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College Students' Engagement with Social Media Messaging from University Health Services: The Importance of Expectancies and Efficacy

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Abstract

Objective: The study analyzes e-health message content shared by university health centers and determines college students' engagement with those messages. **Method:** Using the Reasoned Action Approach (RAA) framework, the current study content analyzed the RAA components (target behavior, attitudes/expectancies, social norms, and efficacy) within Instagram messages that were shared by official university health services accounts to promote health behaviors among college students. **Results:** Results suggest that university health services are often using RAA-informed message strategies, with just under half of all posts containing at least one RAA component. Also, students are more likely to engage with university health services content that includes positive expectancies - specifically, improved academic performance and general efficacy. **Conclusion:** The present research will help university health services tailor their theory-driven messaging to improve student engagement with their content.

Keywords: university health centers, reasoned actioned approach, student engagement, social media, e-health.

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Introduction

College students are a vulnerable population who often experience physiological and mental health problems such as chronic diseases and symptoms of depression and anxiety which are linked to various unhealthy behaviors.[1-3] College students are also more susceptible to engaging in risky health behaviors such as alcohol consumption, substance use, unprotected sex, self-harm, and suicidal ideation.[4-7] Additionally, students' health behavior and coping strategy deteriorated during and after the COVID-19 pandemic and affected their overall well-being.[8] The pandemic also necessitated that colleges and universities expanded their capacity to meet the increased demand for health services and developed various strategies to provide e-health support to their students.

Most college health centers have at least one social media account (e.g., Instagram, Facebook, Twitter/X) to share targeted health messages with students. However, much is unknown about the health messaging components used by these services and whether college students engage with such e-health message content from this resource. To be effective, it is crucial that college students engage with the message content,[9] and perform healthy behaviors accordingly.

The purpose of the current study is to analyze e-health message content shared by university health service centers on social media and determine college students' engagement with those messages. Using the Reasoned Action Approach (RAA) framework,[10] the current study will content analyze the RAA components (target behavior, attitudes/expectancies, social

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norms, and efficacy) within Instagram messages that were shared by official university health services account to promote health behaviors among college students.

Social media health messaging

Social media health messaging on college campuses seeks to connect with students and facilitate online health informational support for college students. Social media has been a useful tool for delivering targeted health messages and implementing health intervention programs on college campuses. College health officials offer health messaging and health promotion programs on college campuses in order to reduce the risk of diseases and promote healthy behaviors (e.g., physical exercise, sleep and mental well-being) among college students[3] Currently, there are various social media sites exists, however, it is found that Instagram is the most popular social media platform among young adults and it has been widely used among college students.[11,12] Therefore, Instagram has been found as an effective communication channel to promote health messages among college students, claims health behavior program experts.[13,14]

However, what remained unknown are the concepts/ strategies used in those health behavior messages and students' engagement with the messaging content. Previous research indicates important gaps that exists in the strategic use of social media for specific age groups, evaluating the outcome of social media-based health interventions and understanding their impact in health development.[15] Many health campaigns and health promotional activity adopt health behavior theories to inform and assist in planning, developing strategies and guiding them to evaluate the outcome of health intervention programs.[16,17] A theory-based evaluation of the Instagram messaging content will help to determine the effectiveness of college shared health messages in addition to understanding what messages are shared by the college health centers.

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The reasoned action approach

The RAA model posits that a person's intention to behavior change can be determined by three factors: individual's attitude toward the outcome, social norms, and perceived behavioral control toward performing the behavior. These three factors can be influenced by their subdimensions such as attitude can be influenced by negative and positive evaluation of the outcome toward behavior change, social norms that is consists of both injunctive and descriptive norms and their impact affects someone's intention to perform health behaviors and self-efficacy to performing that behavior.[18] According to expectancy value theory,[18] attitude is a component that can include a person's negative and positive evaluation of the expected consequences if they perform the target behavior. Perceived social norms pose the idea that people tend to perform a behavior when it is approved by important others such as friends and family (injunctive norms) and if most of the members in their social groups that are similar to them also perform that behavior (descriptive norms).[18] Perceived behavioral control or self-efficacy denotes individuals' tendency to perform a behavior based on their control over the situation and perceived ability to perform the targeted behavior.[18] All of these components are considered to be the determinants of behavioral intention, and this predicts actual behavior.

The RAA is a well-known theory with hundreds of published works demonstrating its predictive and explanatory power regarding the effectiveness of health messaging for many health behaviors relevant to college students.[19] For example, the RAA has been used to study women college students' intention to get HPV vaccines.[20] Additionally, the RAA constructs have been used to predict intention to enroll in health insurance among community college students,[21] predicting healthy sleep behaviors,[22] physical activity,[23] and e-cigarette use.[24]

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Clearly, the RAA is an effective health behavior change theory that could be crucial for persuasive messaging regarding health coming from university health services. However, it is unknown the extent to which university health centers are using the RAA to inform their health messaging. Therefore, one goal of this study is to assess the prevalence of RAA constructs in the social media messaging of university health centers.

RQ1: How often do university health centers utilize RAA constructs in their social media messaging?

In addition to the RAA, there are other components of social media that provide the ability to change a message and how it is received. Delivering public health messages on Instagram using texts or other visuals is quite common in health persuasion and is directly related to post engagement. For example, in analyzing health messages using the Centers for Disease Control and Prevention's Instagram page, a study found that photos that use various shapes (bigger vs. smaller) of human faces and emotions such as happiness vs. neutral have a significant correlation with post engagement.[25] Therefore, in addition to RAA, we are also interested in imagery, as Instagram is a visual-centric medium with options for either static images or audiovisual videos.

RQ2: What is the prevalence of text only, static image, and audiovisual messages from university health services on social media?

Message engagement among college students

Audience engagement plays a significant role in e-health communication. Research indicates that engagement is an important indicator of trust and commitment towards the organization,[26] and is associated with systematic processing of health messaging on social media and intention to perform the target behavior.[27] Audience engagement with social media posts

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may increase the likelihood of acceptance and involvement with the activities and events shown in the message content.[28-31] This typically occurs when interactions happens between the audience and the content within which the audience can like, share, or make comments on a post.[29,32] Finally, engagement on social media is an important metric for the reach of a message, and the likelihood to influence those who are exposed to the content. Engagement is frequently measured by reactions to the post and users interaction with the message content by hitting likes, comments, subscribe or sharing the content among others.[29,32,33] Thus, students' engagement with college shared social media health behavior posts will reveal important information such as whether college students can positively relate themselves to the content and their willingness to accept the content.

RQ3: Is engagement with a social media post from university health services differentially associated with a) the presence of RAA constructs in the messages, and/or b) the use of imagery in the message?

Method

Sample

A content analysis was conducted to analyze Instagram messages disseminated from university health centers during the pandemic-era semesters of Fall 2020 and Spring 2021. In this period, many campus services were all digital, including mental health services. Instagram messages were randomly selected from 15 state flagship university health centers. A flagship university is referred to as the research-intensive, largest public university in a given state.[34] Three universities were eliminated from the list due to the absence of an Instagram account. Two universities were randomly selected to act as training resources for achieving intercoder reliability, and the remaining 10 universities (posts *n*=405) served as the main sample.

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Coding procedures

A codebook was developed with definitions and examples of each construct for coding. Each Instagram post was named with a unique ID number. Two undergraduate coders were trained to analyze the content. One university was initially randomly selected to serve as the training sample for achieving intercoder reliability (posts *n*=52). Most of the coded constructs achieved acceptable intercoder reliability (Gwet's AC > .70) on this first round, but a few constructs required re-training and a second round of coding. A second university was randomly selected to serve as the second-round coder training (posts *n*=45). At this point acceptable intercoder reliability was achieved with few exceptions (see below for details on reliability achieved for each individual construct), and the remaining 10 universities we equally split using random assignment between the two coders and coded separately.

Measures

Reasoned action constructs. The constructs associated with the RAA included: target behavior/call to action, attitudinal expectancies (positive or negative), norms (injunctive or descriptive), and efficacy (self, behavior, or general).

(See supplementary materials for a codebook table).

Target behavior/call to action was assessed first by asking whether there was any call to action or target behavior mentioned, with the examples of requests to make appointments or to engage in self-help behaviors. Coders indicated "yes", "no", and "unclear" (Gwet's AC=0.74). Then, if they had indicated yes, coders were asked to indicate what kind of behavior was elicited (more than one selection possible): make an appointment (Gwet's AC=0.91), seek information (Gwet's AC=1.0), talk to a person in their life (Gwet's AC=1.0), attend an event (Gwet's AC=1.0), engage in self-help/self-care (Gwet's AC=1.0), and something else (Gwet's AC=1.0).

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Attitudinal expectancies were measured for the positive consequences of performing the target behavior. Coders were asked first to indicate whether the post mentions any positive expectancies of the target behavior such as benefits, with options for "yes", "no", and "unclear" (Gwet's AC=0.61). Then, if they had indicated yes, they were asked what specific positive expectancies were included (more than one selection possible): better mental health (Gwet's AC=0.68), happiness (Gwet's AC=0.90), fulfillment (Gwet's AC=0.65), academic performance (Gwet's AC=0.98), incentives/prizes/raffles (Gwet's AC=0.71), and something else (Gwet's AC=1.0).

Norms were assessed first by asking whether the post mentions any normative aspects of the target behavior, with options for "yes", "no", and "unclear" (Gwet's AC=0.92). Then, if they had indicated yes, coders were asked to indicate what type of normative aspect was involved (more than one selection possible): injunctive (what people think you SHOULD do, Gwet's AC=0.98), descriptive (what people like you actually do, Gwet's AC=0.96), and something else (Gwet's AC=1.0).

Efficacy was assessed first by asking whether the post mentions any components of efficacy such as plan engagement or efficacy, self-efficacy, etc. for doing the target action, with options for "yes", "no", and "unclear" (Gwet's AC=0.69). Then, if they had indicated yes, coders were asked to indicate what type of efficacy was involved (more than one selection possible): self-efficacy (Gwet's AC=0.87), response efficacy (Gwet's AC=0.93), general efficacy (Gwet's AC=0.81), and something else (Gwet's AC=0.92).

Visual elements. Visual elements on each post were coded first by asking coders to indicate absence or presence of a video and/or image (Gwet's AC=0.90), with options for "no, blank aside from text", "yes, an image", and "yes, a video". Then, if they indicated yes, they

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were asked to indicate what the image or video contained (more than one selection possible): students (Gwet's AC=0.86), people who are not clearly students (Gwet's AC=0.90), campus/buildings (Gwet's AC=0.94), nature – landscape (Gwet's AC=0.95), nature – close up (Gwet's AC=1.0), animals (Gwet's AC=0.97), abstract/decorative (Gwet's AC=0.65), quote/text (Gwet's AC=1.0), and something else (Gwet's AC=0.86).

Message engagement. Message engagement was measured based on number of likes (coder write-in; *M*=74.87, *SD*=145.24, Gwet's AC=1.0) and number of comments on a given post (multiple choice up to 10, then an option to write in for 10 or more; *M*=0.34, *SD*=1.22, Gwet's AC=0.98). Most posts (86.67%) had zero comments; due to the non-normality of the count measure (skew=5.19, kurtosis=33.57), a dichotomous version was used in inferential analyses to denote whether the post received any comments or none.

Results

Descriptive statistics

RQ1 asked the prevalence of RAA-relevant constructs. Most posts had some sort of specified target behavior or call to action (yes 85.68%, no 11.85%, unclear 2.47%). The most common target behavior was to engage in self-help/self-care (31.11% of posts), followed by seek information (29.38%), attend an event (25.19%), make an appointment (7.16%), and talk to a person in their life (4.69%). However, there were also many that did not fit these categories (34.81%). Some of these included behaviors like "get a COVID test", "use a crisis line", and "sign up for our email list".

In terms of the RAA determinants, positive expectancies/attitudes was the most common (yes 28.61%, no 71.39%, unclear 0.00%), followed by efficacy (yes 26.98%, no 72.52%, unclear 0.50%), then norms (yes 17.28%, no 82.23%, unclear 0.49%). Just under half of all posts

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(43.70%) included at least one of the three determinants. The most common positive expectancy was better mental health (17.78%), followed by fulfillment (12.10%), happiness (5.93%), incentives/prizes/raffles (5.93%), and academic performance (5.19%). A further 5.93% were something not listed, including, "gaining coping skills", and "better physical health". The most common efficacy type was general efficacy (21.73%), followed by self-efficacy (16.54%), and response efficacy (1.73%). There were no responses of "something else" for efficacy. Finally, the most common normative aspect was descriptive norms (14.32%), followed by injunctive norms (2.72%), and something else (0.25%).

RQ2 asked about the prevalence of imagery, specifically static images and videos. Few posts lacked a visual (12.35%), and most had an image (80.99%) followed by a video (6.67%). The most common visual element was abstract/decorative (39.75%), followed by images of students (21.23%), images of campus/buildings (14.32%), people who are not clearly students (7.90%), a quote/text (7.41%), animals (4.44%), landscape nature (3.70%), and close-up nature (2.47%). Another 22.96% were listed as having something else, which included mostly objects such as food, a bed, the school mascot, and a coffee cup, or locations such as a doctor's office or a nondescript wall.

Inferential statistics

RQ3 asked whether there was a relationship between RAA constructs, imagery, and message engagement as operationalized by likes and comments. To answer this question two regressions were run, with RAA constructs presence and image types (none, photo, video) as simultaneous predictors and number of likes and comments (logistic regression for the dichotomous variable) as separate outcome variables. Then, in cases where a predictor variable

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was significantly associated with message engagement, one way ANOVA was used to test for specific differences in engagement by subtype.

When predicting number of likes as the target engagement outcome, the presence of both positive expectancies and efficacy were associated with more likes compared to absence (R^2=0.08, expectancies, *b*(se)=42.31(17.23), *p*=.014, 95% CI (8.44, 76.19); efficacy, *b*(se)=47.79(18.91), *p*=.012, 95% CI (10.60, 84.98)). Norms presence was not significant, *b*(se)=14.89(20.28), *p*=.46, 95% CI (-24.97, 54.76), nor was the comparison of an image to none, *b*(se)=19.14(21.77), *p*=.38, 95% CI (-23.67, 61.94), or the comparison of a video to none, *b*(se)=41.57(33.75), *p*=.22, 95% CI (-24.79, 107.93).

Expectancies and efficacy were the significant predictors of number of likes, so those were focused on for the next analyses in terms of subtype. A one way ANOVA predicting number of likes from expectancy type included the following categories of expectancy, in order from most likes to least: academic performance (*M*=267.25, *SD*=237.19), more than one expectancy (*M*=150.08, *SD*=198.18), incentives/raffles/prizes (*M*=91.95, *SD*=214.19), better mental health (*M*=91.18, *SD*=147.82), no expectancies present (*M*=56.05, *SD*=119.82), and something else (*M*=41.35, *SD*=52.04). Post hoc multiple comparisons using Tukey's HSD found that the number of likes were significantly higher in the academic performance category compared to both something else, 95% CI (-449.63, -2.16), and no expectancies, 95% CI (-413.89, -8.51). Also, multiple expectancies had significantly more likes than no expectancies, 95% CI (-149.99, -38.07). No other pairwise contrasts were statistically significant for expectancies.

A one way ANOVA predicting number of likes from efficacy type included the following categories of efficacy, in order from most likes to least: self or response efficacy (collapsed

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because there was only one post that had response efficacy only; *M*=117.19, *SD*=199.96), general efficacy (*M*=111.56, *SD*=198.82), and no efficacy (*M*=55.36, *SD*=122.52). There were no posts with more than one type of efficacy. Post hoc multiple comparisons using Tukey's HSD found that the number of likes were significantly higher in the general efficacy category compared to no efficacy, 95% CI (-111.56, -0.84). No other pairwise contrasts were statistically significant for efficacy.

When predicting whether a post had any comments as the target engagement outcome (0=no comments, 1=at least one comment), there were no significant predictors, Pseudo R^2=.02, positive expectancies, *OR*(se)=1.28(0.45), *p*=.48, 95% CI (0.65, 2.55); norms, *OR*(se)=1.14(0.45), *p*=.75, 95% CI (0.52, 2.48); efficacy, *OR*(se)=1.45(0.55), *p*=.33, 95% CI (0.69, 3.04); comparison of an image to none, *OR*(se)=1.41(0.80), *p*=.54, 95% CI (0.47, 4.26); comparison of video to none, *OR*(se)=2.19(1.61), *p*=.28, 95% CI (0.52, 9.21).

Discussion

The current study conducted a content analysis to explore college students' engagement with Instagram messages that are shared by college health centers to promote health behaviors among college students. This study also uses the RAA constructs to evaluate the message component to understand the extent to which colleges shared messages may help to enlighten health behavior change among college students from a theoretical standpoint. The results of this study suggest that RAA constructs have been frequently used in university health services' messaging component, with differing prevalence depending on the subtype of constructs.

Results also showed that positive expectancies and efficacy messaging components were both associated with greater message engagement in terms of the number of likes on the post. For expectancies, this appears to be driven mostly by expectancies regarding better academic

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performance and often have more than one positive expectancy included. Interestingly, while academic performance was associated with the most likes, it was also one of the least common expectancies used in the messages. It was more common for messages to include expectancies related to mental health and happiness, not tying the behavior to academic performance. This indicates a gap between what university health centers are doing and what students like to see in their messaging. To the extent that university health centers can tie their target behaviors in their messaging to academic performance, our results suggest they would see an increase in engagement from students on those posts.

For efficacy, this appears to be driven by general efficacy, which is a broader statement about the message recipient's ability to do things successfully, not necessarily specific to the target behavior. This is in contrast to some literature regarding efficacy, which finds that response and self-efficacy are important features of persuasive messaging.[35,36] It might be that this is limited to message engagement as an outcome and not to actual behavior, which is what previous research comparing types of efficacies have tended to measure. Future research should consider the contexts in which efficacy is being studied.

Previous research has demonstrated that it is imperative to understand audience perspectives and frame messages accordingly to match the communication goal for effective outcomes.[37] The result of this study helps to understand college students' engaging behavior with college shared e-health communication, which will further help to develop strategies to design messages to increase students' engagement with e-health messages. The findings of this study will contribute to identify the gaps in evaluating message content from a health behavior theoretical perspective (RAA) which can inform practitioners to implement health promotion

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strategies and health intervention messages to change and promote healthy behaviors on college campuses.

Limitations and future research

While the number of likes suggests some level of engagement with the message, it is not a clear proxy for behavioral effects. Previous research has found that engagement with a post by liking, commenting, and sharing was associated with greater perceived agency, systematic processing, and more persuasion.[27] Future studies could explore the influence of the RAA components of these messages on students' intention to perform targeted health behaviors.

Additionally, it was difficult to achieve acceptable intercoder reliability on whether or not a post contained positive expectancies (α=.61). Unfortunately, positive expectancies also emerged as a crucial component of messaging when it comes to engagement with a post. This is mitigated by the fact that acceptable reliability was achieved for each specific type of positive expectancy (e.g., academic performance), which also mattered in our analysis. However, future research should consider the definition of positive expectancy and the clarity of the construct when designing codebooks.

Finally, whether a message has a specific and actionable target behavior is a crucial component to the RAA.[18] However, approximately one-third of the messages coded as having a call to action could not be categorized within the types of action we originally postulated. Coders wrote in their assessment for those in the "other" category, and while some were specific but idiosyncratic and thus not easily categorized (e.g., "wear purple"), many of the rest were technically calls to action but with that action being very diffuse and arguably not specific enough for RAA (e.g., a broad "check out X" or "learn more" without specifying how, when, or where). Therefore, we have left the "other" category as it is, with the understanding that the

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heterogeneous and diffuse nature of these "other" calls to action make the interpretation of results with that category more difficult to disentangle. Future research should consider how to handle such deviations.

Conclusion

College generated social media health messages can offer important health benefits to students and improve their overall health and well-being. These messages also carry important meaning to students' academic success. However, it is important for university health centers and health professionals to know what message content to include when sharing health messages among college students to support students' preference and emphasize their intention to engage with the messages as they focus on effective messaging strategies on college campuses. This will also help university health services to tailor theory-driven messaging to improve student engagement with their content.

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Disclosure Statement

The authors report there are no competing interests to declare.

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Ethical Approval Statement

This study was submitted to the Institutional Review Board (IRB) of University of Delaware for ethical approval and determined as exemption category # (2i) status, Exempt id: [1989349-1]. No informed consent was required since the study does not include human subject participation.

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Supplementary Materials

Codebook Table

Items/ Variables	**Response measures**
Post mentions e-health	Yes No Unclear
Post mentions call for action such as engage in self-help, appointments:	Yes No Unclear
Specific calls to action (If Post mentions call for action such as engage in self-help, appointments: = Yes)	▢ Make an appointment ▢ Seek information ▢ Talk to a person in their life ▢ Attend an event ▢ Engage in self-help/self-care ▢ Something else
Post mentions any efficacy components such as plan engagement/ self-efficacy or response efficacy for doing the action:	Yes No Unclear
What kinds of efficacy? (If Post mentions any efficacy components such as plan engagement/ self-efficacy or response efficacy... = Yes)	▢ Self-efficacy ▢ Response efficacy ▢ General efficacy ▢ Something else
Post mentions any normative aspects of the action such as descriptive or injunctive	Yes No Unclear
What kinds of normative aspect? (If Post mentions any normative aspects of the action such as descriptive or injunctive = Yes)	▢ Injunctive (what people think you SHOULD do) ▢ Descriptive (what people like you actually do) ▢ Something else
Post mentions any normative aspects of the situation/experience such as descriptive or injunctive:	Yes No Unclear
What kinds of normative aspect? (If Post mentions any normative aspects of the situation/experience such as descriptive or injunctive: = Yes)	▢ Injunctive (what people think you SHOULD do) ▢ Descriptive (what people like you actually do) ▢ Something else

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Post mentions any positive expectancies of doing the action such as benefits:	Yes No Unclear
What kinds of benefits? (If Post mentions any positive expectancies of doing the action such as benefits: = Yes)	☐ Better mental health ☐ Happiness ☐ Fulfillment ☐ Academic performance ☐ Incentives/prizes/raffles ☐ Something else
Post mentions any negative expectancies of doing the action such as risks or lack of risks:	Yes No Unclear
What kinds of risks or lack of risks? (If Post mentions any negative expectancies of doing the action such as risks or lack of risks: = Yes)	☐ References poor mental health ☐ Painlessness of the action ☐ Something else
Does the post include an image or video?	No, blank aside from text Yes, an image Yes, a video
What is the content of the image or video? (If Does the post include an image or video? = Yes, an image Or Does the post include an image or video? = Yes, a video)	☐ Images of students ☐ Images of people, not students ☐ Images of campus/buildings ☐ Images of nature - landscape ☐ Images of nature - close up ☐ Images of animals ☐ Abstract images/decorative images ☐ Image of a quote/text ☐ Something else
Number of likes on the post	
How many comments are on the post?	0 1 2 3 4 5 6 7 8 9 10 or more
If more than 10, how many?	
What is the valence of the comment?	Negative Neutral Positive

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Any notes or things we should know about this post?	