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Cooperation and Community on the Internet: Past Issues and Present Perspectives for Theoretical-Empirical Internet Research*

Abstract: This paper first summarizes two central debates in the field of social scientific Internet research, namely the debate about the so-called ‘social impact of Internet use’ and the debate about the existence of community on the Internet. Early research discussed whether building up a community on the Internet was possible and what the effects of the use of the Internet were for its user. Recent research on the social consequences of Internet use suggests that ‘the’ Internet should no longer be regarded as a constant that has uniform effects for its users. Rather, the consequences of its use depend on a number of contextual conditions. The paper presents some theories that explain which conditions and features of online groups facilitate the finding of solutions to bilateral or group-level problems of cooperation.

1. Introduction

This paper argues that the current scholarly debate about the social consequences of Internet use suffers from a lack of theory guided empirical research. It aims at showing that theory guided research on the Internet and its consequences can lead to new insights that are useful for the research debate and that have important policy implications. The past and current debate about the effects of Internet use is characterized by a lack of theories that would be useful for informing empirical research with clear policy relevance. Nevertheless such theories emerge although they are not yet widely recognized. A summary of a number of such theories of online interaction is given, as a starting point for further theoretical development and as an input for empirical research.

The paper is built up in the following way. Section 2 summarizes the recent debate about the social consequences of Internet use. As we will see, results of these studies suggest that it is not useful to talk of ‘the’ consequences of ‘the’ Internet. The consequences of Internet use are diverse for its users. At the same time, these consequences are, at least to a limited extent, predictable, since they depend strongly on the social context of its use. Moreover, empirical results suggest that research on *online groups* is useful for gaining more insight as to which attributes of the social context are important for desirable or undesirable consequences of Internet use. Section 3 presents some empirical studies that show how

* I am indebted to Michael Baurmann, Chris Snijders, and Bernd Lahno for their valuable contributions to this paper.

online groups are often used. It gives an overview regarding the debate whether online groups can have the character of a community. Different conceptions of the term “online community” are presented and their distinctions are made clear and contrasted to the traditional use of the term “community” within sociology. The distinctions suggest that it is fruitful to discuss the question *under which conditions* online groups can reach some of the qualities that traditional communities have. Section 4 presents a number of theories that point to some of these conditions. These theories analyze different problems of interaction in online groups and how these are related to properties of the group. The crucial point is that the theories support the argument that the consequences of the use of the Internet depend on some group properties. Moreover, the emergence or decline of many of the group properties can be influenced by the way in which online groups are built up or maintained. Therefore the theories not only have strong implications for future research, but also for the shaping of the Internet or the governance of online groups. However, this potential can only be fulfilled if empirical research on the use of the Internet takes these diverse theories into account and if theoretical research develops these theoretical approaches further or complements them with additional ideas in a way that has an eye on future empirical research. The last section gives a summary and proposes such directions for future research.

2. Past Issue I: The Debate About the Social Consequences of Internet Use

One of the most central questions in the public debate about the Internet is what its consequences for society are (see e.g. Katz/Rice 2002; Putnam 2000). Kraut et al. (1998) analyzed the effects of the use of the Internet on a number of indicators for social integration and psychological well-being. They found small, but statistically significant negative effects of the intensity of Internet use, as measured by automatically logged data, on the amount of self-reported family communication, the size of the local social circle and the distant social circle. Additionally, they reported small, but statistically significant positive effects of the intensity of Internet use on the intensity of feelings of loneliness, stress, and depression. The study results were fiercely discussed and often criticized. For example, critics argued that the items used for measuring the size of the social circles had a bias, favoring face-to-face contacts and neglecting online contacts (Hampton 2001). Subsequently published studies either showed that Internet use was positively related to social integration and community involvement (e.g., Cole 2000; Rainie/Kohut 2000), or negatively (see e.g. Nie 2001), or that there was no evidence for a supposed negative effect of Internet use on different measures of social integration (Katz/Rice 2002). However, these studies did not have two important strengths that the original study had, namely the use of a panel design and automatically logged data on Internet use.

The strongest counterevidence against the generalizability of the original findings came from the authors of the study themselves. In a study that analyzed

whether the original effects could be replicated with the same and with another sample, the authors did no longer find any evidence for the effects as found in the first study, with the exception of a positive effect of Internet use on stress (Kraut et al. 2002). In this second study, the authors found evidence for the hypothesis that Internet use leads to an increasing gap in the number of contacts between those who have already many contacts and those who have not. Especially extroverted people and people with many contacts would profit from Internet use by making more contacts.

Since then a number of studies appeared that showed differential effects of the use of the Internet on social integration for different users (see e.g. Katz/Rice 2002; McKenna 2002; McKenna/Bargh 1998; Cummings/Sproull/Kiesler 2002; and the studies mentioned in Katz/Rice 2002). Tyler (2002) therefore argues that it is no longer reasonable to speak of a 'main effect' of the Internet. Rather, the consequences of Internet use would depend on the goals of the users and the social context of their use of the Internet.

Kraut et al. (2002) suggest that the differences in their findings are related to changes of the Internet in the second half of the 1990s. The first study used data collected in 1995–1996 while the data of the second study were collected 1998–1999. The authors argue that in the 'early' times of the Internet, users mostly used it as a tool for information retrieval. In the second half of the 1990s users have more opportunities to socialize online with their friends and colleagues since more of them are online themselves. Moreover, the 'later' Internet itself offers a lot of opportunities that are explicitly designed for socializing or that have the potential to lead to new contacts. These changes might explain why the two studies led to different findings.

Especially the use of *online groups* has the potential to lead to new contacts and to increase community involvement of Internet users. Moreover, the use of online groups is not uncommon among Internet users (see section 3). Therefore the analysis of how structures of online groups influence the outcomes of their use is of crucial importance for finding out more about the social consequences of Internet use. In a similar way DiMaggio et al. (2001) argue that the analysis of institutional conditions of Internet use and the distinction between different kinds of online communities would inform research about the social implications of the Internet.

The outcomes of online groups for their members depend much on the solution of problems of cooperation. For example, a self-help group on the Internet will be more useful for its members, and for society, if members give mutual social support and are motivated to contribute to public goods, such as building up informative web-sites or fostering lively group discussion. Discussion in online groups for researchers or for employees in organizations are more satisfying for the members, may lead to a higher degree of group attachment, and increase economic efficiency more if the members are motivated to contribute to the group discussion. The performance of tasks by groups of virtual organizations, economic transactions in online business groups, and the opportunities for making contacts, and thus the provision of social capital for its members, depend

to a large extent on a sufficiently large motivation of members to contribute to online discussions.

Traditional communities are known to have structures that facilitate the solution to problems of cooperation (see e.g. Bowles/Gintis 1998). Therefore finding out more about which conditions foster the development of typical ‘community qualities’ in online groups or finding out which group conditions help solving problems of cooperation contributes to answering the question what the social consequences of Internet use are.

3. Past Issue II: The Debate About the Existence of Communities on the Internet

The term “community” has many different meanings in sociology (see Matzat/De Vos 2000; Hillery 1964). Some argue that a group should be called a community if members have direct, multiplex, and durable relations that are governed by reciprocity and if the members are strongly interdependent on each other (Taylor 1982). Other researchers stress that community cannot be based on interests alone, but that social bonds based on emotions (Durkheim 1964) or feelings of group attachment (Weber 1922) are crucial for a group to be called a community. Additionally, characteristics such as a high degree of perceived homogeneity among members (Gusfield 1975), common beliefs, norms, and values (Durkheim 1964) are by some regarded as typical. There is no consensus about which of the characteristics are necessary qualities that make a group a community. What researchers do agree about, is that members of traditional communities are geographically close to one another (Hillery 1964), which facilitates that many of the ‘typical’ characteristics of communities are ensured. However, in online groups the geographical distance between its members can be huge. Therefore, in the second half of the 1990s a discussion about ‘community qualities of online groups’ emerged.

Just as there are a variety of definitions of the concept of “community”, there are many different ways in which the term “online community” is used in the public and academic discussion (Wellman/Gulia 1999). Moreover, some authors prefer expressions like “virtual community”. I mention two typical points of view.

Rheingold (1993) defines an online community as a group of people who discuss a topic in a computer mediated way for a sufficiently long time with a sufficient emotional involvement and who form interpersonal relationships. Hagel/Armstrong (1997) use the expression online community for any computer mediated space that allows communication between its users or members and that is characterized by some member-generated content. The different meanings of the concept of online community have a striking similarity to the sociological community discussion, as related to the presence of common interests and emotions. One group of researchers defines an online community in such a way that all kinds of online groups are included. The relevant element of this group of definitions is the interpersonal communication on a common topic, which implies

only a common *interest*—e.g., Hagel/Armstrong (1997). The second group of researchers additionally stresses the *emotional* elements that online communities can have—e.g., Rheingold (1993).

The discussion whether online groups are ‘real’ communities is characterized by a diversity of opinions as well. Especially the potential of online communities to have some emotional qualities was discussed. Rheingold (1993) argues that whenever computer-mediated communication technologies are available to people anywhere, they will build communities with it. He is of the opinion that online communities present new forms of an old phenomenon, namely of living in a community with all its specific emotional qualities. At the same time, a number of scholars criticize this assessment. Wilbur (1997) argues that online communities do not have (emotional) qualities of a community because they are based only on special interests. Foster (1997) misses communication about the group identity (‘we-information’) and Stoll (1995) regards communication in online communities as too narrowly specialized for having community qualities. Weinrich (1997) takes a slightly different position by stating that only local communities can establish online communities with real community qualities. Global online communities cannot exist as a community because according to him trust, cooperation and friendship are based on contacts in the real sensual world.

So the choice of the definition of the term online community has to take into account the difference between groups that are based only on interests and groups that include emotional qualities. It would be advantageous if such a definition does not exclude examples that are discussed in the prominent literature of online communities. Moreover, it should be broad enough so that the question of whether online communities have community qualities is not a priori decided by this definition, but by empirical research. Here, the term *online community* is used to describe a group of users of a web site, who interact with each through computer mediated communication tools of this site. Interaction is centered on at least one topic that reflects the common interest(s) of the site users.

This definition describes an online community as one that is based on interests alone, but not on emotions or other characteristics. If an online community has additional characteristics, such as feelings of group attachment, emotional bonds to other members, or common values and norms, it will be called a “*social online community*”. Otherwise the term “online community” is used interchangeable with the term “online group”.

The use of online communities is not a marginal phenomenon on the Internet. Horrigan (2001) reports that 47% of respondents of a random sample of US Internet users in the year 2001 said they joined an online community (or an online group in the terminology used here). In Italy, 13% of respondents of a random sample of Internet users in the year 2002 said they would participate in an online community (Mandelli/Bossi 2003).

Online groups often succeed in fulfilling the common interests of their members (Matzat 2001; Cothrel/Williams 1999; King 1994; Cummings/Sproull/Kiesler 2002; McKenna/Bargh 1998; Constant/Sproull/Kiesler 1996). Some online groups have, at least in the view of their members or of observers, important

characteristics of a social online community (see e.g. Baym 1993; Hafner 1997; Bastani 2000; Dunham et al. 1998). On the other hand, empirical research also shows that many online groups even fail to reach minimum significant member activity (Cummings/Butler/Kraut 2002), so that it makes no sense to talk about qualities of a social online community.

These findings emphasize that, at the current state of the art, it is only of limited use to discuss any longer *whether* social communities exist on the Internet. The answer to this question is simply “yes”. Unclear is how often we can find online groups or social online communities whose use leads to significant benefits for the members and *on what conditions* it depends whether problems of cooperation are solved and characteristics of a social community evolve. It might be that the social online communities that were presented in the literature are just exceptional cases (Cummings/Butler/Kraut 2002). The presented findings underline that it is useful to analyze on what conditions it depends whether an online group solves problems of cooperation and whether it develops to a social online community.

4. Theories of Interaction in Online Groups and Community Development

There exists no systematic theory of online community development. There are more or less elaborated theories about conditions that affect problems of cooperation or that affect the development of different characteristics of social online communities, such as group attachment, the creation of emotional bonds, or compliance to norms. It remains to be seen whether these theories, if they find empirical evidence, could be building blocks for a theory of social online community development. Moreover, problems of cooperation and problems of the emergence of social online communities are probably related. Existing research suggests that the development of (social) community characteristics reduces problems of cooperation (see e.g. Bowles/Gintis 1998). On the other hand, problems of cooperation are ubiquitous. While their solution is definitely not a sufficient condition for the emergence of a social online community, I would argue that it facilitates the development of a social online community. Emotional involvement is unlikely as long as members behave uncooperatively. In the following, a number of theories are selected that have been used to analyze online interaction.¹

The first part presents theories that apply a human-computer interaction perspective. That is, they analyze how *technology* sets up constraints and possibilities for online interaction. In the second part, sociological theories are discussed that focus on *group structures*, followed by part three that takes a more social-psychological perspective.

¹ Theories that analyze online reputation systems (see e.g., Dellarocas/Resnick 2003) or technical information systems in organizations are beyond the scope of this article.

4.1 The Use of Different Media in Online Groups

4.1.1 A Theory of Discourse Architecture: Media, Type of Communication, and Group Stability

Jones/Rafaeli (2000) examine how different communication media can be used to structure online discussions in groups in such a way that typical problems are less likely. They regard *information overload of the members* as a typical problem for online discussions, together with the *free-riding problem*. They argue that the problem of information overload affects the stability of the group. If the communication volume is too high, some members will leave (ibid: 218f). The free-riding can occur since in discussions in online groups every member profits from the discussion independently of his/her own contribution, the discussion is a public good for the group. The authors argue that for overcoming the public good problem a sufficiently large ‘critical mass’ of members is important. At the same time, the higher the number of members, the more likely the problem of information overload would be (ibid.).

In addition, the authors make use of the concept of “interactivity”. ‘Interactivity’ is the extent to which a sequence of messages relate to each other, and especially the extent to which later messages recount the relatedness of earlier messages (Rafaeli/Sudweeks 1997). This leads to the following relationship between the number of members and the two problems of online groups, as clarified in figure 1.

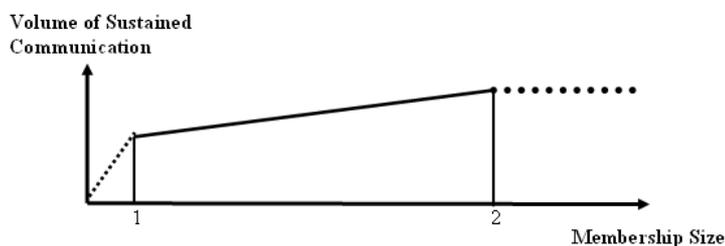


Figure 1: Typical Relationship between Membership Size and Volume of Sustained Communication, source: Jones and Rafaeli (2000, 219—own adaptation)

There are two crucial thresholds in the figure. According to the authors, until the first threshold (point 1 in figure 1) is reached, an increase in membership size would be strongly and positively related to the volume of sustained communication. After that, an increase in membership size would still be positively, but less strongly related to the volume. If membership size reaches the second threshold (point 2 in figure 1) the addition of even more members would no longer result in an increasing effect on the volume of sustained communication, because of cognitive boundaries of the members to process the overload of information. The authors argue that too high a volume of communication beyond the members’ cognitive boundaries would—at least in the long run—

result in a decreasing membership size (Jones/Rafaeli 2000, 220). If the zone² of information overload is reached, some members leave the group, so that after some time the volume of communication will reduce and the volume of sustained communication is not increased.

The authors analyze the effects of the type of communication media that is used (synchronous versus asynchronous communication), the type of communication (empathetic versus other communication), and the degree of interactivity on the group size at which the problem of information overload (point 2 in figure 1) sets in. Their most interesting arguments are summarized in the following two hypotheses (see Jones/Rafaeli 2000, 219f for the details).

Their first hypothesis is as follows: *Asynchronous communication media* that allow information storing, such as emailing lists, could reach a larger member population before the problem of information overload sets in than synchronous communication media, such as an Internet Relay Channel. They also argue that for empathetic discussion to be sustained it requires a greater degree of interactivity than for a discussion about a specific topic. The degree of interactivity, in turn, would be positively correlated with the information-processing load. As a consequence, they present a second hypothesis: When equivalent computer mediated communication tools are used, an online group that conducts *empathetic communication* has a smaller ‘maximum sustainable active membership size’ than an online group that discusses specific topics such as software support. With a “sustainable active membership size” the authors mean a number of members who actively contribute to the online discussion but who do not post a too high number of messages so that the cognitive boundaries of the members are not exceeded. No member would then leave because of a too high number of messages. As a result, the number of active members could be sustained. If this maximum sustainable membership size is exceeded some members would leave.

The arguments of Jones/Rafaeli (2000) point to important conditions that could influence the stability of membership in online groups. Empirical research suggests that a rising membership size of online groups indeed has a positive effect on the communication volume. A higher communication volume increases the turnover rate (Butler 2002). However, to my knowledge there exists no comparative empirical research that has tested the more specific hypotheses of the authors.

A drawback of their arguments is that they do not specify *how* the free rider problem in online groups is solved. The arguments suggest that as long as the group is large enough, the problem will somehow be solved. However, empirical research shows that this is not always true (see e.g. Cummings/Butler/Kraut 2002). A large group size alone does not guarantee a sufficient number of contributions as long as the members have no specific reason to become active. Here the theory remains completely silent about what that reason might be. Moreover, the theory also does not say anything about a member’s decision whether to stay or to leave the group, apart from that it would depend on the information

² Since figure 1 describes the *typical* relationship, the authors speak of the ‘zone’ of information overload, emphasizing that a number of individual and contextual differences affect when exactly the cognitive boundaries are reached.

overload. It seems unlikely that *all* factors that influence the exit decision are mediated by its impact on the information overload. For example, if members have a strong interest in the maintenance of relationships with other members, they may decide to stay although they suffer from a too high volume of communication. It seems that theory about the goals of the members and how they influence their behavior is needed here.

4.1.2 Usability and Sociability in Online Groups: Media and the Development of Empathetic Behavior

Preece (2000; 2001) is also strongly concerned about the appropriateness of different communication media. She is interested in the development of empathetic behavior in online groups. Preece (2000) argues that for the development of empathy between members of online groups it is important that they reach a “common ground”, that is a “mutual belief that they share a common understanding” (ibid: 157). Her idea is that the emergence of empathy is a coordination problem between interacting individuals (see especially ibid: 156f). The coordination of the communication process and its content during the interaction should facilitate the emergence of empathetic relations. Preece (2000) extends arguments of Clark/Brennan (1993) to make predictions about how different media influence the development of empathy in online groups. For instance, email communication would have the disadvantage that emotional understanding suffers from poor social presence of the communicating individuals. Online groups that rely on bulletin board messages could support socio-emotional communication better because of the possible use of icons. Graphical and textual Multi User Dungeons would also have the advantage that there are well-developed ways of displaying emotions (Preece 2000). Hence, during email communication the problem of coordination should be stronger than during communication that relies on a bulletin board or a Multi User Dungeon. Preece (2000) does not argue that email communication makes the development of a common ground, and thereby of empathy, impossible. Rather, the drawbacks that some media according to her have, would have to be compensated by additional active communication efforts of members to develop empathetic relations.

Preece/Ghozati (2001), in a content analysis of messages in 100 public bulletin boards and newsgroups, found that empathetic messages were quite common. Communication in online support groups had a larger proportion of empathetic messages than communication in cultural, professional, sports or other online groups. Moreover, online groups with a higher proportion of women had a higher proportion of empathetic messages. Utz (2000) showed that the use of icons is positively associated with the likelihood to make new friendship relations in Multi User Dungeons and that the use of emoticons is regarded as useful for the display of emotions (Utz 2001), as Preece (2000) presupposes. However, there is no comparative empirical research that allows assessing to what extent the use of different media had disadvantages for the development of empathy. Ethnographic studies and anecdotal evidence suggest that in email group communication, which according to the theory should have disadvantages for the

development of empathy, empathetic communication is not uncommon (Bastani 2000; Avery 1998).

The question whether different media have an important impact on the development of empathy is not yet decided. Survey studies that systematically compare online groups that use different media are rare. A related drawback of existing studies that rely only on content analysis is that they do not have direct measures of how much empathy the members of online groups perceive. It would be useful to supplement such field studies with corresponding survey data. Moreover, while different media may impose specific constraints for individual action, the focus on technology alone does not answer the question why and how empathy develops in some groups, but not in others. For example, is the development of empathy always only a problem of coordination? If members of an online social support group may have not only common interests but also some conflicting interests with regard to empathetic communication, then there exists a problem of cooperation which is more difficult to solve. Some members in support groups may have an interest in ‘telling their story’ and getting empathy from others, but not in listening and giving feedback, that is, in giving empathy themselves. If two such members interact, then there is a not only a problem of coordination—that could perhaps be solved by the provision of additional information about the emotional make up of the members—but also a problem of cooperation. There is indeed evidence that online groups face problems of cooperation for the provision of social support (Markey 2000). Which group structures help to overcome this problem? Finally, in social support groups there often is a need for collective efforts, such as providing information about solutions for medical, psychological, or social problems to a data base. To answer the question which group structures facilitate the provision of public goods one needs behavioral theories.

4.2 Group Structures and Behavior in Online Groups

The following three groups of authors examine how different properties of online groups affect the behavior and the goals of members of online groups and thereby lead to specific outcomes.

4.2.1 *A Theory of Reciprocity in Knowledge Sharing Groups*

Thorn/Connolly (1987) analyze the contribution behavior of users of a common data base who can decide whether to contribute to the data base by giving away some piece of information. If the user contributes, he must bear some costs. In addition, he obtains some benefits from every piece of information that is contributed by other users to the data base. In the simplest case the theory assumes that the costs are equal for all users and for every piece of information. Under these conditions, every user is better off by withholding his information, which is a ‘dominant strategy’ in game theoretical terms, because for every user there are costs but no benefits of his own contribution. To the extent that these simple assumptions reflect real arrangements of data bases, there will be

a tendency for every user to free ride on the contributions of other users, as Thorn/Connolly (1987) argue.

Nevertheless, according to the theory, a user can be motivated to contribute if he hopes that his contribution will induce other users to reciprocate and contribute as well. The authors base their reasoning on the empirical findings of experiments with iterated prisoner's dilemma games. In a two-person case the second user immediately knows whether the first user helped or harmed him, and he is able to reciprocate. Cooperation can be used as a reward, and defection can be used as a punishment for the other actor's past behavior. Experimental research in small groups has shown high rates of contribution being motivated by reciprocity considerations. Thorn/Connolly (1987) claim that in a similar way users of a data base are motivated by a hope for reciprocity. They would use their information contribution to reward the contribution of other users and to be rewarded in the future.

In the following step, the authors relate the hope for reciprocity to a number of group conditions. They argue that the larger the group of actors, the less easy it is to track down contribution or withholding of other users and to punish or reward accordingly. If a user rewards a small minority of contributors in a large group, then at the same time the large majority of free riders are also rewarded. Therefore, since rewarding appropriately does not work so well in larger groups, a larger group size will, according to the authors, reduce the hope for reciprocity and thereby the degree of reciprocal cooperation. Therefore, they expect that a *larger group size* of data base users *will lower the contribution rate* (Connolly/Thorn 1990).

Based on the assumption that the hope for reciprocity is an incentive to contribute, the authors argue that larger *contribution costs* or a lower value of the *information benefit* will reduce the contribution rate. Moreover, they investigate the effects of heterogeneity of users. Three kinds of heterogeneities are distinguished: heterogeneity of the average benefit of information provided by different users (*heterogeneity of information quality*), heterogeneity of the benefit that users obtain from the same piece of information (*heterogeneity of interests*), and *heterogeneity of the contribution costs*.³

Their theory predicts that the introduction of any of the three kinds of heterogeneity will lower the contribution rate, because they reduce the hope for reciprocity. For example, assume that a group of user starts as a completely homogenous group. After some time a subgroup of users acquires—for whatever reason—higher quality information. Now there are some users with 'high quality information' and others with 'low quality information', so that there is a higher degree of heterogeneity of information quality in the whole group. The exchanges of contributions among the first subgroup of users is according to Thorn/Connolly (1987) governed by the hope for reciprocity. However, a user who contributes high quality information does not receive much of value in return from users of the second subgroup. The theory claims that his hope for reciprocity and thus his incentive to contribute are then reduced. The user's

³ Connolly/Thorn 1990 call these heterogeneities "sender-", "user-", and "cost-asymmetry".

reduced contribution rate, in turn, will also reduce the hope for reciprocity of the other users (Thorn/Connolly 1987). A similar line of reasoning is used for the two other predictions (*ibid.*, 224). This effect of heterogeneity is seen as a peculiarity of a collective good that consists of information. Everyone profits from a contribution except the contributor him- or herself.

The theory of Thorn and Connolly (1987) has interesting implications. Before I present some empirical evidence, I first mention two points of criticism. The first one is related to empirical applications of the group size hypothesis; the second one concerns the general theoretical foundation.

The original hypothesis about the negative effect of group size on the willingness to contribute information was developed for the explanation of the contribution behavior to a data base of an organization. In such a situation users are informed about the approximate size of the user group. This may be different for members of online groups on the Internet who contribute to online discussions. They may have no knowledge at all about the size of the group. The point is that according to the arguments of Thorn/Connolly (1987) a user's hope for reciprocity can be reduced by a larger group size only if he realizes that many other passive users do exist. Others argue that the group size hypothesis is valid for online groups in general (see below). However, in this case one either has to assume that members of online groups have at least a vague idea about group size, or one has to argue that the group size hypothesis does not necessarily imply that the members are aware of the group size. According to such a point of view, the rewarding or punishing of other members by giving or withholding information may have objective effects that depend on the group size, but not on whether the information provider (or withholder) is aware of this size. It is unclear to me whether any such 'justifications' for applying the group size hypothesis are reasonable for defending its application in the context of online groups. In any case, other researchers did apply the ideas to online groups (see below).

A second point of criticism concerns the solution offered to the collective good problem, which is, from my point of view, not completely satisfying. According to the reciprocity model users initially have a hope for reciprocity. They give information to reward the past behavior of other users, and they withhold information to punish other users who have not contributed in the past. However, rewarding other members through contributing useful information facilitates the production of the collective good not only directly, but also indirectly by its rewarding function if we follow the logic of this argument. Thus every group member profits from rewarding active members. However, the provision of these rewards also costs time and effort. Why should members not save their time and let others bear the costs? They will gain the benefits of the rewards, i.e. the future active participation of the rewarded members, nevertheless. Even if a member thinks that reciprocal cooperation will induce other members to cooperate in the future, this does not imply that he feels an obligation to personally reward the past cooperator. Others could also do the rewarding. The original free-rider problem of contributing is replaced by a second-order free-rider problem (Coleman 1990, 270) of rewarding the past behavior of active members.

Therefore, the original question “why do members contribute?” still remains unanswered at a higher level. Even if we take the assumption of a hope for reciprocity for granted, the theory does not provide a theoretically satisfying answer to the *collective good problem*, if it does not explain why this second-order free-rider problem can be solved more easily than the original free-rider problem.

If we analyze discussions in online groups on the Internet, and not the provision of information to a data base within an organization, the character of the problem changes somewhat. Discussions in online groups that consist of public answers and questions partly have the character of a public good, since everyone profits of them independently of his/her contribution. At the same time, *if* members have particular *individual* interests in the answers to the questions they stated themselves, and *if* they have a hope for reciprocity, then the mechanisms specified by Thorn/Connolly (1987) could work. Under these conditions bilateral cooperation might arise and the free rider problem would then be solved as a by-product.

Thorn/Connolly (1987) tested some of their hypotheses experimentally and found significant negative effects of the heterogeneity of information quality and of information interests, but a non-significant effect of group size (comparing groups of four users with groups of eight users). Rafaeli/LaRose (1993) made use of some ideas of the theory to explain the usage of public electronic bulletin boards that are accessible via telephone and modem. However, they did not analyze individual contribution rates. Rather, their dependent variable is the ratio of the number of files sent within a week to a bulletin board (‘number of contributions’) to the total number of weekly file transactions. The total number included the number of contributed as well as the number of downloaded files by users. They found only a negligibly small negative effect of group size on this ‘contribution level’.⁴ Hoffmeister (2000) tested some ideas of the reciprocity model to explain differences in the individual contribution rates of approximately 900 users of 52 non-academic emailing lists. His dependent variable is the self-reported participation behavior of the respondents. He showed that the higher the user subjectively perceived the probability of receiving an answer to a question, the higher the likelihood that his self-reported number of sent messages was larger than the mean self-reported number of sent messages for all users. This association was significant while controlling for knowledge of the user and for the subjective assessment of how great the past information benefits have been. In addition, in a multivariate analysis the self-reported expected size of the information benefit was not significantly associated with the self-reported participation behavior. Besides the questionable validity of the used indicators, the study of Hoffmeister (2000) has one notable limitation. Its sample is biased in favor of those emailing list members who are active participants. A total of 90% of the respondents were active participants in their mailing list. How-

⁴ In addition they constructed two indicators that, according to their point of view, are positively related to the hope of reciprocity: the proportion of content estimated by the board operator as devoted to non-computer-related topics and the percentage of board users characterized by the board operator as people “who share knowledge and resources” or people that are “participating in a fair exchange” (Thorn/Connolly 1987, 285f.). Both indicators showed the expected positive effects on the contribution level.

ever, other research has shown that active participants constitute only a small minority of all members, the proportion being approximately 10% in academic mailing lists (Stegbauer/Rausch 2001). Therefore, it is an open question whether the non-significant effect of the (expected) information benefit is due to the homogeneity of the sample and whether the found effect can be generalized to a population consisting of both active and passive members. Matzat (2001), in a study of 49 academic emailing lists, tested some of the hypotheses by analyzing the public answering behavior of researchers. The dependent variable of this analysis is constructed from publicly archived data about the communication of the members, and not from self-reported data, while the information for the independent variables consists of survey data. The study found marginal evidence for an effect of the information benefits and costs, but no effect of the group size or of any other of the hypothesized effects of group properties.

The discussion shows that under certain conditions a hope for reciprocity may work in online groups. More research is needed to find out which conditions induce such a hope.

4.2.2 The Economies of Online Cooperation

Kollock (1999; 1998) is interested in the question why a considerable number of online groups do not fail to produce public goods although groups on the Internet provide opportunities for anonymous and short-term interaction. He first examines the restrictions and opportunities that online environments impose on members of online groups. Second, he proposes a number of potential motivations that could lead them to contribute to the production of public goods. Based on these proposals, he suggests some features of online groups that could induce members to cooperate with other members. While Kollock (1999; 1998) does not aim to present a coherent theory, his analyses nevertheless lead to interesting hypotheses.

According to Kollock (1999) the restrictions and opportunities for the production of public goods in online groups differ in three important ways from the conditions in groups that exist offline. These are changes in the costs of production, the benefits, and in the production function, that is in the way in which the proportion of contributors to a public good relates to the degree of production of this good.

The *costs* for an individual to contribute to a public good in an online group would be comparatively low, since they consist mainly of the time and the effort (and for some the provider costs) one needs for sending online messages, such as email. Moreover, coordination costs for groups would drastically be reduced because meetings with other people are easily organized. When offline groups go online, the *benefits* would change as well. The consumption of digitalized information by one member does not reduce the amount available to others, so that many public goods in online groups would be purely indivisible. Since in the western world the Internet is basically accessible to everybody, an almost unlimited number of individuals would profit from digitalized information. A remarkable characteristic of the *production function* would be that in online

groups one single member can often produce a public good. Consequently, for the production of these goods there are no coordination costs, which means that for the members the fear to waste resources for nothing is eliminated. The effects that these changes in the constraints and opportunities for the production of public goods and for the emergence of cooperation have, then depend on the prevailing motivations that individuals have for behaving cooperatively. Kollock (1999) distinguishes the following possible motivations.

As one possible motivation to cooperate he mentions anticipated reciprocity. Kollock (1999) emphasizes that this motivation sometimes occurs in a system of generalized exchange, that is a system of exchange in which a benefit given to a member is not reciprocated by the recipient, but by another group member. Another potential motivation to cooperate would be the gain of reputation in the group. The provision of high quality information or the willingness to help others in the public domain may increase one's prestige in the group. As a third possible motivation Kollock (1999) mentions a sense of efficacy. Providing information or help to others often results in a sense that one has a positive impact on the environment. These three kinds of motivation rest on self-interested behavior. A motivation that does not rest on the assumption of purely self-interested behavior could be that cooperative behavior is induced by the need of others. Kollock (1999) argues that a high degree of a member's group attachment or his commitment to the group would mean that the well-being of the group or other group members strongly affects his own interests.

Depending on what motivations prevail in online groups, Kollock (1999) claims that certain features of online groups encourage cooperation. If the first two motivations prevail, anticipated reciprocity and reputation gains, then online groups with a large 'shadow of the future' (a large probability of future interaction), and a large and positive 'shadow of the past' (knowledge about previous cooperative behavior by others) should induce a high degree of cooperation. Consequently, Kollock (1999) regards a high likelihood of future interaction of the same members, identity persistence, knowledge of previous interaction of members, visibility of members' contributions, and well defined group boundaries as group features that support cooperative behavior.

If a sense of efficacy rules behavior of many members then, according to Kollock (1999), it may be that as group size increases these members are stronger motivated to cooperate. If altruistic motivations prevail for members, such as a high degree of group attachment, then these members would be more motivated, the more developed, clearer articulated and communicated the goals of the group are.

The analysis of Kollock (1999; 1998) is one of the very few that systematically takes into account how features of online groups provide incentives for behaving cooperatively. Many of its strengths have not yet been used for empirical Internet research. (See for example Kollock 1998 for predictions regarding what kinds of online fantasy communities are successful.) Evidence has been found that for researchers in academic emailing lists the opportunity to gain reputation in the academic community is a strong incentive to become active in online discussions

(Matzat 2001). Other studies that provide evidence for anticipated reciprocity have been discussed in the previous section.

The validity of the hypothesis about anticipated reciprocity as a driving force behind cooperation also has been discussed in the previous section. What Kollock (1999) adds is that he puts anticipated reciprocity in the vicinity of a system of generalized reciprocity. The weakness of this point is that Kollock (1999) regards anticipated reciprocity as a form of self-interested behavior. Under conditions that he himself mentions, such as ensured future interaction, self-interested behavior may lead to bilateral reciprocity. A system of generalized reciprocity, however, strongly has a character of a public good. It is unclear how one can explain the emergence of a system of generalized reciprocity with the assumption of (bilateral) anticipated reciprocity.

There are promising directions for useful supplements of Kollock's (1999) arguments. First, what might be added to the list of motivations that induce cooperative behavior is the goal to make new contacts. In many groups a member probably feels less embarrassed if someone whom he knows by name (or has heard of already during previous public discussions) approaches him. Thus, the contribution to online discussions could be used strategically for facilitating the making of new contacts. Newly made contacts can be of a professional or private nature and could thus be of general relevance for the contributing behavior of members in different kinds of online groups. Second, based on assumptions of specific motivations, one could in more detail derive predictions about specific structures of online groups that support cooperation and the provision of public goods. For example, Matzat (2001) shows that academic emailing lists that have a highly integrated community of researchers as a part of their membership stimulate active discussion contributions stronger than lists that have a less integrated community as part of the membership. This would be due to the fact that in such online groups more reputation can be gained than in other online groups. Third, it would be useful to find out how bilateral reciprocity is related to generalized reciprocity. Fourth, one could elaborate the hypotheses about motivating goals that stimulate cooperation. At the moment, hypotheses about self-interested behavior are completely unrelated to hypotheses about behavior that is motivated by the goals of other members or of the whole group. It may be that different types of personality have their different motivations. However, it would be of considerable theoretical and practical interest to find out, whether and under what conditions self-interested behavior or behavior that takes into account the goals of the group prevails and how the two broad types of behavior relate to each other. Kollock (1999) himself argues that completely altruistic behavior would seldom occur.

4.2.3 A Theory of Relational Signals in Online Groups: the Stimulation of Member Participation

The starting point for the theory is that members of online groups have *individual* interests and *common group* interests that would motivate them to contribute to online discussions (Matzat/De Vos 2000). The two kinds of interest either can

be in complete accordance, or fulfillment of the one kind of interest can be disadvantageous for the fulfillment of the other. In the latter case individuals orient their action either more to the one or to the other goal. The goal that attracts the member's attention and structures the decision situation in such a way that other competing goals vanish in the background is called the 'situational frame' (see Lindenberg 1997; 1998 for the details). In online groups frames for members can be more oriented towards fulfilling the member's individual interests, for example in online markets, or more towards fulfilling the common group interests. An example of the latter would be a self-help group that emphasizes the needs of all group members.

Another point of the theory is that the member's behavior in the online group sends so-called relational signals to others. Three kinds of signals are distinguished. First, in *bilateral interaction* a member's behavior gives information about how he evaluates the bilateral relationship to the other member. His behavior could indicate an interest in the relationship itself, or it could indicate that he regards it only as a means for the short-term fulfillment of his own goals. Second, a member's participation in the activities of the group, as well as his non-participation, gives information to the *whole group* how he regards the common group goals. The extent of his contribution to a common goal or the extent to which he is willing to provide information to other members indicates whether the decision frame of the member is in accordance with the frame of the group. As a third point, especially the *administrator* of an online group signals through his own behavior what kinds of *behavioral standards* he expects from the members. For example, a group administrator who appeals to the members' fairness signals that in the online group members should evaluate the online interaction not only on the basis of maximization of one's own interests. The importance of relational signals for the members' behavior can differ between online groups, depending on certain conditions, as is described below.

A distinction is made between three different kinds of tools that the administration of the online group has for influencing the members' behavior. The first kind of tools, so called *frame-stabilizing tools*, work by increasing the salience of the common group goal. They enhance the individual's attention to the frame, thereby bringing it more in the foreground and diminishing the relevance of the maybe conflicting particular interests of the individual. This mechanism reduces the value of the member's background goals and thereby also reduces the member's costs that may result from neglecting them. Frame stabilizing tools are those tools that make the group easy to identify, that make membership easily recognizable and thereby stress the salience of the common group goal. Examples are the use of symbols within the group or the development of rules that govern the joint efforts to reach the common goal.

The second kind of management tools is called *indirect control tools*. These make use of the formal or informal rules that exist in a group. Such rules coordinate the joint achievement of the common goal (see below the example of the 'WELL'). Indirect control tools work through relational signals that indicate the individual's interest in conformity to the rules and thereby indirectly also his conformity to the group frame. Indirect control tools are those tools that

provide opportunities and incentives for the members to send relational signals that indicate accordance with the group frame. They have the effect that individuals may restrict the fulfillment of the individual short-term goals because they take into account the relational signal of their behavior (and thus the group frame). If the frame is not too individualistic, the individual has an incentive to signal to others and to the group his compliance with the frame to avoid informal sanctions. Group administrators can use these insights strategically by making use of minor group crises that give the members an opportunity for relational signaling. For example, the online community manager of the famous WELL used the difficulties the community had with deviating members for a public discussion about the group frame and its related rules of conduct. It was decided that no direct sanctions should be applied to deviating members if the deviation was not extremely severe. At the same time, the management indicated that informal sanctions applied by the members would be adequate (Hafner 1997). This gave the members low cost opportunities to signal their willingness to comply with the group norms and the frame by applying informal social sanctions to the offender.

The third kind of management tools, *direct control tools*, work through enhancing the direct benefits for a group member, as opposed to through influencing the perceived benefits like the frame stabilizing tools do. Examples for direct monitoring tools in the realm of online communities are the introduction of direct rewards for active participation in the online community. For example, Shafer (2000) proposes to give discount rates for some products to members who are extraordinarily active in discussions of commercial online communities.

Under which conditions is what kind of tool more successful for the stimulation of active participation of the members? The impact of a direct monitoring tool is restricted in situations of a large relevance of relational interests, that is, in situations in which members have a strong interest in the maintenance of good relations to other members. The three kinds of tools constitute a hierarchy of tools that progressively indicate a lack of relational interests (Lindenberg 1998).

Direct control tools imply the signal that the member is expected not to take into account the interests of others for his behavior. They signal to the members that the group or in this case the online community administrator expects the member not to have any relational interest. Accordingly, the larger the importance of relational interests in the group, the less adequate direct control tools are likely to be. On the other hand, the larger the importance of relational interests, the more adequate are tools that indicate more relational interest. Consequently, the larger the importance of relational interests in the group, the more adequate are frame-stabilizing and indirect monitoring tools.

Finally, the theory claims that two important group properties influence the degree of relational interests and thereby influence the effect of the three kinds of monitoring tools. First, some online communities serve a specific goal of narrowly specialized interest groups, while others fulfill many different purposes for its members. This is called *multifunctionality* of an online community, where multifunctionality is higher as the online community fulfills for its members more different kinds of goals. Second, online groups are distinguished according

to their degree of *social embeddedness*. The more the online interaction of the members is embedded in interactions outside of the online group, the higher the degree of social embeddedness of the group. The theory argues that under a condition of a high degree of embeddedness or multifunctionality the interdependencies between group members are stronger. The higher the interdependencies between actors, the more they will develop relational interests, given that there is not too much competition between the members. For example, if an actor depends on another actor for the fulfillment of many of his goals, he will develop an interest in maintaining a good relation with him.

Accordingly, the theory also predicts that in online groups with a higher degree of embeddedness or a higher degree of multifunctionality, frame stabilizing or indirect monitoring tools would be more successful in the stimulation of active membership participation than in groups with a low degree of embeddedness or multifunctionality.

A strength of the theory is that it offers a more coherent framework for predicting under what conditions group members behave narrowly self-interested and under what conditions they take into account the interests of others or the common group interests. The theory is currently being tested in an ongoing research project about a number of knowledge sharing online groups.

4.3 Group Attachment and Norm Compliance in Online Groups

Sassenberg (2002) takes up a general distinction between groups and applies it to the Internet. He distinguishes between so-called 'common bond' and 'common identity' groups. The criterion for this distinction is the kind of attachment that the members have to the group. If the members' attachment to the group is based primarily on the bonds between individual members, then the group is called a *common bond group*. If the members' attachment to the group depends most of all on the identification with the group as a whole, that is on the identification with its common goals and purposes, and is independent of the attractiveness of individual members, then the group is called a *common identity group*. Since the reason for membership in common identity groups depends less on the dropout of other members, common identity groups are expected to have a more stable membership than common bonds group. Moreover, strong identification with the group is expected to foster participation in collective action. Therefore members in common identity groups should participate more in collective action than members of common bond groups.

While the existence of common bond and common identity groups has been found in studies not related to the Internet, Sassenberg (2002) argues that a similar distinction can be made for different types of chat groups. Chat groups could be divided into groups that were established to discuss a special topic, so called *on-topic chat channels*, and groups that are intended as a means to foster the making of contacts between individuals, so-called *off-topic chat channels*. Sassenberg (2002) claims that on-topic channels correspond to common identity groups and off-topic channels to common bond groups. As a consequence, he expects the following. Members of on-topic chat channels (1) should show a

stronger social identification with the channel as a whole, and (2) should perceive a lower attraction of the individual channel members (both as compared to members of off-topic channels). In addition, (3) the degree of social identification of members of on-topic chat channels should be more strongly related to the attraction of the whole group than to the attraction to the individual members, and (4) in off-topic channels the social identification with the group should be more strongly related to the perceived attraction of the individual members than to the attraction of the whole group.

Moreover, Sassenberg (2002) claims that a stronger social identification with a group should lead to a stronger compliance to its norms. Accordingly, he argues that members of on-topic chat channels would behave more in accordance to the norms of their group than members of off-topic channels. The difference in norm compliance should be mediated by differences in the degree of social identification with the group as a whole: members of on-topic chat channels are expected to show a stronger norm compliance because their social identification with the group as whole is stronger than for members of off-topic chat channels.

Sassenberg (2002) tested these hypotheses with a combination of survey and logged data about the online behavior of members of off-topic and on-topic chat channels. Ninety four participants of German on-topic and off-topic channels were surveyed. Depending on their chat-channel the participants were categorized by two coders as member of an on-topic or off-topic chat channel. In the study, corroborating evidence for the expected differences in the degree of social identification with the group as a whole and the perceived attraction of individual members was found. Moreover, as predicted, for members of off-topic channels social identification was not related to group attraction, but positively related to personal attraction. For members of on-topic channels social identification was positively related to group attraction and even negatively related to personal attraction.

For analyzing norm compliance Sassenberg (2002) proposed to measure the homogeneity of the use of synonymous smileys and acronyms by members of a chat channel. The more homogeneous the chatters use the same acronyms and smileys the stronger would be the adherence to the group norm of the chat channel. He indeed found the expected difference in homogeneity. Chatters of on-topic channels used much more homogeneous acronyms and smileys than chatters of off-topic channels. This effect of the type of the online group disappeared when the degree of social identification was included as an additional variable in the analysis (which mediated the relationship between the type of group and norm compliance). Sassenberg (2002) regards the findings as supportive for the assumption that the difference between common identity and common bound groups is meaningful on the Internet as well. Social identification with the group would be an important factor of behavioral influence in chat groups and promising for the distinction between different types of chat groups.

According to my point of view this distinction could be promising especially since it may be related to a number of other phenomena, such as group stability, members' involvement in collective action, and norm compliance that have a direct or indirect relevance for the development of qualities of a social online

community. However, at the moment, there is only evidence for an effect on norm compliance, but not on membership stability or collective action, as Sassenberg (2002) himself argues. Again, more empirical research would be needed here.

I would like to add some suggestions. It would be interesting to know whether the distinction between common bond and common identity groups is meaningful only for chat groups or whether it can be extended to other kinds of online groups. Does it make sense to distinguish between different kinds of bulletin boards, Multi User Dungeons, newsgroups, or emailing lists on the basis of the kind of attachment that group members have? A second point of discussion is the kind of norms that the study analyzes. In the chosen example, the homogeneous use of acronyms and smileys in a group, the norm is a convention and every member of a common identity group profits from its compliance since it makes communication more efficient. Coleman (1990) calls this kind of norms “conjoint conventional norms”. The problem of realizing and maintaining a conjoint conventional norm consists of solving a problem of coordination. The group members have to find a consensus about the kinds of acronyms that should be used and every member has to get the information about this consensus. In many common identity groups this is a matter of time. The use of acronyms by members can be seen as a trial and error process that in some groups will converge, for example if many members use initially the same or similar acronyms. Once the consensus is reached, it will be self-maintaining in a common identity group.

An important point to note is that other kinds of norms are less easily realized and maintained. In knowledge sharing groups members with only a little knowledge may expect from members with much knowledge that they give away some of their knowledge (see e.g. McLure Wasko/Faraj 2000). In such examples the targets and the beneficiaries of the norm consist of distinct groups, which complicates the argument. Moreover, within the knowledge sharing group one can expect to find conflicting interests about how much knowledge should be given away. The problem of reaching a consensus about the norm within the group does not only consist of a problem of coordination. It is a problem of cooperation that imposes *costly* contributions of the members. Such kind of norms are called “disjoint essential norms” (Coleman 1990). Many knowledge sharing and self-help online groups face problems that could be solved by realizing and maintaining disjoint essential norms. It would be of much more interest to find out whether common identity online groups are more successful than common bond online groups in establishing disjoint essential norms.

A final point is the explanation for the found differences in compliance to the conjoint conventional norm. I would like to offer an alternative explanation that does not rely on processes of social identification.⁵ Rather it focuses on structural differences between common bond and common identity chat groups. By definition, members of common bond groups are stronger attracted to other co-members than members of common identity groups are attracted to their co-members. It is more likely that members of common bond chat groups concentrate their chat communication only on those few members to whom they

⁵ I would like to thank Michael Baurmann for this idea.

are strongly attracted, and tend to avoid chat communication with others to whom they are less attracted. On the other hand, members of common identity chat groups have a common interest, and will therefore tend to have more chat communication of general interest to *all* members. As a consequence, in common bond chat groups the communication structure is much more fragmented into different cliques that do not chat with each other. This stronger fragmentation of communication in common bond chat groups impedes the diffusion of information about used acronyms from one clique to another. The result is that in common bond groups a larger heterogeneity of used acronyms can be found. According to this alternative explanation the difference in norm compliance, as this is called by Sassenberg (2002), depends on differences in the communication *structure*, and not on *cognitive* processes, as Sassenberg (2002) assumes.

5. Summary and General Discussion: Directions and Open Questions for Future Research

This paper argues that theory guided research is of importance for the discussion about the so-called social consequences of Internet use. The findings of empirical studies suggest that the impact of the use of the Internet depends on a number of social conditions. Especially the potential of online groups to make new contacts and to socialize may influence its social impact. Past discussions about the possibility of community on the Internet revealed that the term “online community” is used in different ways by different authors. Some authors use the term in the sense of a sociological group, whereas others speak of online communities in the sense of a *social community* with its distinct emotional qualities, such as common norms, emotional exchange, and stability of the group. The use of online groups seems to be not a very rare phenomenon, although it remains to be seen to what extent national differences exist. Empirical research showed that *social* online communities indeed exist. It is an open question whether such social communities are exceptional cases or develop with some regularity. Not seldom online groups do not foster active participation of its members and do not reach qualities of a social community. Therefore the question of which conditions facilitate active participation of members and the emergence of qualities of a social online community in an online group is of both theoretical and practical interest.

The last section presented different theories that contribute to assess the social consequences of Internet use. *Media theories* emphasize the advantages or disadvantages of specific communication media. For example, it was hypothesized that asynchronous communication media with facilities for information storing would make possible a larger number of active contributors to a discussion than synchronous media (Jones/Rafaeli 2000). Preece (2000) argues that communication media with specific facilities for the expression of emotions facilitate empathetic behavior. *Sociological and social psychological theories* underline structural characteristics of online groups and how they influence the behavior, cognitions, and motivations of group members. Some important

structural characteristics of online groups are the heterogeneity of the quality of offered information, the group size (Thorn/Connolly 1987), clear group boundaries, identifiability of members (Kollock 1999; 1998), multifunctionality, social embeddedness (Matzat/De Vos 2000), and the difference between off-topic and on-topic chat groups (Sassenberg 2002). The theories argue that different mechanisms motivate participation of group members in online activities. Examples of such mechanisms are the inducement of anticipated reciprocity, the gain of reputation, the consideration of the needs of other members or of the common interests of the group, and social identification with the group.

There remains much empirical research to be done. Much more *comparative* empirical research is needed that takes into account these different approaches. We need to know more about the prevalence of the different types of motivations to become an active participant in online group activities. How often do members of different groups take into account the needs of others? If the type of motivation depends on certain group characteristics, why is that the case? Is there a selection effect in the sense that self-help groups tend to attract individuals with a higher degree of altruism than other online groups? Or is there a causal relationship between the group characteristic and the activated motivation, as some theories claim? Empirical research is needed that *compares different groups on the basis of the group properties* that are expected to influence behavior and thereby influence the outcomes of the group for the members.

Considered together, theoretical research on the social shaping of the Internet and the governance of online groups may, at a first glance, appear impressive. It seems that the presented theories could be building blocks of a general theory of community development on the Internet. However, I see at least three problems that have to be overcome in theory development: the neglect of behavioral theory, the neglect of the structure of interdependency, and the difference between cognition and behavior.

First, media theories tend to emphasize the characteristics of the technology at the cost of neglecting behavioral tendencies of the members (see section 4.1). Even if a specific communication medium provides additional opportunities for members, the theories remain silent with regard to the question *how* the different opportunities change behavior. Opportunities are used only when they are helpful for reaching certain goals that the members may have. For example, some media with a 'better' usability may reduce the costs (time, effort) of providing help to others. If members still think that the provision of help is useless for themselves then they will not use the opportunity. More opportunities for the display of emotions may harm the member who shows emotions and makes himself vulnerable. Under such conditions, *media differences alone* do not matter. I propose that theories about the impact of media should take into account more the *behavioral* consequences of the media that often will mediate the potential effects of media induced changes.

Second, some theories neglect the structure of interdependency between members (see section 4.1 and 4.3). That is, they neglect to what extent the common interests of the group or the conflicting interests of individuals prevail. Studies of knowledge sharing in online groups often take into account the structure of

interdependency whereas studies of the provision of social support often do not, although free rider problems exist in both groups (see section 4.1). Medical and self help groups have a large policy relevance (Burrows/Nettleton/Pleace 2000; Wright 2000; Muncer et al. 2000a; Swickert et al. 2002; Dunham et al. 1998; Muncer et al. 2000b). It would be fruitful for further research on online social support to take into account the structure of interdependency more carefully to find out how problems of cooperation can be solved.

Third, theory should distinguish more clearly between potential effects of group characteristics on the members' cognitions and on the members' behavior. Some argue that group features affect cognitive processes (see section 4.3) and that they thereby have their strongest impact on the outcomes of the group. Others focus on behavioral processes (see section 4.2.1 and section 4.2.2) and argue that group features have their strongest impact on the outcomes of the group via behavioral processes. At the moment, it is unclear who is right. Both approaches could benefit from incorporating parts of each other: the link between cognition and behavior deserves more attention in social psychological approaches, whereas sociological approaches often neglect cognitive or emotional aspects.

Finally, it would be useful to have *general* theories of online interaction and not separated approaches for online groups with a commercial or organizational relevance on the one hand and different approaches for online groups with a social relevance on the other hand. Humans do not change their nature when they sometimes use knowledge sharing groups for professional reasons and sometimes use online hobby groups for socializing or online support groups for finding fellow-sufferers. Moreover, even online groups that were not founded with the intention to build up a social online community might profit from reaching some qualities of a social community, since it helps to reduce problems of cooperation. One might object to this view that members of social support online groups would behave much more altruistically than members of knowledge sharing online groups and that therefore the problems that these groups face are different. I am not convinced of the usefulness of this counterargument because of two reasons. First, there is evidence that suggests that problems of cooperation exist in both kinds of groups (see section 4.1). Second, even if members of different groups would behave somewhat differently in different kinds of online groups, research has to show why this is the case. If it is a selection effect, then we have to find out how social online communities can be protected against the intrusion of less cooperative individuals. If it is not a selection effect, then we need to find out what characteristics of an online group induce members to take into account more the needs of others.

Individuals, organizations, the economy, and society in general may profit from the potential of the Internet. A solid, integrated theoretical foundation of research on the social shaping of the Internet and the governance of online groups is a crucial ingredient for the realization of this potential.

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