Conformity on the Internet – The role of task difficulty and gender differences

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ABSTRACT

Conformity and the effects of social influence have been studied for a long time in face-to-face situations but have received less attention in contexts of computer-mediated communication (CMC) such as the Internet. The purpose of this study was to investigate conformity behavior in use of the Internet. The social context for the participants was the Internet communities from which they were recruited. Four hypotheses were tested by a survey containing knowledge and logic questions. Half the participants were subjected to conformity manipulations and the result showed a clear conformity to erroneous majority alternatives. Of the participants in the Conformity group ($n = 477$) 52.6% conformed at least once, with an average 13.0% of participants conforming on each critical question. The conformity increased with higher task difficulty, both subjective and objective. The fourth hypothesis, that women would conform to a higher degree than men, received no support. Instead, the results showed higher conformity for men on both difficult and logical questions. Reasons for conformity on the Internet such as turning to the group for guidance, avoiding social isolation and protecting one's self-esteem are discussed with reference to theory and earlier research.

1. Introduction

Conformity as a phenomenon has been widely studied since the beginning of the twentieth century (Reysen, 2003). Conformity is a strong group psychological mechanism that can make people behave inhumanely (Zimbardo, 2007), but can also be an important force keeping groups together and facilitating communication (Bond & Smith, 1996). In this day and age the Internet plays an important part in many people's lives, professionally as well as socially. According to PTS (2010) 90% of people in Sweden between 16 and 75 years of age use the Internet. In the age range of 16–50 almost all (97%) use the Internet at least to some degree. Sixty-five percent of people with an Internet subscription stated that they use the Internet for some form of social activity. It has a considerable impact on many people's social lives (Bargh & McKenna, 2004). The purpose of this study is to investigate if and how people conform when using the Internet, exercising social influence only via computer-mediated communication (CMC).

1.1. Studies on conformity

The most famous and influential study of conformity is probably Asch's line judgment task (Asch, 1955, 1956, 1958). In a meta-analysis from 1996 Bond and Smith (1996 referred to 133 studies using Asch's or a similar paradigm (see Crutchfield, 1955). Consistently with earlier research Bond and Smith (1996) found higher conformity with a larger majority and more ambiguous or difficult tasks. They also found higher conformity for women and in-group members. In Asch's original studies the test subjects complied on average with the majority's wrong judgment in 36.8% of their selections (Asch, 1955). Differently from Asch, however, Crutchfield (1955) removed the face-to-face (f-t-f) situation from his experiments and he also varied the tasks to be performed more. In addition to line judgment tasks there were also, for example, logical tasks and expressions of attitudes. He found compliance depending on the type of task to vary from around 30% to 79% for the most difficult task.

Responses to social influences can take many forms, and can be described in terms of conformity, or non-conformity (or independence) behaviors (see, for example, Nail, MacDonald, Levy, 2000). Most relevant to this study is conformity behavior. Conformity can in its basic forms be described as either compliance or conversion, although a number of other forms have been proposed (Nail et al., 2000). Compliance refers to a public or behavioral level (we act to fit in), whereas conversion includes a private or attitudinal level (we believe it to be true). In this study that distinction was not investigated. The focus was only on the behavioral level, whether or not it also included a change of attitude. Moscovici and Personnaz (1980) argued that minority and majority influence are different processes, and that majority influence in most cases leads to public compliance whereas a minority influence can often result in conversion.

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Many reasons for conformity have been proposed. According to Asch people can go along with a majority owing to the distortion of their perception and unawareness of influence, distortion of judgment because of low self-confidence, or distortion of action to fit in Levine (1999). Conformity can be used to satisfy social motives; to answer correctly, to increase one's membership or to increase or protect one's self-esteem (Cialdini & Goldstein, 2004). Conformity in terms of increasing one's membership can be conscious, to be socially accepted and to strengthen social ties, or unconscious, for example by incorporating and mimicking other group member's facial expressions, gestures and language. In some situations, people will be uncertain what to think or do and in such cases it is easy to turn to the group for guidance (Hornsey, Majkut, Terry, & McKimmie, 2003). Deutsch and Gerard (1955) called this informational conformity; behavior based on a desire to obtain an accurate idea of reality, whereas conformity based on a goal of obtaining social approval is known as normative conformity. Moscovici (1980) argued that majority influence is a normative conformity. The reason for compliance, according to Moscovici, can be understood as a process of social comparison, which inhibits validation, necessary for conversion, when one is opposing a position held by the majority. De Dreu, De Vries, Gordijn, and Schuurman (1999) focused on how people process information and suggested different approaches for when the source is a majority or a minority. They showed that a majority source of influence induces a convergent process in which the focus is on the majority position and its arguments, whereas a minority source induces a divergent process in which alternative aspects are considered, in attempts to understand or falsify the minority position. Using the self-categorization theory David and Turner (1996) focused on identification with or perceived similarity to the source of influence as a deciding factor for when compliance or conversion will occur. They showed that perceived similarity to the source is necessary for conformity at both an immediate, public, and a delayed, private, level, and that the opposite resulted in a shift away from the source – majority and minority alike. Continuing the argument, David and Turner (1999) suggested that the distinction between intra- and inter-group context is important for understanding minority influence. They showed that with a prototypical in-group majority as reference an in-group minority will stand out as different, but compared with an out-group source the in-group minority will be perceived as rather similar.

1.2. Social influence and the Internet

A group can be a tremendous source of social influence and a century of studies has shown various aspects of it. On the Internet there are many ways to connect to people and many sources of identification and influence. Groups on the Internet, virtual groups, are in many ways similar to groups that exist in the "real" world (McKenna & Green, 2002). Amichai-Hamburger (2005) used a minimal group paradigm (see Tajfel, Billig, Bundy, & Flament, 1971) to see how groups formed on the Internet viewed in- and out-groups. The results were similar to what could be expected of "real" groups (f-t-f groups). The members acted as part of a unit and favored the in-group even though the membership was built on a basis of no real importance and without a history or planned future. One difference between virtual groups and f-t-f groups is a lack or reduction of visual cues and physical presence on the Internet, which also often creates a sense of anonymity (McKenna & Green, 2002). Rogers and Lea (2005) showed that experiences of social presence are possible without physical presence, and that it can be achieved by making salient a shared social identity. A reduction of interpersonal visual cues can actually make the shared identity stronger (Spears & Lea, 1992). The effects of anonymity on groups and individuals have been studied almost as long as social psychol-

ogy has been a topic of interest (cf. Le Bon, 1896/1995). That a sense of anonymity can lead to deindividuation is a phenomenon that has been studied for more than half a century (e.g. Festinger, Pepitone, & Newcomb, 1952; Zimbardo, 1970). What the consequences of deindividuation are have, however, been debated. At one extreme Zimbardo (1970) says that it reduces inhibitions and fosters anti-normative behavior. At the other, for example, Reicher, Spears, and Postmes (1995) represent the view that deindividuation can make group members conform more strongly to group norms. The latter supported their argument by means of the SIDE model (Social Identity of Deindividuation Effects; Spears & Lea, 1992). An anonymous situation can increase the salience of a group identity if one is available, and it is the norms connected to that group identity that govern behavior (Spears, Postmes, Lea, & Wolbert, 2002). This is also true in a virtual context and processes of f-t-f groups, such as the formation of group norms, can also be found in virtual groups (Postmes, Spears, & Lea, 2000). Dino, Reysen, and Branscombe (2009) studied the effects of differences in status among members of virtual groups. They found that low status members more often conformed (changed their public view), agreed (explicit statement) and requested information than high status members. This is contrary to notions about status equality on the Internet posited by Dubrovsky, Kiesler, and Sethna (1991), who suggested that the lack of status cues would reduce status as a factor in CMC. Postmes and Spears (2002) found no support for the equalization theory. Instead they showed that even when there are very few clues as to who other members are and in a perceived anonymous context status inequality appears.

1.3. Studies on conformity and the Internet

Even though the Internet as we know it today did not come into existence as the World Wide Web until 1991 studies on the effects of CMC were published as early as the 1980s. One early study on conformity in the context of CMC (the second C at this time stood for "Conferencing") was by Smilowitz, Compton, and Flint (1988). They followed the procedure of Asch's original line judgment task as closely as possible, but in a CMC context. The results showed a clear difference from what had been found in f-t-f groups; conformity occurred only on average in 0.17% of the selections (compared with 36.8% in Asch's study). The conclusion was that with the removal of the physical presence of others the majority influence was diminished. Cinnirella and Green (2007) also used a line judgment task to compare f-t-f and CMC groups on conformity. They included both types of groups in their study. The result showed higher conformity for both groups (compared with a control group), although in the f-t-f condition the level of conformity was about twice that of the CMC condition. They argued that one reason for this result could be that for conformity to a group's social norms to be strong the salient group identity needed to be meaningful, something they perhaps failed to achieve.

Several studies have focused on various forms of conformity on the Internet outside Asch's paradigm. Lee (2006) showed that depersonalization not only led to conformity to group norms, but also a more extreme perception of them. If identifiable in a CMC context the level of conformity is reduced (Postmes, Spears, Sakhel, & de Groth, 2001), and in an anonymous condition the norms can be socially transferred within the group. Lee (2004) also showed that visual representation of members of a CMC group can reduce the level of depersonalization and also reduce conformity to group norms. The argument is that visual representation makes the personal dimension more salient at the expense of group identity. This is so even if the visual representation shows a high level of visual similarity and with that perceived deindividuation (Kim & Park, 2011); only if the group identification is made salient does the conformity increase. Kim (2009) found no difference with respect to

conformity if the group identification is based on shared (lasting) social group membership or a more transient group membership. If a person believes the answers will be public, conformity increases even though the person is anonymous (Lee & Nass, 2002). Williams, Cheung, and Choi (2000) showed that when ostracized in a CMC context one is more likely to conform in subsequent tasks.

An interesting study by Laporte, van Nimwegen, and Uyttendaele (2010) utilized both an adoption of Asch's line judgment task and fact questions (easy enough for an average person to know the answers) to study conformity in varying degrees of social presence in CMC. Social presence was in the form of a photo of participants or live video. The results showed no conformity at all in the line judgment task no matter what the form of social presence. For the facts questions, however, 15% and 28% respectively for the photo and live video condition conformed to an erroneous majority answer. In terms of SIDE (Spears & Lea, 1992), however, the percentages could have been even higher as the use of photos and video would actually reduce conformity in the CMC context.

Even though there are results indicating a great reduction in the level of conformity in a CMC context the majority of modern studies have shown support for social influence also occurring on the Internet.

Hypothesis 1. Being able to see how other people from their own Internet community allegedly have answered will make participants in the experimental condition conform to incorrect majority alternatives.

1.4. Task difficulty

As described above, the question of why people conform has been connected to what Deutsch and Gerard (1955) called informational conformity; a desire to answer correctly (Cialdini & Goldstein, 2004). In the light of this the task at hand becomes important in understanding conformity (Baron, Vandello, & Brunsman, 1996). The more important the task is, the more important it is to find the right answer. The more difficult the task is, the higher conformity can be found (Baron et al., 1996). Crutchfield (1955) saw a dramatic increase in conformity when using more ambiguous stimuli; at the extreme a number series with no correct solution. Gergen and Bauer (1967) found a curvilinear relationship between task difficulty and conformity, with the increase receding when the task became extremely difficult. Morris, Miller, and Spangenberg (1977) varied the exposure time to various perception tasks as a measure of difficulty together with immediate or delayed dissenter support for a correct alternative. They found that, especially for difficult tasks, an early exposure to dissenter support was important in reducing uncertainty, and had informational influence (cf. Deutsch & Gerard, 1955), whereas delayed dissenter support produced more of a normative influence.

Although Baron et al. (1996) called task the forgotten variable there is some support for task difficulty being a factor in understanding level of conformity. We believe this is true also in a CMC context. The hypotheses concern both a more objective measure of difficulty (i.e. based on how the Control group answered the questions) and a more subjective measure (i.e. how one rates the difficulty oneself).

Hypothesis 2. The level of conformity will be higher with increasing objective task difficulty.

Hypothesis 3. The level of conformity will be higher with increasing subjective task difficulty.

1.5. Gender differences

Many studies have found support for difference in conformity between men and women, women generally showing greater conformity (Bond & Smith, 1996), although differences found often have small effect sizes (Eagly & Carli, 1981). In anonymous contexts the differences have been smaller (Bond & Smith, 1996). In an experiment Allen and Levine (1969) showed that women more often chose to compromise on subjective issues despite the presence of social support. They argued that a reason for not allying with the social support was to avoid a complete break with the majority. A study by Eagly, Wood, and Fishbaugh (1981) showed, however, that when participants believed that the responses were monitored, the men reduced their conformity and exhibited more non-conformity. That is, it was not women who increased their conformity but the men who lowered theirs. In addition to distancing themselves from the group by non-conformity the men also perceived other team members as less honest when responses were monitored. One reason for the difference in conformity may have been that non-conformity generated more attention, a fact that meant a risk of exclusion but also opportunities for leadership. Since men generally are attributed a higher status than women in a new group constellation (Eagly & Karau, 2002) the risk of exclusion from non-conformity is less, which is why they might have more to gain from the increased attention than women. Men increased their conformity with the majority when it consisted of high status individuals compared with a group of more equal status (Larsen, Triplett, Brant, & Langenberg, 1979). In an attempt to replicate Asch's experiment Mori and Arai (2010) found conformity only for women.

Guadagno and Cialdini (2002) studied persuasion and gender differences in dyadic interactions in a CMC context. They found that prior interaction led to higher agreement among women but not among men. In a further study of online persuasion Guadagno and Cialdini (2007) added the perception of shared identity in dyads. Gender differences found indicate that men are more easily persuaded than women when there is a low level of shared identity. The question is, however, whether a study of a dyadic relationship lends itself to generalization to larger groups (Moreland, 2010). Lee (2006) showed that women displayed higher levels of conformity in a CMC context only when in a depersonalized situation.

The majority of results from a largely f-t-f context show a higher level of conformity for women, but the reasons for this result have been debated. Consequently it is reasonable to assume the same tendency in a CMC context.

Hypothesis 4. Women will conform to a higher degree than men.

Although there are examples of studies on conformity in a CMC context (e.g. Cinnirella & Green, 2007) more aspects and situations need to be included. The contribution of the present study is a focus on more than mere perception, adding both factual questions and logical reasoning to mirror more closely aspects of the online situations with which people have to deal. The objective of the study was, apart from examining conformity on the Internet per se, to include the effects of task difficulty and gender.

2. Methods

2.1. Design

A quasi-experimental approach was used. The participants answered a web-based survey in which they were divided into two groups, a *Conformity group* and a *Control group*. Both groups answered the same questions but the Conformity group was pre-

sented with a fabricated diagram beneath each question, claiming to show how other participants from their own web community or forum had answered the question. The variable that was manipulated between the groups was the ability to see other people's answers. Information about other participants' answers was the survey's independent variable and the participants' own answer was the dependent variable.

2.2. Selection of websites

The websites where the study was made public were selected on February 9, 2010, by means of two methods, one for communities and one for online forums. Communities were found through the online search engine Google (www.google.se), search word: "community", limiting the search to websites in Swedish since it was the language used in the survey and information. Only websites containing a community for social contact were included. Of the first 31 hits 26 contained contact information for someone responsible for the site and these people were contacted by e-mail.

Online forums were recruited by contacting 21 of the top 26 websites on a site ranking Swedish forums by number of posts (www.svenskaforum.com). Of the remaining five, two had already been contacted, one was under construction and two lacked contact information. After a week a reminder was sent to all communities and forums that had not answered. Of the 47, three communities and seven forums wished to participate in the study. Among the remaining 37, six declined participation, five could not be contacted, one wanted monetary reward and 25 failed to answer in 2 weeks, which was interpreted as a refusal.

2.3. Participants

The participants came from 10 websites covering areas like teenagers, physical training, horses, computer games, gardening, families, social contact and general discussion. Participants from four of the websites were mainly female, from two mainly male and participants from the remaining four fairly even-gendered.

In total there were 2819 visits to the survey and 1185 responses. Of the responses, 259 were excluded since 225 were identical in form, and date and time of answering, 15 because of age (<15 years) and 19 were deemed false because of an unusually high degree of incorrect answers and unlikely demographic information (e.g. age under 20 and claiming to have a university degree). The final number of participants was 926. Of these, 59.5% were women. The participants' age ranged between 15 and 88 years with a mean of 30.7 years ($SD = 12.20$). Among the participants, 23.7% had more than 16 years of education, 26.0% had 12–16 years of education, 37.3% had 12 years of education, 11.8% had 9 years of education and 1.3% had 6 years of education. On average the participants used the Internet 6.62 ($SD = 3.04$) hours per day. The three most common reasons for their Internet use were social contact (77.5%), information/news (65.6%) and work/school (46.5%).

2.4. The survey

The web-based survey contained a total of 38 questions. Twelve questions were about demographics or participation in the study. The remaining 26 questions were experimental questions and were presented one at the time; for each one the Conformity group was presented with a diagram claiming to show the answers of other participants from their own community or web forum (see Fig. 1 for an example of a question with a diagram). There were three types of questions: information (eight questions), logic (eight questions) and attitudes (ten questions). The authors created the questions about information and attitudes, whereas the logical questions were borrowed with permission from Mensa Sweden's

In which city can you find Hollywood?

☐ New York
☐ Las Vegas
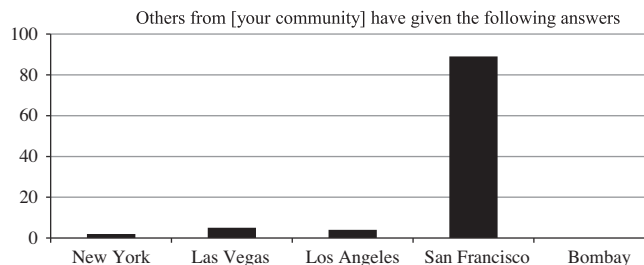☐ Los Angeles
☐ San Francisco
☐ Bombay

Fig. 1. Example of a question (question 5) with the fabricated diagram put to the Conformity group. Substituted for "your community" was the person's own community.

online test (www.mensa.se). The information questions included subjects like social studies, geography, history and chemistry. The attitude questions were excluded from further analyses as they are outwith the scope of this study. Two pilot studies of the survey were carried out. In the first a total of 15 trainee psychologists and social workers rated a larger battery of questions according to perceived difficulty. The survey to be used in the study was then created on the Internet with the survey tool Webropol (www.webropol.com). In the second pilot survey, 46 trainee psychologists not included in the first pilot survey answered the final 38 questions, gave suggestions for improvements and reported bugs. They, and later the real participants, were allocated to the Control and Conformity groups according to their birth month. Participants with odd birth months comprised the Control group and those with even birth months comprised the Conformity group. This method of distribution was applied since the survey tool used could not randomize the participants. Since the birthrates are quite even between even and odd months in Sweden (SCB, 2011) it was regarded as a reasonable substitute for randomization in other forms. Distribution of the participants by every other month meant that big variations in temperature and amount of daylight were avoided, two of the most crucial factors explaining differences in personality by birth month (Kamata, Suzuki, Matsumoto, Togashi, & Otani, 2009).

The diagrams claiming to show other participants' answers which were presented to the Conformity group were, in about 40% of the cases, a correct description of the distribution of the answers in the first pilot survey; that is, a large majority had the correct answer. Questions with these diagrams comprised the neutral questions. The distribution in the other 60% of the diagrams was fabricated, showing the majority choosing an incorrect or, in the case of attitudes, abnormal answer. These were the critical questions (nine of them used in the analyses). The reason for having 40% of neutral questions was to avoid raising too much suspicion in the participants since a high level of suspicion has been shown to impact negatively on conformity and make the data more insecure (Stang, 1976). The percentage comprising the majority choice of the erroneous answer in each critical question varied between 46% and 100% and minority support for the correct answer varied between 0% and 22%.

In the survey the questions on information and logic were presented in order of increasing difficulty (as rated in the first pilot study), all the questions were mandatory and the participant could only navigate forward in the survey. The survey was customized for each participating website by naming the website over the

diagrams, to increase the identification with those who had allegedly already answered the survey. Also, this procedure made it easier to single out participants from web pages where discussions in the forums disclosed part of the aim of the study.

2.5. Procedure

The procedure of this study included the selection of websites, as well as methods for dividing subjects into the Control and Conformity groups (see Sections 2.2 and 2.4). The survey was made public on the participating websites from March 1, 2010 until March 31, 2010. This was accomplished either by using a banner or by posting information and html address. Participants who had answered from a website where there had been discussion about the aim of the study were separated from the rest and statistically tested for significantly different answers. They were compared both with participants from other websites and participants from the same webpage who had answered before the discussion started, and no significant differences were found. Conforming answers were given the value of one and non-conforming answers the value of zero. SPSS version 19 was used for all statistical calculations.

2.6. Ethical considerations

A page with information about the aim of the study, ethical guidelines and confirmation, in the form of a tick box, that the participant had read this information preceded the survey. Since some deception is necessary in conformity research (Stang, 1976), the real aim of the study could not be revealed and therefore it was described in vague general terms. The true aim was revealed the day after the deadline for the survey. Participants with questions were encouraged to contact the researchers both in the information given before the survey and in the complementary information. The aim of the study was explained to any participant who contacted the researchers.

It is always difficult to control for participants' age in research on the Internet (Kraut et al., 2004; Nosek, Banaji, & Greenwald, 2002). One ethical issue that came up was that a total of 15 participants reported being under 15 years old (participating without the consent of their guardians). A decision was taken to remove all 15 participants from the analysis.

3. Results

3.1. Manipulation check

The participants were divided by means of a systematic but unrelated strategy (odd or even birth month). Nevertheless, the two groups, the Control and the Conformity groups, were compared on all variables outside the actual experiment questions, a total of 12 variables (e.g. demographic, Internet use, and motivational variables). Independent t-tests showed no significant differences for any of the variables except one. The question "Were you motivated to answer the questionnaire?" showed a small but significant difference, $t(924) = 2.05$, $p = 0.041$, $d = 0.13$, meaning Conformity group showed slightly greater motivation ($M = 3.39, SD = 1.06, n = 477$) compared with the Control group ($M = 3.25, SD = 0.99, n = 449$). The overall conclusion was that the manipulation in terms of group division had been successful.

3.2. Hypothesis 1 – Conformity on the Internet

Conformity was measured as difference, for each of the nine critical questions, between the number of answers following the

incorrect and manipulated majority answer showed to the Conformity group and the number of participants giving the same answer in the Control group. χ^2 was used to determine if the frequency of answers in accordance with the manipulation in the Conformity group differed from the frequency of the same answer in the Control group. The results of these tests are presented in Table 1.

For the seven non-critical questions (where the conforming answers were the correct ones) there were no differences for four of them and for three of them the increasing difficulty level of the question saw increasingly significant differences (i.e. for difficult questions conformity to the correct answer helped the Conformity group to achieve better results than the Control group).

For the nine critical questions the mean number of answers in accordance with the manipulation in the Conformity group ($M = 1.17, SD = 1.61, n = 477$) was compared by means of an independent t-test with the mean number who had answered in the same way in the Control group ($M = 0.37, SD = 0.61, n = 449$). There was a significant difference between the groups, $t(924) = 9.91$, $p < .001$, $d = 0.65$. The corresponding analysis using all 16 questions showed a similar pattern (the Conformity group, $M = 7.47$, $SD = 1.75$, $n = 477$; the Control group, $M = 6.43, SD = 0.95, n = 449$), $t(924) = 11.05$, $p < .001$, $d = 0.73$.

Both analyses support Hypothesis 1 in that the Conformity group conformed to what they were led to believe was the answer of the majority of the participants to a greater degree than the chance of participants in the Control group giving the same incorrect answer.

Of the participants in the Conformity group ($n = 477$) 52.6% conformed to what they believed to be the majority (incorrect) answer in at least one of the nine critical questions. On average, 13.0% showed conformity for each question.

3.3. Hypothesis 2 – Greater conformity with increasing objective task difficulty

The degree of difficulty of the questions was categorized as easy, moderate, or difficult based on the answers in the Control group ($n = 449$). Easy questions were answered correctly by 90–100% (questions 4, 5, and 10) of the Control group participants. For moderate questions the percentages were 80–89% (questions 6, 12, and 13), and for difficult questions the percentage of correct answers was below 80% (questions 8, 14, and 16).

The degrees of conformity in the Conformity group ($n = 477$) for the three levels of difficulty (easy, $M = 0.29$, $SD = 0.54$; moderate, $M = 0.39$, $SD = 0.71$; difficult, $M = 0.49$, $SD = 0.49$) were compared by means of a GLM repeated measures analysis, $F(2,952) = 16.89$, $MSE = 4.54$, $p < .001$, $\eta^2 = .034$. Pairwise follow-up using Bonferroni showed differences between easy and difficult questions ($d = 0.30$), between moderate and difficult questions ($d = 0.13$), and between

Table 1
Difference in frequency of answers in accordance with the manipulation in the Conformity group and the frequency of the same answer in the Control group for the nine critical questions (percentages presented). See Appendix A for the wording of the four critical information questions.

Question	Conformity group, $n = 477$ (%)	Control group, $n = 449$ (%)	χ^2, $df = 926$	p	d
4	2.5	0.4	6.67	.001	0.25
5	21.2	4.2	58.86	<.001	0.53
6	10.7	4.5	12.71	<.001	0.27
8	18.0	6.2	28.80	<.001	0.37
10	5.5	0.4	19.76	<.001	0.30
12	14.0	4.0	27.95	<.001	0.35
13	14.5	5.8	18.91	<.001	0.27
14	16.8	7.6	18.13	<.001	0.28
16	13.8	3.8	28.63	<.001	0.36

easy and moderate questions ($d = 0.16$). The percentage conforming to at least one of the difficult questions was 34.0%. The result supports the hypothesis that conformity will increase according to the difficulty of the task at hand.

3.4. Hypothesis 3 – Greater conformity with increasing subjective task difficulty

The subjective task difficulty was measured by a question which all participants answered immediately after answering the experimental questions. It involved rating, from easy to difficult (1–5), the perceived difficulty in answering the questions. The Conformity group was divided into two groups based on their answer to that question; low perceived difficulty and high perceived difficulty. To obtain approximately equal group sizes the cut-off was set to include responses 1 and 2 in the low difficulty group ($n = 253, 53.3\%$) and responses 3–5 in the high difficulty group ($n = 224, 46.7\%$).

The mean number of answers in accordance with the manipulation (i.e. the perceived majority had given the wrong answer) for the two groups (low difficulty, $M = 0.88$, $SD = 1.44$; high difficulty, $M = 1.50$, $SD = 1.72$) were compared with an independent t-test, $t(475) = 4.24$, $p < .001$, $d = 0.39$. The result supports the hypothesis that those who found answering the questions more difficult also conformed more than those who found the task easier.

3.5. Hypothesis 4 – Women conform more than men

The mean number of answers in accordance with the manipulation was also used in comparing men and women. An independent t-test was used and no significant difference was found. An additional analysis, a GLM repeated measures analysis, was conducted to investigate a possible interaction effect for gender and type of question (information or logical). The interaction pattern showed almost the same mean conformity for women regardless of the type of question (information, $M = 0.55$, $SD = 0.84$; logic, $M = 0.59$, $SD = 1.03$), whereas for men the level was about the same as for women for information questions ($M = 0.48$, $SD = 0.82$), but higher for logical questions ($M = 0.72$, $SD = 1.22$). The interaction was not significant, but very close ($F(1,475) = 3.77$, $MSE = 2.44$, $p = .053$, $\eta^2 = .008$). The corresponding repeated measures analysis for objective difficulty level and gender showed a significant interaction ($F(2,950) = 3.17$, $MSE = 0.85$, $p = .042$, $\eta^2 = .007$). As shown in Section 3.3, the conformity increases with increasing task difficulty. This is true for both men and women, but when they are faced with a difficult task the increase is less for women than for men (for women: easy, $M = 0.32$, $SD = 0.57$; moderate, $M = 0.39$, $SD = 0.68$; difficult, $M = 0.44$, $SD = 0.73$; for men: easy, $M = 0.26$, $SD = 0.50$; moderate, $M = 0.40$, $SD = 0.75$; difficult, $M = 0.55$, $SD = 0.84$).

The result does not support the hypothesis that women conform to a higher degree than men do. Instead, the interaction effects found, although not significant in one of the cases, point to a result where men conform to a higher degree on logical questions and on difficult questions than women do.

4. Discussion

The present study aimed to see if and how people conform when using the Internet. The result shows that people do conform in this context. The effect was consistent for all critical questions, even if the effect sizes varied somewhat. The results are consistent with earlier research on conformity in a CMC context (Cinnirella & Green, 2007; Laporte et al., 2010; Lee, 2006; Postmes et al., 2000). Compared with previous studies in an f-t-f setting, the percentage

of the participants conforming at least once (52.6%) is less than that found by Asch, for example. There are problems with comparisons, however, because of differences in culture, experimental design and time era, but the decrease in conformity is consistent with that shown in Bond and Smith (1996) meta-analysis. The mean conformity in this study is also lower than Asch's, 13.0% compared with 36.8%. The current results are closer to those shown by Baron et al. (1996). In relation to earlier studies of conformity online, the results can be compared to Williams et al. (2000) study of the effects of ostracism in which participants conformed on average in 26% of the critical judgments.

The results, in accordance with Hypotheses 2 and 3, show that higher levels of both objective and subjective task difficulty increased the degree of conformity. The percentage of participants conforming to at least one of the difficult questions is almost identical to that found by Baron et al. (1996) in their low task importance condition. The task in the present study is probably not so important to the participants. For the fourth hypothesis, that women would conform to a higher degree than men, no support was found. Considering that Sweden is considered to be the most gender-empowered country in the world (UNDP, 2009), it is possible that the lack of difference in conformity is specific to the Swedish culture. The results instead showed a somewhat opposite effect; when faced with a difficult task, men conformed more than women did. The same tendency was also found for the logical questions compared with the informational ones. For the various levels of difficulty the women displayed a curvilinear relationship similar to the general tendency described by Gergen and Bauer (1967) – the level of conformity receding when they were faced with the most difficult questions. The men, however, displayed an almost linear relationship between level of difficulty and conformity. The reasons for these gender differences could be related to Cialdini and Goldstein (2004) notions about conformity as a way to protect self-esteem. There are consistent findings that men perform better in tasks involving visuospatial representation of objects (Halpern, Straight, & Stephenson, 2011). They argued that preconceptions about gender differences could turn into stereotypes about other abilities too – abilities only remotely related to such notions. People's expectations about being able to solve logical tasks and difficult problems and facing a difficulty in living up to them could explain the differences found. Some support for the result that men conform to a higher degree on difficult and logical questions can be found in a study by Guadagno and Cialdini (2007), who found that men are more easily persuaded by email communication, whereas women show stronger conformity behavior in f-t-f interaction. The current study was not conducted via email, but is probably closer to that medium than f-t-f interaction.

The question of why people conform in an anonymous CMC context needs to be addressed. Smilowitz et al. (1988) found no conformity at all in a CMC context. They argued that this was because there is no physical presence. The concept of presence is important in terms of conformity behavior, but as Rogers and Lea (2005) have shown, social presence does not need to be physical to affect people. They argued that a social identity could make social presence a reality. Following Smilowitz et al. (1988) result one can argue that in an anonymous situation in a CMC context in which no social presence or social identity is salient little or no conformity can be expected. However, in most situations on the Internet people are within reach of a social identity. As Postmes and Spears (2002) showed, people do not need much of a cue to identify with and act according to a social identity. In the current study a social identity was made salient by reference to the community from which the participants came for each question in which the answers of others from the same community were shown. If we accept that a social presence can be felt and affect

behavior, albeit not in physical form, we have the grounds for social influence and conformity in an anonymous Internet context. The question of why the conformity occurs needs some elaboration. Several reasons for conformity behavior have been suggested – some of them requiring others actually to see the behavior, others being more personal or the result of an internal process. Conforming in order to be socially accepted probably calls for a belief that others will be able to hold a person accountable for his/her answers. In the context of the present study nothing would really make that a plausible explanation for the conformity found, as the closest to personal accountability in relation to people's group was the diagrams, and they were clearly on a group level. The urge to conform is possibly to be found in a wish to make one's own group look good in that the group as a collective would answer correctly. Another reason for conformity can be avoidance of social isolation (Hornsey et al., 2003). Ostracism has been shown to invoke several negative feelings and increase the level of conformity following social exclusion (Williams et al., 2000). Also, non-conformity has been shown to increase the individual's emotional load, reflected in activation of the amygdala (Berns et al., 2005). Therefore some participants may have conformed in order to avoid negative feelings associated with going against the majority. The most probable reason can probably be found in what Hornsey et al. (2003) described as an uncertain situation in which it is easy to turn to the group. This, together with an urge to answer correctly to protect one's self-esteem, was especially pronounced in the current study in that it contained a test of both knowledge and logical ability.

There are some limitations to the current results that need to be discussed. On three of the participating websites some form of (limited) discussions about the study was noticed. There is a possibility that such discussions can have an impact on the study in terms of participants knowing or guessing the true purpose of the study when answering the questions. Since conformity is often viewed as something negative in western society (Bond & Smith, 1996), such knowledge would, however, probably have lowered the degree of conformity, which would make the results in this study a low estimate of the true degree of conformity. As we also have data on when each survey was completed we could separate the answers from these websites during and after the discussions occurred. No consistent significant differences were found between these participants and those who answered before the discussions began or participants from the seven other websites. Something to take into account when valuing the results (Hypothesis 2–4) is also the fact that the data is somewhat skewed, as is often the case in count data (Micceri, 1989). Another limitation is that all the participants were from Sweden. Because of cultural differences the results should be interpreted with some caution when compared with other cultures. As discussed above the higher gender-empowerment in Sweden could, for example, influence the degree of conformity.

The small difference in motivation between the Conformity group and the Control group was the only difference out of 12 possible questions outside the actual experiment questions compared to ensure the manipulation was acceptable. The small difference in motivation may be owed to an increased interest in completing the survey when one is presented with other people's answers. This is more probable than a cohort-effect based on the method of distribution since this was the only significant difference between the groups.

In research on the Internet there is always a risk that a decreased sense of responsibility makes some participants willing to sabotage a survey by answering it several times or in a fraudulent manner (Kraut et al., 2004; Nosek et al., 2002). There was protection against repeated answers from the same participant in the form of cookies, but it was a protection easily bypassed by experienced Internet users. We found 225 identical answers within a very short time span from the same community, presumably created by use of some computer software. We also judged 19 of the answers to be untrue on the basis of unlikely answers to the demographic questions. All 244 answers were removed from the data. Although steps were taken to ensure obvious fake answers were removed we cannot guarantee there were no other similar, but less obvious, answers. As all participants were divided into the different conditions any fake answers which we overlooked would have an equal chance of ending up in either of them, making it less of a problem.

5. Conclusions

Conformity behavior, in terms of answering questions requiring common knowledge and logical abilities in line with a majority, is evident on the Internet. Earlier research in a variety of contexts, including CMC, has for the most part shown similar results. Very often studies of conformity have tried to replicate the original line judgment task devised by Asch. The current study showed comparable results in a task closer to what we are faced with more often, at least in an Internet context – having to show knowledge about a variety of subjects or show logical abilities. The impact of conformity on the Internet could become even greater in the future with more people using it as a natural part of everyday life, and an increase in the opportunities to comment on news articles, blogs, and video-clips, answer online polls and more. The reason for conformity behavior on the Internet found in this study can probably be attributed to a social presence felt, albeit in an anonymous situation, and with that also a ground for comparison, especially in the more uncertain situations in terms of more difficult questions. Also, being able to protect one's self-esteem could play an important role in the desire to keep an image of oneself as knowledgeable and able to reason logically, something especially true for men, it seems.

This study shed some light on conformity in a CMC context; however, the relation between the size of the majority, the size of the deviant support, and task difficulty needs to be further studied. Also, knowledge on the gender differences found is in need of further research, and within different cultures, as this study was conducted with participants from just one country, to discover the role of gender empowerment.

Appendix A

The experimental (critical) information questions and the possible responses:

Question 4. What did Alfred Nobel invent?

A. The match (conformity answer)
B. Dynamite (correct answer)
C. The revolver
D. Gunpowder
E. Antibiotics

Question 5. In which city can you find Hollywood?

A. New York
B. Las Vegas
C. Los Angeles (correct answer)
D. San Francisco (conformity answer)
E. Bombay

Question 6. What chemical symbol is used for hydrogen (*väte* in Swedish)?

Appendix (*Continued*)

- A. C
- B. F
- C. O
- D. H (correct answer)
- E. V (conformity answer)

Question 8. How far above sea level is Mount Everest?

- A. ~7050 m
- B. ~7650 m (conformity answer)
- C. ~8150 m
- D. ~8550 m
- E. ~8850 m (correct answer)

References

Allen, V. L., & Levine, J. M. (1969). Consensus and conformity. *Journal of Experimental Social Psychology, 5*, 389–399.

Amichai-Hamburger, Y. (2005). Internet minimal group paradigm. *CyberPsychology & Behavior, 8*, 140–142.

Asch, S. E. (1955). Opinions and social pressure. *Scientific American, 193*(5), 31–35.

Asch, S. E. (1956). Studies of independence and conformity. A minority of one against a unanimous majority. *Psychological Monographs, 70*(9, whole No. 416), 1–70.

Asch, S. E. (1958). Effects of group pressure upon the modification and distortion of judgements. In E. E. Maccoby, T. M. Newcomb, & E. L. Hartley (Eds.), *Readings in social psychology* (3rd ed., pp. 174–183). New York, NY: Holt, Rinehart and Winston.

Bargh, J. A., & McKenna, K. Y. A. (2004). The internet and social life. *Annual Review of Psychology, 55*, 573–590.

Baron, R. S., Vandello, J. A., & Brunsman, B. (1996). The forgotten variable in conformity research: Impact of task importance on social influence. *Journal of Personality and Social Psychology, 71*, 915–927.

Berns, G. S., Chappelow, J., Zink, C. F., Pagnoni, G., Martin-Skurski, M. E., & Richards, J. (2005). Neurobiological correlates of social conformity and independence during mental rotation. *Biological Psychiatry, 58*, 245–253.

Le Bon, G. (1896/1995). The crowd: A study of the popular mind. Retrieved from: <http://etext.lib.virginia.edu/toc/modeng/public/BonCrow.html>.

Bond, R., & Smith, P. B. (1996). Culture and conformity: A meta-analysis of studies using Asch's (1952b, 1956) line judgment task. *Psychological Bulletin, 119*, 111–137.

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology, 55*, 591–621.

Cinnirella, M., & Green, B. (2007). Does 'cyber-conformity' vary cross-culturally? Exploring the effect of culture and communication medium on social conformity. *Computers in Human Behavior, 23*, 2011–2025.

Crutchfield, R. S. (1955). Conformity and character. *American Psychologist, 10*, 191–198.

David, B., & Turner, J. C. (1996). Studies in self-categorization and minority conversion: Is being a member of the out-group an advantage? *British Journal of Social Psychology, 35*, 179–199.

David, B., & Turner, J. C. (1999). Studies in self-categorization and minority conversion: The in-group minority in intragroup and intergroup contexts. *British Journal of Social Psychology, 38*, 115–134.

De Dreu, C. K. W., De Vries, N. K., Gordijn, E. H., & Schuurman, M. S. (1999). Convergent and divergent processing of majority and minority arguments: Effects on focal and related attitudes. *European Journal of Social Psychology, 29*, 329–348.

Deutsch, M., & Gerard, H. (1955). A study of normative and informational social influences upon individual judgement. *Journal of Abnormal and Social Psychology, 51*, 629–636.

Dino, A., Reysen, S., & Branscombe, N. R. (2009). Online interactions between group members who differ in status. *Journal of Language and Social Psychology, 28*, 85–93.

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

Eagly, A. H., & Carli, L. L. (1981). Sex of researchers and sex-typed communications as determinants of sex differences in influenceability: A meta-analysis of social influence studies. *Psychological Bulletin, 90*, 1–20.

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*, 573–598.

Eagly, A. H., Wood, W., & Fishbaugh, L. (1981). Sex differences in conformity: Surveillance by the group as a determinant of male nonconformity. *Journal of Personality and Social Psychology, 40*, 384–394.

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

Gergen, K. J., & Bauer, R. A. (1967). Interactive effects of self-esteem and task difficulty on social conformity. *Journal of Personality and Social Psychology, 6*, 16–22.

Guadagno, R. E., & Cialdini, R. B. (2002). Online persuasion: An examination of gender differences in computer-mediated interpersonal influence. *Group Dynamics: Theory, Research, & Practice, 6*, 38–51.

Guadagno, R. E., & Cialdini, R. B. (2007). Persuade him by email, but see her in person: Online persuasion revisited. *Computers in Human Behavior, 23*, 999–1015.

Halpern, D. F., Straight, C. A., & Stephenson, C. L. (2011). Beliefs about cognitive gender differences: Accurate for direction, underestimated for size. *Sex Roles, 64*, 336–347.

Hornsey, M. J., Majkut, L., Terry, D. J., & McKimmie, B. M. (2003). On being loud and proud: Non-conformity and counter-conformity to group norms. *British Journal of Social Psychology, 42*, 319–335.

Kamata, M., Suzuki, A., Matsumoto, Y., Togashi, H., & Otani, K. (2009). Effect of month of birth on personality traits of healthy Japanese. *European Psychiatry, 24*, 86–90.

Kim, J. (2009). I want to be different from others in cyberspace. The role of visual similarity in virtual group identity. *Computers in Human Behavior, 25*, 88–95.

Kim, J., & Park, H. S. (2011). The effect of uniform virtual appearance on conformity intention: Social identity model of deindividuation effects and optimal distinctiveness theory. *Computers in Human Behavior, 27*, 1223–1230.

Kraut, R., Olson, J., Banaji, M., Bruckman, A., Cohen, J., & Couper, M. (2004). Psychological research online: Report of board of scientific affairs' advisory group on the conduct of research on the internet. *American Psychologist, 59*, 105–117.

Laporte, L., van Nimwegen, C., & Uyttendaele, A. J. (2010). Do people say what they think: Social conformity behavior in varying degrees of online social presence. In *Proceedings of the 6th Nordic conference on human–computer interaction* (pp. 305–314). New York, NY: ACM Press.

Larsen, K. S., Triplett, J. S., Brant, W. D., & Langenberg, D. (1979). Collaborator status, subject characteristics, and conformity in the Asch paradigm. *Journal of Social Psychology, 108*, 259–263.

Lee, E.-J. (2004). Effects of visual representation on social influence in computer-mediated communication: Experimental tests of the social identity model of deindividuation effects. *Human Communication Research, 30*, 234–259.

Lee, E.-J. (2006). When and how does depersonalization increase conformity to group norms in computer-mediated communication? *Communication Research, 33*, 423–447.

Lee, E.-J., & Nass, C. (2002). Experimental tests of normative group influence and representation effects in computer-mediated communication when interacting via computers differs from interacting with computers. *Human Communication Research, 28*, 349–381.

Levine, J. M. (1999). Solomon Asch's legacy for group research. *Personality and Social Psychology Review, 3*, 358–364.

McKenna, K. Y. A., & Green, A. S. (2002). Virtual group dynamics. *Group Dynamics: Theory, Research, and Practice, 6*, 116–127.

Micceri, T. (1989). The unicorn, the normal curve, and other improbable creatures. *Psychological Bulletin, 105*, 156–166.

Moreland, R. L. (2010). Are dyads really groups? *Small Group Research, 41*, 251–267.

Mori, K., & Arai, M. (2010). No need to fake it: Reproduction of the Asch experiment without confederates. *International Journal of Psychology, 45*, 390–397.

Morris, W. N., Miller, R. S., & Spangenberg, S. (1977). The effects of dissenter position and task difficulty on conformity and response conflict. *Journal of Personality, 45*, 251–266.

Moscovici, S. (1980). Toward a theory of conversion behaviour. *Advances in Experimental Social Psychology, 13*, 209–239.

Moscovici, S., & Personnaz, B. (1980). Studies in social influence. V. Minority influence and conversion behavior in a perceptual task. *Journal of Experimental Social Psychology, 16*, 270–282.

Nail, P. R., MacDonald, G., & Levy, D. A. (2000). Proposal of a four-dimensional model of social response. *Psychological Bulletin, 126*, 454–470.

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). E-research: Ethics, security, design, and control in psychological research on the Internet. *Journal of Social Issues, 58*, 161–176.

Postmes, T., & Spears, R. (2002). Behavior online: Does anonymous computer communication reduce gender inequality? *Personality and Social Psychology Bulletin, 28*, 1073–1083.

Postmes, T., Spears, R., & Lea, M. (2000). The formation of group norms in computer-mediated communication. *Human Communication Research, 26*, 341–371.

Postmes, T., Spears, R., Sakhel, K., & de Groth, D. (2001). Social influence in computer-mediated communication: The effects of anonymity on group behavior. *Personality & Social Psychology Bulletin, 27*, 1243–1254.

PTS (Swedish Post and Telecom Agency), (2010). *Svenskarnas användning av telefoni & Internet 2010: Individundersökning 2010* [Swedes' use of telephony & Internet 2010: Population Survey 2010]. Retrieved from: <http://www.pts.se/upload/Rapporter/Tele/2010/2010-25-individundersokning-2010.pdf>.

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

Reysen, M. B. (2003). The effects of social pressure on group recall. *Memory & Cognition, 31*, 1163–1168.

Rogers, P., & Lea, M. (2005). Social presence in distributed group environments: The role of social identity. *Behaviour & Information Technology, 24*, 151–158.

Smilowitz, M., Compton, C. D., & Flint, L. (1988). The effects of computer mediated communication on an individual's judgment: A study based on the methods of Asch's social influence experiment. *Computers in Human Behavior, 4*, 311–321.

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). New York, NY: Harvester-Wheatsheaf.

Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? The power of influence and the influence of power in computer-mediated communication. *Journal of Social Issues, 58*, 91–107.

Stang, D. J. (1976). Ineffective deception in conformity research: Some causes and consequences. *European Journal of Social Psychology, 6*, 353–367.

SCB (Statistiska centralbyrån), (2011). Preliminär befolkningsstatistik per månad 2008-2011 [Preliminary population statistics per month from 2008 to 2011]. Retrieved from: <http://www.scb.se/Pages/TableAndChart____25896.aspx>.

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology, 1*, 149–178.

UNDP (United Nations Development Programme), (2009). Human development report. Overcoming barriers: Human mobility and development. Retrieved from: <http://www.undp.se/assets/Human-development-reports/HDR2009fullreport.pdf>.

Williams, K., Cheung, C., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology, 79*, 748–762.

Zimbardo, P. (2007). *The Lucifer effect: Understanding how good people turn evil.* New York: Random House.

Zimbardo, P. (1970). The human choice: Individuation, reason, and order versus deindividuation, impulse, and chaos. In W. J. Arnold & D. Levine (Eds.), *1969 Nebraska Symposium on Motivation* (pp. 237–307). Lincoln, NE: University of Nebraska Press.