# Depression-related Imagery on Instagram

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## Abstract
Despite the well-established finding that people share negative emotions less openly than positive ones, a hashtag search for depression-related terms in Instagram yields millions of images. In this study, we examined depression-related images on Instagram along with their accompanying captions. We want to better understand the role of photo sharing in the lives of people who suffer from depression or who frame their experience as such; specifically, whether this practice engages support networks and how social computing systems can be designed to support such interactions. To lay the groundwork for further investigation, we report here on content analysis of depression-related posts.

## Author Keywords
Mental Health; Wellness; Social Computing; Photo Sharing

## Introduction
Sharing images is extraordinarily popular. All of the most trafficked social network sites (SNS) provide ways of sharing and annotating visual imagery. And no wonder, sociologists have long argued that people use pictures to communicate messages that would not be possible with words alone [1]. Notable among image-sharing platforms is Instagram, a SNS where the only

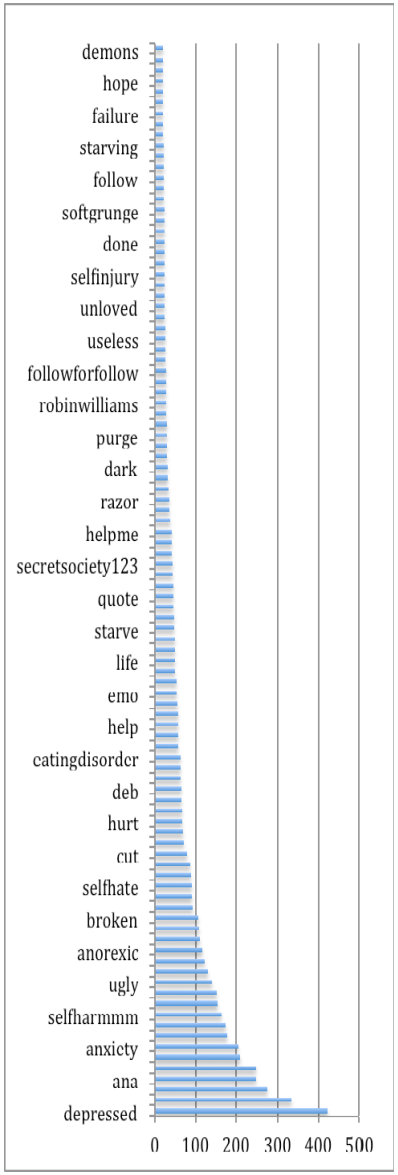


**Figure 1** Top 100 Frequent Tags

way to post is by sharing an image. As of October 2014, Instagram is the fastest growing SNS globally and has attracted about 200 million active users, with an average of 60 million shared photos per day, and about 20 billion photos shared overall [2]. About 17% of all adult Internet users use Instagram most of whom are women aged 18-29 [3].

Photo sharing provides a unique lens for understanding how people curate and express personal dimensions of their identity. People use photos to define and record their identity, maintain relationships, curate and cultivate self-representation, and express themselves [4]. Moreover, people who share provocative images have been found to advocate for the right to be one's self, advocate for the rights of others, and protect others [5].Due to the freedom associated with sharing among weak social ties, digital image-sharing can provide more opportunities for self-expression than traditional photo-clubs [6].

Sharing about depression is an interesting case for understanding photo sharing as an expressive activity. Traditional self-disclosure literature suggests that people share positive events with their networks more readily than negative ones [7]. People experiencing stressful events may be reluctant to share negative emotions due to self-presentation concerns and the stigma of being depressed or sad [8]. Yet, when people do share, there may be benefits—early work on online health support forums explored how they function as support groups [9]. In the only example we have encountered of research related to depression and image sharing, Seko discussed self-harm photographs on Flickr as a kind of identity performance, where the self-harmed body becomes a site of intersecting discourses [10].

As a first step toward understanding the role of photo sharing in the lives of people who are coping with depression, we are examining depression-related shared content. For this initial study, we analyzed hundreds of Instagram image/caption pairs with #depression to answer the questions:

*Q1. What information do people disclose about themselves through depression-tagged images?*

*Q2. What information do people disclose through captions accompanying these images?*

*Q3. How do captions and images relate to each other?*

## Data

Using Instagram API, we gathered 95,046 depression-tagged photos posted by 24,920 unique users over one month (July 2014). Each image's URL was stored together with its user ID, number of likes and comments, date/time of creation, and tags. The images were separated into 24 bins representing activity by hour of the day. The average number of images per hour was 3960. We sampled 20% of one hour's worth of traffic (=800 posts) by randomly choosing posts from each bin in proportion to the total number of posts in that bin. Our final sample included 788 images and captions after removing 12 posts (foreign language and spam). 75% of images were tagged with other terms in addition to depression; the 100 most frequent co-occurring tags appear in Figure 1, with #demons appearing 20 times.

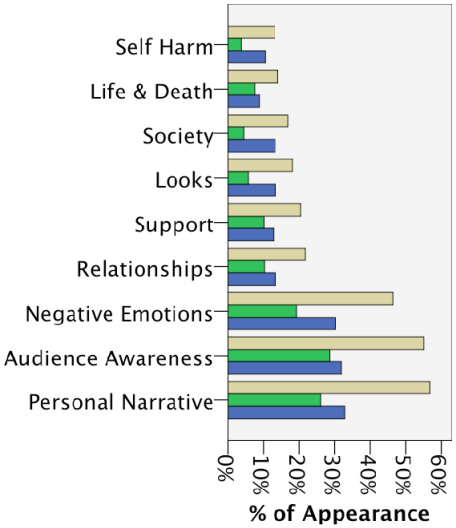


**Figure 2** The percentage of appearances of each topic is shown in this figure. Each topic is represented with three bars: Percentage of appearance in posts as a whole, captions, and images. These are respectively shown in yellow, green, and blue from top to bottom.

Due to space and visibility constraints, observed topics are illustrated in two figures (i.e. Figure 2 and Figure 3). Figure 2 shows more frequent topics.

## Method

Our approach to analyzing images and their textual captions is inspired by the social semiotics position that people communicate using multiple modes and that choosing a particular mode has cultural and social meaning. Therefore, we think it is important to examine both visual and textual content. To develop a codebook, the first two authors independently coded a sample of 100 images and captions, and then discussed each image, caption and code together. Next, they coded another 100 posts and similarly discussed each afterwards. They finally coded a batch of 50 posts for which the Cohen's Kappa coefficient was 0.96 which is considered excellent agreement. Finally, each one of the first two authors coded a new separate batch of 400 images and captions. For images, codes were developed related to the ***content***, the ***form*** of presentation, and visual ***techniques***. The authors coded captions both for content and how they related to the image. Multiple codes were applied to each image and caption. Data related to form and techniques are not reported in this paper.

## Findings

In response to Q1 and Q2, Figure 2 and Figure 3 show detailed topical themes in captions-only, images-only, and whole posts (caption and image). As seen in the graphs, in addition to documenting the kinds of content shared such as emotions, suicidal thoughts, personal narratives, or emotional and informational support, it is notable that many of the posts suggested that sharers are aware of and thinking about their audience. They would sometimes show this by asking questions, apologizing, directly talking to the audience or addressing them as "you." In a few cases, we observed audience transactions such as promises to share a selfie in exchange for a certain number of likes or followers. In other cases, people requested an "ana buddy" or promised "2 hours of fasting for each like." In selfies, gazing at the camera suggested reduced social distance [10]. Additionally, there were instances of seeking or providing support, advice, and information.

In some posts we identified a sense of group identity; for example, sharers would refer to themselves as "just another depressed girl" which suggests an affinity identity. Sentiments like, "we are not cutting for your attention, so get out of here" suggest the sharers perceive Instagram as a "*publicly private space.*" Perceptions of society not caring and the stigma of depression were widely discussed, as were personal relationships (i.e. family, romance, friendships). Some sharers degraded or blamed themselves. Our analysis suggests that images alone were used to communicate about most topics; however, seeking or providing help/support/engagement, and positive emotions were shared more often through textual captions.

Additionally, in posts that depicted individuals and were not celebrities or screen shots, we coded for gender and approximate age. We identified 72% females and 17% males and around 4% minors. These cues were largely available through images, though captions occasionally referred to age or gender.

With regards to Q3, when we examined the relationship between the image and its caption - excluding the 35% that only had tags - we found that 13% of captions were descriptive of the image, 35% provided contextual and different information, 32% provided additional but similar information, and 20% were unrelated.

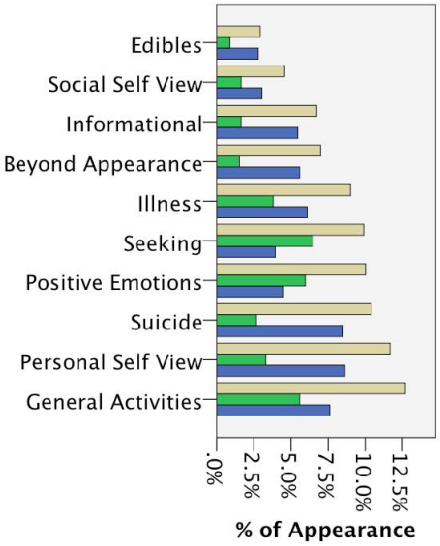


**Figure 3** The percentage of appearances of other observed topics is shown here. Details on reading this graph are the same as Figure 2.

Due to space limitations, we cannot go into much more detail in this paper, but "edibles" refers to food and drinks. "Social self-view" refers to identification with a group. "Illness" refers to general health problems and eating disorders. Finally, "beyond appearance" refers to expressions of putting on fake smiles while going through a rough time and telling their audience that there is much more to what they see on the surface.

## Discussion

These findings give rise to several insights about photo sharing and depression. First, by comparing communication modes of image and text, we established the importance of visual imagery as a vehicle for expressing aspects of depression; only a few categories of messages seemed to depend heavily on textual captions. Importantly, the caption-heavy categories included opportunities for support and potential coping mechanisms such as seeking interaction, expressing positive emotions, and providing support. As we move forward, we believe it will be important to investigate how these communication modalities are perceived by Instagrammers.

Additionally, our analysis suggests that there may exist a sense of shared identity among these Instagrammers. #depression and related hastags are being used not only as semantic markers, but also to denote a kind of belonging. Although hashtags can be thought of as a way of categorizing content to make it *more* findable and analogously more public, the existence of in-group/out-group language that we identified suggests that, for these Instagrammers, depression tags demarcate a hazy affinity group boundary within which sharing about depression should be a safe activity.

While we do not claim generalizability and acknowledge that our data was collected based on only one keyword "depression," we believe our approach is robust enough to provide a foundation for understanding depression-related photo-sharing. As a next step to this research, we plan to look into engagement types and discourses, how they relate to post topics, and network aspects of these interactions. The ultimate goal of this series of studies is to inform the design of technologies to support sharing of negative emotions while also creating and sustaining support networks for people going through a rough time.

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