

# I'm polite(r) because I think you are.

## Elucidating the impact of contextual information on the expression of emotions by users of Wikipedia

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### Abstract

The expression of emotions is important for a work group to achieve coordination, creativity. However, there are few studies on how emotions are expressed in situation of scarce social contextual information, such as asynchronous interaction via text only, as in computer-mediated communication. The goal of this research is to examine emotions in comments on Wikipedia's talk pages and, referring to main psychology theories, to identify contextual factors that contribute to their emotional intensity. We show that emotions present in the context can push comment authors to modulate their own emotion expression level.

**Keywords:** Sentiment Analysis; Wikipedia; Commons; OOCs; Mimicry.

## 1 Introduction

Technical characteristics of online collaborative platforms such as Slack, wiki systems, or GitHub, can enable or limit certain collective actions in collaborative work. While these platforms can signal tasks, complex actions often require explicit communication (Dipple et al., 2014). Communication affects collaborative efforts not only through content, but also through emotions and social cues (Van Kleef, 2009).

In online environments, individuals communicate primarily through asynchronous text, which has been found to constitute a set of tacit guidelines to which users tend to adhere (Rösner and Krämer, 2016). But this text-only interaction omits typical social cues used by a group to interpret messages, such as demographics or social roles. Given the aggressiveness observed in online communities, it is important to understand what guides people and the factors that influence the positive or negative emotions expressed.

The expression of emotions is influenced by two major categories of factors: the personal profile of the subject, and the context and the subject's response to it. Appraisal theory suggests that an individual's expressed emotion is a result of their reaction and evaluation of an external stimulus, which is influenced by their personal beliefs

and values. Mimicry theory argues that individuals tend to imitate the vocabulary, emotions, and expressions of those around them. According to CAT, the ultimate goal is to signal shared appraisals and values (Bernhold and Giles, 2022).

This research aims to examine the relationship between individual emotional tendencies and their reactions to the context in which they interact, based on the aforementioned theories, based on, and only based on what people can "read" in a space dedicated to discussing collaboration, the Wikipedia talk pages.

## 2 Methods

Our decision to use Wikipedia is motivated by three factors. First, users manage conflicts themselves without a hierarchical conflict resolution mechanism (Lerner and Lomi, 2020). Second, participation is voluntary, with no financial or career incentives, or hierarchical obligations forcing moderation or agreement (ibid). Finally, interactions are trackable because the entire history of comments and edits is publicly available.

In contrast to previous studies on Wikipedia talk pages, and for the reasons given above, we focused on the contextual characteristics of the comments rather than the socio-demographic characteristics of the subjects, which are not observable. We investigated the relationship between a subject's emotional tendencies and the context in which they discuss by examining the effect of perceived valence (pleasantness) and arousal (emotional charge) on the emotional expression of a new comment posted in that context.

Our strategy for selecting comments involved creating a sample of articles representing various topics, team sizes, and levels of conflict. We first selected all *Today's Featured Articles* from the English Wikipedia home page between December 1<sup>st</sup> and December 31<sup>st</sup>, 2019. We then followed hyperlinks in each to other *Articles*, repeating this process to collect 312,088 articles, aiming to control for topic-specific or structural factors.

For each talk page comment, we identified the sender, recipient, and thread (excluding thread-initiating comments). We collected the state of the *Talk Page* at the time of posting. Figure 1 illustrates this. We ended up with 1.4 million comments, each representing one obser-

vation in our dataset. For each observation, we collected previous threads between the sender and receiver and all previous comments of the receiver.

In line with (Gallus and Bhatia, 2020), we used two techniques, namely Word Frequency Averaging (WFA) and Word Embeddings (EMB), to assess the emotions conveyed in each comment and its surrounding context. The purpose of using these techniques was to address any potential data sparsity in the dataset created by (Warriner et al., 2013). Figure 2 provides a sample of words with their respective *valence* and *arousal*.

Logistic regression models were used to analyze comments with exceptionally high or low (first and last decile) valence (arousal) and to identify the contextual or behavioral factors that may have contributed to the expression of extreme emotions. During the analyses, we considered three contextual levels of analysis, i.e., the discussion page, the thread, and the dialog between the author and the recipient of the observed comment to explain 1) that level of emotion; 2) the deviation from the average level of the receiver’s comments.

### 3 Results

Tables 1 and 2 summarize the results from the regressions. Table 1 shows the impact that the context has on the likelihood of having an extremely high valent (or aroused) comment (respectively, highVal and highAro) and on the likelihood of having a particularly high shift in the *valence* (arousal) in the emotion expressed by the author (highRelVal and highRelAro). Table 2 shows the impact that the context, measured on the baseline of the author of the comments, has on the same dependent variables.

The results support the hypothesis that the valence (arousal) of the context positively influences the likelihood of an extremely high valence (arousal) comment. The thread level seems to have the strongest effect. It is suggested that this is because authors must take into account previous comments in order to participate in the discussion. The limited effect of the dyadic level may be due to its limited occurrence in the dataset.

A similar approach was used to examine the variation in the valence (excitement) of the authors’ comments compared to their usual valence (excitement). This analysis yielded similar results. There is indeed an overall positive effect of context on variation. The thread level seems to have the stronger effect compared to the other context levels.

### 4 Discussion / Conclusion

This work proposes a new method to investigate among other things, the emotional discrepancy between the subject’s idiosyncratic emotional tendency and the emotion conveyed in the context that can be transposed to other

context. It seems to confirm that emotions can be evaluated within a textual exchange, and that people react to the emotional information contained in the previous text to react, with their personality. Each contextual level has a different magnitude on affecting the expressed emotions. One interesting factor that we highlighted is also the dyadic relevance. Due to the complexity of the implications of including social relations, we couldn’t dig more into this aspect.

This can be very useful to detect flaming mechanisms, due to a person, or a context, to mitigate toxic situations as soon as possible, to help solve conflict or prevent people from stopping their participation in Wikipedia.

There are obvious limitations to this research. Only two emotions are considered, and the history of discussion between the people has not been taken into account. This limits the scope of the managerial implications of this study. But the dataset can and will be reused to address these questions. It is also available for other researches.

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