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Linguistic Analysis in Different Types of Support using LIWC for Spanish and English online communities

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Abstract

Social support is a construct and includes emotions relating to social help, social appraisal support, informational support, and instrumental support that a person gets from other people. The focus of the present work is on how social support is expressed on YouTube in different ways by English and Spanish speakers underscoring cultural and linguistic differences. The social support issue and the four social support types of social support relating to social issues were collaboratively annotated by humans and the GPT model support system with good agreement achieving. A chi-square test revealed that support types differ significantly between the two languages. Additional linguistic and psychological assessment employing LIWC brought to light more social processes, feelings and culture markers unique to each support type and each language. We underscored analytical gaps in the phraseology of social support offered online and emphasized the need to derive more insightful cultural divisions in expression social support. The significance of the study lies in the application of sophisticated NLP social media analytic tools. The results will further enhance the clarification and fusion of culturally informed design to automated support systems.

Keywords: Social support, social media, NLP, LIWC

1. Introduction

Social support is defined as approaches with psychological assistance, invisible support, and physical aid obtained from associates and makes the individual experience the feeling of being cherished, cared about, honored and appreciated (16; 1). It is also distinguished into four types of resources.

Social support can be categorized into four primary types. Emotional support deals with the expression of care, empathy, and affection, as well as the provision of comforting support. Appraisal support is validating feedback and self-evaluation support without solving particular problems. Informational support entails giving advice and guidance to assist in the resolution of problems, especially those arising from stressful situations. Finally, instrumental support is defined as the provision of physical forms of assistance, services, or funds to meet identified needs (29; 2).

Social support goes beyond psychological strength and items an individual possesses. It refers to social support networks and helps received from others (17; 15).

Culturally, by language and even organizationally determined factors frame the expression of social support on the net. As social media becomes more central in the support of individuals, these factors will certainly aid in optimizing the functioning of support online. This is the rationale of the current research. It investigates the expression of social support by migrants from the country to English and Spanish speaking countries (39; 22). It applies cutting-edge language technology and natural language processing. In this research, we worked with GPT-4o to classify in two levels and in one multi-class English and Spanish dataset. In Task 1, we identified the Support and Non Support comments. In Task 2 the Individual and Group comments were classified. In Task 3, which is a multi-class classification, we classified Support and Non-Support comments into Nation, Other, LGBTQ, Black Community, Women, Religion, and Religion, and the four types of social support defined above (17; 34). After classification, we made a detailed examination of the results. Furthermore, we used LIWC (31; 38) to measure psychological and linguistic categories including Social Processes, Word Count (WC), Function Words, Affect, Drives, and Culture.

The subsequent sections comprise the intricate analysis and results.

The contributions below highlight the most important points of this research.

Cross-Language Study of Social Support:

The work demonstrates the contrasts and similarities of the expression of social support on YouTube in English and Spanish and exposes important socio-cultural and linguistic elements.

Human Annotation and AI Annotation Agreement:

It shows a notable concordance between social support type classification by domain experts and the GPT model, therefore confirming the value of AI-assisted classification in social media studies.

Validation of Culture Based Variation in Support Types:

The difference in support in English and Spanish granted by a chi square test emphasizes the culture surrounding the social media platform user.

Psychological and Linguistic Dimensions:

LIWC analysis demonstrates different supportive communication styles reflecting cross cultural differences and communication patterns in the social media context.

2. Literature Review

Recent studies have focused on the application of NLP techniques for social support detection. Ahani et al. (17) achieved the classification of individual versus group support with psycholinguistic, emotional, and n-gram features, with an accuracy of 0.72 to 0.82. Kolesnikova et al. (16; 23) used the LLMs (GPT-3, GPT-4, GPT-4-turbo) with Zero-Shot learning and Transformer models from Hugging Face. Their research indicated RoBERTa-base as the best model, exceeding other results by up to 8

Kwon et al. (32) examines the social support patterns of cancer patients and their impact on self-reported outcomes through latent class analysis (LCA). The analysis categorizes social support into emotional, instrumental, informational, and appraisal support and derives three levels of latent class emotional support identified as low, moderate, and high. The findings indicate that social support is disproportionate, and having strong support in one domain does not ensure good support in other domains. The study emphasizes social support and intervention neglect for older cancer patients and advocates for social prescribing as a means of referral to local community resources to address the support deficits.

Choi et al. (33) conducted a concept analysis on social support in nursing students within the context of their clinical placements. An analysis of 27 selected documents published between 2000 and 2022 detailed four descriptor dimensions of social support: structural (integration into and engagement in social relationships), educational (academics and mentorship), psychosocial (emotional and positive evaluative self-endorsement) (37; 35), and instrumental (informational and tangible). Antecedents of social support identified are stress, individual (personal) need, social network, and social environment, while outcomes are improved psychological well-being and enhanced overall life quality. Findings support that social support available to nursing students is both structurally and functionally complex, composite, and multifaceted. This warrants focus in future studies, with the development of more specialized measurement instruments, and tools, for programs and research.

3. Methodology

Datasets: This study focused on the datasets described in (17) and (34) on the analysis of YouTube comments. This study is constrained to one platform and two languages (English and Spanish) chosen for their ample resources to conduct an initial analysis. YouTube was chosen as the data source because it contains many videos of particular events that allows for the analysis of comments made in real time that are supportive. This platform provided relevant data congruent with the focus of the research. Support comments were divided into two tasks. There is a binary task which contains a group and individual classification, and a multi-class task which further divides group comments into classifying different social issues like nationality, the Black community, women, religion, LGBTQ+ and other social issues. The classification was social issues and the categories were the same for both English and Spanish datasets (16). The comments were further classified on the type of social support they provided. For the supportive actions that pertain to as emotional support, informational support, appraisal support, and instrumental support (2), see Table 1 for the statistical data.

Task	*Category*	*English Count*	*Spanish Count*
Task 1	Supportive	2,232	678
Task 2	Group	1,811	507
	Individual	421	171
Task 3	Nation	981	35
	Other	519	101
	LGBTQ	154	245
	Black Community	114	16
	Women	24	41
	Religion	19	69
Support Type	Emotional	1,826	298
	Informational	257	94
	Appraisal	128	286
	Instrumental	21	-

Table 1: Statistics for English and Spanish Datasets

3.1. Annotation Guidelines

The social support detection (SSD) task deals with determining the type of support expressed in text comments. Each support type is classfied the following four types:

Support Type Classification

- **Emotional Support (ES):**
  Comments that demonstrate protective, reassuring, soothing, and comforting behaviors. They aim to alleviate distress, and discontent.
  Example: "I'm here for you." / "Estoy aquí para ti."

- **Informational Support (IS):**
  Comments and discourse that provide a solution to the problem and gives advice, suggestions, facts, and a guiding hand.
  Example: "Check this helpful article." / "Consulta este artículo útil."

- **Instrumental Support (ISu):**
  Comments that provide help, facilitation, and assistance with the needed tasks and service.
  Example: "Let me help you move." / "Te ayudo a mudarte."

- **Appraisal Support (AS):**
  Comments that support, provide feedback, and validate to help the person evaluate or interpret the situation in a more positive way.

Example: "You did an excellent job." / "Lo hiciste muy bien."

3.2. Annotation Process and Inter-Annotator Agreement

The focus of this annotation assignment was to detect the types of social support in the comments and subsequently categorize each comment according to one of four predefined categories.

English Dataset: The English dataset was fully labelled by two human annotators, both co-authors of the present paper with a PhD and a Master's Degree respectively, while abiding by rigorous instructions to maintain uniformity and minimize bias as much as was feasible. Both human and automated annotation was used with the the AI GPT to gauge agreement between humans and machines. Their respective Cohen's Kappa scores of 0.624 (GPT vs. Human 1), 0.841 (Human 1 vs. Human 2), and 0.802 (Human 2 vs. GPT) attest to the varying degrees of agreement. Following the harmonization of labels through a set mapping, the three annotators' Krippendorff's Alpha was 0.758, demonstrating a significant level of agreement. The final labels corresponded to the highest frequency consensus among the annotators.

Spanish Dataset: Collaboration among three annotators was required, with the first being GPT, followed by an author with PhD qualifications who is a native writer of Spanish, and the other who is also a PhD holder and native Spanish speaker. Annotator 3 was first learning under the supervision of 100 sample guidelines. Annotator 2 scored Cohen's Kappa with GPT of 0.748 while Annotator 2 and 3 demonstrated 0.930, and GPT with Annotator 3 was 0.676. The final Krippendorff's Alpha calculated for the three was 0.786 hence confirming substantial agreement among them. The last labels were decided by the annotators based on the majority vote, achieving consensus among them.

3.3. Statistical Validation of Support Type Differences

To ascertain if the identified differences in the type of support offered across the English and Spanish datasets were of statistical significance, a chi-square test of independence was conducted (36). The contingency table was designed in relation to each support type's (Emotional, Informational, Appraisal, and Instrumental) use in both datasets.

The chi-square test yielded the following results:

- **Chi-square statistic:** 596.46
- **Degrees of freedom:** 3
- **p-value:** 5.89×10^{-129}

The differences in the two datasets were highly statistically significant given that the p-value was far below the threshold of 0.05. This result indicates that the differences in support type distributions in the two datasets are attributable to factors other than chance. It suggests the possibility of contextual and cultural differences in social support representation in English and Spanish.

3.4. GPT-Based Classification

In our study, we utilized OpenAI's GPT-4o model to classify datasets in English and Spanish regarding social support types (34; 18). We accessed the model through the ChatCompletion API and assigned the following parameters: model=gpt-4o, max_tokens=10, and temperature=0.2. We provided the model with a set message 'classify the text into one of the four categories: Emotional, Informational, Instrumental, or Appraisal support and do that solely based on the text you have.'

```
Text: "I'm really sorry you're going
through this. Stay strong!" -> Emotional
Text: "You can apply for financial aid
through this website." -> Informational
Text: "I can help you move to your new
apartment this weekend." -> Instrumental
Text: "You're doing great! Keep going and
don't give up!" -> Appraisal
```

For Spanish, the structure was identical, with the aim of keeping the same meaning:

```
Texto: "Lo siento mucho que estés pasando
por esto. ¡Mantente fuerte!" -> Emotional
Support
Texto: "Puedes aplicar para ayuda
financiera a través de este sitio web."
-> Informational Support
Texto: "Puedo ayudarte a mudarte a tu
nuevo apartamento este fin de semana." ->
Instrumental Support
Texto: "¡Estás haciendo un gran trabajo!
¡Sigue así y no te rindas!" -> Appraisal
Support
```

Each comment was evaluated individually by the model, and the predicted support type was stored in a new column. The updated datasets were exported to CSV for further analysis.

3.5. LIWC

LIWC has certainly improved psychological research in terms of analyzing language data because it is strong, accessible, and fact-based. Over 20,000 cited and trusted research papers have proven LIWC-22 to be a reliable piece of software that evaluates over one hundred of its dimensions. It is also notable that this software has the capacity of working with almost fifteen languages including Spanish and English (19). In spite of its capabilities, LIWC inadequately interprets natural language. It has also barely any success with sarcasm, irony, or almost any low key expression. In those cases, there are guaranteed bound to be misjudgments and major misunderstandings (3; 20).

We examined the LIWC components of the online cultural and linguistic support activity to calculate the average values of six LIWC components: Social Processes, Word Count, Function Words, Affect, Drives, and Culture. In analyzing Spanish and English comments along four reputable support types, the breadth of data ensured reliable and useful cultural and psychological comparisons. The selected components are crucial

building blocks at the intersection of the psychological, emotional, and communicative aspects of support discourse. In this way, support discourse received a cross cultural and psychological analysis.

Every category corresponds to a significant aspect of communication. Social Processes (25) deals with elements of human interaction at the level of language, such as personal pronouns and involvement-marking verbs. Word Count (WC) is an indicator of the level of interaction, engagement, and the fluency of conversation of the users. Function Words (27) includes pronouns, articles, prepositions, auxiliary verbs, and conjunctions which are considered the lower tertiary level of the hierarchy and reveals the level of the communication style. The Affect category (25) illustrates the emotional components of communication, which are analyzed as the Presence of Positive Emotion, Negative Emotion, Anxiety, Anger, Sadness, and the use of Swear Words. Drives (24) are the subconscious motives and in this instance, we considered Affiliation, Achievement, and Power. Finally, the Culture (26) category deals with culturally significant issues of the users such as Politics, Ethnicity, and Technology.

For the purpose of accuracy and uniformity, we adopted LIWC's integrated standardization which divides the total count of words in a text by the total count of words in each category and computes a percentage for each category. After that, we calculated the averages for every parameter in the English and Spanish datasets to resolve the imbalance as offered in the preceding section.

These linguistic traces shed light on the psychological and communicative aspects of each of support type across different languages.

4. Analysis and Results

4.1. Support Types in the English Dataset

Analysis of the support types a dataset from the English speakers shows that, even if the differences in support types allocated is in focus, groups retain the same tendencies between them. Almost in all categories emotional support is the predominant form. The LGBTQ (95.80%) and Nation (92.24%) groups are the most emotionally supportive, suggesting a significant focus on emotional bonding and solidarity. Group (90.09%), Other (90.81%), and Support (88.67%) also exhibit emotionally supportive communication, suggesting that empathic responses dominate support communication in these contexts.

Most groups do not show a high degree of Appraisal support, which is evaluative feedback and affirmation. Women (14.29%) and Individual (11.92%) are the most dominant members of these groups, which suggests that in more personalized or gender oriented contexts, the need of appraisal and self-evaluation is relatively higher.

Informational support is most disparate between communities. The Black Community (36.78%) is exceptional in having a high proportion of members with a dominant value indicating a strong focus on the exchange of practical information and advice. Religion (29.41%) also has a strong focus in the dissemination of information and advice. Women (14.29%), Group (8.55%), and Support (7.97%) are also noted, while LGBTQ (2.80%) and Nation (7.20%) members are relatively low on the support.

Label	Appraisal	Emotional	Informational
Support	42.18	43.95	13.86
Group	43.39	38.26	18.34
Individual	38.60	60.82	0.58
Black Community	62.50	12.50	25.00
LGBTQ	44.49	43.27	12.24
Nation	17.14	82.86	0.00
Other	56.44	34.65	8.91
Religion	13.04	14.49	72.46
Women	70.73	29.27	0.00

Table 2: Distribution of Support Subtypes Across Tasks (in percentages)

Aside from the above forms of support, tangible help or assistance remains the least represented and covered in the entire support catalog. Support groups, including of the LGBTQ, Nation, Black Community, Religion, and Women, record 0% proficiency in this category which points to the fact that practical help offered is scarce. Negligible examples would be Other (0.64%), Individual (0.27%), Support (0.20%), and Group (0.18%). Therefore, the data points to emotional support as the primary form of assistance provided and most needed by the respondents in English-speaking groups, Whiles there are informational and appraisal support, the patterns are more to do with cultural, identity, and contextual framework needed by the various groups. Clearly, there is no or very little instrumental support provided which confirms and reinforces the idea that the social online support interactions in the framework and context are mainly emotional and informational.

4.2. Support Types in the Spanish Data set

Examining the types of support present in the Spanish dataset reveals the intricacies of support offered and received in the different communities. Appraisal support, which comprises evaluative feedback or validation, seems to be the most prevalent type in a number of different groups. Of particular note, Women (70.73%), Black Community (62.50%), and Other (56.44%) groups represent the highest proportions of appraisal support, signaling the possible presence of a culture which prioritizes identity affirmation and reflective encouragement. In parallel, LGBTQ (44.49%), Group (43.39%), and Support (42.18%) echo similar patterns of heavy reliance on appraisal support which demonstrates the type's ubiquitous applicability.

Emotional support is still an important construct, especially in the Nation category (82.86%) followed by Individual (60.82%), Support (43.95%), and LGBTQ (43.27%). These statistics capture the continued presence of emotional weight and empathy in Spanish speaking social media, particularly in the national and personal spheres.

Although the prevalence of informational support is relatively low, there are communities in which they are critical. The Religion category stands out with the highest proportion

	English				Spanish		
	Emotional	Appraisal	Informational	Instrumental	Emotional	Appraisal	Informational
WC	18.36	18.53	30.35	17.05	11.49	28.44	85.91
Function Words	0.31	0.22	0.13	0.33	1.49	2.30	2.52
Social Processes	5.43	5.37	4.67	7.86	2.08	3.11	3.15
Affect	6.43	5.42	3.57	5.13	5.77	2.44	1.50
Drives	4.07	6.95	6.95	9.27	7.34	6.72	6.14
Culture	1.67	0.85	3.46	2.49	0.79	0.45	5.03

Table 3: LIWC feature comparison across support types in English and Spanish

of informational support (72.46%) which emphasizes the importance of sharing information or guidance about faith in interpersonal religious communication. The Black Community (25.00%), Group (18.34%), and Support (13.86%) are also noted for possessing moderate levels of informational support. In contrast, Nation and Women groups receive no informational support (0.00%) and Individual shows only a minimal amount (0.58%).To conclude, the evidence reflects the diverse emphases placed on various forms of social support by the members of Spanish-speaking communities in relation to identity and context. Appraisal support is the most prevalent type, especially within the more vulnerable, or personal, subsets like Women, Black Community, and Individual, while Emotional support predominates in national and interpersonal situations. Informational support, while marginal, is still salient in religious and particularistic cultural contexts. These trends highlight the supporting and seeking social support patterns through the internet by Spanish-speaking users in a cross-culturally nuanced manner.

4.3. Comparison of Social Support Types in English and Spanish

The difference in types of social support in English and Spanish speaking communities is that Spanish contexts have more appraisal support and English contexts have more informational support. In the Spanish dataset, appraisal support was overwhelmingly high, particularly among Women (70.73%) and Black Community (62.50%), while in the English dataset, the Women category in appraisal dominates at a mere 14.29%. This difference suggests that Spanish speaking societies have a heightened concern around feedback, affirmation, and group reflection, as described in familism (21). This is in contrast to English speaking societies, especially the Black Community (36.78%), in which there is more informational support, suggesting a more individualistic perspective in which knowledge and resources are seen as central to personal empowerment and independence.

Another highly specialized difference is that English-speaking groups have more evenly and uniformly distributed emotional support, whereas in Spanish-speaking communities, there is greater disparity in support types. In the English dataset, there is emotional support offered at levels exceeding 80% in groups such as LGBTQ (95.80%), Nation (92.24%), and Group (90.09%), which serves to support the argument that empathic concern and emotional validation are primary features of supportive interactions in these communities. In contrast, emotional support in the Spanish dataset is more context dependent. For example, in the Nation group, 82.86% emotional support is offered, whereas in the Religion (14.49%) and Women (29.27%) categories, much lower values are observed. This finding suggests that in Spanish-speaking contexts, emotional support is conceptualized as support that is embedded within, or substituted for, appraisal support, reflecting a culture-specific pattern of supportive communication.

Table 3 documents the differences between English and Spanish LIWC suggesting there are cultural differences regarding the use of language. Spanish and Englishs are, certainly, similar in some regards but English supportive discourses contain higher "Word Count" (49.67) and "Culture" (3.67) metrics which Spanish counterparts do not have over "Word Count" (32.35), "Affect" (3.57), and "Culture" (3.46) compared to English discourses. Children from over 100 diverse cultures around the world are, in fact, capable of using the Internet and as a consequence "sesamo" and "webbigo" have been designed for Spanish and English cultures, respectively. Fig. 1 depicts a PI of LIWC derived metrics for English and Spanish supportive text.

5. Discussion

Our findings indicate that the expression of social support takes different forms in English and Spanish online communities. The support type distribution differences indicate that social and linguistic norms influence how people render support in online contexts. English comments had greater emotional and informational support whereas Spanish comments had significantly greater proportions of appraisal support. This might indicate that Spanish-speaking cultures place higher value on validating social identity and relations.

The use of GPT-4o made the classification of support types more scalable and consistent. High inter-annotator agreement also speaks to the reliability of the labels. GPT-4o also demonstrates level of performance in English and Spanish which points to its proficiency in cross-linguistic NLP tasks, though the Spanish sample showed lower annotation agreement with human coders, suggesting that more culture specific annotation processes are still needed.

LIWC was also useful in offering psychological and linguistic phenomena. The social processes and function words showed different frequencies in the two languages suggesting

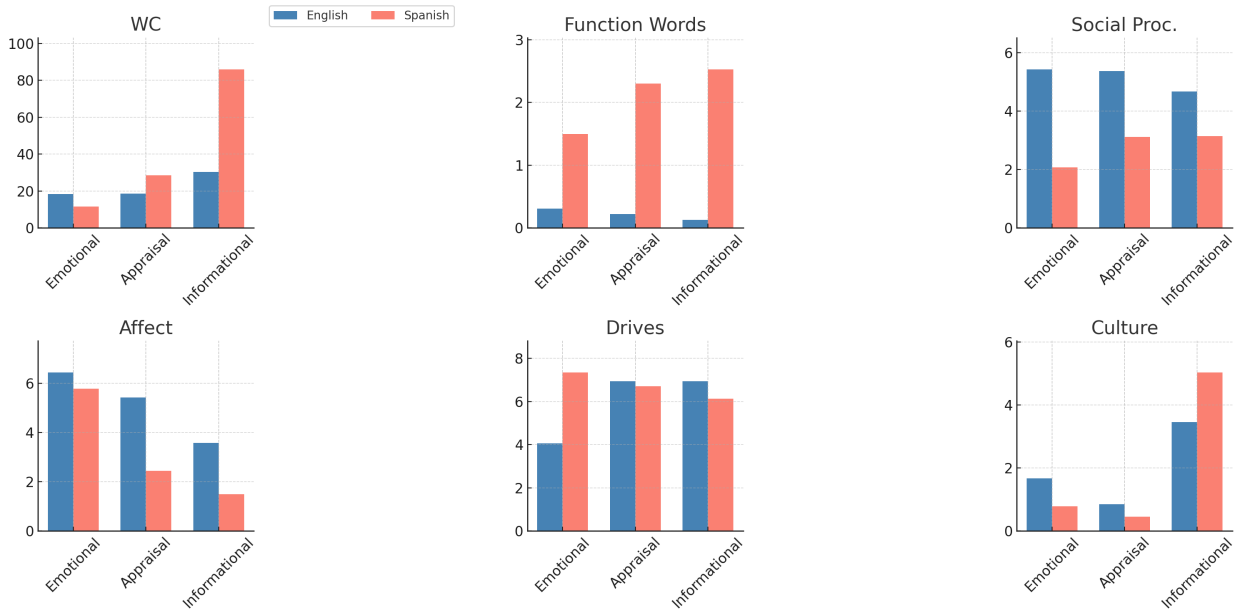


Figure 1: English vs spanish LIWC Feature Comparison by Support Type

differences in communication and cultural norms. These phenomena should also guide the development of support-sensitive NLP systems to ensure the systems function appropriately in and are fair to the target cultures.

6. Conclusions and Future Work

This study analyzes social support in the YouTube comments in English and Spanish cultures in a cross-cultural framework using GPT-4o for classification and LIWC for the linguistic and psychological analyses of social support. We tailored social support into four categories—Emotional Support, Informational Support, Instrumental Support, and Appraisal Support—and highlighted the importance of culture and language context in shaping the expression of support online.

Our analyses identified marked discrepancies in the distributions of support types in English and Spanish emotionally disproportionately accounting for support on both datasets, but with divergent expression and emphasis. The chi-square test revealed the culture that is not strictly Western plays a role in shaping electronically expressed support behavior and that these differences identified are not by chance. In addition, through multi-class classification, we investigated the representation of social groups (e.g., Women, LGBTQ, Religion) within support discourse to shed light on the sociological aspects of support.

LIWC in conjunction with GPT-4o and annotated examples revealed the psychological and functional words used in support cross-culturally that specifically reflect cultural differences in communication. Our study adds to the body of work in cross-cultural NLP and digital empathy by providing instances of language-specific care, validation, and aid to express support.

In terms of future study, we recommend scaling the research to add more languages and cultures to confirm the cross-culturally applicable findings. We also recommend tapping into other sites such as Reddit, which contains diverse community and support discussions, and serves as an ancillary platform to YouTube. We also note that augmenting the size of the dataset, as well as the distribution of support types to improve balance, will be necessary to perform the analysis and the model's performance on undersupported categories. We also suggest collaborating with social psychologists for the cross-culturally contextual analysis and to help refine the explanatory model as well as NLP systems that focus on culture.

7. Limitations

Not withstanding the contributions this study made, there are some limitations that need to be addressed. First, the dataset is limited to two languages, which are English and Spanish. This results in a poor level of generalisation and transferability of the conclusions to other cross language and cross cultural contexts. Second, although the Psycholinguistic Analysis software (LIWC) adds some value to the understanding of a person's language use and behavior, it is overly constrained by its limited, previously defined, and assumed lexicon and categories and may not appreciate the more subtle and culturally relevant forms of support a person gives. Finally, our work here was based on comments made to YouTube videos and more specific social norms may apply and users comments and behavior may not be typical of other platforms.

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