use of the internet: this applies to other ICTs also. For example, mobile phones not only provide an excluding technology in terms of the advantages of connectedness, they can be seen as status symbols, signifiers of conspicuous consumption. The Volkskrant recently led with an article in which Japanese schoolgirls were discussed wearing their IP/WAP mobile telephones as fashion jewellery, and these were being marketed as such. This can create it own social problems, with pressure to acquire these devices. Young adults and children may dread the stigma of not having these markers of status, pressuring parents to pay up or getting themselves into debt.

The level of use and the great expense means that for the younger generation in particular the costs of such communication habits are starting to compete with accommodation for their budget. The ease of payment and credit (another feature of the informational economy) only exacerbate this problem.

To summarise, the evidence on the true social effects of the internet and ICTs generally are actually rather mixed. Some research suggests that they can threaten existing relations. Other research suggests the internet can be a beneficial way of building new relationships as well as sustaining existing ones. Although it connects many people in an affordable way, and allows for the building of virtual communities unrestricted by distance, it also currently excludes many sections of society who either do not have access to the resources nor the expertise to use it.

2.2 Social norms and the "social order": asocial and antisocial behaviour

In the previous section we reviewed issues arising from concerns that the internet and related technologies will undermine social relations (social contact, social bonds, social cohesion, etc.). A second theme that relates closely to this is the concern that the internet my change not just the nature of our relations with others, but even our very social nature as sociable and pro-social beings. Much writing on this topic has painted a rather worrying although sometimes contradictory picture of how communication using CMC and the internet can influence the way we relate to others. One aspect of this has already been considered in the previous section, in the sense that mere use of the internet can be considered antisocial in itself, especially by those it excludes. However, some have argued that the ICTs can have more direct antisocial effects on users' behaviour online.

One recurring theme is that the internet can stimulate uninhibited, emotionally charged and even aggressive behaviour compared to FtF interaction. Perhaps the most commonly discussed example of this is the phenomenon of "flaming". This refers to a tendency to use aggressive or insulting language in email and internet interactions. This phenomenon has been related by Kiesler and her associates (e.g., Kiesler et al., 1984; Siegel et al., 1986) to the lack of social cues available in CMC and the internet, which allegedly reduce the impact of social norms and standards. The relative anonymity of CMC has also been suggested to increase the possibility of "de-individuation", a state of reduced social awareness previously associated with immersion in the crowd, resulting in uninhibited and anti-normative behaviour. We consider the theoretical foundations for this in more detail in the theoretical section. In the meantime it is sufficient to state that other researchers have both questioned the validity and appropriateness of the concept of de-individuation, especially as used in this context (see e.g., Spears & Lea, 1992; Spears et al., 2000).

More generally, research has begun to question whether in fact CMC and internet use actually is characterised by antisocial behaviour or flaming has often been proposed, or for the reasons given. Research indicates that there is great variety in the degree and nature of "flaming" and other examples of antisocial behaviour depending on the context (e.g., user group, IRC, organisation context of CMC etc.; see Lea et al., 1992; Postmes, Spears & Lea, in press; Walther, Anderson, & Park, 1994). Such findings suggest that flaming may not be a necessary consequence of the medium as such but may be product of local subcul-

tural norms, reflecting a local "netiquette" (Lea et al., 1992). More fundamentally evidence of flaming tends to neglect the possibility that such behaviour can also occur in FtF environments and using other communications media, or at least to ignore the baselines associated with such behaviour. It is also true that what an outsider views as insulting language might not be perceived as such by either senders or receivers, and can again be normative form a local contextual perspective (Postmes, Spears & Lea, in press).

Some researchers have focus of the limited bandwidth offered by CMC as making it inappropriate for task requiring nuances of meaning, the implication being that the limits of CMC to transmit information can in certain cases lead to misunderstanding and even offence (e.g., taking intended irony literally). The proposal of researchers in the tradition of "media richness" research is that the media chosen should match the complexity of the task at hand (e.g. Daft & Lengel, 1986). For example using email to dismiss a colleague would be considered inappropriate and insensitive (as would the use of a mobile telephone). However it is not clear that the offence caused in such inappropriate suggests resides in the information carrying capacity of the medium. Rather the *social significance* of the choice of the medium for this purpose may be critical here (e.g. that CMC it is seen as an informal medium and does not conveys sufficient respect in such situations).

Early social psychological approaches to the effects of CMC and the internet have also suggested that the social effects could also have consequences for decision-making and processes of social influence in groups. Thus Kiesler and colleagues showed that decisions made using CMC were often more extreme or polarised than decisions following FtF groups discussion (e.g., Siegel et al. 1986). Some of the explanations for such outcomes were similar to those used as those used to explain flaming and other examples of uninhibited behaviour (e.g. lack of social and normative influences due to reduced social cues, "de-individuation", frustrations about using the technology, etc). Again, a critical theme that has emerged here is the consequent lack of social restraints and normative pressures that might temper decision outcomes.

Interestingly the very problems associated with the putative lack of social cues and therefore social and normative influences, has been seen as some in the area of group decision making as a positive boon. For example theorists working in the tradition of GDSSs argue that eliminating social influences by virtue of anonymous communication can sometimes enhance creativity and productivity, reducing the effect of certain intragroup dynamics which might undermine these (deference to powerful others "groupthink", etc; see discussion in the domain of organisations below). The question here then is when and whether social influences are seen as positive or negative.

A more radical question however concerns whether ICTs are indeed as stripped of the social dimension as both these lines of research suggest. Theorists working within the social identity tradition have challenged this assumption (e.g., Lea & Spears, 1991; Spears & Lea, 1992; 1994). Indeed these theorists have argued that social influences can be *increased* in anonymous environments (see theoretical section). For example, they propose that polarised or more extreme decisions actually reflect the operation of normative processes associated with group identities. This approach proposes that the anonymity associated with CMC and the internet tends to accentuate the salience of contextually relevant social identities that underlie social influence process. This suggests that these virtual environ-

ments may actually be highly socially regulated and thus prone to local social influence and norms. Naturally resolving these questions is central to evaluating the question of whether the ICTs do present problems of lack of social control and disinhibition.

It is true to say that the anonymity associated with CMC and the internet provide the opportunity to get way with behaviour that might not be possible in more accountable FtF environments (although knowledge of the traceability of information, and electronic surveillance generally, should not be underestimated). For example, there have been many instances of sexual harassment, stalking, and even "cyber-rape" in virtual environments (MUDs, MOOs, IRC). Evidence suggests that the sense of psychological violation can be highly traumatising. The nature of these relatively anonymous environments means that the incidence of such behaviour is probably much higher than in FtF contexts.

Although comparisons are difficult, it is true to say that many internet contexts are not "women friendly" and even where they are policed, this may not be by women or by those that have insight into their concerns. The idea that the internet is blind to gender and other social categories is something of a romantic myth that we discuss further below. The internet allows not only for withholding of identity through anonymity but also the manipulation of identity that can be used in antisocial ways of for dubious motives. For example, Van Gelder (1985) reports the case of a male psychiatrist who posed as a handicapped woman to gain the confidence of other females, and abused this confidence in a way that would not have been possible using his true gender (see Lea & Spears, 1995). Although identity manipulation or anonymity is one of the advantages of the net, this can have its downside.

The new informational technologies in general provide increasing possibility for those with subversive or criminal motives to achieve their goals. There are a number of facilitating factors involved here including: 1) the access that the internet provides to esoteric knowledge that can be put to subversive ends, 2) the new communicative, organisational and technological possibilities it affords, and 3) the temptations that easy access to illicit material on the internet stimulates. For example, with respect to (1) there are many examples of extremists engaged in terrorist type activities, obtaining knowledge about weapons or bomb-making from web-sites (the extreme right-wing London nail-bomber David Copeland, and the "Trench-coat Mafia" responsible for the Columbine School massacre are notorious examples).

With regard to (2), informational technologies are also increasingly used by criminal organisations for money laundering, cyber-fraud, and other illegal activities. Castells (1998) points to increases in internationally organised crime, as one of the products of the age of informational capitalism. These predictions seem well founded: one UK government official indicated that there was 50 billion pounds worth of illegal transactions conducted on the internet in the UK annually. The breakdown of the Soviet bloc has certainly been associated with an increasingly powerful and organised international dimension to crime, paralleling the multinational nature of business generally. New alliances are being forged by old Mafia families realising (in both senses) the economic potential of the internet. ICTs and knowledge of how to exploit these technologies for criminal purposes is certainly an important input into this development.

With regard to (3), easy access to illegal pornography at one's terminal eliminates many of the risks, barriers and costs that may have prevented many poten-

tial offenders from obtaining such material. The fact that the net contains an almost endless range of sex sites means that the opportunity and thus temptation to access these sites and download material is available in the home and at work (also raising concerns of access by minors). The increasing number of reported case of workers disciplined for downloading pornography at work is an recurring problem, not just for reasons of legality and morality but also for lost productivity (a recent study indicated that up to 60% of managers had disciplined employees for abuse of the internet during working hours). Evidence from a recent wave of prosecutions in France suggest many offenders are professional people in respectable positions in the community who may have thought twice about risking their reputations if such access was not so available and apparently anonymous.

The internet therefore provides a new power to influence and corrupt those whose criminal potential might otherwise remained dormant, precisely because of its affordability, access and anonymity; those with the potential to become offenders can be literally drawn into the web. These three factors can often combine in quite potent and pernicious ways. The anonymity, broad range of contact and difficulty with which to trace people mean that the internet has been used as new means by which by pedophile rings and extremist groups can organise and exchange information such as illegal pornography and subversive material. The internet provides a means to communicate propaganda inciting race hatred and homophobia, promoting "leaderless resistance" (i.e. individually initiated acts of terrorism against such groups), as well as the providing access to the technology of terrorism. The international nature of the web, and issues of free speech mean that it is increasingly difficult to police and prosecute those who pursue this course. The fact that the "lone wolves" of extremist "leaderless resistance" act independently make them very difficult to anticipate and to trace.

The cloak of anonymity is also an important feature of the hacking culture providing protection to hackers. The motives behind hacking behaviour are varied but can be both a form of political protest (e.g., replacing the content of the official Chinese government site by pro-dissident information in 1998) as well also more individual (e.g., personal satisfaction, being able to get into a 'secured' division; see Politics below). There is also clearly an important group dimension to hacking culture whereby kudos is gained by breaking into protected institutions, and interrupting big companies (e.g., paralysing Yahoo's web-site for 36 hours in 1999). Although these actions can inflict great materialist damage to a company or institution, as well as in terms of image, it would be too simplistic here to say that the internet is an asocial or antisocial environment that itself produces such antisocial behaviour. The very nature of the internet, in its high degree of connectedness through email accounts using related and linked software, introduces commensurate levels of vulnerability to attack that are tempting to those motivated to disrupt for whatever reason. It is therefore important to examine the social processes and social identifications that motivate people to engage in destructive behaviour, and the opportunities it provides to "lone wolves" with personal grudges and motivations.

To summarise, the issue of whether CMC and the internet foster antisocial behaviour, or whether it constitutes a social medium par excellence, suggest contrasting visions of these effects. The evidence suggest that any anti-social aspects may be overstated and not necessarily of a different nature or order to those experienced in communication outside of ICTs. Part of the issue is that new

technologies attract close attention so that it is very easy for any specific effects to be quickly over-generalised and lead to moral panics about the effects of technology or the nature of modern society. Although the medium would seem to represent a reduction in social cues compared to FtF communication, not all social information is eliminated and it is not necessarily the case that antisocial behaviour follows. Increases in bandwidth, increased memory and storage capacity of personal computers, and the introduction of streaming video-links, mean that these channels may quickly come to mimic FtF interaction in any case. However, the internet does provide new possibilities and powers that mean that the effects of cyber-sabotage can be especially wide-ranging.

2.3 Identity manipulation and self-management

One of the much-lauded features of communication on the web is that the anonymity it affords allows people to manipulate and play with their identity, often in ways facilitating interaction with others. Theorists have claimed development of the internet might be transforming the nature of the self, experience and communication in everyday life (Gergen, 1991; Slevin, 2000; Turkle, 1995). Much research and commentary has emphasised the often exotic and sometimes spectacular identity play afforded by CMC (Gergen, 1991; Haraway, 1990; Poster, 1990; Rutter & Smith, 2000; Turkle, 1995). For example, in her influential volume entitled "Life on the screen" Turkle (1995) suggests that "the internet is *the* identity technology" providing the ultimate freedom to explore, express, and even escape the self. Gender-bending, adopting other identities associated with the opposite sex is one practice that is commonly referred to.

Probably more than with any other medium, individuals using the internet have to actively negotiate mediated experience and endow it with structures of relevance to the self. The internet can provide people with a relatively safe space (providing anonymity and freedom from other's judgements) to try out different roles and identities ("possible selves: Markus & Nurius, 1986). Although gender-bending is often cited in research and in the media to highlight new forms of self-presentation taking place on the internet, its incidence is probably overstated. Withholding cues relating to status, race, sexuality or gender in order to bypass existing stereotypes is a strategy people may actively use more often on the internet than in other media. Some virtual worlds are designed to stay virtual, like MUDs (Multiple User Dungeons) and MOO (Object Oriented MUDs), giving people the opportunity to explore different identities. Other forms of online exploration may be used to develop new aspects of self, such as altruism or a sense of humor. As with other media, from television to books, internet use is healthy if it positively enhances other areas of one's life.

Much writing in this tradition has accordingly been very positive about the effects of internet. However, there are potential risks involved. People can get so immersed in their online identities or alter-egos that they can start to lose touch with the everyday identities embedded in their offline lives (Weil, 1997, p. 18). This can lead to "splitting", living in terms of online often two dimensional identities that start to cause identity problems in the "real" world (Steere, 1998). As we have seen, the adoption of identities that actively mislead others, especially when gender swapping, can be problematic. Whereas a certain amount of fantasy and idealism, may be healthy in the context of play, this may result in more long-term problems where it represents an escape from self and real life. To the

extent that people can use the forum of the web to practice identities that they want to merge into their everyday life in a way which is personally fulfilling, integration may be healthy (Suler, 2000; Turkle, 1995). Other internet selves might, on the other hand, take a more dangerous path and focus, for example, on pedophilia. However, it would be mistaken to see the internet as a source of such identities, rather than just a medium for their expression and gratification.

In fact research suggests that people are often more likely to use the freedoms of the internet to present and explore their "true" selves in interaction with others, rather than to present ideal or fantasy ones. For example, in one recent ethnographic study Rutter and Smith (2000) studied a corpus of over 9000 threads. They found that people actively avoided presenting fantasy selves despite the possibilities afforded by the medium to do so. Rather participants sought to present their offline identities "as a practical means of generating solidarity and community on line." When internet-centered communities were established and online interactions became routinised there was a notable tendency for those involved explicitly to display aspects of their non-internet history, biography, and embodied selves. This suggests that notions of the 'virtual' as a separate space for self is misleading. In practice individuals blur any boundaries between 'real' and 'virtual' selves, relationships and actions (Rutter & Smith, 2000).

Adopting different identities can have other motives. For example gender bending may be used in technical domains by women to be taken seriously in what is often a very male dominated environment (Wolbert, 2000). Despite claims that CMC and the internet eliminate group differences in terms of gender, race and so forth, this does not seem to be the case. Research suggests people in chat room environments to behave even more gender stereotypical than in real life (the "Ken and Barbie" effect). Moreover, there are questions about how functional the strategy might be for women to adopt male identities in a "male" domain if it means that their gender category as a whole becomes even less visible on the net (Wolbert, 2000; see the section on Politics below). The motives for male users adopting female identities can also be critically questioned. Sometimes this can be seen as invading female spaces, and examples of deception for more dubious sexual motives is a problem already alluded to.

To summarise, the web provides new opportunities to manipulate and hide features of self. However, the benefits of this possibility can be easily overestimated, idealised or romanticised. Although this may be rewarding in more recreational or play contexts, there is the question of how useful or healthy this can be as a general practice of "self-management". In practice people often use this facility to present what they see as their "real" selves, rather than simply to dissimulate and escape everyday identity.

2.4 Power and politics: freedom, democracy, equality in the network society?

The developments of the ICTs and the internet in particular provide new freedoms and commentators have been fast to note the political implications. At the macro level, the internet transcends national boundaries, allowing people under repressive regimes to access information that was previously centrally controlled through state media. Moreover, it puts people in contact with others with shared interests and agendas, and can be used to organise protest and collective action both online and offline in the real world (disruptions of the recent world finance summits in Seattle and Washington were co-ordinated via the internet).

In terms of the micro-politics, theorists have argued that the anonymity associated with CMC and the internet largely eliminates status differences and power differentials based on category membership (e.g., gender, race, class) as well as undermining cues to individual status in the power hierarchy. In other words many have hailed the internet as equalising, democratic and even liberating. It is believed by many that the ease of communicating and interacting online will lead to a flourishing of democratic institutions, heralding a new and vital arena of public discourse. Others have offered a more critical vision. There is no doubt that the internet does bring new political potential to empower people and may facilitate participatory democracy. However, it is also rather idealistic, even romantic, to suggest that power differences and interests disappear in the age of the net. Let us consider both sides.

At the macro level, it is true that the internet does transcend the national boundaries and interests of particular governments and is very difficult to control or police at the national level. Paradoxically the relative strength of sovereign nation states compared to supranational organisations, such as the United Nations, may contribute to the difficulty of international policing of the net. This has not stopped national governments trying to exert control however. China, for example, has made it a crime to download or distribute any information on the net that it considers critical or subversive. Saudi Arabia has gone further and attempted to gate-keep on the input side what can be displayed on the internet within its borders. Time will tell to what extent these attempts at control are successful. However, most governments have taken the view that it is very difficult to control the supranational nature of the net and that to do so raises issues of rights to free speech and interventionism (France being a recent exception).

Perhaps a bigger concern from the macro-political angle concerns the accountability people who own and control these new media and the web in particular. Although many of the first investments in the web reflected small-scale self-generated entrepreneurship, as the economic potential has become clear, massive investment and buying up by large multinational corporations has quickly gathered pace. This raises issues of monopoly and control, the fight between the US federal government and Microsoft being perhaps the most high profile recent example. In sum, the very widespread accessibility and use of the internet has attracted commercial attention. Its increasingly commercial character allies it with the multinationals and put it centre-stage in the age of "informational capitalism", reinforcing the power of the net beyond the nation states (Castells, 1996). However, it is a very moot point whether these commercial interests are always necessarily compatible with individual freedom and local democracy.

Moving to the micro-level, social psychological issues become perhaps more central. Social psychologists have argued that participation in CMC and on the internet becomes much more equal and reduces if not eliminates power differentials. Some experimental studies suggest that participation by women goes up in CMC compared to FtF, and that inequalities in communication are reduced in general (Siegel et al., 1996; Sproull & Kiesler, 1990). The central idea here is that the absence of social cues helps to blur or eliminate these differences. However, these findings have been challenged by theorists who argue that although certain interpersonal cues may be eliminated, cues to category membership can often percolate the web and influence the communication (Postmes & Spears, 2000; Postmes, Spears & Lea, 1998; Spears & Lea, 1994). Moreover, evidence suggests that cues to gender, race and class are communicated in the language

and not just by visual markers (e.g., Thomson & Murachver, in press). This literature is discussed in more detail in the theoretical section.

If we move outside of the experimental setting and into everyday use on the internet, we find that far from being eliminated, power differences associated with category membership can be exacerbated. Kollock and Smith (1999) conclude that most online groups have the structure of either an anarchy or a dictatorship. Some notable experiments with democratic electoral politics on the internet have failed dramatically, raising questions about what sort of governance is possible and what the prerequisites are for democratic institutions. Cyberspace is often a domain of vast power imbalances. These power differences often follow the familiar power differences in society, structured by class, gender, and "race." As we have already discussed, despite the optimistic vision of accessibility and affordability, this is clearly less true for the poor and the working class than it is for the well off. The opportunity afforded by access to the net implies that these differences are likely to become accentuated.

As we have already indicated, despite the protection of anonymity, the net is very gendered and not always a friendly place for women. Women report that they are often harassed and intimidated from posting and participating on conferences or via e-mail (Shade, 1993). Gender is one of the first means by which persons introduce and represent themselves to others in electronic communications. For instance, one of the most frequently asked question on bulletin board systems (BBS's) and in chat rooms is, "are you male or female?" (Herring, 1996). Gender is such a central feature for organising interpersonal relations that persons go to great pains to reproduce gender in online interaction. As social creatures, our maps or scripts consist primarily of categories for defining and distinguishing self and other and the context for interaction. In presenting self to others in electronic interactions it may be simpler to rely on stereotypes, especially those that are likely to elicit the desired response, than to author rich, complex composites of the gendered self (O'Brien, 1999). In other words we often rely on the same categories that structure our offline identities and interactions to make sense of and guide behaviour on the net. As a result people will tend to reproduce conventional gender forms in their online interactions. A similar story emerges in the case of "race": "Race" is no less relevant in online interaction than it is in face-to-face interaction. Instead racial stereotypes may be more influential and resilient on the Usenet (Burkhalter, 1999).

Despite these more negative accounts it is clear that the net also provides a means by which to reach others with shared interests and from similar categories. The evidence of "virtual communities" discussed above makes this clear. Moreover, the web provides more than simply a means of communication; it fosters a network of social support for those in similar positions, and with similar problems, providing a means to raise consciousness and organise politically. The internet and email networks have been used by progressive and political movements such as Feminism, green politics, the aged. Equally, however, it has been used by right-wing and extremist organisations (see previous section).

Hacking culture can also be seen as reflecting certain groups or even communities that may be engaged in political action, resistance and even democratisation in its own terms. This global technology can be used to challenge the economic dimension of globalism (see Castells, 1996, 1998). More generally one of the motivations behind traditional hacking is to make available free software to this using the internet, for the benefit of all. This could result in improvements in the

software as well as improved security (Jordan & Taylor, 2000). The group and political dimensions of hacking culture therefore need to be understood.

One important way that the net may contribute to democratisation and equality is by helping to challenge the hierarchies of expertise and power/knowledge that are characteristic of establishment institutions (e.g., medical and legal services). It not only provides access to expert knowledge and self-help beyond one's GP, one's legal representative, it also counters expert knowledge with lay knowledge and the shared experience of others on the net (Burrows, 2000). This people who consult medical expertise on the web might discover that their doctor does not know everything, and may feel better able to evaluate and challenge their "expertise". The UK government has also recently suggested using the internet to name and shame professionals found guilty of poor work or malpractice.

One way in which ICTs can be used to increase political participation is by means of virtual voting and "direct" consultation and input. Already in the 2000 US primary elections the State of Arizona implemented the possibility of voting via the internet from home. This possibility could help to overcome voter indifference and increase participation although it raises questions of unequal access, perhaps privileging certain social groups that are more likely to be connected. The internet may also provide a means of increasing participation more generally, for polling, online referenda, as well as perhaps even more direct participation in civic politics and decision-making. The related idea of "video soap boxes" to give people their say direct to politicians has also be experimented with (Moran, 2000). In short, the ICTs provides opportunities for increasing participation.

Although ICTs seems to enhance individual freedom the rise of these information technologies also threatens freedom in other ways. As we noted above, the very knowledge and expertise provide at our fingertips may widen the digital divide and social exclusion by giving an advantage to those with the access, but also skills and cultural resources to take advantage – typically the middle class and well educated (Burrows, 2000; Liff, 2000; Thomas & Wyatt, 2000). Bodily disability as well as social and cultural factors are also a basis of exclusion from the ICTs: Self help may therefore be most beneficial for those used or able to "help themselves" in both senses (Carey, 2000). The new technologies may empower those with the most power or voice in the first place, such that they accentuate social inequalities.

The possibilities for surveillance provided by diverse technologies (logging of phones, traceability of email and surveillance in public spaces by CCTV) mean that the information age is also the surveillance society. Technological advances in DNA testing mean that it is very difficult not to leave any traces of our presence and this is no less true of the "dry" world of computerised information. This can be a boon for crime detection. However, these same possibilities also mean encroachment into civil liberties and the rights to privacy. This is partly a political question (Raab, 2000) but it is also social psychological question, in the sense that it can feed into perceptions, feelings and behaviour (Spears & Lea, 1994). Gandy (1993) has documented the increasing "informationalisation" of our world, and suggested this reflects a new degree of "panoptic" power over the citizen. The "panopticon" was a penal institution designed as a surveillance device developed by Jeremy Bentham in the 19th century that has served as a metaphor for aspects of the information society (Gandy, 1993; Spears & Lea, 1994; Zuboff, 1989). The network society has the same powers of observation

and can exert subtle forms of control on citizens who are increasingly aware of this. The availability of information net search histories and documented consumer behaviour mean that commercial organisations are also increasingly interested in getting access to profiles, raising issues of data protection. The use of CCTV in public spaces can also be seen as relating to issues of privacy and social control as well as questions of public order (Levine, 2000).

To summarise, the political effects of ICTs are important and have social psychological dimensions for perception and behaviour. At the macro level, the power of the net to transcend not only local but also nationality provides new freedoms to the users, but also to the owners of the technology and of the websites. At the micro level although there may be benefits from anonymity in breaking down certain barriers, it is not at all clear that these barriers evident in the real world are eliminated in its virtual counterpart, and many of these may be reproduced and accentuated. Some of the reasons for this will become more apparent when we look more closely at the processes operating in virtual environments.

2.5 Cognitive consequences, mental health, addiction

The use of ICTs, epitomised most clearly by the internet, raise issues of their direct psychological and physiological effects on health and well being in both short and long-term. The internet provides a highly complex, potentially infinite resource of information. The benefits of this are clear in providing access to this information (see also education and business below). However there can be a downside to this resource. Users can be potentially overwhelmed by the sheer amount of information. This can causing feelings of cognitive overload, uncertainty and boundlessness, and endless choice. Gergen (1991) has referred to the "saturated self" to describe the new sense of complexity, infinity of information input as part of the "post-modern condition" of the informational society (see also Giddiness, 1991).

High levels of information load are sometimes associated with stress, which in the long term fosters a variety of unhealthy behaviours and states (Rader, 1981; Tetrick, 1992). On the other hand, people have a need for information and are generally well-equipped to deal with large amounts of it. Indeed they can suffer from under-stimulation, and boredom without information (Jacoby, 1984; O'Reilly, 1980). Although the available information in *any* domain is potentially infinite depending on what details are attended to, perception is selective and in this sense we cannot get overloaded in the same sense as machines can. However, what distinguishes many new media such as the web (and also Intranets used for organisational communication) is that information is not consumed passively, but can be interactively sought in limitless quantities, at tremendous speed and with huge variety. One might almost say that this possibility is something to which humankind has never previously been exposed to, at least at this level of intensity and interactivity. It follows that there could be no inputs into evolutionary pressures to deal with or adapt to such circumstances. This poses question marks about whether people can adapt easily to the richness of such inputs. Research from several decades of cognitive psychology and cognitive science suggests that we are much more flexible information processors than computers: attention can be focused and flexibly distributed ("parallel distributed processing") according to needs and goals (e.g., Allport, 1980). Moreover, when

information is communicated effectively, electronic media have been found to *reduce* perceptions of overload (Kraut & Attewell, 1997). Some scientists go as far as to suggest that as we become more adept at adapting our patterns of attention in these new information rich environments, this may form a basis for extending human intelligence and even potentially our consciousness (Gackenbach, 1998).

Others have been more pessimistic. Some have argued that "our minds aren't wired to multi-task in the way our computers are." (Rosen, 2000). Reuters recently published a survey of 1000 business managers ("Glued to the screen") 60% of whom said the surfeit of information (from fax, phone, TV as well as the net) made them stressed and tense. Although the freedom to set one's own pace means it is not obvious that information overload would be a hazard, attention is drawn to novelty and change and in this sense the internet provides continuing stimulation. Where attention and curiosity are continuously fed, this can lead users to overreach themselves in terms of extending arousal, causing fatigue, and even affecting our immune systems (Lewis, 2000). Some research confirms that information consumers are unable to stop short of overloading themselves in a sufficiently rich information environment (Keller & Staelin, 1987). Researchers have referred to a condition called "data smog", or more technically "information fatigue syndrome", to describe the disorientation of constant uninterrupted use (Lewis, 2000). When people become absorbed in altered or constructed realities, they may also experience altered states comparable to states such as sleep and dreaming. This is specifically relevant to playing computer games where research reports of states of 'dizziness' people can experience after an hour of playing a computer game. Changes in spatial thinking, shifts in processing speed and integration of self and emotions with cognition are apparent in heavy users of computer games and other forms of virtual reality (VR). Research indicates that overload can become a problem in electronic environments in which information is not embedded in clear structures for communication and retrieval (Nagasundaram & Dennis, 1993).

Thus, the overload issue is one that is more complex than would appear initially. Although information and variety are generally positive resources, problems can arise when these are effectively unlimited, and for individuals who for various reasons are not well equipped to cope with this. Even the possibility and feeling of choice which is generally positive (and ideologically favoured in the west), can lead to stress when taken to high levels (Iyengar & Lepper, 1999). Although complexity and the potential for overload may be features that many users can deal with, some may be sucked into constant use, precisely because of constant novelty, stimulation and decisions. Despite offering new possibilities and new means of delivering services, there is a danger that *over-use* itself may become problematic in terms of mental and even physical health.

Reliance on the internet for whatever reason may lead to *addiction* and (as we have considered above) is potentially damaging to social relationships. Internet addiction is a growing concern that is receiving increasing attention from health care services (and mobile telephones, in offering constant access may pose similar problems). Research suggests that internet addiction is a growing problem, especially among teenage males, who can get engulfed in their virtual worlds of MUDs, MOOs and IRC (Internet Relay Chat), and neglect their own direct social surroundings (Emmons, 2000; Little, Jackson, & Cohara, 2000; Young, 1998). Commentators warn that these users can become addicted to their online

chat and begin to neglect the responsibilities of the real world. People who may have a hard time forging friendships in real life may find it much easier on IRC to establish friendships. A danger is that some people may begin to withdraw more and more from their physical friends, and learn to rely increasingly on their friends in the IRC community. This could, in turn, lead to an even deeper loneliness than the person felt before (Rheingold, 1993)

Psychologists have now started to talk of Internet Addiction Disorder (IAD: Goldberg, 2000), a syndrome that has many of the features of other forms of addiction. Addictions may also exacerbate addictions that may occur in the offline world but where there is less opportunity to satiate these impulses to the same degree as on the net (e.g., consumption of pornography). There is debate however about whether it is useful to talk of internet addiction, or whether this just provides the context in which pre-existing addictive impulses are given free rein. In other words is there is the question of whether the internet causes addiction, or whether "addicts" are drawn the internet (King, 1996). Similarly, even if people with low self esteem and communication problems tend to use the internet, the question is whether the internet actually exacerbates their problems, or provides a medium of communication and a social milieu that these people would otherwise miss (see McKenna & Bargh, 1998).

Whereas the spectre of addiction reflects the more pessimistic vision of the effect of the web, there have been equally optimistic accounts of its psychological benefits, often to the same young people who are seen as most vulnerable. Some writers and theorists have pointed to the importance of computer access for the young, and have even referred to the "N-Gen" or Network Generation. For example, Tapscott (1997) highlights the beneficial effects of being connected to the net for curiosity, self-reliance, and independence. Unlike the more passive relation to the "static" media such as TV and print, the internet represents an interactive forum that emphasises agency. It discourages the blind acceptance of knowledge, allowing the user to challenge and judge by searching and comparing information (see Education below). Moreover young users who have grown up with internet find themselves in a more equal relation with the older generation. The anonymity of the net means that adults do not necessarily know they are speaking to someone traditionally lower than them in the power structure and so treat them with the respect they would treat another adult. This means that young people are more likely to be treated on their own merit by adults, which can raise their self-esteem and confidence. This picture may be rather rosy, and critics have pointed to Tapscott's funding by the computer giants that profit from the technology he advocates (e.g., Cisler, 1998). However, this analysis, it provides an important counter to arguments that the internet is necessarily bad in terms of its influence on the young.

In terms of the use of the internet, this technology can serve many people denied access to social contacts or resources, and in this sense can be liberating and potentially good for functioning and mental health. The internet has been used for on-line help of people without the need to leave one's home and also opened up new possibilities for self-help for those seeking information relating to problems. Some have even used the net to address the problem of internet addiction: self-help is available on the web through a listserv (Goldberg, 2000). So although the net can be a source of problems, it also provides a medium within which to address them. The internet also offers potential for automating interactions and even providing therapy. An example of this is the Interapy initiative at

the University of Amsterdam where pre-programmed feedback over the internet has been shown to be effective, and can reach many more people than labour-intensive calls or visits. However, the question arises of how far this can go, and whether increasing availability of such features will render the automated character visible and therefore less effective.

The internet not only causes problems arising from the quantity of information (overload), but also in relation to the *quality* or reliability of information. In short, it raises issues of trust. Internet interaction emphasises the need for trust at number of different levels. First, there is the question of the degree to which we can trust the information displayed on the internet. For example when people look for help (e.g. information about medicines) the pedigree and provenance of this information may be less clear than that obtained through more official offline channels.

Second, there is the issue of trust in 'machines', whether transactions are handled properly and safely (monies transferred, credit-card details, booking airline tickets). Whereas trust in the FtF world has a human face, on the net it is often impersonal. Interaction with individuals is increasingly being replaced by interaction with machines, eliminating the personal treatment in service culture (Haslam, 2000). Even on the phone we routinely interact with taped information lines and experience constant deferment in expanding choice menus. This can lead to frustration, stress, and feelings of loss of control.

Third, when we are interacting with genuine individuals, there is the question of whether to trust them. Anonymity on the internet makes them less identifiable and accountable. How reliable is the authentication information revealed by others about themselves? Many individuals will now go to great lengths to display accountability as real people by exchanging e-mail, homepage addresses, and digitally scanned photographs of themselves. Internet users have also developed new social skills, for example, cross-referencing information before others are trusted. Moreover, as the number and diversity of virtual 'meeting places' increases, they acquire experience an expertise in discriminating trustworthy environments. Users are now more likely to know what kinds of individuals they will encounter when they visit them.

To summarise the cognitive and health consequences of the proliferation of information provided by the ICTs seem to be mixed. As well as a realm for opportunity, enlightenment, and also self-help, there are also clear hazards for mental health and stress. The sheer complexity and variety of content implied by the internet already suggest that one simple conclusion would be grossly over-simplistic. The virtual world is quickly becoming as rich and complex as the "real" world; we would not expect it to have singular or simple effects. However, important new dimensions are the sheer amount of information available, and the opportunity to access this with little effort or accountability does raises new problems as well as possibilities.

2.6 Education: the virtual classroom?

As we have already discussed above, some commentators extol the virtues of the internet as a self-educating medium in itself. However ICTs also provide many new possibilities for more formal education too, as in distance learning and the virtual classroom (e.g., Hiltz 1992). The potential of computer-mediated communication within education is enormous and is creating interest throughout the

education community. For example, in the UK the Department of Education's targets for the National Grid for Learning are that by 2002 all schools, colleges, universities and libraries will be online. In 1997 the report for the UK National Committee of Inquiry into Higher Education (the Dearing Report) placed communication and information technology at the heart of its vision for a learning society.

Many attempts have been made to implement internet communication tools such as Bulletin Boards and chat rooms in educational contexts at many different levels and with varying degrees of success. For example, Kirkley et al. (1998) describe the use of email in graduate level courses, whereas Bereton et al. (1998) give an account of the use of video, audio, chat and shared workspaces in a software engineering course. The relatively anonymous nature of computer-mediated communication provides a very different environment from that in the traditional classroom, or even in a traditional distance-learning course. The use of CMC within education, represents a unique domain of interaction which cannot be fully understood by reference to traditional approaches (Harasim, 1989). In these and similar studies, very little consideration is given to how social and communication processes may change when using these new communication tools. In the case of Bereton et al. (1998) initial problems of student motivation and focus were overcome by students arranging to travel some distance for face to face meetings. Without these face to face meetings, it is unlikely that the group projects would have succeeded. This is a rather disheartening conclusion for the use of CMC in education but is one that should be avoidable through appropriate implementation of the available technology.

As would be expected, there are many projects to develop environments that support collaborative learning between distributed or even co-present groups of individuals via the internet. These applications are variously classified under the headings of CSCL (Computer Supported Collaborative Learning, Computer Supported Co-operative Learning or even Computer Supported Collective Learning) and VLE's (Virtual Learning Environments). Environments which incorporate communication technologies are also being developed under the related headings of CSCW (Computer Supported Collaborative Work) and GroupWare. However, these latter two are not designed explicitly for education purposes. It should also be pointed out that all these environments are being developed from within differing subject domains and from various research perspectives resulting in a wide range of products. Although there are central issues to each of the headings discussed, there are also shared characteristics and often overlapping characteristics between them. There are, of course, too many of such environments for a comprehensive review to be possible here but a few observations are in order.

Systems developed under the heading of CSCL enhance learning in a dynamic fashion, where the system that delivers the collaborative environment takes an active part in analysing and controlling collaboration. CSCL systems can be employed to address issues such as concept learning and problem solving (Kumar, 1996), and each system is designed for application in a specific subject domain. For example, CLARE (Wan & Johnson, 1994) structures collaborative knowledge construction of scientific research using a semi-formal representation language aimed at providing guidance on the process of shared knowledge-building; and Belvedere (Suthers & Weiner, 1995) supports critical scientific discussions by allowing students to map out diagrammatic argument structures. These

systems however, are structured to support a specific collaborative effort and do not allow for a wide range of flexible communication styles necessary to support a working group over time and distance. Hartley (1999) goes as far as to suggest that systems built by the AI community in education, such as CLARE, are more useful as research tools for examining the processes of group discussions than for practical classroom use. Many CSCL systems, however, have been successfully implemented within structured domains (see Koschman 1996).

Under the heading of Virtual Learning Environments systems have been developed which purport to support collaborative learning. For example, WebCT (Goldberg, 1997) allows groups to be formed, provides facilities for presentation of HTML pages and quizzes, with supporting navigation. It incorporates email and bulletin boards, whiteboard and chat rooms for collaborative purposes. All this is delivered under an administrative harness. COSE (Stiles, 1996) and The Virtual Classroom (Hiltz, 1992) are similar virtual learning environments and the opportunities for collaborative leaning are discussed by both authors. Hiltz (1992) suggests that the Virtual Classroom suitable for collaborative strategies such as debates, joint projects and role-playing exercises. However, the emphasis in these systems, is on the course administration or management (i.e. supporting many students within a course, tracking their progress, and the delivery of content). They are shells that allow instructors to construct their own courses to be delivered online. While such systems purport to support collaborative learning, they do little more than provide the main internet communication tools such as chat systems, email and Bulletin Boards. Any consideration of group processes is left for the instructor or tutor to address. Importantly, the parts played by normative influences and situational factors in determining appropriate group behaviour are largely ignored (Lea & Giordano, 1997). In essence, these systems lack any representation of social psychological theory about group processes in their design that would enable educators to address some of the fundamental differences in the communication and behaviour that result from relatively anonymous computer-mediated interactions.

More work regarding group process has been done in the field of CSCW, although as already mentioned, this field is not explicitly concerned with education. Moreover, the move in this field is towards software reproduction of the face to face environment. Greenberg (1998) suggests that text based communication is inadequate and that individuals in an interactive workspace should have at least a voice channel. He goes on to say that, "Electronic virtual workspaces must emulate the affordances of physical workspaces if they are to support a group's natural way of working together" (p. 246). It is assumed that to support group processes, the focus should be on the interpersonal level, i.e. supporting interpersonal communication between individuals within the group (Lea & Giordano, 1997). In other words, the relative anonymity offered by CMC should be reduced to a minimum. It is assumptions such as these that this research seeks to address.

Anonymity in CMC is not always seen as a negative trait. In the context of work groups GDSSs have made use of the anonymity of members of a decision making group as a key technological characteristic to improve the quality of decisions (e.g. Jessup & George, 1997; Dennis & Gallupe, 1993; see also the next section on work and organisations). It has been argued that anonymous GDSS interactions can reduce group process dysfunction, such as conformity pressures and domination due to status imbalance (e.g., Valacich et al., 1991). However, the

underlying social psychological process given as an explanation for these effects is that the anonymity of the CMC environment reduces social influence. This is the same reason given for the observed negative effects of CMC (Postmes & Lea, 2000). This issue will be returned to later.

Many of the issues raised about the cognitive effects of the internet in terms of information proliferation and overload considered earlier also feed into educational concerns, particularly with regard to independent working (e.g., homework, self-study). Research on students using the internet and other ICTs to study on line suggests that they engage in constant multi-tasking, and spend 50% of their time doing "something else" beyond the focal task (Crook, 2000). This can result in a state of animation and even agitation with many of the cognitive and even stress-related problems we discussed earlier potentially coming into play. Here the concern is for the capacity for concentrated and focused work without distraction. Popular concerns about the reduced attention spans of the young may have some basis, not just in the N-Gen itself, but in the technological context in which they find themselves (the mass media and entertainment industry arguably reinforce this "sound bite" approach to information).

In summary, of the available educational environments, while much of the available software purports to support collaborative learning, it is often the case that the opportunities of the computer-mediated environment as a unique domain for collaboration is ignored. Furthermore, support often amounts simply to providing the tools for collaboration. It is then left to the skills of the teacher or instructor to promote collaboration among students. This in turn often results in only the sharing of documents. These conditions do not result in the effective gains that true collaborative efforts offer. Susman (1998) investigated this issue in a meta-analysis of thirty-six studies employing computer-based collaborative learning. It was found that many studies reported failure to fulfil the expectations of increased achievement when collaborating in a computer environment. Those studies which reported significant success rates, included in their design some of the vital aspects of collaborative learning, such as 'co-operative learning training' whereas those that did not show positive effects had not designed the group situation to encourage interaction.

2.7 ICTs at work and in organisations

In organisational applications, some of the paradoxes of modern communication technology become most apparent. In this domain, technology has made a rapid progress, principally because of assumptions with regard to the effectiveness of ICTs and their promise for increasing productivity. That these promises with regard to productivity have not materialised is widely publicised but less often heard. As Nobel laureate Robert Solow said, "today we see computers everywhere, except in the productivity statistics". Much more trumpeted has been the recent rise in productivity figures (the celebrated 'new economy'). However, new analyses have shown that the debate has not yet been settled: it is argued that the recent productivity increase can be attributed exclusively to the computer hardware industry; other industry and the service sector's productivity has even decreased over the past 5 years (Gordon, 2000). Although the debate will continue for some time to come, it is striking to find that there even is a debate: The hype around the internet has socialised us to take ICTs effectiveness for granted. That this productivity issue is still not settled – after more than 30 years of

research – suggests that a critical examination of actual uses of ICTs in organisations is in order.

Organisations have generally used ICT for three purposes: (a) as a tool for teamwork, (b) as a vehicle for organisational communication, and (c) as a tool to aid decision making processes. Teamwork is one of ICTs main growth areas, often referred to as CSCW: computer-supported co-operative work. The assumption in this domain is that technology may be used to facilitate collaborations over long distances. Frequently, this involves 'virtual teams' which spearhead the development of networked organisations. In this domain many of the issues identified in previous sections re-emerge. Thus, much uncertainty exists about the capacity for virtual teams to elicit attachment and cohesion, and concerns have been expressed with increasing individualisation in such teams. Another area in which organisations have made great investments, is that of Group Decision Support Systems (GDSSs). GDSSs are increasingly popular means of aiding decision making in a variety of organisational settings, by combining the computer, communication, and decision technologies to improve the decision making process (Briggs, Nunamaker, & Sprague, 1998; Fulk & Collins-Jarvis, in press). Such technologies generally make use of anonymity of members of a decision-making group as a key tool to improve the quality of decisions (Hiltz & Turoff, 1978; Nunamaker, Dennis, George, Valacich, & Vogel, 1991a; Pinsonneault & Heppel, 1998). Finally, organisations have sought to improve their organisational communication by building 'intranets' and promoting that their employees share their knowledge via such networks. In all three cases, hopes have been high, and expectations were based on utopian forecasts of increased effectiveness and efficiency.

The reality of organisations success with these technologies is, predictably, more complex than initially believed. By now, the examples of huge successes are at least as numerous as examples of grandiose failures (Robey & Boudreau, 1999). What has become the challenge in this domain, then, is not so much to find the appropriate 'tool' with which to engineer organisational changes and successes, but rather to comprehend the interplay of social context and technology in producing certain social effects (Contractor & Eisenberg, 1990). The case of GDSSs may serve as a good example of how the field deals with these unexpected difficulties. Initially, protagonists of these systems provided a rosy pictures of the potentials of GDSSs (Nunamaker, Dennis, Valacich, & Vogel, 1991b), but gradually the same people have acknowledged the variety of limitations of the 'older' systems, stressing how many improvements have been made over the years (Nunamaker, Briggs, Mittleman, Vogel, & Balthazard, 1997). Designers and researchers alike thus keep a 'moving target': consumers are prodded to buy the latest product, and all problems of the last version will belong to the past.

The consistent emphasis on innovation conveys a superficial analysis of social effects of ICTs. The rapid pace of innovations tends to mask that the issues with which organisations struggle show a remarkable consistency across time. For example, many of the obstacles experienced by organisations are related to issues of *participation*. With each innovation, a substantial part of the workforce is being cast aside by the pace and nature of changes enforced, leading to severe economic damage (Attewell, 1996) and introducing or even accentuating social inequalities in the workplace (Postmes, Spears, & Lea, 1998). Likewise, organisations continue to struggle with issues of *power and control* (Spears & Lea, 1994).

On the one hand, ICT is often introduced as empowering, for example as enabling a vision of human resource management that promotes workers' independence and autonomy in collaborations such as virtual groups, quality circles and self-managing teams (Fulk & DeSanctis, 1995). Yet, this notion is contradicted by the fact that, for example, management uses technology as a means to enforce particular changes in organisational structure and practice, thereby more often than not strengthening their own position (Haslam, 2000; Micklethwait & Wooldridge, 1996). Finally, technology is often used as a direct means of control, with which employees are monitored and assessed (Spears & Lea, 1994; Zuboff, 1988).

Technology also introduces issues of *quantity versus quality*. ICT has tended to expand the communication network of employees, and hence to increase the quantity of communications with which especially lower-level employees need to deal on a day to day basis (Kraut & Attewell, 1997). Yet, communication itself is not necessarily productive, and may be counter-productive in many cases. A good example of this is that management, already having rich and sophisticated Information Systems at their disposal, appear to have an insatiable need for more information: The increase in management information seems to increase uncertainty rather than reduce it (Attewell, 1996). At the level of teams, the issue of quality versus quantity can also be felt. Organisations usually implement changes in the hope that they will receive tangible output increases. In teams this has led to a focus on the quantity of ideas generated in a GDSS session, for example, or the number of entries in a knowledge management database, as *ends in themselves*. This is at the expense of thorough analysis of how people spend their time in groups, and if, when, and how, this time is spent productively. In the realm of GDSS, for example, there are clear trade-offs between quantity and quality: as a rule they lead to more ideas, but to less consensus, satisfaction, and (perhaps as a result) to time-consuming decision-making procedures.

In implementing ICTs such as email intranets can often go together with an idealistic view that new technology will automatically lead to more efficient working. While there may be some truth in the view that it facilitates the efficiency of communication this in itself does not necessarily translate into organisational efficiency or productivity. Because email is a text based medium, it can formalise communication in deleterious. This can lead to bureaucratic and semi legalistic petty disputes, "ass covering", multiplying the dangers of memo-culture (Brown, 2000). It is not unusual then for the introduction of such systems to lead to an increase in the number of FtF meetings in the organisation as well as consuming much time in themselves. Moreover the actual decision-makers with power quite often will not use, will have filtered or will avoid email, and make decisions in less formal contexts (Brown, 2000).

To summarise, CMC and intranet technology is increasingly being used within organisational and work contexts, although the jury is out on whether this has been generally beneficial to productivity and investment. Organisations tend to view innovation as an end in itself, without always evaluating or thinking through the implications of the technologies implemented. The IT/ICT revolution has led to a fear of lagging behind: organisations are consistently worried they will lose competitive advantage, and feel forced to embrace ICT to ward off threats to their position. Because this is not based on a careful analysis of the gains and pains of ICTs, organisations are frequently disappointed with the effectiveness of their investments. Once again a general conclusion is premature and depends on

a combination of social psychological and organisational issues on the one hand and on the specific features of the technology on the other.

2.8 E-business, e-commerce, entertainment

If the effects of the internet technology have been equivocal within the organisation they have more clearly transformed the nature of business and financial markets. Internet technology mean that financial markets have become truly global, strengthening the hand of multinational interests at the expense of nation states (Castells, 1996; 1998). At the same time, these same informational features render these markets vulnerable to sometimes wild rumours, spread on the burgeoning web-sites devoted to second guessing the rise and fall of stock values. Because share transactions are effectively instantaneous this brings a new instability to these markets (Pollner, 2000), requiring flexibility from business managers (Castells, 2000). The impact of key individuals and analysts on these markets can therefore be considerable, raising social psychological issues of social influence and rumour transmission. Sometimes billions are wiped off share values before the validity of information widely promulgated on the net is established. Once again this raises the prospect of another brand of cyber terrorism that can be extremely potent because of the features of anonymity, access, and instantaneous global distribution.

The internet is *the* new frontier for business and commerce generally: e-commerce. Recent prognoses suggest that one third of all commerce will be via the internet within 10 years. For example, Amazon.com to started 5 years ago and now has a turnover of $2.5 billion. The shop is never closed on the internet, nothing is out of stock, parking is no problem and advertising is cheap and literally in your face (e.g., pop-ups). The internet and related channels in digital and interactive TV allows for customisation for both consumer and seller, and customers can get feedback about similar items that match their previous preferences.

The entertainment industry has not been slow to see the opportunities provided by the internet, as well as many other related informational technologies (video, play stations, etc). The internet provides not only a new face of the entertainment corporations, it is increasingly seen as an outlet that threatens them. It can cut out the middle-men as well as merely adding to existing channels and media. Musicians are increasingly using the net as a direct way to release their music thereby bypassing record companies and high street outlets. For example, David Bowie recently sold shares in his whole oeuvre in order to launch himself on the internet, and numerous pop stars have released their work first on the internet. Some books and films have also already been exclusively released on the internet (e.g., Steven King published a net novel exclusively on the internet).

However, it remains to be seen whether the internet will actually compete with the established media. The film industry has, after all, survived the advent of TV and video. Indications suggest that the new media will more likely complement the printed word and celluloid (and the owners of net companies are often the same corporations and multinationals that own the established media in any case). Many video game characters have now crossed over into the wide screen, forming opportunities for mutual advertising and merchandising. Another interesting recent example of cross-fertilisation with a social psychological dimension was the use of a web-sites to hype the low budget horror flick "The Blair Witch

Project". Rumours of this film's basis in reality were deliberately spread by the makers of this movie in order to create publicity. This was perhaps only credible in this medium, far detached from the slick PR machine of Hollywood. The public actively became part of the hype which gathered its own momentum producing a self-generated entertainment in its own right.

The relation between entertainer and audience is also becoming more individualised and interactive (the combination of IRC with live sex sites is a less salubrious example). The internet also provides new opportunities for plagiarism and piracy. For example Napster, the mp3 site, is currently being sued by the band Metallica for making their work accessible. The established record companies and entertainment corporations are having to invest into this new culture if they are to get their cut rather than be cut out. Consumers, can increasingly pick and mix their entertainment, or their preferred news channel, or teletext information, be it in their home or their hotel room. At the same time the individualisation of choice allows providers of these services, armed with data on consumer behaviour (even on the specific consumer), to target their products to the different consumer segments. The shared experience of both watching and discussing last night's TV is increasingly the memory of a previous generation. Greater choice can therefore mean greater fragmentation and individualisation, and a reduced sense of community and common experience. The burgeoning choice is not necessarily positive: it can also lead to uncertainty and stress (Iyengar & Lepper, 1999).

To summarise, as a domain for commerce, and also trading is stocks and shares, the internet has clearly been extremely effective and is fast replacing as well as adding to other traditional domains. It has simultaneously accelerated the twin trends to globalisation and individualisation in relation to the consumer society. However, this brings issues that have a social psychological basis: the power of rumour to affect reputation increases the power of the individual to affect global markets introducing a new instability to these markets undermining some of the rational economic principles of market behaviour.

3. EXPLANATION AND ANALYSIS: THEORIES AND META-THEORY

3.1 Meta-theory

A range of social psychological theories have been proposed to understand and account for the effects of ICTs. These theories often include implicit or explicit assumptions about he nature of technological effects, their impacts, society, etc. These general assumptions have been called 'meta-theory', and these guide but also bias evaluation of the societal effects. In this section, before outlining specific theoretical approaches, we provide a general taxonomy of theories that takes account of these meta-theoretical assumptions and can be used to categorise theories for approaches to ICT effects. Two important sets of distinctions are particularly important here. First many theories in this area tend to provide generalised evaluations of the benefits and implications of the technological changes that are generally optimistic or that are generally pessimistic. In more extreme terms we can classify (meta) theory as tending towards respectively 'utopian' or 'dystopian' visions of the networked society (Kling, 1996; Spears & Lea, 1994). A second important dimension is whether the changes are seen to be driven by primarily technological change, or whether any technological changes are primarily mediated through, and constructed by social factors and social actors. To clarify this distinction we can distinguish between approaches (or evaluations) that reflect 'technological determinism' on the one hand, or 'social determinism' on the other. Crossing these two dimensions results in a fourfold taxonomy of approaches. Many of the existing theories can be placed in these four quadrants. An alternative general meta-theoretical approach that tries to avoid falling into any one of these quadrants, is a more interactionist meta-theory. These approaches try to emphasise that the use and effect of the new technologies are *co-determined* by technological features and social factors (identities, social relations and social practices) rather than being (ultimately) reducible to either. That is the instantiation of technology can not be understood without a knowledge of the people using it and contexts in which it is used. This approach can be conceptualised as existing at the intersection of the four quadrants, transcending these dualisms. We begin by reviewing a range of these theories, models, and frameworks, and define their application in terms of the themes and domains described above.

3.2 Information-based perspectives: technological determinism?

Early theoretical statements about the social impact of ICTs appeared when audio-conferencing became available. These models tend to predict that features of the medium have certain static effects, usually to make interaction less 'social'. What is 'social' here is equated with features that are important in *interpersonal* face-to-face communication such as the degree to which people are sociable and warm towards each other. We shall argue below that this is an unfortunately narrow conception of what the social comprises. Nevertheless, the comparison is very common, and very often leads to the conclusion that ICTs are socially impoverished, with technology determining social outcomes (and usually dystopian visions). However, in some cases social impoverishment is identified as a blessing, namely when social influences are seen to impede individual progress (utopian visions). The grounds for both these assumptions are

the same, however: compared with face-to-face communication ICTs are held to lack qualities of truly social interaction.

A key concept common to many theoretical approaches, one that has contributed to technological determinist vision, is communication 'bandwidth'. Grounded in engineering the aim was to produce an informational model of communication potentially applicable to any situation of information transfer, by humans or machines. The central premise of information theory is the notion that communication can be quantified, reduced to bits of information required to solve problems of uncertainty (Frick, 1959). The digital computer is not only the basis for much new communication and the ICTs, it also provide the metaphors for communication in terms of information transfer. Research on CMC and the internet has been heavily influenced by theoretical approaches that have focused on in the bandwidth principle. As a consequence there has been a tendency to equate the technical efficiency of a communication medium with its 'social efficiency' leading to evaluations of the sociality that rely on mechanistic analysis of information transfer (Lea & Giordano, 1997). The focus on concepts from engineering and information theory meant that this dominant research tradition in this area tended to underestimate the social dimensions of CMC. We now identify a few of the most common theories that are central to this assumption.

3.2.1 The Social Presence Model

The most influential of these early approaches is the Social Presence Model (Short, Williams, & Christie, 1976), the initial development of which predates CMC and the internet. However, it was developed to examine the effects of telephone, audio and video channels compared to FtF communication, which is relevant here. As a result it has been very influential in relation to subsequent theorising about CMC and the internet in laying the meta-theoretical ground rules (e.g., Daft & Lengel, 1986; Johansen, 1977; Rice 1984; Rice & Love, 1987). The critical factor in the communication medium according to this model is its 'social presence'. Social presence comprises a number of dimensions relating to degree of interpersonal contact, 'intimacy', 'immediacy' (Wiener & Mehrabian, 1968) and the personal-impersonal dimension (Champness, 1973).

Empirical evaluations of the Social Presence Model have focused on whether communication media with greater social presence are more effective channels of social influence, and how the hierarchy of social presence maps on to the perceived appropriateness of the new media to deal with different tasks. The results have been mixed on both counts. Ironically the early results of Short et al. (1976) suggested that lower presence (e.g. auditory channel only) resulted in greater social influence than higher presence and this finding has been sustained by subsequent research (see SIDE model below). Research has also not unequivocally supported the ranking implied by the social presence model (e.g., Burke & Chidambaram, 1996; Daft & Lengel, 1986; Hiemstra, 1982; Lea, 1991; Reid, 1977; Rice, 1987, 1992; Rice & Love, 1987; Rice & Williams, 1984; Sproull & Kiesler, 1986; Sumner, 1988; Steinfield, 1986; see also Walther, 1992). In sum, the assumption that CMC is less social, and therefore less conducive to social influence compared to higher social presence media such as FtF is flawed, although this assumption has persisted.

3.2.2 Media Richness Theory

The same or similar ideas to those contained in Social Presence Model have resurfaced since in various guises. The information richness approach, for example, is largely based on social presence theory and follows a similar line of reasoning. Daft & Lengel (1984, 1986) argued that the *media richness* is the key to the capacities of media. The richness of a medium is defined as the potential information-carrying capacity of data (Daft & Lengel, 1984, p. 196). The theory in rooted in organisational information processing theory which identifies resolving ambiguity and reducing uncertainty as the main goals of communication. The fewer communication channels available, the more restricted the medium's capacity is, and the less uncertainty and equivocality it is able to manage.

Although couched in more technological terms, the argument is essentially similar to social presence: the limited capacity for transmitting a variety of social cues is what limits the social potential of various ICTs. This leads to proposals that simple, task-oriented communications are more effective via e-mail, whereas complex social interactions (such as negotiations) are more successful FtF. The richness of the medium should be chosen to match the 'equivocality' or uncertainty associated with the particular communication task. Indeed, most tests of this theory have been concerned with the perceptions of media fit rather than evaluating actual efficiency of performance (Dennis & Kinney, 1998). Although some studies support the media richness ranking for traditional media, large variances relative to very small mean differences have been reported for electronic mail and other mid-ranking media, suggesting considerable variation in media use unaccounted for by the richness continuum (Fulk & Boyd, 1991). Studies that have examined the match between media have not always provided support, and in practice it seems that many factors beyond media richness affect media choice (e.g., Markus, 1987; 1994; Zmud, Ling & Young, 1990). For example in a comparative study of a range of media, including CMC, Kennis and Kinney (1998) found little effect of media choice on decision quality and even contradictory evidence. In sum, the effects of media such as CMC do not seem to bear a straightforward relation to the amount of information exchange of the medium.

A number of question marks can be set next to these relatively deterministic approaches to CMC effects. In particular, the 'media-matching' hypothesis equates communication efficiency with the non-redundancy of information since richer media are supposedly only used because there is more information to communicate. However in human communication redundancy, and even lack of richness ('directness') may sometimes be useful in communicating meaning. What one person (the sender) considers appropriate, another (the receiver, a third party) may not, suggesting we need a more sophisticated understandings of 'appropriate for whom?' Related to this point these models assume that maximum communication efficiency is equated with maximum organisational efficiency. But there are situations in which media are strategically used to distance communication or increase uncertainty, especially in hierarchical organisational communications (e.g., communicating on a 'need to know' basis for forward planning, or managing disputes). Media choice in these circumstances may not be so much a matter of increasing communication efficiency as using media to maintain and reinforce existing power relations.

These models also lack specificity about the processes that determine preferences for media choice and use. Although recent studies have suggested the need to incorporate additional concepts dimensions in order to account for variations in media choice unexplained by the original concepts (Rice, 1993; Trevino, Daft & Lengel. 1990; Valacich, Paranka, George, & Nunamaker, 1993), these additions seem to undermine the notion that a single concept is sufficient to explain media perceptions and choice. Even if social presence or media richness could be shown to provide a reliable explanation of comparison and choice between media, they are poorly placed to account for the variability of uses *within* a specific medium such as electronic mail and internet. Instead, a more refined approach to task analysis may be necessary in order to understand interaction and predict outcomes in which, for example, the nature of the group, the task, the situation and the environment are taken into account (Lebie, Rhoades, & McGrath, 1996; McGrath, 1984).

3.2.3 The Reduced Social Cues model

A more recent theoretical work has drawn on these perspectives to argue that ICTs reduction of social cues has certain social-psychological consequences. The Reduced Social Cues model evolved out of a major investigation of the processes by which the reduction of non-verbal cues and other contextual information in CMC affects the social behaviour of individuals and groups (e.g., Kiesler, 1986; Kiesler, Siegel & McGuire, 1984; Kiesler & Sproull, 1992; Kiesler, Zubrow, Moses, & Geller, 1985; McGuire, Kiesler & Siegel, 1987; Siegel, Dubrovsky, Kiesler & McGuire, 1986; Sproull & Kiesler, 1986, 1991).

The basic thesis of the RSC approach is that reducing social cues stimulates psychological states that undermine the social and normative influences on individuals or groups, leading to more deregulated and extreme ('anti-normative') behaviour. This approach therefore speaks directly to the evaluation of CMC the internet as producing antisocial and anti-normative effects reviewed earlier (and indeed has in part been responsible for this evaluation). In particular this approach has argued that a lack of social cues lead to a state of 'de-individuation', which is associated with disinhibited and anti-normative behaviours (Hiltz, Turoff, & Johnson, 1989; Jessup, Connolly, & Tansik, 1990; Kiesler, Siegel, & McGuire, 1984). De-individuation is a state of reduced awareness of the self and individual accountability, usually accompanying immersion and anonymity in the group (it was originally used to explain aggression in crowds). This state is proposed to underlie deregulation of behaviour and failure to follow social norms and standards (e.g., Diener, 1980; Festinger, Pepitone & Newcomb, 1952; Prentice-Dunn & Rogers, 1989; Zimbardo, 1969; for a review of the de-individuation concept see Postmes & Spears, 1998). RSC theorists have argued that de-individuation associated with anonymity in CMC attenuates normative influence, and reduces evaluation concern, while the slowness and inefficiency of message exchange further exacerbates frustration arousal, and disinhibition. These factors, it is argued, are responsible in turn for greater uninhibited, anti-social behaviour, group polarisation and extreme decision-making, observed in CMC (Kiesler, 1986; Kiesler, et al., 1984; Siegel, et al., 1986). As we have seen these processes have therefore been used to account for 'flaming' (e.g., Kiesler, et al., 1984).

However, reducing social cues is also considered to have 'beneficial' social consequences. As we signalled earlier in assessing the social consequences of the net, it has been argued that this can help to undermine status and power differentials found in FtF groups, leading to more equalised participation (e.g. Dubrovsky, Kiesler & Sethna, 1991; Kiesler & Sproull, 1992).

These differing views on whether the effects of reduced social cues are good or bad highlight the problems inherent in making general claims about the benefits and losses of CMC. More fundamentally they rest on genuine difficulties and differences as to the validity or relevance of the social psychological theory used to explain these effects. As a consequence, a number of specific criticisms have been levelled at the reduced social cues model, particularly on the issue of to what extent the social dimension in group interaction actually plays a role in CMC (e.g. Lea & Spears, 1991; Matheson, 1992; Spears & Lea, 1992; 1994). For example, a central concerns the central thesis that the greater group polarisation follows from a weakening of social norms in CMC, when group norms and group influence are central explanatory concepts in accounting for group polarisation (Isenberg, 1986; Wetherell, 1987; Turner, 1991). Part of the problem for the RSC model derives from the translation of the state of disinhibition, as reflected in uninhibited behaviour, into group polarisation and more risky or extreme decisions. Disinhibition and the riskiness or extremity of decisions are separate phenomena. This evident when one considers that group polarisation can also reflect shifts to caution following group discussion (Fraser, Gouge & Billig, 1971; Pruitt, 1971). Indeed Hiltz, Turoff and Johnson (1989) obtained just such a cautious shift in a CMC study. These findings would seem hard to square with the idea that polarisation reflects 'disinhibition'. Indeed there seems to be surprisingly little if any direct empirical support in the literature that CMC is characterised by an absence or weakening of social norms.

Moreover, the deregulated and antisocial psychological state of de-individuation theory is inconsistent with the relatively reasoned deliberation argued to underlie group polarisation effects. The role of self-awareness within the model is problematic for similar reasons. Whereas de-individuation implies reduced self-awareness (e.g., Diener, 1980; Prentice-Dunn & Rogers, 1989), Siegel et al. (1986) argue for a heightened (private) self-awareness within CMC. Indeed, isolation at the computer terminal could be regarded as individuating rather than de-individuating, and this could help to explain evidence of greater (private) self-awareness in CMC observed in independent studies (Matheson & Zanna, 1992).

In empirical terms, results of research within this framework have been rather mixed, partly reflecting some of these theoretical problems. Significantly more group polarisation was observed in CMC conditions, accompanied by significantly less information exchange (Kiesler et al., 1984). There was also more uninhibited behaviour (flaming) was observed in CMC than in FtF in two out of four experiments (Kiesler, et al., 1985; Siegel et al., 1986). In addition, greater task focus and lower attraction responses were found in CMC (Kiesler, et al., 1985). However, a subsequent experiment found significantly more decision proposals, uninhibited behaviour, and equality of participation in electronic mail, compared to FtF, but no difference in group polarisation (Dubrovsky, et al., 1991). Subsequent research also questioned whether CMC is a less powerful medium of social influence than FtF communication that is less sensitive to normative or group influences.

Subsequent research has also questioned whether status and power equalisation is a generic consequence of CMC. There is evidence that CMC can reflect and even enhance status related groupings (e.g., Postmes, Spears & Lea, 1998; Postmes & Spears, 2000; Schofield, 1999; Spears & Lea, 1994; Straus, 1997; Weisband, Schneider & Connolly, 1994). However, this proposition assumes that power related gender differences, for example depend in part or whole on the tangibility of the categories (visibility, identifiability, accountability) rather than (quite literally) being engendered in the discourse itself. In the case of gender relations, if as research suggests that the power relations are indeed already encoded to some extent within the discourse (e.g. Mulac, 1989; Mulac & Lundell, 1986; Thomson & Murachver, in press), then even individual and category anonymity is unlikely to eliminate gender speech markers or their consequences. In fact, some have argued that the anonymity associated with the CMC and the internet may actually enhance gender differences by giving freer rein to typically uninhibited male behaviour such as flaming (Herring, 1994; see also Kramerae & Taylor, 1993; Spears & Lea, 1994; Spender, 1995). We discuss further reasons why this may be the case below, in relation to the SIDE model.

To summarise, the RSC model has been important and influential in highlighting the range of effects that CMC can have and relating these to the reduction in social cues within this medium. It is less convincing in identifying or testing the precise mechanisms responsible for the effects. In particular, the claim that behaviour is less socially regulated or less subject to normative influences does not seem well founded. This is due in part to the theoretical eclecticism that has not always facilitated the parsimony of explanation or the clarity of predictions. Moreover, precisely because the RSC approach tends to define the group in terms of face to face interaction between co-present individuals, this approach tends to underestimate the psychological 'reality' of virtual groups, and thus the impact of social influence and group processes in CMC and the internet.

3.2.4 The Social Information Processing Model

The social information processing model (SIP: Walther, 1992) also uses aspects of the limited bandwidth associated with ICTs as a foundation for driving social psychological effects. Drawing on impression formation literature, SIP argues that these processes in CMC are unlikely to be radically different from the impression formation processes implicated in FtF, but just operate on a slower time scale, commensurate with the slower rate of social information exchange in CMC. The limited bandwidth of CMC forces social information into a single linguistic channel that retards impression formation relative to FtF interaction leading to more impersonal communication and negative evaluations of others in CMC relative to FtF. This model therefore attempts to clarify the effects of bandwidth restriction in CMC as retarding rather than removing social information exchange from interaction. This in turn implies that in longitudinal studies of CMC using longer time scales would get to a similar position to FtF the end in terms of relational development.

Two key propositions follow from this approach, namely that more impersonal, task-focused communication and less positive social evaluations of other interactants should be observed in short-term CMC than in FtF interaction or long-term CMC. However, tests of these propositions have met with only limited success. Indeed, some studies found less impersonal focus and greater attraction in

short-term CMC than in FtF, directly contrary to predictions (Walther, 1995, Walther & Burgoon, 1992). More recently, the social information processing determination of CMC effects has been revised to incorporate contextual factors, such as anticipation of future interaction and group salience. For example, anticipation of future interaction was found to be a better predictor of dyadic relational communication than communication channel, which in turn moderated rather than determined these effects. In group CMC, high group salience was found to support greater intimacy levels within long-term CMC groups than low group salience conditions (Walther, 1994, 1997).

Meta-analyses of previous research also tend to contest the inevitability of impersonal task focus and reduced sociality within short-term CMC. One such analysis supported greater task focus in CMC decision-making groups, compared to equivalent FtF groups (McLeod, 1992), but a wider analysis of anonymity in group CMC did not (Postmes & Lea, in press). A further analysis that directly examined interaction time found a small effect of time on the ratio of socially-oriented communication in CMC, compared to FtF, but no effect on the level of antisocial communication (Walther, Anderson & Park, 1994). Recent research using the SIDE model (see below) showed that the SIP model prediction of more impersonal task focus in CMC leading to reduced social attraction did not fit the data (Lea, Spears, & de Groot, in press). Taken together, these results suggest that limited bandwidth communication (such as in text-based CMC) has at most only small and inconsistent effects on social communication and relational development that are not well explained by temporal factors.

3.2.5 Summary

To summarise, various information processing approaches that have their theoretical roots in the engineering concept of communication bandwidth have proposed that limiting information exchange will have deleterious effects on social communication. In general the implications for the social effects of technology are fairly straightforward from these theoretical perspectives. They are positive where social influences are obstacles for individual performance (as in the realm of GDSSs and status equalisation, where these determinist perspectives have tended to be utopian). However, ICT's social effects are negative where social influence has a beneficial and regulating impact on keeping people's behaviours in check (as is the case in flaming and anti-normative behaviours, where dystopian views prevail).

However, the assumptions are more clear-cut than the empirical results. The evidence is weak that the 'social nature' of CMC can be determined in such a direct manner from technical efficiency, whether this is cast in terms of social presence, information richness, reduced social cues or social information processing. Research consistently shows that in some contexts, the use of ICTs stimulates anti-normative behaviour, whereas in other contexts behaviour is *more* normative. Likewise, contradictory results have been obtained for equalisation (Schofield, 1999; Spears & Lea, 1994; Straus, 1997), social influence (Postmes et al., 1998), social cohesion and attraction (Lea, Spears, & de Groot, 1999; Walther, 1996), and decision-quality in GDSSs (Benbasat & Lim, 1993; Chun & Park, 1998; Postmes & Lea, in press). Thus, empirical support for these perspectives is limited and equivocal.

Despite their poor empirical record, it is nevertheless important not to underestimate the importance of these theoretical perspectives. Their assumptions are widely shared, and as a consequence we find these narrow conceptions are applied to a broad range of social effects. In response, many theorists have dismissed *all* perspectives that aim to identify the ways in which technology has certain social consequences, concluding that technological determinism is too limited to explain the rich interaction between technological and social influences. This theoretical response has fuelled an equally one-sided counter-movement, which assumes that technologies are principally determined by their social uses. This is the core assumption of the perspectives we discuss next.

3.3 Social constructionism I: social determinism?

The idea that communication technology has certain fixed effects on human interaction has increasingly being challenged by research showing the diverse effects of these media, disproving assumptions of designers and scientists alike about the expected uses of ICTs (e.g. Robey & Boudreau, 1999). A familiar example is that when the telephone was introduced, designers believed it was fit only for brief business-to-business communication. To use telephones for personal conversation was an 'invention' of the users themselves, and only gradually became normative (Fischer, 1992). This process whereby users collectively establish norms is sometimes referred to as *social construction*, and reflects a current within sociology and critical social psychology that has become known as 'social constructionism'.

Social constructionism has many different roots and variants. It has roots lie in ethnomethodology (e.g. Garfinkel, 1967), linguistic philosophy and speech act theory (Austin, 1962), semiology and semiotics (e.g., Barthes, 1972), and post-structuralism and deconstructionism (e.g., Derrida, 1976; Foucault, 1981). Social constructionists have emphasised how social practices, representations and discourses help to shape social reality and effectively bring it into being (Berger & Luckman, 1966). These approaches often go hand in hand with a critique of positivist science and experimental methodology, and prefer to see behaviour as historically and contextually situated rather than reflecting underlying causal processes grounded in general principles (see Spears, 1998, for a review in relation to social psychology). As such, social constructionism tend to be relativist rather than realist, and in its most radical form, has taken the position that there is nothing beyond the constructions or 'outside the text' (e.g. Derrida, 1976; Gergen, 1985; but see Parker, 1992). Michael (1996) captures social constructionism with the following definition: "social practices constitute givens which have consequences" (p.5).

Social constructionism has had an impact in the realm of understanding ICTs, and particularly how these are used and transformed in practice (e.g., as distinct from their prescribed usage). In CMC theorists have proposed that social construction is a major influence in the use of ICTs (Fulk, 1993). Social constructs can develop from the micro-sociological aspects of the situation, and macro-sociological forces in society (Feenberg, 1992). Perhaps the most influential approaches of these has been Adaptive Structuration Theory (AST). AST is a theory of how social context and technology mutually influence the 'structuration' of technology (Contractor & Seibold, 1993; DeSanctis & Poole, 1994; Orlikowski, Yates, Okamura, & Fujimoto, 1995). Structuration is a concept

introduced by the sociologist Giddiness (1984) to transcend the individual/society, agency/structure dualisms that have plagued sociology and social theory. Within traditional sociology there has been a historical split between theorists who tend to emphasise the importance of social structure (e.g., structural functionalists) and those who emphasise the agency of individual actors (as in social action theory, ethnomethodology, symbolic interactionism). Whereas the former tend to over-emphasise the stable, fixed, and functional nature of the social order (emphasising social reproduction and thus social determinism), the latter tends to over-emphasise the freedom of individual agents (with the consequent danger of voluntarism). Simply speaking, structuration theory represents and attempt to bridge this dualism by showing how social structures are always reproduced by individuals, and by collective agents (groups, institutions) that comprise and deploy individuals.

AST proposes that technology provides a social structure for actors, because the 'spirit' of technology and specific technological features stimulate particular forms of interaction. This social structure provided by technology is just one of many structures (such as the task at hand, the wider organisational context, etc.) that influence the way in which technology is appropriated by groups and organisations. A further influence on the nature of these appropriations is the 'internal system of the group,' which encompasses various group characteristics such as communication style, members' knowledge and expertise, and shared visions and interpretations. Due to the myriad of factors that impact on the users of technology, AST suffers from difficulties predicting *how* technology structures its use (DeSanctis & Poole, 1994, p. 131). From a social psychological perspective it tends to be couched in somewhat abstract and even mystifying terms, and usually fails to specify the (social) psychological processes that underlie or accompany particular patterns of behaviour.

Despite the theoretical sophistication of these theories and the importance of crediting social influences in technological domains, they remain rather indeterminate and vague (a criticism that has plagued social constructionism generally). Indeed, ethnographers and ethnomethodologists who follow this tradition often eschew theory completely, viewing it as imposing ideas from above. They prefer to looking at the specific instantiation of technology as implemented and constructed in practice, often letting the subject matter speak for itself, and avoiding abstracting general principles or rules (see Gergen, 1985). Generalisation and consequent theory formation are often see as problematic from this point of view, and are part of a critique of positivism in general (see Spears, 1998). This has perplexed some looking for more theoretical structure, and a search for underling process that might promote the explanation and prediction of behaviour. For example, Rice (1992) has noted that models of social influence and social construction "in general fail to provide adequate guidance as to how to identify relevant source others, operationalise different mechanisms of social influence, or specify the sources of influence at different levels of analysis" (p. 32). Baym (1955) comments that "the scholar…is left without precise pointers about where to look or what to look for in search of appropriation" (Baym, 1995, p. 150).

The tendency towards social determinism is not always obvious, and is often characterised by an absence of an analysis of the effects of technology rather than claims of explicit social determination. Many of these approaches do explicitly acknowledge the importance of features of the technology (e.g., as in AST).

Nevertheless, they consistently fail to specify *how* technology limits the extent to which users may invent and develop their own uses of technology, often to avoid the conflicting conclusions of technologically determinist approaches. Such approaches are most elaborate about ways in which users determine uses. Consequently technology seems to impose few constraints on how people use it, conveying the message that social factors are the key to understanding technology use (Postmes et al., in press). For example, the behaviour-context approach of Fulk, Schmitz and Schwarz (1992), which has close affinities with the structuration theory, emphasises the specificity and richness of social context in an effort to explain the variety of technological effects. However, as a result the role of technology itself is often excluded from the context, and remains unspecified or "black-boxed" (Lea, O'Shea & Fung, 1995). Button (1993) has referred to the tendency to undertheorize the effects of technology in social studies of technology as "a curious case of vanishing technology."

Social constructionism has been associated with both dystopian and utopian visions. For example, social constructionism and AST have tended to warn against over-simplified conceptions of the impacts of for example GDSSs on decision quality, suggesting that those impacts are much less positive than is often assumed. Conversely, we also find utopian visions in relation to identity manipulation. The idea that the internet offers a realm for reinventing the self could be seen as part of this trend (Gergen, 1991; Haraway, 1990; Poster, 1990; Turkle, 1995). These are examples of the agency end of the agency/structure dualism taking precedent – forming an idealist escape from the social structure and the reality of offline life. From our perspective, the main concern with these approaches is that they tend to lead to social determinism on the one hand (where the stress lies on pre-existing social structures), and to relativism and voluntarism on the other (where the emphasis lies on the freedom of individual agents). Both share a failure to specify just how technological features interact with and constrain social psychological factors with what results.

This makes this approach to vague and indeterminate to be of great value to policy makers. However, would argue that a wealth of knowledge has accumulated about uses of technology that *does* suggest that meaningful prediction is possible, provided that both characteristics of technology as well as social context are taken into account. Indeed, it is ironic that social constructionism and adaptive structuration theory are based on experiences with GDSSs, because in this domain the variability of ICTs' social effects is actually quite limited, provided that certain contextual features are taken into account (Benbasat & Lim, 1993; Chun & Park, 1998; Postmes & Lea, in press). We now consider perspectives that try to make progress in prediction whilst acknowledging the social and technological inputs.

3.4 Interactionist approaches

In this section we consider what we call 'interactionist' approaches to the effects of information technologies that attempts to take into account both the social and technological sides of the equation, without reducing explanation to either. There have been a number of attempts to integrate these two elements, although sometimes this has involved grafting social elements on to the technological base (or vice versa). For example, later modifications to Media Richness Theory have attempted to extend it beyond its original strictly informational base by borrow-

ing from structural symbolic interactionism (Trevino, Daft and Lengel, 1990). These authors suggest that 'external forces' or contextual factors may influence media choice, include distance, time pressure, accessibility of the medium, and the existence of a critical mass of users. A revised symbolic interactionist perspective of media choice also recognises that symbolic meanings of different media that are independent of message content ('the medium is the message') can also affect communication outcomes.

In the present section we go further along this road by considering approaches that from the outset try to acknowledge the social and the technological inputs into (dynamic) media effects. We propose two candidates, one with a more sociological and social constructionist emphasis (Actor Network Theory) and one with a more social psychological focus (the SIDE model). We do not claim that these are the only interactionist perspectives of value, nor that they should be viewed as final theoretical statements. However, in our view they form useful provisional frameworks that we think provide the currently best hope of a) gaining insight into the specificity and contextual contingency of media effects, without b) dissolving into 'anything goes' ad hocism.

3.4.1 Social constructionism II: Actor Network Theory and ICTs

A social constructionist approach that is better placed to take into account both the social and technological sides of the new media is Actor Network Theory (ANT: Bijker, Hughes & Pinch, 1987; Bijker & Law, 1992; Callon, 1986, 1991; Callon & Law, 1989; Latour, 1991; Law, 1991; Michael, 1996). Unlike other forms of social constructionism, ANT accords technology the status of an actor that shares some of the properties of human agents, and helps to shape their mutual interaction. A key notion of ANT is that technology exhibits interpretive flexibility: it can mean different things to different individuals or different groups, at different times and in different contexts. This flexibility is frequently transient however, and after 'closure' occurs (e.g., because a consensus emerges or one particular group wins the debate), the memory of the original process by which the design was 'fixed' may be lost. The goal of this approach is therefore to examine how and why technology comes to assume one particular form in a given social context from a range of possible alternatives (e.g., Bijker, Hughes & Pinch, 1987; Bijker & Law, 1992; Law, 1991).

According to this perspective design is not fixed in the traditional development stage. Rather the interpretive flexibility of technology means that its design continues to evolve even during diffusion, implementation and usage (e.g., Bijker, 1992). Consequently, the functions of a new communication medium are negotiated during the course of its development and through its manner of adoption by users. We have already noted the example of the telephone. A more recent example can be found in the development of the French videotex system (Télétel) which, although originally designed as an information service linking French households to on-line databases, was subsequently reinvented during use to become primarily a notoriously successful computer-based messaging system for interpersonal communication between users themselves (Feenberg, 1992). Lea, O'shea and Fung (1995) have applied a similar analysis in order to understand the particularity of CMC implementation in an organisation.

Actor-networks are subject to continual processes of definition and redefinition by the actors themselves. The construction and transformation of these socio-

technical networks is achieved through the process of *translation* whereby sets of relations between separate projects, interests, goals and objects are proposed and built. This process of translation involves the production of *intermediaries*. They include texts (such as reports, manuals, training materials, help files, and so on), technical artefacts (the relatively stable technical elements which combine to form the technology), and human beings and the skills and knowledge that they incorporate. Actors put intermediaries into circulation. They take the last generation of intermediaries and transform them to create the next generation. The difference between an actor and an intermediary is not predetermined by, for example, the distinction between humans and machines; it is an entirely practical matter concerning agency and authorship. Finally, the act of translation is achieved through a series of *investments of form*: objects that are numerous, heterogeneous, and difficult to manipulate are rendered less numerous, more homogeneous, and more easily controlled while nevertheless remaining sufficiently representative of the former as to facilitate their control (Callon, 1986, 1991; Callon & Law, 1989).

ANT seeks to account for both success and failure of technology within the same theoretical framework. Thus, the success of videotex in France and the contemporary failure of similar systems in Britain and many other countries are explained in terms of the relevant (social) actors and the kinds of social and technical issues that were negotiated and re-negotiated during the development and use of the respective systems. In this case the functions of videotex followed from the interpretations that were agreed upon through the negotiations of governments, PTTs, manufacturers, the press, the public, and eventually the users themselves, over issues such as the mode of connection of databases to the system, the means of providing access to the system, the definition of services and service providers, the kind of user interface, the system of tariffs, the communication infrastructure, the place of the technology in national politics and ideology, and so on. 'Technical problems' and their resolution had profound implications for relations between relevant social actors. However, a stable technology only emerged once solutions to the relational issues were themselves resolved (Feenberg, 1992; Thomas, Vedel, & Schneider, 1992).

As well as challenging more deterministic analyses of technology design and adoption, ANT has extended the constructionist approach beyond its primary concern with the influence of prior social groups upon technology development. It argues that these social groups are themselves constructed in part by the technology; that the process of constructing technology *and its users* is a reflexive one in which both technology and social groups mutually elaborate each other. Latour (1991) demonstrated this co-constructionist process in the simultaneous development of the Kodak camera by the Eastman Company in the late 19th century and the building of a new mass-market of amateur photographers. Latour (1991) argues that what is observed in such cases is an innovatory path in which all the actors co-evolve in a process of translation of technology and social group by each other.

For example, Lea et al., (1995), showed in a case study of a professional services company in the IT industry (SoftCo) how the trajectory of attempts to implement email follows the mobilisation of actors over time, and is shaped by the specific and shifting concerns of the actor networks in the organisation. In other words, patterns of use cannot be predicted directly from features of the communication technologies (here email), but are shaped by the actors mobilising other

actors and intermediaries, including features of the new media, to achieve their ends; "the development of electronic communications did not follow a simple linear path, but was instead shaped and reshaped erratically and somewhat haphazardly as a host of different actors and events came into play." (Lea et al., 1995).

This theoretical framework may appear abstract and daunting to those unfamiliar with the terminology and concepts. However, it should be apparent that ANT is better placed than many frameworks to account for many of the often contradictory phenomena relating to the implementation and effects of ICTs reviewed earlier. It does not privilege either social or the technical elements in the analysis of design, implementation and use of new technology. Nor does it make generic predictions about technological effects, and is open to variation in how ICTs are used, defined and instantiated. This approach therefore helps to explain why new ICTs that are widely adopted in one social, or cultural context, do not necessarily translate their success in another context. The example of Videotex has already been mentioned. In the Dutch context this approach might provide insight into why the introduction of 'Chipknip' (direct payment via plastic for small transactions) flopped here, but was a success in Belgium. According to ANT, understanding this requires an analysis of how different actors (the public, the designers, promoters, shopkeepers and vendors) were or were not mobilised in relation to this new technology. The success of ICTs does not follow automatically from their properties and possibilities: these have to be actively mobilised and realised in practice.

This theoretical approach also provides insight into how some of the virtual networks associated with the internet acquire their force. According to this approach there is no reason why the social ties, and virtual communities should be any less powerful or important than their offline equivalents. This approach also provides a basis for understanding how power and influence may operate in these virtual environments, without depending on coercion and co-presence.

At a more critical level, one of the potential theoretical weakness of this approach that it shares in common with some of its social constructionist relations, is a reluctance to generate *generalisable* process accounts of media effects. Whilst an emphasis on the importance of local context is laudable at one level this can be frustrating for those, including policy makers, keen to abstract more general lessons about the social effects of ICTs.

A second, theoretical problem with ANT is that, partly because of the drive to emphasise the equivalence of social and technological actors in the interactionist equation, it can underplay important differences between these. Although both social and technological elements shape and elaborate each other, in our view it is misleading to view them as similar kinds. In particular ANT, by treating both as equal inputs, tends to assume that technology functionally shares features usually associated with social agents, such as 'agency' (the capacity to *consciously* interpret and *intentionally* act on one's environment). In our view, it is important to preserve this distinction between the social and the technical. This is not to deny that technology, as part of the material world, will exert important and powerful *affordances* (Gibson, 1986; see Costall & Still, 1987), and affect how the technology is shaped and used by social actors. Nor are all mobilisations of technology by social actors necessarily conscious and intentional. However, it is important to preserve the property of agency and capacity for intention as distinctly human if we are to understand fully the nature of the social/technological

interaction. In short social and technological components can be equally impactful without being equivalent. It is important that avoiding reductionism and determinism does not lead us to neglect the different character of the two.

A consequence of downplaying the social/technology boundary in ANT is that it also tends to view a (social) psychological analysis of the social actor side of the equation. The capacity of for consciousness and reflexivity open the door to the agendas and interests associated with self and identity which help to explain the motivations and behaviour of users of technology (and explain why social actors might try to mobilise in certain ways). From a social psychological perspective, ANT does lack insight into some the concrete social psychological processes which would help us to explain and understand behaviour when using ICTs. We now turn to an approach that offers further specification in this area.

3.4.2 SIDE, CMC, and the internet

A second interactionist approach to consider the effects of ICTs and CMC in particular is the SIDE model (the Social Identity model of Deindividuation Effects: Lea & Spears, 1991; Reicher, Spears & Postmes, 1995; Postmes & Spears, 1998; Spears & Lea, 1992; Spears & Lea, 1994). This model has a more social psychological focus than ANT in the sense that it tries to specify the psychological processes underlying particular effects of technology, analysed in terms of their contextual features (e.g., anonymity, isolation). However, in contrast with more technologically determinist psychological models, it does not view these technologies as having generic effects. Rather the effects are always mediated in terms of identities and their accompanying norms that are often determined in context. Like ANT then it sees the social and the technological as mutually determining, and the behaviour associated with particular communication forms as the product or interaction of the two. Taking a temporal perspective makes this iterative, dialectical relationship even more apparent.

The SIDE model arose partly as a response to the reduced social cues approach described earlier, and contested the notion that CMC is less socially regulated than FtF communication (Lea & Spears, 1991; Spears & Lea, 1992). Indeed this model offers perhaps the most explicit challenge to the notion that ICTs are socially impoverished media that reduce the effects of social norms and standards. This speaks to some of the central issues raised when considering the effects of the net. In this model an important distinction is drawn between different sorts of social cues that may be present (or absent) in CMC, namely interpersonal cues, and cues to social features, such as group identity and category membership. It is argued that whereas CMC may indeed filter out many interpersonal cues that identify and individuate the communicators, group and category level cues that are communicated relatively independently of bandwidth considerations are thereby given more opportunity to influence interaction, and the definition of the self and situation.

The model extends a social identity critique of deindividuation theory previously applied to collective behaviour to the CMC domain (Reicher, 1984; Reicher, Spears & Postmes, 1995; Spears, Lea & Lee, 1990). According to this approach, deindividuation caused by immersion and anonymity in the group does not result in loss of identity or reduced self-awareness (as proposed by classical deindividuation theory and the reduced social cues approach). Rather this results in a shift of self-focus from personal to group identity. Social Identity Theory

(Tajfel & Turner, 1986) and Self-Categorisation Theory (Turner, 1987) provide the foundations for the model in proposing that the self is in not a fixed entity, but is socially defined in the context (links to social constructionist models such as ANT are also evident here: see Lea & Spears, 1995; Lea et al., 1995). Although our identity as unique individuals may be salient in many interpersonal situations, in intergroup contexts, where group identity is salient, we are likely to see ourselves and others in terms of this identity, and act in accord with the norms of this identity (Tajfel & Turner, 1986; Turner, 1987).

Organisational Identity Theory (OIT) also draws on social identity theory in explaining how allegiances to different groups or categories can explain behaviour in organisational settings that are increasingly dependent on CMC and ICTs generally (Albert & Whetten, 1985; Ashforth & Mael, 1989, 1996; Dutton & Dukerich, 1991; Dutton Dukerich & Harquail, 1993). However OIT, while incorporating the strengths of social identity theory, does not provide an analysis of the specific contextual effect of *technological features* addressed in SIDE. Specifically the SIDE model extends the social identity analysis of self and behaviour by outlining how the salience and effects of social identity might be affected by key situational variables in the CMC context such as anonymity versus identifiability.

According to the SIDE model, anonymity can have two classes of effects, that we have termed 'cognitive' and 'strategic' (Reicher, Spears & Postmes, 1995; Spears & Lea, 1994). The cognitive effects relate to the salience of a particular identity (personal identity or a group identity) and more precisely refer to issues of self-definition. Anonymity can function to enhance group salience by reducing attention to individual differences within the group (literally 'de-individuation' or 'depersonalisation'). The strategic dimension refers to whether the individual or group member feels able to express behaviour in line with a particular identity, given that this is salient. This depends on the presence of social reality constraints in the situation (Spears, Jetten & Doosje, in press). This is particularly relevant in intergroup contexts in which a power relation is present between groups. In this case anonymity from a powerful outgroup may enable members of the other group to express group normative behaviour that might otherwise be punished or sanctioned by this group.

Research on CMC from the perspective of the SIDE model has to date largely concentrated on the cognitive effects of anonymity in enhancing group normative behaviour. It should be noted that this prediction is directly opposite that of classical deindividuation theory which would predict anti-normative behaviour under conditions of anonymity (e.g. Festinger, Pepitone & Newcomb, 1952; Diener, 1980; Zimbardo, 1969), and therefore is contrary to the predictions of the Reduced Social Cues perspective. However, as we have seen, there is growing evidence that anonymous CMC does lead to increased social influence in line with group norms compared to FtF interaction or conditions of identifiability (Lea & Spears, 1991; Watt, Sünram-Lea, Spears, & Rogers, in press; Postmes, Spears & Lea, 1998; Postmes, Spears, Sakhel & de Groot, 1998; Spears, Lea & Lee, 1990). Enhanced group polarisation in CMC is, according to this view, one form of social influence that reflects conformity to (extremitised) group norms (Spears et al., 1990: see Turner, 1991; Wetherell, 1987). Recent experimental research has also provided more direct support for the processes thought to mediate the effects of anonymity on the group, namely by enhancing group identification, self-categorisation as a group member, and self-stereotyp-

ing (Watt et al., in press; Lea, Spears, & de Groot, in press; Postmes et al., 1998).

It is important to note, however, that the SIDE model does not always predict increased social influence in CMC, because this depends on the identity made salient in context. In common with social identity and self-categorisation theories, SIDE sees social influence as a group process of conforming to group norms when these identities are internalised and made salient (Turner, 1991). However, if competing social identities, or alternatively more individual or 'personal' identities are made salient, social influence should not result, and reactance or counter-influence may even occur. This was demonstrated in a study by Spears, Lea and Lee (1990). As predicted participants conformed to the group norm when this was salient, and this effect was strongest in the anonymous condition. However, when individual identity was salient, participants diverged from the group norm under anonymous CMC.

This example, emphasises most clearly the interactionist nature of the SIDE model: It does not predict generic main effects of the technology, but rather these effects are quite literally an interaction of the context (constituted by the technology) and the social inputs provided by (personal or group) identity and normative content. This forms a key divergence with the other social psychological approaches reviewed above which explicitly predict an impersonal task focus in anonymous CMC. This is supported by several studies. For example, Lea et al. (1998) found no generic effect of task focus on attraction in CMC discussion groups; instead, perceived task focus increased (rather than reduced) attraction to the group for those participants who self-categorised with the group, in line with a local normative explanation of task focus effects. Indeed there is evidence that behaviour in even short-term anonymous groups can become more socio-emotional rather than task-oriented, if this is evident from group norms. Postmes et al. (1999) surreptitiously primed these two different types of group norms prior to a group discussion. Subsequent group decision reflected these different norms but most strongly in anonymous groups. Moreover evidence showed that this norm developed over time during group discussion and reflected the operation of genuine social influence that was linguistically transmitted in group discussion.

Other research in a more naturalistic field setting using email groups has also confirmed that group norms develop over time, conforming to norms that are prototypical and distinctive for the group (Postmes, Spears, & Lea, in press). Content analysis of both the content and the form of group communication showed that over time language tended to conform to a prototypical pattern that characterised the content (but not necessarily the form) of group communication. Once again then this study confirmed that group-based CMC does not reflect a generic norm (e.g. impersonal, task oriented), but that norms are constructed *in situ*, and become reinforced within the group through mutual group influence.

This research program also indicated that flaming was not generic to all groups but varied widely depending on the group norm. Moreover, analysis of the transcripts suggested that where flaming did occur, it often did not reflect genuine insults, but was playful, ironic, and reflected social intimacy rather than social distance. Once again the linguistic markers are highly variable and related to specific group norms developed in context. This is confirmed by a review of the literature concluding that despite widespread acceptance of the ubiquity of

flaming in CMC, it only occurred in a tiny proportion of CMC messages overall, and its absolute and relative frequency (compared to FtF) were overestimated by observers and reporters (Lea, O'Shea, Fung & Spears, 1992). Indeed, rather than flaming being a general effect of the CMC medium, it appears to be restricted to certain groups, both in experimental studies and on internet newsgroups, in line with a group normative explanation of their occurrence (Kayany, 1998; Lea et al., 1992).

An important technical reality of CMC and the internet is that although it connects people, it also isolates them physically. This dual identity has interesting and contradictory effects, especially in relation to empowerment and the ability to engage in collective action (Spears & Lea, 1994). The isolation means that people may lack the feeling of power that co-presence ensures (e.g. in the crowd, in the mass meeting). On the other hand, CMC also provides the communication medium linking previously isolated individuals, and by means of which social support for shared collective interests can be communicated. This speaks to the important of the internet as a medium for social support, networks of solidarity forming virtual communities. Experimental research on the strategic dimensions of the SIDE model suggests that resistance against powerful outgroups may indeed be facilitated when communication by computers is available, and that this is mediated by social support (Spears et al., 2000). So where as the increasing isolation and distributed nature of communication may undermine certain traditional forms of collective resistance based on co-presence, it also produce opportunities for new forms based on increased connectivity and communication.

The possibility of anonymity afforded by the internet helps us to understand the cognitive and strategic processes underlying the operation of status and power differentials in ICTs (Lea, & Spears, 1995; Postmes & Spears, 1998; Spears & Lea, 1994). Identifiability to ingroup and outgroup audiences can result in behaviour compliant with norms and expectations of these groups. This results from the power of sanction in the case of powerful outgroup audiences. Whereas identity may often be anonymous in recreational use of the internet (e.g., IRC), this is unlikely in more organisational use of CMC where ones identity is likely to be known to managers and those in authority (Spears & Lea, 1994). These effects are consistent with the argument of previous approaches that anonymity can offer some protection from status and power inequalities, although in practice CMC is unlikely to offer this anonymity in those very contexts where it might be desired, and where there are power differentials (Spears & Lea, 1994). However, power relations can be sensitive to 'cognitive' as well as strategic effects. In line with SIDE principles anonymity can have effects on the salience of the intergroup context, and thus enhance the impact of associated power differentials. Moreover, like other group level effects, somewhat counter-intuitively, we would expect anonymity to strengthen group boundaries and reinforce power relations associated with them. For example, Postmes and Spears (1999) showed that when gender identity was salient, anonymous CMC tended to reinforce gender inequalities in participation, compared to identifiable CMC. Other research also supports the accentuation of status difference within CMC (e.g., Herring 1994; Postmes et al., 1998; Spears & Lea, 1994; Weisband et al., 1994). The SIDE model therefore challenges the notion that CMC will always or generally equalise status and power differentials, which should only occur if cues to category membership themselves are eliminated. As argued earlier this condition

may be hard to achieve even in CMC because cues to enduring social categories such class, gender, and ethnicity are often subtly communicated in language, as well as through direct category markers (e.g., Mulac, 1989; Mulac & Lundell, 1986) and evidence is emerging that these are detected and acted upon in anonymous CMC (e.g., Herring, 1996). For example, in one bulletin board study, men's messages were longer and used more 'male language' (assertions, challenges, authoritative tone) than women's, who tended to use less confrontational and authoritative styles. The salience of these cues to gender is also revealed by their effects on participants' communication behaviour, which are dependent in turn on the social context for communication. In work-group discussions, women's messages tend to receive fewer responses (from men and women) and topics initiated by women were less likely to be taken up by the group (Herring, 1994). However, in recreational situations, women's messages tend to receive more attention from men (Reid, 1991).

The SIDE model is not without its shortcomings and criticisms (see Spears, Lea, & Postmes, in press). For example the effects of isolation are as yet less fully researched than the effects of anonymity. However it offers a provisional theoretical framework to analyse contextual features in terms of their interaction with social psychological variables. Moreover, like ANT, it has key advantages over more determinist models in being able to account for variation in media effects, while providing further insight into the underlying social psychological mechanisms. Specifically, it predicts the form and direction of behaviour deriving from the level and content of identity. In these terms it is able to account for both prosocial and antisocial forms of behaviour in CMC and on the internet, by demonstrating the fundamentally social basis of both.

A major aim of SIDE is to demystify the impact of these new media by arguing that essentially the same processes apply as for interaction in other media. However, SIDE does attempt to explain how the specific features of the media technology (anonymity, identifiability, isolation) can strengthen or weaken effects of contextually relevant identities. SIDE is able to explain the impact of identities, and the possibility of intense sociality in distributed environments, and virtual communities. Equally it helps to explain the possibility of isolated individualism, and why the internet may feed the cult of the individual as much as it can strengthen social identities. Finally it also provides an analysis of power that helps to account for the panoptic properties of the internet and other informational forms (the panoptic sort: Gandy, 1993; see Spears & Lea, 1994). The sheer opportunities provided by the internet and other ICTs means that *strategic* powers afforded by ICTs are dramatically increased (the power to reach and influence others, the power to disrupt global information systems, the power to avoid detection), compared to FtF interaction. We now try to combine the effects of the ICTs with these explanatory principles in assessing implications for policy.

4. IMPLICATIONS: RELATING EFFECTS THROUGH THEORY TO POLICY AND PRACTICE

In this section we begin by attempting to draw together the lessons learnt from this survey in terms of the social effects of the ICTs, and suggest how these effects can be interpreted and evaluated with the help of the theory and research reviewed in the previous section. Here we favour interactionist perspectives that do not treat either the technology or the social users thereof as having primacy over the other, but view them as mutually defining. To assist the critical reader, we first set out a series of general principles or messages that summarise these ICT effects in the light of the theoretical insights. In the second section we then proceed to outline some more concrete implications arising from this review in terms of a fairly broad set of policy recommendations.

4.1 Critical principles, principal lessons

4.1.1 Don't believe the hype

The first general conclusion to draw from this review is that it is probably wrong, and certainly misleading, to draw *general* conclusions about ICTs at all. It is our view that the effects of the ICTs are not generic but need to analysed by examining how the specific constellation of features of the specific technology (e.g., anonymity, isolation, asynchrony) combine and interact with social features (context, identity, task). The same technology may have different effects in combination with a different set of social factors (different cultures, different communities, different organisational contexts, different levels of identity). However, the temptation to generalise beyond these parameters is understandable. There is a tremendous amount of hype surrounding the ICTs and their societal impacts. Since the internet has become the domain of big business, companies are investing large amounts of capital selling this hype to their potential customers. This is further stimulated by the (popular) media, who have a vested interest in creating headlines, and highlighting the evaluative dimension, good and bad. There is also a similar danger for researchers to overplay the effects, their generality, their conclusions. Part of the reason for this is that, because we have entered a new era in which the effects associated with new technologies are as yet largely unknown and where research lags the actuality. As a result there is a tendency to misrecognise any effects as typical, characteristic, and general when the full range of facilitating and inhibitory conditions that can operate are not yet established. As research programs unfold, variety and of the effects become apparent, and come to reflect the variety of their social instantiations.

A good example of this 'rush to judgement' and generalisation concerns the phenomenon of 'flaming'. Flaming was identified initially as a phenomenon in the early 80s by researchers at Carnegie-Mellon University, perhaps the most computerised university at that time. Evidence of hostile exchanges on email were then quickly seen as characteristic of communication in this medium. Only later did it become apparent that there was tremendous local and contextual variation in this phenomenon, while questions were raised about what constituted flaming in any case. Moreover comparisons with communication in everyday life were rarely made, reinforcing the assumption that this behaviour was part of the communication environment (email, CMC) rather than simply a part of communi-

cation. Because the focus is on the new technology, there is a inherent danger of *reification*, or of making what social psychologists call a 'fundamental attribution error': in this case attributing the cause to the technology, rather than to the broader communication situation. By analogy, when we observe evidence of hostile communication in real life, we rarely think that this says something about the medium of face to face communication. We more likely attribute this to something about the specific social context in which such communication is embedded (e.g., exchanges between rival fans at a football match, evidence of sibling rivalry etc.). In our view much of what goes on in ICTs is broadly similar to interaction that occurs outside them, it just occurs in another domain (e.g., on the net). This means that this behaviour does not always necessarily demand a radically new set of principles or processes in order to understand what is going on. In short, an important lesson of this review is to be sceptical about attempts to generalise, and to render spectacular and new what may often be mundane. To make generic statements about the effects of technology without broader sampling of the social contexts of implementation and use is a common danger in evaluating any new media, and ignores the fact that they are simply that: a media. Media are populated by people, and people are not created by the media: they simply use it for a range or reasons arising from their everyday lives. In short: "don't believe the hype."

4.1.2 Beware evaluative closure and determinism

Closely related to this first principle are its specific forms, such as the tendency to overemphasise the positive or negative consequences of aspects of the technology (utopian versus dystopian visions and verdicts), or to emphasise the driving force as either technology or society (technological versus social determinism). These tendencies are oversimplifications: ICTs offer many possibilities but they are unlikely to form either panaceas or plagues. The contexts of use are likely to generate problems and abuses as well as solutions and services. Evaluating ICTs is rather like evaluating other technologies such as nuclear energy. To define this as good or bad (it may be both) may only make sense in the context of its application and use by people: to generate energy or nuclear weapons (and politicians and others have evaluated both of these as positive and negative). Blanket optimistic or pessimism are therefore misplaced and evaluation of the technology cannot be made independent of social uses and local goals. A good example of this is the contrasting evaluations of the putative effects of reduced social cues in CMC. This has been evaluated as bad by approaches that value the influence of social cues in social interaction but as good by approaches that do not (e.g., as in some GDSSs). This notwithstanding the whole question of whether the social dimension is actually reduced in CMC, as both these evaluations tend to assume.

4.1.3 ICTs are not 'less social'

The notion that ICTs such as CMC and the internet are less 'social' media (than FtF) is something of a myth that is in need of such qualification as to render it meaningless. Indeed, research and theory (and particularly the SIDE model) suggest these media can be *even more* social in important ways than FtF communication. This has implication for two of the major themes that have

plagued concerns about evaluation ICTs, namely a) whether it undermines social relations, and b) whether leads to anti-normative and asocial behaviour. A review of the literature suggests that neither of these concerns is well grounded and research and theorising suggests some reasons why this may be the case. The evidence that the internet undermines social relations is mixed: some relations may be undermined but others based around choice rather than proximity may be strengthened. The net also provides a basis for greater connection, cohesion and even community, as well as reflecting isolation and fragmentation. However, it is also questionable whether it breaches the social boundaries that divide societies. The social identities that unite some people and divide them from others, are just as real on the internet as in the offline world, and can be even more potent in cyberspace. The social categorical and intergroup nature of social life in the real word is no less real in the virtual world of CMC and the internet. Indeed sociologists such as Castells (1997) have argued that social and group identities have take on a renewed importance in the network society, partly as resources to resist the de-individualising and alienating tendencies of global capitalism it fosters. Moreover, the ICTs themselves provides a further domain and means by which (and in which) certain sections of society, and whole regions of the globe are excluded rather than included. Information technology could have the potential power to lead to greater mutual understanding. However, if care is not taken to give everyone the means and skills to this technology, the same power can be economically and culturally divisive.

4.1.4 ICTs add to rather than replace existing technology and social arrangements

A recurring lesson of this review is that the ICTs do not generally replace or threaten either existing technologies of communication, or the social relations in which these are embedded. Rather social factors and earlier forms of technology form a context in which the new technologies are embraced, shaping their use. As we have seen the ICTs can even reinforce pre-existing social relationships and inequalities. Consequently the new technologies tend to be integrated with the old: on the whole virtual technologies tend to support and supplement the real world activities rather than replace them. Technologies that build on existing social arrangements are therefore likely to be more successful and the globalising tendencies of the internet require the co-operation of the local context in order to prosper (Woolgar, 2000).

4.1.5 ICTs affect power and potency rather than the form and content of social effects

While it may be problematic to associate ICTS with specific evaluations or effects, it may be true to say that these technologies increase the *potency* of effects defined by the combination of technology and social context in a number of ways. First, the internet offers unprecedented access to information and others. Knowledge is power but this can have positive or negative effects: for self-enlightenment or social abuse through access to esoteric knowledge (e.g., medical information vs. bomb-making); for self-help or succumbing temptation (e.g., addiction); for self-exploration through identity manipulation or for self-delusion for the same reasons. It can expand the mind and befuddle it with reams of

information. Second, research in the context of the SIDE model has shown that *salience* and thus *impact* of various aspects of social identities (e.g., status, gender, age, race, nationality) can often be accentuated in the anonymous contexts of CMC, making them more potent and influential. Third, the *strategic* dimension of this model is also relevant to a consideration of the new powers that the internet offers in terms of distributing knowledge, the willingness to share knowledge, the ability to reach others, to organise, to resist powerful authorities, and even to undermine the very medium itself (on which business organisations and governments are becoming increasingly reliant).

In short while it is problematic to make general pronouncements of the content and direction of effects, it is clear that he ICTs do present shifts in power relations and access new powers that did not exist before. These can have potent effects that can affect the balance of powers in society. These powers increase the influence of the forces that control the flow of information in the ICTs. These are at the macro end the multinationals that transcend the globe, and at the other end the skilled individual users and entrepreneurs who can either forge their own way in the fast changing frontier of the network society (Castells, 1996; 1998). There is probably a closer link between macro and micro, in this case the unlikely alliance between informational capitalism and the individualistic anarcho-culture of the cyberpunk, than has existed before in history. Like the move from sixties hippie to eighties yuppie, the move from hacker to i–tech executive is an increasingly unlikely but common transition. If knowledge is power (as Foucault once said) then information (and computer skill) is economic power in the information society. Although individuals can feel powerless in the face of globalising tendencies, they can also empower themselves by the tremendous expansion of information and communication power previously unavailable. Moreover, the individual's ability to intervene in events that are not normally 'within reach' are increased by the internet. It provides new opportunities for organisation and community building and the opportunity to exchange personal experiences and information can be empowering for marginalised and disenfranchised groups in society. Equally the ICTs provides a new layer of exclusion that reinforcing other bases of social exclusion, they can be abused by international crime as well as creating legitimate entrepreneurial forms of economic activity; and they can be used for surveillance and monitoring by the state and commercial organisations.

4.2   Some policy implications and recommendations

With these principles in mind we now make some specific suggestions for points of attention for policy makers. Of course these recommendations depend to a certain extent on political priorities and agendas, and depend on relate implications of the technologies we have outlined to broader values such as equality, democracy, freedom which are nut always mutuality compatible (Rokeach, 1960; Schwartz, 1992), and themselves depend on a political stance. To make our position clear, we have highlight issues that may steer the uses of ICTs in more progressive, pro-social and productive directions, while trying to minimise their deleterious effects. However other readers are of course free to relate the social and social psychological effects that we have outlined above to different agendas and priorities, and we do not claim to present here an exhaustive set of recommendations. Policy makers and politicians are better placed to use this

material as a resource to inform policy based on their specific criteria and objectives. The following points should be read with this in mind.

4.2.1 Social division and social exclusion: Bridging the digital divide

Where divisions become accentuated (race, gender, and age) by communication technology this is a cause for grave concern. The elderly are a rapidly increasing proportion of the population, women will need to play an increasingly active and 'volwaardige' role as part of our workforce, and 'allochtonen' need to be given a place in society which serves the needs of both cultural integrity and integration. In our view it is important that the problems relating to digital divides based on these social categories should be anticipated now and addressed in education, access and other domains. Whereas language education in relation to issues of multiculturalism has been a top priority, the rapid developments in the ICTS means that technical knowledge lags behind. For example, issue of 'allochtonen' and ICT in schools currently receives relatively little attention by comparison but is an area where the broadening of the digital divide could be anticipated an reduced. Schools have a critical role to play in not just in provide technical training in how to use ICTs, but also to provides the skills to deal with the issues and problems that they throw up (e.g., information overload, dealing with contradictory information, problems of potential addiction, and so forth). It is important for example that the internet is not just seen as a means of virtual escape for disadvantaged groups, but is used as a self-empowering improve their social position both individually and collectively.

Integrating this technology with other aspects of social policy may provide an important and self-generating way of preventing further social exclusions. Because CMC and the internet are not media that ignore or bury social differences, policy makes should not be worried that providing access will emphasise assimilation rather than integration. On the contrary, all the evidence suggests that ICTs, like the internet, are ideal media for sustaining contact with others who share social identities, as well as providing a means to bridge these boundaries when this is desired (because of the virtues of anonymity). In these terms the internet should be seen as the technology for maintaining and giving full expression to multiculturalism and not just a medium or tool of cultural assimilation and standardisation. Encouraging greater participation from all sections of society in these media should also prevent them becoming homogeneous domains (dominated by young males and the norms and subculture associated with this), and more friendly environments for women, minorities and the deprived.

While the nature of the net means it is difficult and probably undesirable to police content and ensure that there are virtual environments to suit all sectors of society, guaranteeing access is one way to stimulate this. The variety already exists, but there is a long way got go before the social asymmetries in access and use are levelled. The recent initiative of giving free email access to all schoolchildren from Group 5 (Minister Hermans, 8/6/2000) is a very positive step in this direction. However, the push for quantity of access in terms of just getting more people connected will probably not be sufficient on its own to reduce the various divide, because of different patterns of use, and subtle exclusion within the internet. The educational system will have to find more and new ways to inspire children (boys and girls, and from all backgrounds) to keep up with the technology shift and invest time to teach them the value of learning these tools, as well as

how they can be used profitably. Thought might be given to providing low-income groups and communities with computer clubhouses to provide access to machines and with the necessary technical support to get people (young and old) trained.

4.2.2 Political participation

Because ICT is increasingly a communication medium, as we have seen it is likely to be used for grassroots organisation initiatives. The internet will increasingly serve as a platform for collective/civil action, and in this capacity it surpasses the somewhat narrow conceptions of ICT as a carrier of information. The government should probably therefore devote attention to its use of and responses to ICT as a platform collective/civil action, surpassing but also supplementing the present initiatives of 'inspraak' and electronic democracy (top-down models of action). Appreciation of the potential of the internet for grassroots initiatives (bottom-up democracy and civil action) should therefore extend the possibilities for broad-based participation, ensuring that governments closer to and less in conflict with their constituencies. That means that the government should probably search for ways to engage grassroots initiatives and take an active stance on these platforms (i.e., more than an 'electronisch loket' for consultation, but also active two-way participation). At the same time it may be possible to develop ways to democratise the top-down approaches by giving people more room to propose their own issues, have an influence in the rules that exist for 'inspraak' on electronic platforms, etc. In this way, the government may become more attuned to issues as they arise, quite literally on-line, rather than depending on the ballot box or polling agencies to get feedback.

4.2.3 Identity

Perspectives on identity need to change. People are not just individuals, nor are they as easily categorised (or stigmatised) as in the days of the 'verzuiling'. ICT is not the major force behind this process, but ICT does reflect the increasing flexibility in choosing among many different social identities. All the indications are that social identities are becoming more important in the multicultural society in the age of the internet (Castells, 1997). Policy needs to be sensitive to these collective identities and avoid adopting an antagonistic stance where these are seen as problematic. For example, the social and prosocial dimensions of hacking culture need to be understood as counter-culture and not simply as criminal. Attacks on highly computer-literate individuals and groups may drive them underground and provoke resistance in more antisocial directions. It is also important to question the assumptions of individual self-interest associated with individualistic western cultures such as the Netherlands. The prevailing image of 'homo economicus', the idea that we are all fixated at the individual level of self-definition, and act on the basis of individual interests, tends to discourage more collective and prosocial forms of behaviour. The insights of social identity based approaches (such as SIDE) show that people do not act on the basis of their individual needs alone (see 2 above). People often act for the good of a group, movement, and policy might attempt were possible to reward prosocial behaviour based around the group, mutual support and virtual communities.

4.2.4 Mental health

It is not easy to legislate to limit access or use of ICTs such as the internet where these are causing problems for mental health (stress, addiction). However, the government can provide information (voorlichtingscampagnes) to warn of the dangers of overuse, particularly directed at parents and educators and other opinion leaders. These people can spot danger signs, access comparison norms for degree of use, develop competencies for assessing what sort of sites are being accessed by children and to block access to adult or subversive material in the home if necessary (see below). Codes of practice or guidelines, especially in work environments may help to guard against the dangers of overuse and overload.

4.2.5 Education

As well as the issues of access through education addressed in (1) above there is also the question about how these technologies can be used to facilitate education. The interactive element of educational computer programs, tools, and CD-roms permits children to explore traditional school subjects in new ways. These explorations in computer-based learning environments could facilitate and add to the learning process and provide new ways of learning. More research is needed in the context of learning with the aid of computers. The challenge for this research is also to provide some guidelines to shape future design of CMC environments within the domain of group collaborative learning. Systems that support communication and social interaction will be more effective in enabling users to continue to learn about the functions of the system than those designed to isolate individuals. A collaborative web environment cannot easily be developed without reference to the social and pedagogical situation in which it is to be used, although this is not always clearly considered. Certain conditions must be met in order to ensure that collaborative efforts are successful and some of these will need to be incorporated into the task structure and imposed by the instructor. However, with the aid of a social psychological models of group process, the design of the environment can be significantly enhanced to support the collaborating group. Education and training in the use of ICT skills may be especially important for the older generation as well as the young, not only because these people are in danger of being left behind, but so that they are to have insight and if necessary exert some parental control over web use by their children (see 4 above).

4.2.6 E-commerce, e-business

The sheer volume of commerce conducted via the internet but the difficulty of policing this domain raises issues of consumer protection at a number of different levels. The applies not only to the quality of goods and services delivered (often from outside of national boundaries) but also to presence of the shop window in the home. For example, whereas there may be rules about the targeting and timing of advertising on television in order to protect children, it is difficult to police these things on the internet (and this is even more an issue for sites with adult material). E-commerce has to be increasingly aware of its client and to adapt to their needs. Whereas in the past shops could rely on customers coming to them because they only had to rely on competition in the local neighbour-

hood, now there is global competition to worry about. This means that business has to 'think global and act local' if they are not to lose their customer base. The internet age and the choice of information and well as product will lead to increasing consumer sophistication, which should be good for competition and for the competitiveness of e-business in the longer haul. For such reasons government should stimulate these trends. Regulation may also be necessary especially where monopolies threaten consumer interests. From the perspective of the e-commerce, awareness of client profiles and the social psychology of marketing and consumer behaviour will acquire increasing importance. Businesses will take advantage of the internet to have to target groups and niche markets and not just individuals. Segmentation based on social identities as well as crude economic classes will become increasingly possible, providing a social psychological dimension to marketing and consumer-targeting. Governments have to be aware if these distinctive characteristics in creating optimal conditions for e-commerce.

The nature of the net also means that there are increasing opportunities for registering and running businesses outside of national boundaries while effectively residing within them. This raises issues of tax and revenue for the GNP: The government has to encourage the identification with a national identity and a national business culture in order to keep this as part of the national economy. Awareness of the specific needs of e-commerce may be an important part of this (for example, the UK is just introducing legislation which will make electronic signatures legally binding, facilitating the possibility and speed of business on the internet). Launching new ICT initiatives in the market place (e.g., Chipknip, e-banking) also need to take into account existing social relations and social sensibilities if these are to be successful. Making tax forms and banking facilities available online in our homes means ensuring user-friendly informational support, and even taking into account how particular forms of computer and software may even inspire social identifications and loyalties (e.g. PC vs. Mac-users). Social psychological factors such as perceived trust, security, privacy issues and identity concerns will all feed into this equation and need to be analysed and taken into account at the policy level. At the same time government has to be sensitive to what these developments will do to existing social arrangements and communities. Will the trend to e-commerce threaten the neighbourhood shops and our civic centres, or will it simply open up a space for alternative social activities and richer forms of social interaction than shopping? These considerations clearly feed into planning and policy making.

The increased influence of finance web-sites and their gurus on the financial markets mean that some monitoring of these may be necessary, both to understand economic trends and to protect against scare-mongering and deliberate attempts of destabilisation.

4.2.7 Surveillance, security and privacy

Concerns of surveillance and privacy are not just applicable to consumer behaviour. We live increasingly under the scrutiny of CCTV and personal information about us is kept on more data-bases in the network society than we can imagine. Protection of citizens rights is therefore a major concern. The changes of the information society are such that legislation ahs barely kept pace with these technological changes. Legislation that restricts the use of personal information,

especially when taken without consent may need to be safe-guarded and rein-forced. Use of video and CCTV surveillance technology should probably be restricted to crime hotspots, and should probably not be introduced as a stand-ard feature of town and city centres without good reason. Experience shows that it can be counterproductive, often encouraging vandalism and violence by pro-viding it an antagonistic audience.

Surveillance technologies may introduce disincentives to visible and 'physical' crimes, but the ICTs also open the door to new forms of blue-collar crime as well as providing a medium for vice rings and subversive activity such as 'leader-less resistance' and cyber terrorism. The policing of the internet asks new ques-tions of governments, which will increasingly require supra-national levels of organisation and co-operation. The question of internet surveillance may need to be addressed as an appropriate way to tackle this social problem. Policies that facilitate international co-operation and exchange, and that help to avoid sec-tional interests and rivalries, should help this process of fighting international crime at a global level.

5. GLOSSARY OF TERMINOLOGY, ABBREVIATONS AND ACRONYMS

ANT	Actor Network Theory (see 3.4.1).
AST	Adaptive Structuration Theory (see 3.3).
CCTV	Closed Circuit Television.
CMC	Computer Mediated Communication.
CSCL	Computer Supported Co-operative Learning (see 2.6; e.g., COSE, CLARE).
CSCW	Computer Supported Collaborative Work (see 2.6).
Deindividuation	A process involving reduced self-awareness or loss of self in the group.
Depersonalisation	A process involving a switch from individual to group identity.
Extranet	An open or extended computer communication network.
FtF	Face to Face (communication).
GDSS	Group Decision Support Systems (i.e., software for group decisions; see 2.6, 2.7).
Groupware	Software used to accompany or facilitate group working (see 2.6, 2.7).
IAD	Internet Addiction Disorder (see 2.5).
ICQ	"I Seek you"; email or chat technology designed to target specific persons on the net.
ICT	Information Communication Technology.
Intranet	An enclosed or contained CMC network (e.g. within an organisation).
IP	Internet Protocol.
IRC	Internet Relay Chat (as in 'chat rooms' on the internet).
IT	Information Technology.
MOOs	Multiple Object Oriented (domains).
MUDs	Multiple user Dungeons.
N-Gen	The Network Generation.
OIT	Organisational Identity Theory (see 3.4.2).
Panopticon	A surveillance apparatus/institution developed by Jeremy Bentham.
RSC	Reduced Social Cues (model)
SCT	Self-categorisation theory (see 3.4.2).
SIDE	Social Identity Model of Deindividuation Effects (see 3.4.2).
SIT	Social identity Theory (see 3.4.2).
SMS	Short Message Service.
VLE	Virtual Learning Environment(s) (see 2.6).
VR	Virtual Reality.
WAP	Wireless Application Protocol.

REFERENCES

Albert, S., & Whetten, D.A (1985). Organisational identity. In L.L. Cummings & B.M. Staw (Eds.) *Research in organisational behaviour* (Vol. 7) (pp.263–295) Greenwhich CT: JAI press.

Allport, D.A. (1980). Attention and performanc. In G. Claxton (Ed.) *Cognitive psychology: New directions.* (112–153), London: RKP.

Attewell, P. (1996). Information technology and the productivity challenge. In R. Kling (Ed.), *Computerization and controversy* (2nd ed., pp. 227–238). San Diego: Academic Press.

Ashorth, B.E., & Mael, F. (1989). Social identity theory and the organisation. *Academy of Management Review,* 14, 20–39.

Austin, J.L. (1962). *How to do things with words.* Oxford: Oxford University Press.

Baym, N. (1995). The emergence of community in computer-mediated communication. In S. Jones (Ed.), *Cybersociety: Computer-mediated community and communication* (pp. 138–163). Thousand Oaks, CA: Sage.

Bakardjieva, M. (2000). Virtual togetherness: A perspective from everyday (real?) life. Paper presented at the ESRC Virtual Society? Get Real! Conference, Ashridge, UK, May.

Barthes, R. (1972). *Mythologies.* London: Paladin.

Benbasat, I., & Lim, L. H. (1993). The effects of group, task, context, and technology variables on the usefulness of group support systems: A meta-analysis of experimental studies. *Small Group Research, 24,* 430–462.

Berger, P.L. & Luckman, T (1966). *The social construction of reality.* Harmondsworth: Penguin.

Bereton, P. et al. (1998). Distributed group working in software engineering education. *Journal of Information and Software Technology,* 40, 221–229.

Bijker, W. E. (1992). The social construction of fluorescent lighting, or how an artifact was invented in its diffusion stage. In W. E. Bijker & J. Law (eds.). *Shaping technology/building society: Studies in sociotechnical change.* Cambridge, MA: MIT Press.

Bijker, W. E., Hughes, T. P. & Pinch, T. J. (eds.) (1987). *The social construction of technological systems: New directions in the sociology and history of technology.* Cambridge, MA: MIT Press.

Bijker, W. E. & Law, J. (1992). *Shaping technology/building society: Studies in sociotechnical change.* Cambridge, MA: MIT Press.

Briggs, R. O., Nunamaker, J. F., Jr., & Sprague, R. H., Jr. (1998). 1001 Unanswered research questions in GSS. *Journal of Management Information Systems,* 14, 3–21.

Brown, S. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Burkhalter, B. (1999). Reading race online: Discovering racial identity in Usenet discussions. In P. Kollock, & A. Smith (Eds.) (1999). *Communities in Cyberspace,* London: Routledge.

Burke, K., & Chidambaram, L. (1996). Do mediated contexts differ in information richness? A comparison of collocated and dispersed meetings. *Proceedings of the Twenty Ninth Hawaii International Conference on System Sciences, 29,* 92–101.

Burrows, R. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Button, G. (1993). The curious case of the vanishing technology. In G. Button (ed.). *Technology in working order: Studies of work, interaction, and technology.* London: Routledge.

Callon, M. (1986). Some elements of a technology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. In J. Law (ed.). *Power, action and belief: A new sociology of knowledge?* London: Routledge.

Callon, M. (1991). Techno-economic networks and irreversibility. In J. Law, (ed.). *A sociology of monsters: Essays on power, technology and domination.* London: Routledge.

Callon, M. & Law, J. (1989). On the construction of sociotechnical networks: content and context revisited. *Knowledge and Society,* 8, 57–83.

Carey, K. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Castells, M. (1996) *The information age: Economy society and culture, Vol. 1: The network society.* Oxford: Blackwell.

Castells, M. (1997) *The information age: Economy society and culture, Vol. 2: The power of identity.* Oxford: Blackwell.

Castells, M. (1998) *The information age: Economy society and culture, Vol. 3: The end of the millennium.* Oxford: Blackwell.

Castells, M. (2000). Invited keynote address. The institutions of the new economy. ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Champness, B.G. (1973). *The assessment of user reactions to confravision: II. Analysis and conclusions*, Unpublished ms., Communication Studies Group, University College, London.

Chun, K. J., & Park, H. K. (1998). Examining the conflicting results of GDSS research. *Information and Management, 33*, 313–325.

Cisler (1998) Cited in http:/miavx1.muohio.edu/~psybersite/cyberspace/n-gen/tapscott.htx

Constant, D., Sproul, L., Kiesler, S. (1996). The kindness of strangers: The usefulness of electronic weak ties for technical advice. *Organisation Science*, 7, 119–35.

Contractor, N. S., & Seibold, D. R. (1993). Theoretical frameworks for the study of structuring processes in group decision support systems: Adaptive structuration theory and self-organising systems theory. *Human Communication Research, 19*, 528–563.

Contractor, N., & Eisenberg, E. (1990). Communication networks and new media in organisations. In J. Fulk & C. Steinfield (Eds.), *Organisations and Communication Technology* (pp. 143–172). Newbury Park: Sage.

Cooper, A. (2000). Cited in R.A. Clay (2000) Linking up on line, *APA Monitor, Special Issue on Psychology and the Internet*, 31, 20–23.

Costall, A., & Still, A. (Eds.) (1987). *Cognitive psychology in question.* Sussex: Harvester.

Crook, C. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Daft, R. L. & Lengel, R. H. (1984). information richness: A new approach to managerial behaviour and organisational design. *Research in Organisational Behaviour*, 6, 191—233.

Daft, R.L. & Lengel, R.H. (1986). Organisational information requirement, media richness and structural determinants. *Management Science*, 32, 554–571.

Dennis, A. R. & Gallupe, B. R. (1993) A history of group support systems empirical research: lessons learned and future directions. In L. M. Jessop & J. S. Valacich (Eds.) Group Support Systems: new perspectives. New York: Macmillan.

Dennis, A.R., & Kinney, S.T. (1998). Testing media-richness theory in the new media: The effects of cues, feedback, and task equivocality. *Information Systems Research*, 9, 256–274.

Derrida, J. (1976). *Of grammatology.* Baltimore, MD: Johns Hopkins University Press.

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organisation Science,* 5, 121–147.

Diener, E. (1980). Deindividuation: The absence of self-awareness and self-regulation in group members. In P. Paulus (Ed.), *The Psychology of Group Influence.* Hillsdale, NJ: Erlbaum.

Dubrovsky, V.J., Kiesler, S., & Sethna, B.N. (1991). The equalisation phenomenon: Status effects in computer-mediated and face-to-face decision-making groups. *Human Computer Interaction*, 6, 119–146.

Dutton, J.E., & Dukerich, J.M. (1991). Keeping an eye on the mirror: The role of image, identity in organisational adaptation. *Academy of Management Journal*, 34, 517–554.

Dutton, J.E., & Dukerich, J.M., & Harquail, C.V. (1993). Organisational images, member identification. Administrative Science Quarterly, 39, 239–263.

Emmons, S. (1998). Internet addiction. Available online: http://www.cas.usf.edu/honors/9601b/emmons. html

Feenberg, A. (1992). From information to communication: The French experience with videotex. In M. Lea (Ed.), *Contexts of Computer-Mediated Communication* (pp. 168–187). Hemel Hempstead, England: Harvester Wheatsheaf.

Festinger, L., Pepitone, A., & Newcomb, T. (1952). Some consequences of deindividuation in a group. *Journal of Abnormal and Social Psychology*, 47, 382—389.

Fischer, C. S. (1992). *America calling: A social history of the telephone to 1940.* Berkeley, CA: University of California Press.

Foucault, M. (1981). The history of sexuality 1: An introduction. Harmondsworth: Penguin.

Fraser, C., Gouge, C., & Billig, M. (1971). Risky shifts, cautious shifts and group polarisation. *European Journal of Social Psychology*, 1, 7–29.

Frick, F.C. (1959). Information theory. In S. Koch (Ed.) *Psychology: A study of science.* (pp.611–636) McGraw-Hill.

Fulk, J. (1993). Social construction of communication technology. *Academy of Management Journal,* 36, 921–950.

Fulk, J. and Boyd, B. (1991). Emerging theories of communication in organisations. *Journal of Management,* 17, 407–446.

Fulk, J., & Collins-Jarvis, L. (in press). Research on the productivity of mediated meetings. In L. L. Putnam & F. M. Jablin (Eds.), *New handbook of organisational communication* (2nd ed.,). Newbury Park, CA: Sage.

Fulk, J., & DeSanctis, G. (1995). Electronic communication and changing organisational forms. *Organisation Science,* 6, 337–349.

Fulk, J., Schmitz, J. A. & Schwarz, D. (1992). The dynamics of context-behaviour interactions in computer-mediated communication. In M. Lea (ed.). *Contexts of computer-mediated communication.* London: Harvester-Wheatsheaf (pp. 7–29).

Gandy, O.H., Jr. (1993). *The panoptic sort: A political economy of personal information.* Oxford: Westview.

Gackenbach, J. (Ed.). (1998). *Psychology and the Internet: Intrapersonal, interpersonal and transpersonal implications.* San Diego: Academic Press.

Garfinkel, H. (1967). *Studies in ethnomethodology.* Englewood Cliffs N.J.: Prentice-Hall.

Garton, L., Wellman, B. (1995). Social impacts of electronic mail in organisations: A review of the research literature. *Communication Yearbook,* 18, 434–53.

Gergen, K.J. (1985). The social constructionist movement in modern psychology. *American Psychologist,* 40, 266–275.

Gergen, K.J. (1991). *The saturated self: Dilemmas of identity in contemporary life.* New York: Basic Books.

Gibson, J.J. (1986). *The ecological approach to visual perception.* Hillsdale, NJ: Erlbaum.

Giddiness, A. (1984). *The constitution of society: Outline of the theory of structuration.* Cambridge: Polity Press.

Giddiness, A. (1991).*Modernity and self-identity: Self and society in the late modern age.* Cambridge: Polity Press.

Goldberg, M. W. (1997). Communication and Collaboration Tools in WebCT. Proceedings of the conference Enabling Network-Based learning, May 28–30, Espoo, Finland. (*http://homebrew.cs.ubc.ca/webct/papers/enable/paper.html*)

Goldberg. I. (2000) Internet addictions. Available online: *http://www.transarc.com*.afs/transarc.com/public/mic/html/Addiction.html

Gordon, R. J. (2000). Does the 'New Economy' measure up to the great inventions of the past? *Journal of Economic Perspectives,* Forthcoming.

Granovetter, M. (1973). The Strength of Weak Ties. *American Journal of Sociology,* 78, 1360–80.

Greenberg, S. (1998). Collaborative interfaces for the Web. In Forsyth et al. (eds.) Human factors and Web development. New Jersey: Lawrence Erlbaum.

Greenfield, D. (2000). Cited in T. DeAngelis (2000) Is Internet addiction real? *APA Monitor, Special Issue on Psychology and the Internet,* 31, 20–23.

Harasim, L. (1989). On-line education: a new domain. In R. Mason & A. Kaye (eds.). Mindweave: Communication, Computers and Distance Education. Oxford: Pergamon.

Harasim, L., Winkelmans, T. (1990). Computer-Mediated Scholarly
Collaboration. *Knowledge,* 11, 382–409.

Haraway, D. (1990). A manifesto for cyborgs: Science technology, and socialist feminism in the 1980s. in L. Nicholson (Ed.) *Feminism/postmodernism,* New York: Routledge.

Hartley, J. R. & Collins-Brown, E. (1999).Effective pedagogies for managing collaborative learning in on-line environments. Educational Technology and Society 2(2), Available: http://ifets.gmd.de/periodical/vol_2_99/formal_discussion_0399.html

Haslam, S. A. (2000). *Psychology in organisations: The social identity approach.* London: Sage.

Herman, C. (1999). 'Women and the Internet', *Liberating cyberspace.* London; Pluto Press.

Herring, S. (1994). *Gender differences in computer-mediated communication: Bringing familiar baggage to a new frontier.* Electronic Journal of Communication / Revue Electronique de Communication (Vol. 3,): *http://www.cios.org/www/ejc/v3n293.htm.*

Herring, S. (1996). Posting in a different voice: Gender and ethics in computer-mediated communication. In C. Ess, (Ed) *Philosophical perspectives on computer-mediated communication.* New York: State University of New York Press. pp. 115–146.

Hiemstra, G. (1982), Teleconferencing, concern for face, and organisational culture. *Communication Yearbook*, 6, 874–904.

Hiltz, S. R. (1992). Constructing a virtual classroom. In M. Lea (Ed.) Contexts of Computer-Mediated Communication. Hemel Hempsted: Wheatsheaf.

Hiltz, S. R., & Turoff, M. (1978). *The network nation.* Cambridge, MA: MIT Press.

Jacoby, J. (1984). Perspectives on information overload. *Journal of Consumer Research,* 10.

Hiltz, S. R., Turoff, M., & Johnson, K. (1989). Experiments in group decision making, 3: disinhibition, deindividuation, and group process in pen name and real name computer conferences. *Decision Support Systems*, 5, 217—232.

Isenberg, D.J. (1986). group polarisation: A critical review and meta-analysis. *Journal of Personality and Social Psychology*, 50, 1141–1151.

Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology*, 76, 349–366.

Jackson, L.A. (2000). Cited in R.A. Clay (2000) Linking up on line, *APA Monitor, Special Issue on Psychology and the Internet*, 31, 20–23.

Jessup, L. M., Connolly, T., & Tansik, D. A. (1990). Toward a theory of automated group work: The deindividuating effects of anonymity. *Small Group Research,* 21, 333–348.

Jessup, L. M. & George, J. F. (1997). Theoretical and methodical issues in group support systems research: Learning from groups gone awry. Small Group Research, 28, 394–413.

Johansen, R. (1977). Social evaluations of teleconferencing. *Telecommunications Policy*, 1, 395–419.

Katz, J. E., & Aspden, P. (1997). A nation of strangers? *Communications of the ACM*, 40, 81–86.

Kayany, J.M. (1998). Contexts of uninhibited online behaviour: Flaming in social newsgroups on Usenet. *Journal of the American Society for Information Science,* 49 (12), 1135–1141.

Keller, K. L., & Staelin, R. (1987). Effects of quality and quantity of information on decision effectiveness. *Journal of Consumer Research*, 14, 200–213.

Kiesler, S. (1986). The hidden messages in computer networks. *Harvard Business Review*, 64, 46–60.

Kiesler, S., Siegel, J., & McGuire, T. (1984). Social psychological aspects of computer-mediated communications. *American Psychologist*, 39, 1123–1134.

Kiesler, S. & Sproull, L. (1992). Group decision making and communication technology. *Organisational Behaviour and Human Decision Processes*, 52, 96–123.

Kiesler, S., Zubrow, D., Moses, A.M., & Geller, V. (1985). Affect in computer-mediated communication: An experiment in synchronous terminal to terminal discussion. *Human Computer Interaction*, 1, 77–104.

King, S.A. (1996). Is the Internet addictive or are addicts using the Internet? Available online: http://rdz.stjohns.edu/~storm/iad.html.

Kirkley, S. E., Savery, J. R. & Grabner-Hagen, M. M. (1998). Electronic Teaching: Extending Classroom Dialogue and Assistance Through Email Communication. In C. Bonk & K. King (eds.) Electronic Collaborators: Learner-Centered Technologies for Literacy, Apprenticeship and Discourse. New Jersey: Lawrence Erlbaum.

Kollock, P., & Smith, A. (eds.) (1999). *Communities in Cyberspace*, London: Routledge.

Koschmann, T. (1996). CSCL: Theory and practice of an emerging paradigm. New Jersey: Lawrence Erlbaum.

Kling, R. (1996). Hopes and horrors: Technological utopianism and anti-utopianism in narratives of computerisation. In R. Kling (Ed.) *Computerisation and controversy* (2nd ed., pp. 40–58) San Diego: Academic Press.

Kramerae, C., & Taylor, H.J., (1993). Women and men on electronic networks: A conversation or a monologue? In H.J. Taylor, C. Kramerae, & M. Ebben (Eds.), *Women, information technology and scholarship* (pp. 52–61). Urbana-Champaign, Ill.: Center for Advanced Studies, Illinois.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53, 1017–1031.

Kraut, R. E., & Attewell, P. (1997). Media use in a global corporation: Electronic mail and organisational knowledge. In S. Kiesler (Ed.), *Culture of the Internet* (pp. 323–342). Mahwah, NJ: Erlbaum.

Kumar, V. S. (1996). Computer-Supported Collaborative Learning: Issues for Research. Available: *http://www.cs.usask.ca/grads/vsk719/academic/890/project2/project2.html*.

Latané, B. & Darley, J. (1970), *The unresponsive bystander: Why doesn't he help?* New York: Appleton-Century-Crofts.

Law, J. (1991). *A sociology of monsters: Essays on power, technology and domination.* London: Routledge.

Lea, M. (1991). Rationalist assumptions in cross-media comparisons of computer-mediated communication. *Behaviour & Information Technology*, 10, 153—172.

Lea, M & Giordano, R. (1997). Representations of the group and group processes in CSCW research: A case of premature closure? In G.C. Bowker, S. L. Star, W. Turner & L. Gasser, (eds.). *Social Science, Technical Systems and Co-operative Work: Beyond the Great Divide* (pp. 5–26). Mahwah, NJ: LEA.

Lea, M., O'Shea, T. & Fung, P. (1995). Constructing the networked organisation: Content and context in the development of electronic communications. *Organisation Science. (Special issue on electronic communication and changing organisational forms)*, *6*, 4, 462–478.

Lea, M., O'Shea, T., Fung, P., & Spears, R. (1992). 'Flaming' in computer-mediated communication: observations, explanations, implications. In M. Lea (Ed.), *Contexts of computer-mediated communication* (pp. 30–65). Hemel Hempstead, England: Harvester Wheatsheaf.

Lea, M., & Spears, R. (1991). Computer-mediated communication, de-individuation and group decision-making. *International Journal of Man-Machine Studies*, Special Issue on CSCW and Groupware, 39, 283–301. Reprinted in S. Greenberg (Ed.). *Computer-Supported Co-operative Work and Groupware.* London: Academic Press (1991).

Lea, M. & Spears, R. (1995). Love at first byte? Building personal relationships over computer networks. In J. T. Wood and S. Duck. (eds.). *Understudied relationships: Off the beaten track* (pp. 197–233). Thousand Oaks, CA: Sage.

Lea, M., Spears, R., & de Groot, D. (in press). Knowing me, knowing you: Effects of visual anonymity on stereotyping and attraction in computer-mediated groups, *Personality and Social psychology Bulletin.*

Lebie, L., Rhoades, J.A., & McGrath, J.E. (1996). Interaction processes in computer-mediated and face to face groups. *Computer Supported Co-operative Work*, 4, 127–152.

Levine, M. (2000). Surveillance, CCTV and SIDE: developing a research programme. In T. Postmes, R. Spears, M. Lea, & S.D Reicher (Eds.) *SIDE issues centre stage: Recent developments of de-individuation in groups.* Amsterdam: Proceedings of the Dutch Royal Academy of Arts and Sciences.

Lewis, D.(1998) Available online: http://netuclture.about.com/internet/netculture/gi/dynamic/ offsite.htm?site=http://ww.apa.org/monitor/mar98/smog.html smog

Liff, S. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Little, J-R., Jackson, J., & Cohara, C (2000). Muds and IRC: The heroin of the Internet? Available online: *http://miavx1.muohio.edu/~psybersite/cyberspace/Addtiction/index.htmlx*:

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41, 954–969.

Markus, M.L. (1987). Towards a "critical mass" theory of interactive media: Universal access, interdependence and diffusion. *Communication Research*, 14 (5), 491–511.

Matheson, K. (1992). Women and computer technology: Communicating for herself. In M. Lea (Ed.). *Contexts of computer-mediated communication.* London: Harvester-Wheatsheaf (pp. 66–88).

McLeod, P. L. (1992). An assessment of the experimental literature on electronic support of group work: Results of a meta-analysis. Special Issue: Computer-supported co-operative work. *Human Computer Interaction*, 7, 257–280.

McGrath, J. E. (1984). *Groups: Interaction and performance.* Englewood Cliffs, NJ: Prentice-Hall.

McGuire, T. W., Kiesler, S. & Siegel, J. (1987). Group and computer-mediated discussion effects in risk decision making. *Journal of Personality and Social Psychology*, 52, 917—930.

McKenna, K. Y. A., & Bargh, J. A. (1998). Coming out in the age of the Internet: Identity "demarginalisation" through virtual group participation. *Journal of Personality and Social Psychology,* 75, 681–694.

McKenna, K.Y.A., & Bargh, J.A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Review.*

Michael, M. (1996). *Constructing identities.* London: Sage.

Micklethwait, J., & Wooldridge, A. (1996). *The witch doctors: Making sense of the management gurus.* New York: Random House.

Moran, M. (2000). Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Mulac, A. (1989). Men's and women's talk in same-gender and mixed-gender dyads: Power or polemic? *Journal of Language and Social Psychology*, 8, 249–270.

Mulac, A., & Lundell, T.L. (1986). Linguistic contributors to the gender-linked language effect. *Journal of Language and Social Psychology*, 5, 81–101.

Nagasundaram, M., & Dennis, A. R. (1993). When a group is not a group: The cognitive foundation of group idea generation. *Small Group Research,* 24, 463–489.

Nunamaker, J. F., Jr., Briggs, R. O., Mittleman, D. D., Vogel, D. R., & Balthazard, P. A. (1997). Lessons from a dozen years of group support systems research: A discussion of lab and field findings. *Journal of Management Information Systems,* 13, 163–207.

Nunamaker, J. F., Jr., Dennis, A. R., George, J. F., Valacich, J. S., & Vogel, D. R. (1991a). Electronic meeting systems to support group work: Theory and practice at Arizona. *Communications of the ACM,* 34, 40–61.

Nunamaker, J. F., Jr., Dennis, A. R., Valacich, J. S., & Vogel, D. R. (1991b). Information technology for negotiating groups: Generating options for mutual gain. *Management Science,* 37, 1325–1346.

O'Brien, J. (1999). Writing in the body; Gender (re)production in online interaction. In P. Kollock, & A. Smith (Eds.) (1999). *Communities in Cyberspace*, (pp. 78–103). London: Routledge.

O'Reilly, C. A. (1980). Individuals and information overload in organisations: Is more necessarily better? *Academy of Management Journal,* 23, 684–696.

Orlikowski, W. J., Yates, J., Okamura, K., & Fujimoto, M. (1995). Shaping Electronic Communication – the Metastructuring of Technology in the Context of Use. *Organisation Science,* 6, 423–444.

Pinsonneault, A., & Heppel, N. (1998). Anonymity in group support systems research: A new conceptualisation, measure, and contingency framework. *Journal of Management Information Systems,* 14, 89–108.

Parker, I. (1992). *Discourse dynamics: A critical analysis for social and individual psychology.* London: Routledge.

Pollner, M. (2000). Inside the bubble: Community, meaning and deep play at the intersection of Wall Street and cyberspace. Paper presented at the ESRC Virtual Society? Get Real! Conference, Ashridge, UK, May.

Poster, M. (1990). *The mode of information: Post-structuralism and social context.* Oxford: Polity Press.

Postmes, T., & Lea, M. (2000). Social processes and group decision making: Anonymity in group decision support systems. Social processes and group decision making: Anonymity in group decision support systems. *Ergonomics*, 43, 1152–1274. (Special issue on contemporary theory and methods in the analysis of team working).

Postmes, T., & Spears, R. (1998). Deindividuation and anti-normative behaviour: A meta-analysis. *Psychological Bulletin*, 123, 238–259.

Postmes, T., & Spears, R. (2000). Contextual moderators of gender differences: Behaviour and stereotyping in computer-mediated groups. Manuscript submitted for publication.

Postmes, T., Spears, R., & Lea, M. (1998). Breaching or building social boundaries? SIDE-effects of computer-mediated communication. *Communication Research*, 25, 689–715.

Postmes, T., Spears, R., & Lea, M. (in press). The formation of group norms in computer-mediated communication. *Human Communication Research*.

Postmes, T., Spears, R., Sakhel, K., & de Groot, D. (1998). Social influence in Computer-Mediated Communication: The effects of Deindividuation on group behaviour. Manuscript under review.

Potter, J. & & Reicher, S.D. (1987). Discourse of community and conflict: The organisation of social categories in accounts of a "riot". *British Journal of Social Psychology*, 26, 25–40.

Prentice-Dunn, S., & Rogers, R. W. (1989). Deindividuation and the self-regulation of behaviour. In P. B. Paulus (Ed.), *The psychology of group influence* (2nd ed., pp. 86–109). Hillsdale, N. J.: Lawrence Erlbaum.

Pruitt, D.G. (1971). Choice shifts in group discussion: An introductory review. *Journal of Personality and Social Psychology*, 20, 339–360.

Raab, C. (2000). Negotiating privacy in a changing environment. Paper presented at the ESRC Virtual Society? Get Real! Conference, Ashridge, UK, May.

Rader, M. H. (1981). Dealing with information overload. *Personnel Journal*, 60, 373–375.

Reicher, S. D. (1984). social influence in the crowd: Attitudinal and behavioural effects of deindividuation in conditions of high and low group salience. *British Journal of Social Psychology*, 23, 341—350.

Reicher, S.D., Spears, R., & Postmes, T. (1995). A social identity model of deindividuation phenomena. *European Review of Social Psychology*, 6, 161–198.

Reid, A. (1977). Comparing telephone with face-to-face contact. In I. de Sola Poole, (Ed.). *The Social Impact of the Telephone.* Cambridge, MA: MIT Press.

Reid, E. (1991). Electropolis: Communication and Community on Internet

Relay Chat. Honours Thesis, University of Melbourne.

Rheingold, H. (1993). *The Virtual Community: Homesteading on the Electronic Frontier.* Addison-Wesley, Reading, Mass.

Rice, R. E. (1984). *The New Media: Communication, Research and Technology.* Beverly Hills: Sage.

Rice, R. E. (1992). Task analysability, use of new media, and effectiveness: A multi-site exploration of media richness. *Organisation Science,* 3, 475–500.

Rice, R. E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organisational media. *Human Communication Research,* 19, 451–484.

Rice, R. E., & Aydin, C. (1991). Attitudes towards new organisational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly,* 36, 219–244.

Rice, R. E., & Love, G. (1987). Electronic emotion: Socio-emotional content in a computer-mediated communication network. *Communication Research*, 14, 85–108.

Rice, R. E. & Williams, F. (1984). Theories old and new: The study of new media. In R. E. Rice & Associates (Eds.), *The New Media: Communication, research, and technology.* Beverly Hills: Sage.

Robey, D., & Boudreau, M. C. (1999). Accounting for the contradictory organisational consequences of information technology: Theoretical directions and methodological implications. *Information Systems Research*, 10, 167–185.

Rokeach, M. (1960) *The open and the closed mind.* New York: Basic Books.

Rosen, L. (1998). Available online: http://netuclture.about.com/internet/netculture/gi/dynamic/offsite.htm?site=http://ww.apa.org/monitor/mar98/smog.html smog.

Rutter, J. & Smith, G. (2000). Identity is ordinary: Presentations of self in everyday life online. Paper presented at the ESRC Virtual Society? Get Real! Conference, Ashridge, UK, May.

Sack, R.D. (1988). The Consumer's world: place as context, *Annals of the Association of American Geographers* 78, p.642

Schofield, J. W. (1999). *The Internet: A place for social psychology.* Paper presented at the Society for Experimental Social Psychology, Annual Meeting, St. Louis, MO, October.

Schwartz, S.H. (1992). Universals in the in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M.P. Zanna (ed.). *Advances in Experimental social psychology* (vol. 25, pp. 1–65). San Diego, CA: Academic Press.

Shade, L. (1993). Gender Issues Paper. Available via ftp at alfred.carleton.ca: pub/freenet/93conference/leslie_regan_shade.txt

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications.* Chichester: Wiley.

Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. (1986). group processes in computer-mediated communication. *Organisational Behaviour and Human Decision Processes*, 37, 157—187.

Slevin, J. (2000). *The Internet and Society.* Blackwell (pp 113)

Spears, R., (1997). Introduction. In: T. Ibáñez & L. Iñiguez (eds.). *Critical social psychology.* (pp. 1–26) London: Sage.

Spears, R., Jetten, J., & Doosje, B. (in press). The (il)legitimacy of ingroup bias: From social reality to social resistance. In B. Major & J. Jost (Eds.) *The Psychology of Legitimacy: Emerging Perspectives on Ideology, Justice, and Intergroup Relations.* New York: Cambridge University Press.

Spears, R., & Lea, M. (1992). Social influence and the influence of the 'social' in computer-mediated communication. In M. Lea (Ed.) *Contexts of computer-mediated communication.* (pp. 30–65). Hemel-Hempstead: Harvester-Wheatsheaf.

Spears, R., & Lea, M. (1994). Panacea or panopticon? The hidden power in computer-mediated communication. *Communication Research*, 21, 427–459.

Spears, R., Lea, M., & Lee, S. (1990). De-individuation and group polarisation in computer-mediated communication. *British Journal of Social Psychology*, 29, 121–134.

Spears, R., Lea, M., & Postmes, T. (2000). Social psychological theories of computer-mediated communciation: Social pain or social gain? In P. Robinson & H. Giles (Eds.) *The handbook of language and social psychology.* Chichester: Wiley.

Spender, D. (1995). *Nattering on the net: Women, power and cyberspace.* North Melbourne, Victoria: Spinifex Press.

Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organisational communication. *Management Science*, 32, 1492—1512.

Sproull, L., & Kiesler, S. (1991). *Connections: New ways of working in the networked organisation.* Cambridge, Mass.: MIT Press.

Stiles, M (1996). COSE: Creation of Study Environments. Available: *http://www.staffs.ac.uk/COSE/cose10/welcome10.html.*

Steere, E.R. (2000). Cited in B. Murray A mirror on the self. *APA Monitor, Special Issue on Psychology and the Internet*, 31, 16–19.

Steinfield, C. W. (1986). Computer-mediated communication in an organisational setting: explaining task-related and socio-emotional uses. *Communication Yearbook*, 9, 777–804.

Stoll, C. (1995). *Silicon Snake Oil: Second Thoughts on the Information Highway.* New York: Doubleday.

Straus, S. G. (1997). Technology, group process, and group outcomes: Testing the connections in computer-mediated and face-to-face groups. *Human-Computer Interaction*, 12, 227–266.

Suler, J. (2000). The psychology of cyberspace. *www.rider.edu/users/suler/psycyber/psycyber.html.*

Sumner, M. (1988). The impact of electronic mail on managerial and organisational communications. In P. B. Allen (Ed.), *Proceedings of the IFIP Conference on Office Information Systems.* Palo Alto, CA. March. New York: ACM.

Susman, E. B. (1998). Co-operative Learning: A review of factors that increase the effectiveness of co-operative computer-based instruction. Journal of Educational Computing Research, 18(4), 303–322

Suthers, D. & Weiener, A. (1995). CSCL'95 Conference Proceedings. New Jersey: Lawrence Erlbaum.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behaviour. In S. Worchel & W. G. Austin (Ed.), *Psychology of Intergroup Relations.* Chicago: Nelson-Hall.

Tapscott, D. (1997). *Growing up digital: The rise of the net generation.*

Tetrick, L. E. (1992). Mediating effect of perceived role stress: A confirmatory analysis. In J. C. Quick, L. R. Murphy, & J. J. J. Hurrell (Eds.), *Stress & well-being at work: Assessments and interventions for occupational mental health* (pp. 134–152). Washington, DC: American Psychological Association.

Thomas, G. & Wyatt, S. (in press). Access is not the only problem: Using and controlling the Internet. In S. Wyatt, F. Henwood, N. Miller & P. Senker (eds). *Technology and In/equality: Questioning the information society.* London: Routledge.

Thomas, G., Vedel, T., & Schneider, V. (1992). The United Kingdom, France and Germany: Setting the stage. In H. Bouwman & M. Christoffersen (eds.). *Relaunching videotex.* London: Kluwer.

Thomson, R. & Murachver, T. (in press). Predicting gender from electronic discourse. *British Journal of Social Psychology.*

Trevino, L. K., Daft, R. L. & Lengel, R. H. (1990). Understanding Managers' Media Choices: A symbolic interactionist perspective. In J. Fulk & C. Steinfield (Eds.), *Organisations and Communication Technology.* Newbury Park: Sage.

Turner, J.C. (1987). A self-categorisation theory. In Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D. & Wetherell, M. S. (1987). *Rediscovering the Social Group: A self-categorisation Theory.* Oxford: Blackwell.

Turkle, S. (1995). *Life on the screen: Identity in the age of the internet.* Simon and Schuster: New York.

Turner, J. C. (1991). *Social influence.* Milton Keynes: Open University Press.

Valacich, J. S., Dennis, A. R., & Nunamaker, J. F. (1991). Electronic meeting support: The GroupSystems concept: Special Issue: Computer-supported co-operative work and groupware: I. International Journal of Man Machine Studies, 34, 261–282.

Valacich, J. S., Paranka, D., George, J. F., & Nunamaker, J. F. (1993). Communication concurrency and the new media: A new dimension for media richness. *Communication Research*, 20, 249–276.

Van Dijk, L., de Haan, J., & Rijken, S. (2000). *Digitalisering van de leefwereld: Een onderzoek naar informatie- en communicatietechnologie en sociale ongelijkheid.* Den Haag: Sociaal Cultureel Planbureau.

Van Gelder, L. (1985, October). The strange case of the electronic lover. *Ms.* (pp. 94, 99, 101–4, 117, 123–4).

Walther, J.B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19, 52–90.

Walther, J.B. (1994). Anticipated ongoing interaction versus channel effects on relational communication in computer-mediated interaction. *Human Communication research*, 20, 473–501.

Walther, J.B. (1995). Relational aspects of computer mediated communication: Experimental observations over time. *Organisation Science*, 6, 186–203.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal and hyperpersonal interaction. *Communication Research, 23*, 1–43.

Walther, J.B. (1997). Group and interpersonal effects in international computer-mediated collaboration. *Human Communication research*, 23, 342–369.

Walther, J.B., Anderson, J.F., & Park, D.W. (1994). Interpersonal effects in computer-mediated interaction: A meta-analysis of social and antisocial communication, *Communication Research*, 21, 460–487.

Walther, J.B., & Burgoon, J.K. (1992). Relational communication in computer-mediated interaction. *Human Communication research*, 19, 50–88.

Wan, D. & Johnson, P., M. (1994). Experiences with CLARE: a computer-supported collaborative learning environment. International Journal of Human-Computer Studies, 41, 851–879.

Watt, S.E., Sünram-Lea, M., Spears, R. & Rogers, P. (in press). Who's on-line? Effects of anonymity in computer-mediated group interactions. To appear in: S. Woolgar (Ed.) *Virtual Society? The social science of electronic technologies.*

Wellman, B., & Gulia, M. (1999). Virtual communities as communities; Net surfers don't ride alone. *Communities in Cyberspace*, London: Routledge.

Weil. M (1997). *TechnoStress: Coping with technology @work @home @play.* Chichester: Wiley.

Wetherell, M. S. (1987). social identity and group polarisation. In J. C. Turner, et al. *Rediscovering the Social Group: A self-categorisation Theory.* Oxford: Blackwell.

Wiener, M., & Mehrabian, A. (1968). *Language within language: Immediacy, a channel in verbal communication.* New York: Appleton-Century-Crofts.

Wireman, P. (1984). *Urban Neighborhoods, Networks and families*. Lexington, MA; Lexington Books.

Wolbert, A. (2000). Gender in CMC: Anonymity, power and dissimulation. Unpublished Masters thesis, University of Amsterdam.

Woolgar, S. (2000). Introduction. Paper presented at the ESRC Virtual Society? Conference Delivering the virtual promise? From access to use in the virtual society. London, UK, June.

Wyatt, S. Thomas, G. & Terranova, T. (2000). They came, they surfed, they went back to the beach: Conceptualising use and non-use of the Internet. To appear in S. Woolgar (ed.) *The Virtual Society? Get real!*

Young, K. (1998) *Caught in the net: How to recognise the signs of Internet addiction and a winning strategy for recovery.* New York; Wiley.

Zimbardo, P. G. (1969). The human choice: Individuation, reason, and order vs. Deindividuation, impulse and chaos. In W. J. Arnold & D. Levine (Eds.), *Nebraska Symposium on Motivation* (Vol. 17, pp. 237–307). Lincoln: Univ. of Nebraska Press.

Zmud, R., Ling, M., & Young, F. (1990). An attribute space for organisational communication channels. *Information Systems Research*, 1, 440–457.

Zuboff, S. (1988). *In the age of the smart machine*. New York: Basic Books.

• How can individuals and society counteract the inuence of. media violence? (Research on Interventions). But both are wrong in inferring that their exposure to their respective risk factors (violent me-dia, cigarettes) has not causally increased the likelihood that they and people around them will one day suffer the conse-quences of that risky behavior. Third, a developmental perspective is essential to an ade-quate understanding of how media violence affects youthful conduct and to the formulation of a coherent public-health re-sponse to this problem.