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Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words

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ABSTRACT

Social media use continues to grow and is especially prevalent among young adults. It is surprising then that, in spite of this enhanced interconnectivity, young adults may be lonelier than other age groups, and that the current generation may be the loneliest ever. We propose that only image-based platforms (e.g., Instagram, Snapchat) have the potential to ameliorate loneliness due to the enhanced intimacy they offer. In contrast, text-based platforms (e.g., Twitter, Yik Yak) offer little intimacy and should have no effect on loneliness. This study ($N = 253$) uses a mixed-design survey to test this possibility. Quantitative results suggest that loneliness may decrease, while happiness and satisfaction with life may increase, as a function of image-based social media use. In contrast, text-based media use appears ineffectual. Qualitative results suggest that the observed effects may be due to the enhanced intimacy offered by image-based (versus text-based) social media use.

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“The more advanced the technology, on the whole, the more possible it is for a considerable number of human beings to imagine being somebody else.” -sociologist David Riesman.

1. Introduction

As digital technologies continue to make communication channels and platforms more ubiquitous and effortless, human beings are more connected to each other than ever before. Social media (often referred to as social networking sites, or SNSs) can be broadly defined as the websites and applications that enable users to create and share content with networks (i.e., friends, followers, etc.) they construct for themselves. These forms of media have revolutionized how people interact with each other, and young adults are the most avid users. In a recent study, the Pew Research Center found that “fully 91% of smartphone owners ages 18–29 used social networking on their phone at least once over the course of the study period, compared with 55% of those 50 and older”

(Smith, 2015, p. 35). Indeed, age is a strong determinant of the frequency and quality of an individual's social media usage, and it is unsurprising that younger people are more comfortable with on-line communication than adults (Thayer & Ray, 2006). In terms of platform popularity among young adults (18–29 years old) with Internet access, 87% use Facebook, 53% use Instagram, and 37% use Twitter (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015).

Ostensibly, the heightened interpersonal connectivity afforded by social media should be associated with an overall increase in psychological well-being, yet the problem of loneliness persists in the same societies where social media usage is likely at its highest (e.g., the US, the UK, etc.). According to a nation-wide survey, commissioned by the Mental Health Foundation, 48% of British adults believe that people in the UK are getting lonelier as time progresses, 45% report feeling lonely at least some of the time, and 42% report having felt depressed due to being alone (Griffin, 2010). Importantly, nearly all indicators of loneliness reported in the survey are of the highest incidence among young adults aged 18–34 (as opposed to older adults). Similarly, in their book *The Lonely American*, Olds and Schwartz (2009) argue that loneliness in 21st century America is higher than in any previous generation, despite the fact that modern Americans “devote more technology to staying connected than any society in history” (p. 1).

The public health implications of this trend toward loneliness should not be understated. In 2015, *Time Magazine* ran an article,

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unclear.

Twitter, launched shortly after Facebook, is another popular social media platform that lets users share 140-character “tweets” of text which might link to other sites or photo/video files. Although Twitter’s numbers do not quite match those of Facebook, the platform still commands an impressive following (302 million active users that send over 500 million tweets every day) and initial research indicates an array of socially-related gratifications. [Chen \(2011\)](#) determined that the more one uses Twitter, the more that use gratifies a need for connection. [Lee and Ma \(2012\)](#) found that users pursuing gratifications such as information seeking, status seeking, and socializing were more likely to share news in social media platforms such as Facebook and Twitter. Research has examined and verified Twitter’s viability in communicating news and events ([Bollen, Mao, & Zeng, 2011](#); [Hull & Lewis, 2014](#); [Sakaki, Okazaki, & Matsuo, 2010](#); [Tumasian, Sprenger, Sandner, & Welp, 2010](#); [Watson, 2015](#)), particularly for fans of sports ([Lee, Han, Kim, & Kim, 2014](#)) and television ([Wood & Baughman, 2012](#)). Twitter has also been shown to facilitate parasocial interaction to varying degrees, depending on the interpersonal orientation of the user ([Lee & Jang, 2011](#)) or famous account they are following ([Frederick, Lim, Clavio, & Walsh, 2012](#)). Despite studies on Twitter’s many uses, it remains unclear whether any of those uses might mitigate or exacerbate loneliness. Certainly it is convenient, but does use of Twitter to, for example, vent frustration about the World Cup ([Yu & Wang, 2015](#)) or converse with a friend about a favorite television show ([Pittman & Tefertiller, 2015](#)) have a measureable impact on one’s psychological well-being?

Relative to Facebook and Twitter, there is a dearth of research on each of Instagram, Snapchat, and Yik Yak. Thus, we can only speculate as to the U&G satisfied by each of these three media. Instagram was released in 2010 and functions like a photo version of Twitter: users choose whom to follow, but instead of posting 140-character tweets, they post aesthetically-filtered photos or videos. [Pittman \(2015\)](#) found that as one’s affinity for and activity on Instagram increased, self-reported loneliness decreased. Photos with friends and selfies are the most popular ([Hu, Manikonda, & Kambhampati, 2014](#)) and unsurprisingly, [Bakhshi, Shamma, and Gilbert \(2014\)](#) found those sort of photos (ones with faces, regardless of age or gender) are 38% more likely to receive a “like” and 32% more likely to receive a comment than those without. If likes and comments contribute to the immediacy and/or intimacy that is required for simulated social presence, this would seem to make Instagram a good bet to mitigate loneliness.

Snapchat was released in 2011 and functions a bit like an ephemeral Instagram: users send each other photos or videos that self-destruct after a set amount of time, typically three to ten seconds. As the first major social media platform to offer non-permanent content creation, Snapchat initially received attention for its potential in sexting ([Poltash, 2012](#)), but little else is known about the platform. Anecdotally, because it lets users send their friends silly or “ugly” photos of themselves that they might not want recorded permanently, we might expect Snapchat to relate to gratifications of intimacy or social bonding, since those casual expressions are more akin to what those friends might experience in non-mediated (face-to-face) interaction.

Yik Yak was released in 2013 functions like an anonymous, geo-centered Twitter: users can create, view, and up- or down-vote “yaks” within a 1.5 mile radius. Yik Yak has received attention for its potential link to cyber bullying ([Darling, 2015](#)) and some colleges have banned it entirely ([Mahler, 2015](#)). Anecdotally, although Yik Yak activity near a college campus does occasionally contain bullying or trash-talking, it typically ranges from the jovial (“Where’s the party tonight?”) to the mundane (“My roommate ate too many burritos.”). Therefore we might expect gratifications of

entertainment and information seeking, but it is unclear what effect its use might have on psychological well-being.

With their variegated forms of interaction—permanent and ephemeral, personal and anonymous, images and text—do any of the five above-mentioned social media platforms let users interact with one another in a way that combats loneliness or contributes to happiness and SWL? After all, as discussed above, the U&G of each platform pertains to fulfilling needs for social interaction to some degree. However, the *nature* of the social interactions offered by each platform differs considerably in terms of the salience of the person or people with whom the user interacts. It seems logical that the social media platforms that offer the greatest degree of salience—thereby most closely imitating real-life social interactions—would be most effective at attenuating loneliness. This level of salience is referred to as “social presence” in communication literature ([Gunawardena, 1995](#); [Short, Williams, & Christie, 1976](#)), and depends primarily on both the immediacy and intimacy of communication, such that social presence is highest in interactions that have both highly immediate and intimate communication. Immediacy is certainly positive, but it is doubtful that one could achieve meaningful social connection without also experiencing intimacy of some kind. Therefore, in investigating which social media platforms might ameliorate loneliness, it may be most useful to consider which platforms provide both immediacy and intimacy to their users. We contend that the medium through which users of each platform primarily communicate (i.e., images or text) may shed light on this latter consideration.

2.2. Images and text

Which aspects of mediated communication confer experiential aspects that might lead to a genuine social presence of immediacy and intimacy? Some research has determined that online communication has the potential to boost perceived social support and self-esteem while decreasing loneliness and depression ([Shaw & Gant, 2002](#)), whereas other studies have found that online communication might further isolate individuals offline and decrease social well-being ([Kim, LaRose, & Peng, 2009](#); [Moody, 2001](#)). Thus, in an attempt to explicate this relationship, the present research examines the differences between image-based and text-based social media as they might relate to loneliness.

[Sundar’s \(2008\)](#) MAIN model takes a heuristics approach to understanding how digital technology has altered our perception of credibility. Credibility, or assessing the authenticity of a source, may be an important factor for mitigating loneliness: if mediated communication is perceived as more authentic, individuals may feel more social support. The MAIN model posits that our brains implicitly trust visual modalities such as images and video more than text because those modalities cue the “realism heuristic.” This heuristic immediately determines that a photograph of something is inherently more real than text written about the same thing; “that is, we trust those things that we can see over those that we merely read about. This heuristic also underlies people’s general belief that pictures cannot lie (even in this day and age of digital manipulation) and the consequent trust in pictures over textual descriptions” ([Sundar, 2008](#), pp. 80–81). When individuals share everyday media with each other, concerns over cost and time mean they are more likely to send photos than text, audio, or video ([Goh, Ang, Chua, & Lee, 2009](#)). People could potentially use text via Twitter, for example, to tweet about a vacation at the beach, which might conjure a mental model in the mind of the reader, but this is not the same as posting a picture of the beach itself. Why are images more specific than mental models?

A visual image is sensory-specific because it is linked to the visual modality, whereas a mental model is not sensory-specific

Table 1
Summary of MANCOVA results (full sample, N = 253).

	No image-based platforms	One image-based platform	Two image-based platforms	Between groups p-value	Effect size η^2 -value	Linear contrast p-value	Quadratic contrast p-value
Loneliness	3.47	3.12	2.54	0.002	0.049	0.004	0.494
SWL	4.95	4.75	5.24	0.016	0.033	0.694	0.015
Happiness	4.82	4.91	5.28	0.037	0.026	0.079	0.318

Note – Age was entered as a covariate.

In so doing, we observed a near-identical pattern of results with even stronger effects, as indicated by substantially larger η^2 -values (see Table 2). Fig. 2 below displays the pattern of results from this latter analysis graphically. Taken together, the results of our analyses thus far strongly support H1–H3.

5.2.3. Qualitative analysis

Because of inevitable semantic and lexical differences, a quantitative analysis of qualitative data is imperfect, yet it may help illumine what is a relatively new research area and support or explain other data. Therefore, to support our quantitative findings, we turned to participants' open-ended responses. Recall that for each social media platform that participants reported using regularly, they were also asked to list three words or phrases that they associate with uses of the platform, as well as to report their own primary reason for using that platform. If image-based social media facilitate social presence, as we hypothesize, we should expect to find words and phrases that relate to immediacy (e.g., “share what I'm doing now”, “see what a friend is up to”) and intimacy (e.g., “keep in touch”, “sneak peak into my life”). We combined the open-ended responses from both prompts—personal use and general use—into a single text file to gain overall perspective on the potential U&G (Katz et al., 1973) the participants might seek in image-based platforms. We then analyzed this text file using VOSviewer 1.6.1 (Van Eck & Waltman, 2010), a useful program for extracting salient terms from a corpus and then constructing and visualizing a co-occurrence network of those terms.

We set the threshold in VOSviewer to a minimum of ten occurrences, and of the 431 terms in the open-ended data file, eight occurred at least ten times. These terms are mapped out in a Density Visualization (Fig. 3) in such a way that the distance between two terms provides an indication of the number of co-occurrences of the terms. In general, the smaller the distance between two terms, the larger the number of co-occurrences of the terms. According to the designers of VOSviewer, “the density view is particularly useful to get an overview of the general structure of a map and to draw attention to the most important areas in a map” (Van Eck & Waltman, 2010, p. 528).

The colors in a Density Visualization correlate with frequency and relevance of contextual terms. The greater the number of items in the neighborhood of a term and the higher the relevance of the neighboring terms, the closer the color of the point is to red. For example, in Fig. 3, “friend” is the point with the most red in it because the word friend occurred with the greatest variety and salience of connecting words, e.g., “Share with a friend,” “see a friend's life,” etc. Conversely, the smaller the number of items in the neighborhood of a point and the lower the relevance of the neighboring items, the closer the color of the point is to blue. Thus in Fig. 3, “touch” appears to be one of the “coolest” points, indicating the least variety in respondents' use of the word. A detailed examination of the text file confirms this; every use of the word “touch” was preceded by “in”, as in “keep in touch” or “stay in touch.” The frequency of these phrases suggests that image-based social media affords a good deal of relational intimacy.

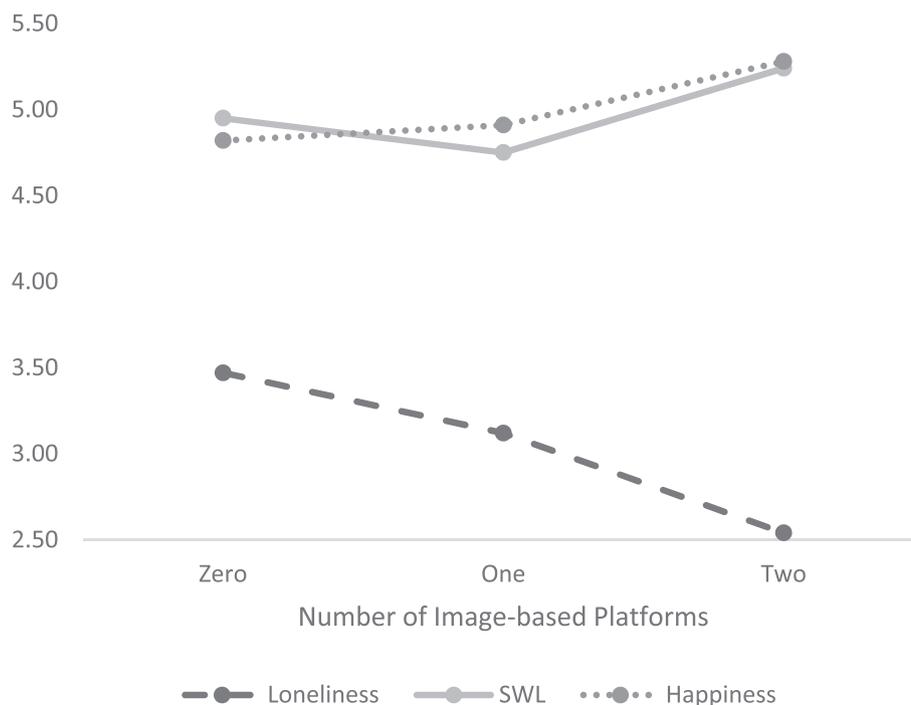


Fig. 1. Trait scores at three levels of image-based social media use (full sample, N = 253).

Table 2
Summary of MANCOVA results (text-based social media users excluded, N = 132).

	No image-based platforms	One image-based platform	Two image-based platforms	Between groups p-value	Effect size η^2 -value	Linear contrast p-value	Quadratic contrast p-value
Loneliness	3.58	2.98	2.26	0.000	0.122	0.000	0.812
SWL	4.84	4.70	5.38	0.015	0.064	0.158	0.029
Happiness	4.75	5.01	5.42	0.026	0.056	0.011	0.704

Note – Age was entered as a covariate.

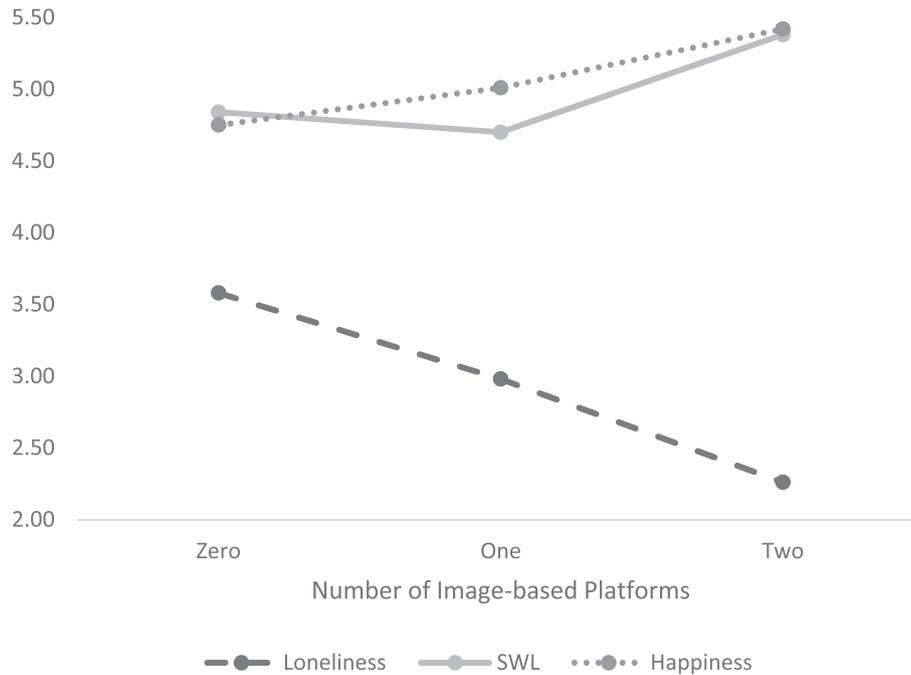


Fig. 2. Trait scores at three levels of image-based social media use (text-based social media users excluded, N = 132).

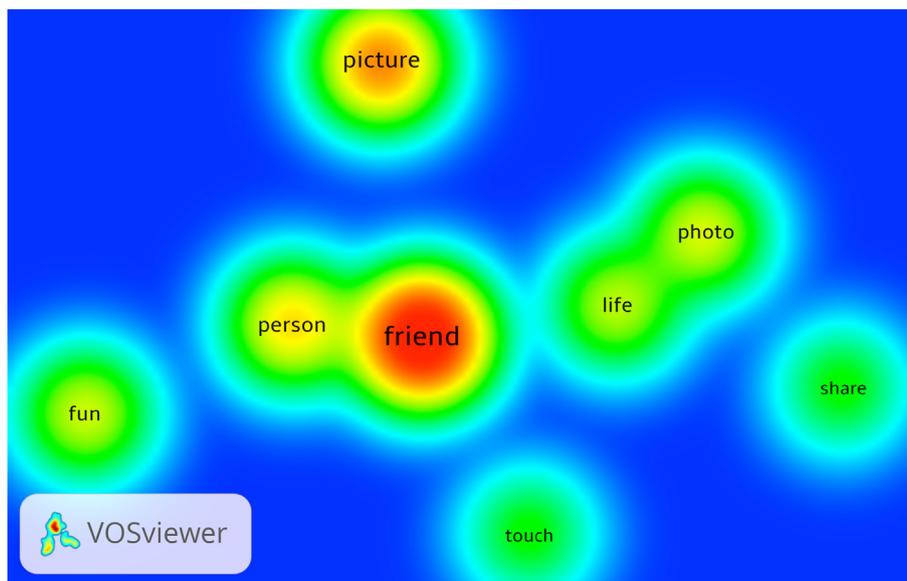


Fig. 3. Density Visualization Map of open-ended responses for image-based Social Media.

Similarly, the distance between two nodes approximately indicates the relatedness of the nodes. In general, the smaller the distance between two nodes, the higher their relatedness. For example, “friend” and “person” are the closest (distance-wise), and

it is not difficult to imagine those two words being used interchangeably: e.g., “see a friend’s life” or “see a person’s life.”

Finally, the relevance of each term (Table 3) is determined by calculating similarity of co-occurrences with other terms. Noun

phrases such as “my life” or “a friend’s photo” have a low relevance score if their co-occurrences with other noun phrases follow a mostly random pattern. For example, the word “photo” could be preceded by myriad phrases such as “I share my...”, “I like to see other people’s...”, “cool nature...”, and more. On the other hand, noun phrases have a high relevance score if they co-occur mainly with a limited set of other noun phrases (Van Eck & Waltman, 2014). Thus the term “fun” has the highest relevance score (1.86), indicating its co-occurrence with few other terms (and thus most unique usage), whereas “life” has the lowest relevance score (0.29), indicating its co-occurrence with a great number of other noun phrases. Again, a detailed examination of the text file confirms these data: “fun” usually occurs by itself or succeeding “for”, whereas “life” occurs in many combinations with many possible meanings, e.g., “photos of my life,” “share my life,” and “see my friend’s lifestyle.” In their own words, respondents have painted a general picture of friends delighting in the images that keep them familiar with each other’s lives.

Occurrences are not simply the number of times a word occurred but rather the weighted calculation of that term’s frequency, uniqueness, and co-occurrence with other noun phrases. The terms with the greatest number of occurrences and co-occurrences, “friend” and “picture”, indicate they were, in some form or another, the most popular responses from participants. The terms to which VOSviewer assigned the highest relevance, “fun” and “picture”, indicates they have the most specific meaning and occurred most often in the same form: “it’s fun”, “for fun”, and “funny pictures” were common noun phrases. From these data we can surmise that one general gratification of image-based social media relates to pictures of or with one’s friends, and one specific gratification is likely humor and fun. Intimacy can be defined as “close familiarity or friendship”, and these eight terms taken together connote that sharing photos of and with one’s friends not only gratifies needs of affection and attention (Malik et al., 2015), but also the need for close familiarity with those friends. These gratifications may explain why we observed decreased loneliness and increased happiness and SWL among image-based social media users.

5.3. Text-based platforms

Although not formally hypothesized, we did pose a research question (RQ1) regarding text-based social media as well. Thus, we tested for associations between text-based social media use and the three outcome variables of interest in an analogous fashion to the image-based social media tests. We began testing for correlations between a composite frequency of text-based social media use score and each of loneliness, SWL, and happiness. We did observe a weak positive correlation between this frequency variable and loneliness, although it failed to reach statistical significance ($r = 0.098$, $p = 0.118$). Further, this frequency variable was statistically uncorrelated with SWL and happiness (both $ps > 0.716$). Similarly, the composite attitudes toward text-based social media score was statistically uncorrelated with the three constructs of interest (all $ps > 0.280$).

An analogous MANCOVA on the full sample showed that the three-level variable of text-based social media use did not have a significant association with loneliness, SWL, or happiness (all

$ps > 0.486$). This pattern of results did not change when including only those participants who did not use any image-based platforms ($N = 37$, all $ps > 0.333$). Thus, with respect to RQ1, it appears that text-based social media use does little or nothing to attenuate loneliness or boost happiness and SWL. If anything, increased use of text-based media may exacerbate loneliness.

5.3.1. Qualitative analysis

We set the threshold in VOSviewer to a minimum of three occurrences, and of the 184 terms in the open-ended data file, eight occurred at least ten times. These terms are mapped out in a Density Visualization (Fig. 4) with settings identical to the image-based Density Visualization of image-based social media (Fig. 3). In Fig. 4, “news” is the point with the most red in it, followed closely by “friend”, thus those words occurred with the greatest variety and salience of connecting words, e.g., “read the news”, “to get news”, etc. Conversely, “boredom” appears to be one of the “coolest” points, indicating respondents consistently used it in the same way; in this case it only ever appeared as a one word response to the query as to why they used Twitter or Yik Yak: “boredom.”

The terms with the greatest number of occurrences, “news” and “friend” (Table 4), indicate they were the most popular responses, in some form or another, from participants. The terms to which VOSviewer assigned the highest relevance, “person” and “sport”, indicates they have the most specific meaning and occurred most often in the same form: “personal opinions” and “sports news” were common noun phrases. From these data we can surmise that general gratifications of text-based social media may relate to reading about friends’ activity and keeping up with news, and more specific gratifications could be reading friends’ opinions and sports news. The eight terms taken together connote that engaging in text-based social media platforms may have a social component (Chen, 2011) but is most likely just about killing time or getting snippets of news from around the world. Text-based social media may have the immediacy necessary for social presence but lack the requisite intimacy, which may explain why we observed virtually no relationship between use of text-based social media and loneliness, happiness, and SWL.

5.4. Facebook

As described in *Theoretical Background* above, Facebook represents an interesting case of social media due to its hybrid nature, incorporating elements of text-based and image-based media. Examining the correlations between frequency of Facebook use (with non-users coded as 0) and the three outcomes of interest among the full sample showed no statistically significant effects (all $ps > 0.491$). Similarly, attitudes toward Facebook among Facebook users only ($N = 194$) were statistically uncorrelated with these three outcome variables (all $ps > 0.389$). Further, a MANCOVA with the dichotomous Facebook use variable as the predictor revealed no statistical association with SWL, happiness, or loneliness (all $ps > 0.468$).

As a more focused test, we reran the same MANCOVA including only participants who reported *not using* the other four social media platforms ($N = 28$; see Fig. 5). Results show directionally consistent but statistically non-significant associations between the dichotomous Facebook variable and SWL and loneliness (both $ps > 0.403$). These null results are not surprising given the small group sizes in the model, leading the analysis on these two outcomes to be extremely underpowered (both $\beta s > 0.870$). The association with happiness, in contrast, was statistically significant, with Facebook users ($M_{\text{Happiness}} = 4.34$, $SD_{\text{Happiness}} = 1.27$) being significantly less happy than non-users ($M_{\text{Happiness}} = 5.29$,

Table 3
Summary of terms’ occurrences and relevance scores for image-based social media.

Term	Fun	Picture	Share	Friend	Person	Touch	Photo	Life
Occurrences	24	48	12	93	33	12	25	22
Relevance	1.86	1.38	1.10	0.96	0.87	0.82	0.71	0.29

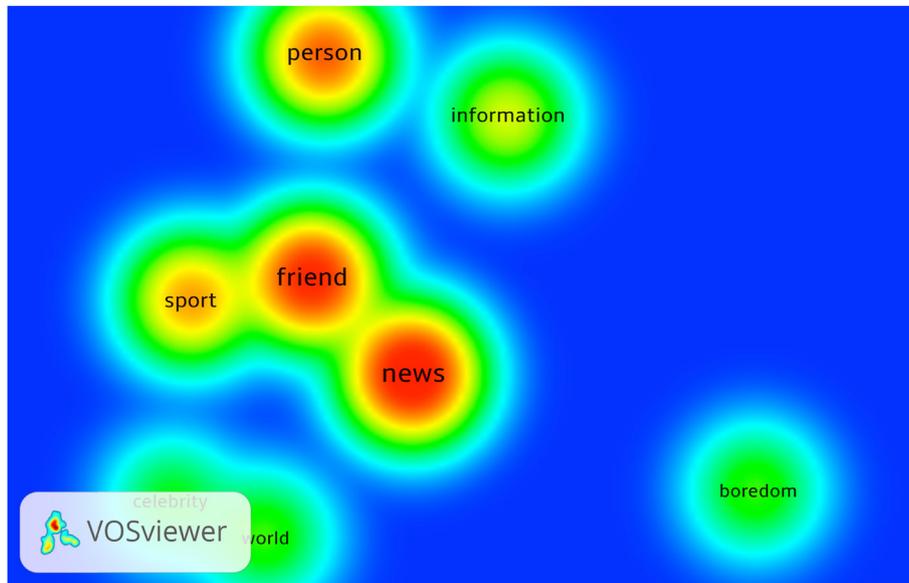


Fig. 4. Density Visualization Map of open-ended responses for text-based Social Media.

Table 4
Summary of terms' occurrences and relevance scores for text-based social media.

Term	Person	Sport	News	Friend	Celebrity	Information	World	Boredom
Occurrences	16	12	26	22	3	7	4	4
Relevance	2.16	1.77	1.18	1.14	0.76	0.60	0.39	0.00

$SD_{Happiness} = 0.96, F [1, 25] = 4.572, p = 0.042, \eta^2 = 0.155$). Thus, with respect to RQ2, we surmise that Facebook may work counter to image-based social media. That is, at least directionally, Facebook use appears to increase loneliness and decrease SWL and happiness. Although most of these results are not statistically significant, the magnitude and direction of effects is still compelling. However, the ambiguous nature of Facebook's "currency" (i.e., muddled mixture of images and text) makes it difficult to fit this platform into our theory. Thus, due to space constraints, we abstain from a qualitative analysis of Facebook users' open-ended responses.

5.5. Alternative explanations

One potential alternative explanation for our findings is that using more social media platforms in general—rather than image-based social media platforms in particular—is driving the observed pattern of results. However, if this were in fact the case, then we should expect to see significant associations between text-based social media use and each of loneliness, SWL, and happiness. Our analyses indicate that this is not the case (see *Text-based Platforms* above). To explore this possibility further, we summed the five dichotomous use variables across all five social media platforms,

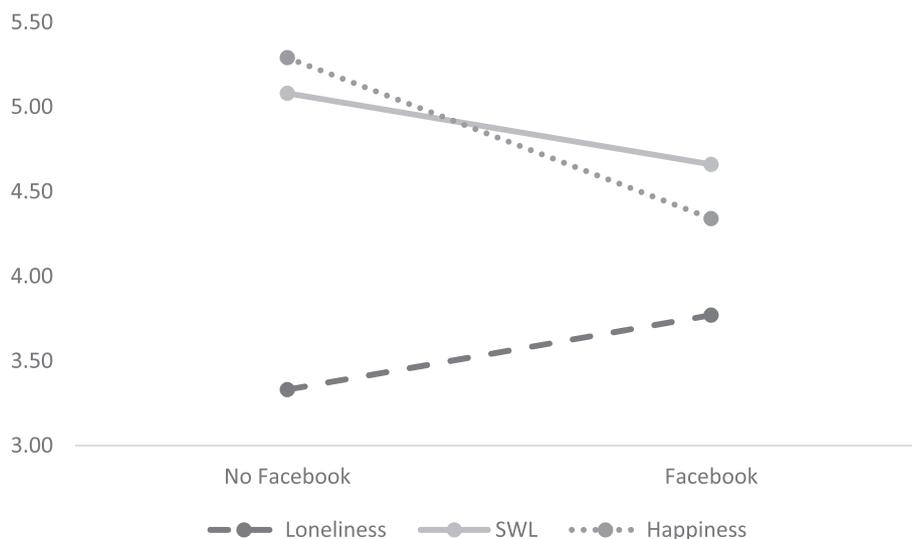


Fig. 5. Trait scores for Facebook users and non-users (all other social media users excluded, N = 28).

creating a total social media use variable ranging from 0 to 5. Running another MANCOVA with this total social media use variable as the between-subjects factor did not reveal any statistically significant associations with the three outcomes of interest (all $ps > 0.105$). Although loneliness did approach marginal significance as an outcome ($p = 0.105$), no statistically significant polynomial contrast coefficients emerged (all $ps > 0.170$), rendering this near-effect spurious at best. Similarly, a composite score of frequency of social media use across all five platforms was statistically uncorrelated with loneliness, SWL, and happiness (all $ps > 0.122$). Thus, the attenuation effect on loneliness appears to be specific to image-based social media use rather than social media use in general.

6. Discussion

When it comes to offline well-being, is an Instagram image really worth more than a thousand Twitter words? It would seem so. Our results indicate that the more image-based social media platforms one uses, the happier, more satisfied with life, and less lonely he or she is likely to perceive being. These findings shed light on the nature of loneliness in a contemporary digital society as well as the potential side-effects of social media use.

6.1. Positive effects of image-based platforms

Image-based platforms such as Snapchat and Instagram confer to their users a significant decrease in self-reported loneliness. Equally significant was the use of these platforms predicting an increase in happiness and SWL. In line with our qualitative findings, this ability to mitigate an undesirable psychological state and induce positives ones may be due to the ability of images to facilitate social presence (Sundar, 2008), or the sense that one is communicating with an actual person instead of an object. This may occur “even without anthropomorphic features of the technology, although if there are cues in the interface that represent human characteristics such as voice, language, and personality, the social presence heuristic appears to be more strongly invoked” (Sundar, 2008, p. 84). Naturally, then, a photo of one’s friend making a silly face or eating at a restaurant—even more so if it is a video and his or her voice is audible—is more likely to signal the brain that the friend is really there.

Even before Instagram and Snapchat were developed, Goh et al. (2009) found that photos were the medium of choice for individuals to share, because they quickly got the job done in terms of communicating feelings or situations. It makes sense that this trend only continues with specialized platforms like Instagram and Snapchat streamlining and augmenting the process of sharing image and video files, both publically (Instagram) and privately (Snapchat). Moreover, if lonely people “transmit the same feeling of loneliness to their remaining friends” (Cacioppo, Fowler, & Christakis, 2009), it is possible that feelings of connectedness and happiness could be similarly transmitted through image-based networks. Compared to (mostly) indirect public platforms such as Facebook, direct messaging is geared toward developing and maintaining relationships (Quan-Haase & Young, 2010), so photo or video messages sent to and from one’s friends should be a powerful way to recreate the intimacy of social presence necessary to stave off perceived loneliness.

6.2. Negative or neutral effects of text-based platforms and Facebook

Real-life conversations occur in real time, so immediacy is important for social presence. Thanks to near-instantaneous speed

of digital technology, text-based social media grant users immediacy but they lack the other component—intimacy—that is needed to more accurately replicate face-to-face conversations. Our qualitative data support this explanation for our null quantitative findings surrounding text-based social media use. Although Twitter, for example, does have some social utility (Chen, 2011), the advent of more specific and intimate platforms for use between friends has likely modified its role to be more centered around general news and alleviating boredom. It makes sense, then, that we observed virtually no relationship between text-based social media use and psychological well-being.

7. Limitations and future research

In a digital economy where attention is scarce, images are a quick and efficient way to communicate thoughts and feelings. Indeed, their use seems to imbue us with greater happiness and SWL. These findings are important for psychology and communication scholars alike, and contribute to a greater understanding of the consumption of social media and psychological well-being. That said, our research suffers from a few limitations.

First, our research design is correlational (as opposed to experimental) and thus does not permit causal inference. Although we hypothesized a fairly complex series of outcomes, supplemented our quantitative results with qualitative data, and statistically ruled out one alternative explanation, the threats of ambiguous temporal precedence and spurious effects (Shadish et al., 2002) remain plausible. Future research should use true experiments to probe the causal role of image-based social media use in psychological well-being.

Second, our study restricted participation exclusively to young adults. Sampling from this population was intentional due to the fact that this age group is at once most likely to use social media and to suffer from loneliness and thus most pertinent to our research questions. However, it would be interesting to explore whether the relationship between image-based social media use and loneliness extends to other demographic groups. For example, will the same findings result from a study with adolescents, who have greater fluency with new platforms, or with older adults that have less? Relatedly, our study relies on a convenience sample and thus cannot be extended to the general population. Although this sampling practice is fairly common in the social sciences, it leaves the generalizability of our findings open to future research.

Third, although image-based social media may have positive effects, there surely exists a point of diminishing returns. How much is *too much* time to spend on Instagram and Snapchat? At a certain point one’s mediated interaction with the world would no longer augment real interaction but hinder it. As an exploratory study, this research did not have a chance to dive into the potential effects of individual characteristics on social media choice and use. How might one’s personality traits moderate the effect of image-based platforms in reducing perceived loneliness? For example, do extroverts require *more* or *less* time on Instagram to feel socially connected? Future research should incorporate concepts such as personality and cellphone addiction in seeking to establish if and when use of image-based social media might lead to diminishing or negative returns.

In spite of the above limitations, our research suggests that the increasingly ubiquitous image-based social media platforms that are connecting people in new ways can actually facilitate a kind of human connection that mitigates loneliness and cultivates happiness and SWL. Although more research is needed to clarify, contextualize, and expand upon this phenomenon, our research takes a necessary first step in drawing the connection between image-based social media and loneliness attenuation through social presence.

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