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# Antecedents of Replies and Non-Replies in Online Discussion Forums: Evidence from a Think-Aloud Study

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**Abstract:** This paper investigates users' intentions to reply and their actual replies in an informal learning online discussion. Based on the literature, it was expected that two factors determine whether users will reply to a discussion post: a) cognitive conflict between the attitude expressed in a post and a user's attitude; b) degree of emotionality of a discussion post. In order to test for these assumptions, 19 participants were requested to think aloud while reading through an online forum discussion on the advantages and disadvantages of alternative medicine. Verbalizations of users were coded for intentions to reply or not to reply, and for underlying reasons. Moreover, actual responses were coded for agreement and disagreement. Results indicate that cognitive conflict plays an important role when contributing to an online discussion, whereas emotionality only plays a minor role.

**Keywords:** Online discussions, participation, informal learning

## 1. Introduction

Participation is the key ingredient of computer-supported collaboration (Stahl, 2005). There is lot of research about the effects of messages on recipients. For instance, readers exhibit confirmation bias, a tendency for attending to information that is consistent to their attitude (Hart, Albarracin, Eagly, Brechan, Lindberg, & Merrill, 2009). In contrast, comparatively little is known about the reasons why people move from a recipient's stance (reading, listening) and actively participate in online discourse (writing, speaking). In typical small group settings, a lot of the dynamics of group discussions can be explained by reciprocity (Joyce & Kraut, 2006). However, the dynamics of participation in larger groups are poorly understood. As our field has begun to address mass collaboration (e.g., in MOOCs), this becomes an important issue for online education. This paper tries to close this gap by providing evidence on the factors that turn readers of an online discussion forum into active participants.

The paper briefly describes the rationale for the study by focusing on two factors that might influence participation: cognitive conflict and emotionality. Subsequently, the method of this study (think-aloud verbalizations) is explained. Selected results of the study are presented, leading to a brief conclusion about the main findings.

## 2. Theoretical Background

From an educational perspective, two strands of literature focus on antecedents of cooperative and collaborative learning. First, Cohen (1994) has pointed at the strong linear relationship between participation in discourse and cooperative learning performance. Second, socio-cognitivist theories of learning describe cognitive conflict between persons as an important antecedent of learning (Doise & Mugny, 1984; Schwind, Buder, Cress, & Hesse, 2012). Taking these two strands of literature together, it can be speculated that cognitive conflict might be an important antecedent of participation in online discussions. In other words, learners should be most likely to respond to online discussion posts that are inconsistent to their knowledge and/or attitudes.

A second factor that might spur participation in online discussions is the emotionality of a discussion post. For instance, Chmiel et al. (2011) reported that participation in a political online discussion forum was determined by the amount of negativity expressed. Anecdotal evidence for the

importance of emotionality as a precursor to participation also comes from the prevalence of heated debates (flame wars) on the Internet. Thus, it can be hypothesized that learners are more likely to respond to online discussion posts that are emotionally laden.

## 3. The Present Study

The present study seeks to investigate how cognitive conflict and emotionality are associated with learners' intentions to reply and their actual replies in an online discussion forum. Studies on participation in large forums often investigate online discussions "in the wild", for instance by using machine learning methods like sentiment analysis (e.g., Chmiel et al., 2011). The present study, however, uses a different approach, the think-aloud technique (Ericsson & Simon, 1998). Individual participants of this study read a carefully controlled excerpt from a fictitious online discussion, and were requested to verbalize their thoughts upon reading the discussion, as well as their intention to reply to given discussion posts. This technique does not only provide deeper insights into the psychological mechanisms of participation, it also permits to investigate reasons why users are sometimes *not* willing to respond to a discussion post.

## 4. Method

19 participants (7 male, 12 female; average age 27.1 years) from a German university took part in this study, and received 12 € for participation (duration of 90 minutes). The material for this study consisted of a fictitious online discussion about the advantages and disadvantages of alternative medicine. An initial discussion entry was followed by 24 actual discussion posts (12 providing arguments in favor, and 12 providing arguments against the use of alternative medicine). Moreover, half of the discussion posts were composed in an emotional style, using emotionally laden words. After pre-testing, the material was carefully controlled for length, emotional valence, and persuasiveness. In the main study, participants first had to rate their attitude with regard to the topic (for vs. against the use of alternative medicine) on a 5-point Likert scale. After training the think-aloud technique with a different discussion, the alternative medicine discussion was displayed on a computer screen. Participants were asked to verbalize their thoughts on each discussion post, particularly with regard to the question whether they would intend to reply or not. The experimenter sat in the same room and encouraged verbalizations if participants were silent for longer stretches of time. After the verbalization phase, all 24 posts were presented again in a second phase. Here, participants were asked to write actual replies if they wanted to respond to certain discussion posts.

Verbalizations were coded according to intention (intention to reply, intention not to reply, no intention expressed). Moreover, reasons for intentions were categorized according to the perceived content of a post (e.g., experiencing conflict or consensus), the perceived style of post (e.g., rational style), the perceived characteristics of the author (e.g., close-mindedness), and self-reports (e.g., lack of knowledge). Actual replies written in the second phase were coded according to whether they expressed agreement or disagreement.

## 5. Results

On average, participants verbalized an intention to reply on 27.8% of posts, and an intention not to reply on 21.5% of posts. As for the intentions to reply, participants felt a stronger desire to respond to discussion posts that expressed a viewpoint that is inconsistent with prior attitude ($M = 0.35$, $SD = 0.31$) than to posts that expressed a consistent viewpoint ($M = 0.21$, $SD = 0.19$). Statistical analysis showed that this was a significant difference, $F(1, 14) = 6.13$, $p = .027$, partial $\eta^2 = .305$. This is in line with our expectation that cognitive conflict through inconsistent posts is an important antecedent of participation. However, we did not yield a significant difference in the intention to reply to emotional posts ($M = 0.30$, $SD = 0.25$) versus non-emotional posts ($M = 0.29$, $SD = 0.23$), $F(1, 14) < 1$, *ns*.

As for intentions not to reply, there was no difference between inconsistent posts ($M$ = 0.18, $SD$ = 0.26) and consistent posts ($M$ = 0.24, $SD$ = 0.27), $F(1, 14) = 1.55$, $p = .234$, partial $\eta^2 = .100$. There was also no difference between emotional posts ($M$ = 0.23, $SD$ = 0.30) and non-emotional posts ($M$ = 0.20, $SD$ = 0.24), $F(1, 14) < 1$, *ns*.

Participants' verbalizations were also coded for reasons to reply or not to reply. The three types of verbalization most often associated with an intention to reply were experiences of conflict (29.2%; particularly with inconsistent posts), feelings that a post contained weak arguments (16.3%; slightly more with regard to consistent posts), and experiences of consensus (14.2%; particularly with consistent posts). The three types of verbalization most often associated with an intention not to reply were experiences of consensus (20.9%; particularly with consistent pots), lack of knowledge (18.1%), and feelings that post contained weak arguments (18.0%; slightly more with regard to consistent posts).

Finally, actual replies were analyzed and coded. Participants replied more often to posts that were inconsistent to their own opinion ($M$ = 0.28, $SD$ = 0.28) than to posts that were consistent ($M$ = 0.17, $SD$ = 0.22), $F(1, 14) = 4.59$, $p = .05$, partial $\eta^2 = .247$. However, other than they intended, participants replied more often to non-emotional posts ($M$ = 0.28, $SD$ = 0.28) than to emotional posts ($M$ = 0.18, $SD$ = 0.22), $F(1, 14) = 6.00$, $p = .028$, partial $\eta^2 = .300$. Further analyses on the coded categories revealed that consistent posts resulted in both agreeing (12.1%) and disagreeing (14.1%) replies. In contrast, inconsistent posts very frequently led to disagreeing replies (47.1%), but never to agreeing replies (0.0%).

## 6. Conclusions

Results confirmed our expectation that inconsistent posts are associated with stronger cognitive conflict which in turn raised both the intention to reply and actual participation. It is interesting to note that users exhibit confirmation bias (preference for consistent information) as recipients of content, but exhibit a disconfirmation bias (preference for inconsistent information) as producers of content. In contrast to previous studies (Chmiel et al., 2011), we did not yield strong effects of the emotionality of a message. Finally, feelings of consensus and feelings that a post contained weak arguments were indicators of both an intention to reply, and an intention not to reply. Taken together, these findings can help to better understand the dynamics of participation, collaboration, and thus to learning in online settings.

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