Does This Photo Make Me Look Good? How Posters, Outsiders, and Friends Evaluate Social Media Photo Posts

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In recent years, the use and importance of visual communication through photos have grown considerably. However, we have little understanding of the alignment between the intentions of the photo posters and the reactions of viewers. To address this gap, we replicated previous work that studied the alignment of poster and outsider judgments of text posts by extending it to photo posts. In our study of 573 users across four social media platforms, we found that outsiders generally judge photo posts more positively than anticipated by posters. Examining viewer engagement on social media revealed that photos depicting family and friends receive fewer reactions. We apply our insight to propose novel solutions that can help users create a more positive digital presence by aligning their photo posts with the expectations of their audiences.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**; **Empirical studies in collaborative and social computing**; **Social media**; **Social content sharing**.

Additional Key Words and Phrases: social media, self-presentation, impression management, audience feedback, photo posts, outsider judgment, visual communication, privacy

1 INTRODUCTION

People try to influence how others perceive them by managing self-presentation through a process of 'impression management' [20, 38]. Initial research on self-presentation examined social interactions in face-to-face settings. Today, however, many social interactions take place on online platforms. As a result, people tend to pay careful attention to the impressions they project online [36, 37], often engaging in self-monitoring [59] of their social media posts [13, 64].

Rettberg classified self-presentation on social media platforms into three modes: visual, written, and quantitative [53]. Among these, the visual mode has become immensely popular, with more

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than three and half billion photos shared on social media every day as of 2020.[1][2][3] Photos posted on social media often reflect the poster's desire to be seen in a positive light as it boosts self-esteem [9]. However, it is unclear whether viewer impressions of the photos match poster intentions. For instance, photos of children enthusiastically posted by their parents may not be received with the same enthusiasm by the viewers.[4]

Misalignment between *intended* and *actual* audience reactions may stem from context collapse [44] that occurs when the audience is composed of a large number of people from multiple disparate social contexts. Alternatively, misalignment can result from differences in viewpoints. As Wang et al. [64] discovered, posters tend to overestimate positive audience reception. However, studies of social media self-presentation by Wang et al. [64] and others (e.g., [23, 40]) have been limited to *text* posts. To fill this gap, we address the following research questions:

RQ1: How closely do posters and viewers agree on social media *photo* posts as representing the poster well?

RQ2: How do the *contents* of a photo influence the agreement in perceived self-representation between posters and viewers?

RQ3: How does the agreement between posters and viewers vary across social media platforms?

We addressed these questions by replicating previous research comparing poster and outsider judgments of social media *text* posts [64] by employing the same method to collect and analyze social media *photo* posts. We collected photo posts from 573 participants recruited via Amazon Mechanical Turk ($n = 398$) and other means ($n = 175$). In addition, we asked participants for the corresponding metadata, such as the number of reactions and comments connected to the photo posts they provided. The data covers photos from four popular social media platforms: Facebook, Instagram, Snapchat, and Twitter. More than two-thirds of the photos in our data were public, i.e., not restricted to viewing by only the poster's connections on the platform.

We analyzed the match between participant self-assessments of their photos and judgments of independent outsiders. In contrast to prior research on text posts, we found that outsiders judge photo posts more positively than anticipated by posters. In addition, we discovered that judgments of photos are driven by their *content*. For instance, we found that photos of family and friends were rated positively by posters and outsiders, yet less likely to receive viewer reactions on social media platforms. While there were few differences across social media platforms, we noted that outsiders judge Instagram photos more positively than posters, and photos posted on Twitter receive significantly more audience reactions. Based on our insight, we provide design suggestions to help people improve self-presentation on social media and achieve better alignment with their audiences.

In the sections that follow, we begin by situating our work in the literature. We then describe the details of our data collection, coding, and analysis. Next, we provide the findings related to each of our research questions. We proceed to offer implications of our work along with a few limitations. We conclude by pointing out promising avenues for future work.

2 RELATED WORK

In the subsections below, we first review the literature on the challenges of social media impression management that motivated our research. Next, we describe research investigating how social

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[1]https://www.omnicoreagency.com/facebook-statistics/

[2]https://www.omnicoreagency.com/instagram-statistics/

[3]https://www.omnicoreagency.com/snapchat-statistics/

[4]http://www.mandatory.com/living/1067127-heres-what-people-really-think-of-your-baby-pictures

media users are impacted by audience perception and feedback. We then cover work specifically pertaining to photo-based engagement on social media platforms.

2.1 Impression Management

Goffman theorized that external judgment and the need for social acceptance and approval leads to a strategic presentation of self to the world [20]. As communication and interaction increasingly move online, researchers have devoted extensive attention to the online presentation of self in various settings, including social media (e.g., [23, 56]), messaging applications (e.g., [15, 36]), and photo sharing (e.g. [26, 39, 46]). Branding and showcasing positive aspects of one's life have been noted as important motivations for posting online updates [12, 43]. Given that social media is an outlet to form emotional connection with audience members [9, 66], it is important to understand the relationship between poster expectations and audience reactions to social media posts.

In that regard, Barash et al. [4] discovered that people are only partially aware of how they are perceived based on their text posts on social media platforms. A misalignment between the expected and actual audience perceptions can diminish the connection between posters and their audiences [21]. Although misalignment resulting from information being seen by a different or larger audience than intended has been recognized [44, 62], such context collapse is not the sole contributor to misaligned expectations regarding a person's social media posts. Moreover, people's posts can be judged unfavorably even by their social media contacts (that is, by the typical *intended audience*). For instance, audience members have reported finding many status updates from their social media contacts to be banal [5] or boastful.[5] Posters tend to feel more satisfied when they receive more 'Likes' and gratifying comments on the content they post [6]. In contrast, being judged negatively for posting content that audience members consider uninteresting, unimportant, or inappropriate can lead to undesirable social and emotional consequences for the posters [63].

Although audience perspectives have been studied for specific mechanisms, such as providing feedback in the form of Likes [58] or 'sanctioning' posters who violate privacy norms [49], relatively little research has focused on the full range of reactions provided by social media audience members. Studying audience reactions more generally can enable a better understanding of posting and feedback practices and facilitate improved user interaction. To that end, Wang et al. [64] compared the intended self-presentation properties of text status updates posted by Facebook users to corresponding judgments of outsiders. In their study, posters overestimated the self-enhancing nature of posts regarding mundane activities and underestimated it when discussing family and friends. Given the ever-increasing number of social media posts in visual forms, we drew inspiration from Wang et al. [64] and replicated their approach to study self-presentation in the context of *photos*. Specifically, we investigated whether poster self-assessment of photo posts matches corresponding audience perceptions.

2.2 Audience Perception and Feedback

Audience perceptions reflected in the feedback provided using various social media interactive mechanisms, such as Likes, Tags, Reactions, Comments, Retweets, etc., can often have an impact on posters. Das and Lavoie [14] modeled social media user practices, concluding that users engage more on the platform when they receive social-psychological feedback from the audience. Social media feedback mechanisms, such as Likes, have been found to provide valuable social cues [55]. For instance, Burrow and Rainone [9] found that greater number of Facebook Likes is associated with higher levels of self-esteem. Similarly, Seo et al. [57] reported that receiving faster reactions from

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[5]https://www.psychologytoday.com/us/blog/the-science-behind-behavior/201802/why-people-should-stop-bragging-social-media

friends on Facebook contributes to an increase in perceived social support and alleviates feelings of loneliness, especially for those who are more sensitive to audience perception and practices. Indeed, the value of social support derived from audience feedback has been noted for social media disclosures covering a variety of circumstances, such as pregnancy loss [2], rare diseases [41], etc. The support structure created by social media audience feedback underscores the need for research on the alignment between poster intention and audience reception, as we do in our study.

In addition to providing social support, studies have shown that social media interaction can have a positive impact on social capital [17, 18] and, in turn, on offline communication [61]. The impact on social capital is enhanced by the public or semi-public nature of many social media posts that can reach broad audiences consisting of large networks of weak ties, such as Friends of Friends [19]. Our study includes consideration of public audiences by studying the perspectives of outsiders, i.e., individuals other than social media connections of the person posting the information.

2.3 Photo-based Engagement

Malik et al. [42] reported that photo sharing on social media provides six different gratifications: affection, attention seeking, disclosure, habit, information sharing, and social influence. Rettberg [52] noted that visual self-representation, such as posting selfies, is an increasingly important form of social media photo sharing. Relatedly, Nov et al. [45] found that photo tagging practices on social media are connected user perceptions of the *social presence* of the expected audiences for the photos.

Despite these benefits of photo sharing, posters have raised privacy concerns about photos shared on social media. Higher levels of privacy concerns can lead to lower photo-related interactions, such as tagging [65]. For instance, Hoyle et al. [26, 27] found that lifeloggers were wary of sharing certain types of photos with the wrong audience primarily because of self-presentation issues. Further, social media photo posts containing multiple people can lead to privacy-related conflicts between the parties because of divergent assessments regarding audience perceptions [60]. It has been shown that social media users tend to underestimate audience size by a substantial amount [7]. Therefore, it is important to understand the alignment between photo poster intentions and viewer reactions, especially when photos are intended for broad audiences beyond immediate contacts on social media.

Yet, there are relatively few studies examining the impact of the content of a shared photo on its viewers. Krämer and Winter [37] reported that self-presentation efficacy influences the facial expression and location of a user's profile photo on social media. Through a quantitative analysis of photos posted on Instagram, Bakhshi et al. [3] found that photos with faces are 38% more likely to receive Likes and 32% more likely to receive Comments. Such studies show the importance of the photo contents for influencing viewer perceptions and actions. Our study helps shed further light on these matters by examining how photo contents affect audience perceptions of the poster.

People increasingly interact via a diversity of social media platforms. Since content, functionality, and interactions can vary across these platforms [22], we included multiple platforms in our study. Across these platforms, we compared the self-assessment scores of posters with those of viewers. On social media, the poster-viewer relationship is often expressed through feedback from viewers, so it is important to understand viewer perceptions and reactions, which we cover in our study.

3 METHOD

To answer the research questions outlined in Section 1, we drew upon the method used by Wang et al. [64] to collect photos posted to four popular social media platforms. We first describe relevant features of the platforms active during the period of our study, followed by our study design and data collection along with ethical considerations and sample characteristics.

3.1 Photo Sharing Mechanisms across Social Media Platforms

We collected photos posted on four popular social media platforms where users share photos and/or stories: Facebook, Instagram, Snapchat, and Twitter. The diversity of these platforms allowed us to examine whether platform-specific aspects affect judgments of photo posts. Given the ever-changing nature of these platforms, it is important to note the photo-related mechanisms of the platforms that were active during our study period:

- **Facebook:** Posters could upload one or more photos with optional corresponding captions. Posters could set the visibility of each photo to one of the following options: Friends, Friends except…, Specific friends…, Only me, or Public. Viewers could react to photos with one of six icons (Like, Haha, Love, Wow, Sad, and Angry), Comment on the photos, or Share them further. The story feature was relatively new and not yet popular.
- **Instagram:** Posters could post a photo with a caption, and viewers could Like the photo, Comment on it, or Share it further. Anyone on the Internet could see photos posted by those with public Instagram accounts. The story feature was available, but not widely used.
- **Snapchat:** Posters could post a story by combining multiple photos or videos. The story was visible to the poster's Friends for 24 hours unless deleted earlier by the poster. By default, only Friends could see the poster's story. However, posters could block specific people from viewing the story. Further, posters could set the visibility of a story to Public, thus making it visible to anyone on the Internet.
- **Twitter:** Posters could post a photo with an attached tweet. Photos posted by public accounts were visible to everyone on the Internet. Viewers could Like, Retweet, and Reply to the tweet.

3.2 Study Design

We modified the online questionnaire used by Wang et al. [64] for our focus on photos instead of the text posts covered in their study. Upon consent, we screened participants for eligibility. Only adults (18 years of age or older) who indicated using one of the four targeted social media platforms at least once a week were eligible to participate. To avoid the influence of cultural variation, we restricted participation to those who had lived in the United States for at least five years [33].

Those who qualified for the study were randomly directed to questions specific to *one* of the social media platforms they indicated using regularly. We asked participants to upload the most recent photo[6] they posted to the social media platform. Participants provided self-assessment by rating the photo on a 7-point scale (1 = Disagree strongly to 7 = Agree strongly) for the following Likert-type items:

- It was important for me to present myself positively in this photo.
- I was concerned about how I would come across in this photo.
- This photo reveals more desirable than undesirable things about myself.
- I didn't care what other people would think of me from this photo.
- In this photo, I worried about making a good impression.

We took the above self-assessment items from the questionnaire used by Wang et al. [64], who developed them using standard scales, such as the Self-Monitoring scale [59], Narcissistic Personality Inventory (NPI) [50], and the Balanced Inventory of Desirable Responding (BIDR) scale [48].

For photos collected from the participants, we asked for the corresponding social media metadata, such as the caption, the number of reactions received, the audience, etc. We helped participants locate the metadata by providing platform-specific screenshots along with instructions for accessing the requested information. We then inquired about general social media use. The study concluded

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[6]For Snapchat, we asked for the most recent *story*. For the sake of consistency, we refer to the Snapchat data with the term 'photo' as for the other three platforms.

by collecting demographic information. Throughout the questionnaire, we allowed participants to provide open-ended explanations as warranted. Further, we embedded a couple of attention-check questions within the questionnaire to flag inattentive participants.

We iteratively improved the study design over a span of six months from February to July 2017 via multiple pilots with a total of 50 individuals covering diverse ages and educational backgrounds. Data from the pilots was used solely to test and refine the questionnaire and is not included in the analyses presented in the paper. The complete questionnaire is included in Appendix A.

3.3 Study Deployment

Following the pilot, we deployed the study for a period of eight months from August 2017 to March 2018. To avoid priming, the study was promoted without revealing the focus on online self-presentation. We advertised the study to US-based individuals with an approval rating of 98% or higher on the Amazon Mechanical Turk (AMT) crowd work platform. For broader coverage, we recruited additional participants via the Volunteers sections of Craigslist portals for 40 cities in the United States and by advertising on social media and mailing lists. To ensure a sufficiently diverse sample, we advertised in batches covering various time intervals during the day.

Most participants completed the study within 3–8 minutes. Upon completion, AMT workers received a randomly-generated code. Those who entered a valid completion code on AMT received compensation of US $1, which is in line with the hourly minimum wage for the state of Indiana. Participants recruited via other means were asked to provide an email address for a chance to win one of twenty US $15 gift certificates for Amazon.com and one grand prize of an Apple Watch.

3.3.1 Ethical Considerations. All study procedures were approved by the Indiana University Institutional Review Board (IRB). In compliance with AMT Terms of Service, we did not ask for personally identifiable information. Identical to the method used by Wang et al. [64], participants were free to upload any photo post. In accordance with the approved IRB protocol, the data was stored on secure servers and accessible only to the researchers. All responses were anonymized prior to analysis.

3.3.2 Sample. After filtering out 71 responses for failing one or more attention checks or not completing the essential elements of the questionnaire (such as uploading a photo post), we obtained valid data from 573 participants who contributed one social media photo post each. Of these, about 398 (about 70%) were from AMT, while the remaining 175 came across the study on the other recruitment channels mentioned above. The photos cover all four platforms we targeted: Facebook (149), Instagram (171), Snapchat (119), and Twitter (134). Participant ages ranged between 18–75 years (Mean = 30.57, Median = 28), with incomes between $10,000 to more than $150,000 per year. Most participants (90%) were under 50 years old. We received somewhat greater participation from women (355 women, 214 men, 2 others, and 2 who did not wish to specify gender). Participants covered a diversity of professional backgrounds, such as students, teachers, doctors, janitors, game developers, business owners, data analysts, ticket agents, sales managers, etc. Most participants (90%) reported at least some college education.

3.4 Photo Coding and Rating

We found that the themes generated by Wang et al. [64] for text status messages were typically not applicable to photos, making it necessary for us to develop our own themes to categorize the photo posts we collected in the study. The four authors of the paper first examined a random sample of 50 photos taken from the data and individually generated a free-form list of applicable codes via open coding. Some of the codes that emerged in the initial open-coding process were: anger, artistic, auditorium, belly, car, chess, chicken, Christmas, climbing, couple, greetings, magazine, makeup,

meme, pets, politics, rainbow, selfie, etc. After five rounds of detailed discussion to reach consensus among the authors, we consolidated the codes into a list of 24 themes: Activity, Advertisement, Animals, Art, Body Parts, Celebration, Celebrity, Crowd, Emotions, Family and Friends, Fashion, Food, Gaming, Humor, Individuals, Mundane, Nature, Objects, Politician, Quotes, Screenshot, Sociopolitical, Travel, and Transportation.

Once the themes were finalized, we proceeded to code the entire set of collected photos by assigning applicable themes to each photo and rating it on each of items of the self-assessment scale mentioned above in Section 3.2. Like Wang et al. [64], we employed multiple independent coders. Specifically, we recruited four independent coders (an undergraduate male, an undergraduate female, a graduate male, and a graduate female). We chose coders who were native English speakers and had lived in the United States for at least five years, similar to the inclusion criteria for the participant pool. We chose coders from different age ranges and educational backgrounds to get diverse views regarding the photo posts as would be the case when photos are viewed by diverse audiences on social media. We trained each coder on the basics of qualitative coding using the same set of 50 photos used by the authors for the initial open coding described above. Each coder independently categorized each photo into one of the 24 themes in the above list and rated it using the assessment items listed in Section 3.2. When coding and rating the photos, the coders examined the photo caption if the participant provided it. Apart from the themes we provided, the coders could specify additional themes if they deemed it necessary.

After checking the ratings of the coders for the initial set of 50 photos, the Fleiss' kappa inter-coder reliability (ICR) indicated 72% agreement, with an average correlation 0.50 (0.57 was the highest and 0.39 was the lowest correlation between any pair of coders). After the initial independent coding and rating, we organized a group session with the four coders for a detailed discussion on disagreements. The coders then re-coded and re-rated the same 50 photos based on the shared understanding of the coding and rating process that developed during the discussion. The post-discussion coding pass for the initial 50 photos achieved 100% agreement on the assigned themes. For self-assessment ratings, the post-discussion average correlation among the coders was 0.80 (0.83 was the highest and 0.75 was the lowest correlation between any pair of coders). These discussion procedures follow the same processes as those used by Wang et al. [64] for coding and rating the text posts they collected. In particular, we did not seek high agreement for ratings because the ratings are expected to vary. Instead, the discussion served the purpose of clarifying the rating *scheme* so that the coders shared a unified interpretation of the rating scale.

After reaching a shared understanding of the rating scheme and a reasonable agreement on coding for the first 50 photos, the coders proceeded to code and rate the remaining photos. The four coders independently coded and rated each remaining photo in the dataset, with no further discussion after coding and rating. Since the coders could assign multiple themes to a photo, we picked the theme for each photo that was the majority choice among the four coders. In case of ties, we picked both of the tied themes. We excluded 12 cases where the four coders had no overlap in their theme assignments. For the ratings, we averaged the scores of the four coders to derive a single score that combined the four ratings.

4 FINDINGS

To answer our research questions, we compared the assessments of the study participants (i.e., photo posters), independent coders, and social media users who viewed and reacted to the photo. We refer to our independent coders as 'Outsiders,' the social media connections of the poster as 'Friends.' Anyone who viewed the photo either in our study or on social media is considered a 'viewer.' We examined differences in judgments of participants and viewers to understand the alignment between their assessments of the photo posts we collected in our study.

Further, we carried out a thematic analysis of the collected photos and analyzed the reactions of viewers across the identified themes. For the analyses regarding themes, we merged redundant themes within the 24 coded by the Outsiders into a consolidated set of 16 themes for linear regression: Activity, Advertisement, Animals, Art, Celebration, Celebrity, Emotions, Family and Friends, Food, Humor, Individuals, Objects, Quotes, Screenshot, Sociopolitical, and Travel.

4.1 Agreement between Posters and Viewers (RQ1)

To answer *RQ1*, we compared the self-assessments of posters with the corresponding assessments of Outsiders. Pearson's correlation tests found the agreement between posters and Outsiders to be low ($r = 0.19$, $p < 0.001$). On a 1–5 scale, Outsiders judged the photo posts much more positively than the posters themselves (mean = 4.44, CI = [4.40, 4.48] for Outsiders vs. mean = 3.54, CI = [3.48, 3.62] for posters). Since our sample size is greater than 30, we used parametric statistical tests [28, 34]. Welch's two-sample t-test [1] found that the differences between the judgments of posters and Outsiders were statistically significant ($t = -21.76$, $df = 885.03$, Cohen's d = -0.99, $p < 2.2e^{-16}$).

We noted that self-assessment scores of photos provided by AMT participants (mean = 3.49, CI = [3.40, 3.58]) were statistically significantly lower than those of participants recruited from other sources (mean = 3.66, CI = [3.55, 3.79]) based on Welch's two-sample t-test ($t = -2.28$, $df = 364.09$, Cohen's d = -0.2, $p = 0.02$). Similarly, Welch's two-sample t-test ($t = -2.77$, $df = 367.77$, Cohen's d = -0.24, $p = 0.0058$) found that Outsiders scored photos of AMT participants (mean = 4.41) lower in terms of presenting the poster in a positive light compared to the photos shared by non-AMT participants (mean = 4.52). The difference suggests that photos posted by non-AMT participants represent the poster better than those posted by AMT participants. These differences in ratings are surprising because privacy and security preferences and practices of AMT participants have been found to be aligned with those of the general population having college education [51]. It is plausible that the differences can be attributed to AMT participants contributing more impersonal photos to protect the anonymity of their study responses since AMT workers are known to place emphasis on protecting their anonymity [31].

4.2 Influence of Photo Content (RQ2)

We analyzed the themes that Outsiders assigned to each of the 573 photos. Similar to the analysis carried out by Wang et al. [64], we built a random-effects linear regression model [32], with role (i.e., poster or Outsider) nested within the uploaded photo post. The unit of analysis was the uploaded photo, with self-assessment scores as the dependent variables and the type of judge (i.e., poster or Outsider) and the 16 coded themes for the photos as the independent variables.

4.2.1 Theme-Wise Judgment: Posters vs. Outsiders. Themes were not mutually exclusive; each photo could be categorized under more than one theme. In case of disagreement among Outsiders regarding the categorization, we assigned themes by majority vote, as mentioned in Section 3.4. Among the photos we collected, the top five themes were: Individuals (including selfies and portraits) ($n = 97$, 16.95%), Animals (including pets) ($n = 83$, 14.5%), Family and Friends ($n = 81$; 14.2%), Travel ($n = 70$; 12.2%), and Screenshot ($n = 69$; 12.06%). Although a majority ($n = 391$; 68.4%) of the photos were publicly viewable, these themes suggest that many of them contained content of a personal nature.

Table 1 presents the results of the linear regression analyses showing the expected means of the poster and Outsider self-assessment scores segregated by photo themes. The Difference column shows the differences between the respective poster and Outsider means, analyzed as a separate dependent variable. It can be seen in Table 1 that photos depicting Family and Friends

Table 1. Linear regression results predicting self-assessment scores based on the themes contained in the photos ($n = 573$). The Poster and Outsider columns present the respective coefficients (β) and corresponding confidence intervals in the linear regression models. The Difference column is the difference between the coefficients of Posters and Outsiders.

Themes	Examples	Poster	Outsider	Difference
Intercept		**3.51***** [3.32, 3.70]	**4.30***** [4.23, 4.37]	**0.79***** [0.60, 0.99]
Activity ($n = 38$)	Baking, Ballet, Bragging, Climbing, Drinking, Eating, Exercising, Gardening, Playing, Relaxing, Sports, Swimming, Watching TV, etc.	0.03 [−0.27, 0.33]	−0.09 [−0.20, 0.03]	−0.12 [−0.42, 0.19]
Advertisement ($n = 31$)	Advertising any product, Advertising own brand, Branding, etc.	−0.19 [−0.53, 0.14]	0.06 [−0.07, 0.19]	0.25 [−0.09, 0.60]
Animals ($n = 83$)	Cat, Dog, Fish, Grasshopper, Insect, Leopard, Pets, etc.	−0.09 [−0.33, 0.14]	**0.41***** [0.31, 0.50]	**0.50***** [0.25, 0.74]
Art ($n = 26$)	Abstract, Artistic, Colors, Drawing, Fractal, etc.	−0.09 [−0.44, 0.27]	**0.15*** [0.01, 0.28]	0.23 [−0.14, 0.60]
Celebration ($n = 39$)	Christmas, Concert, Conference, Entertainment, Event, Festival, Gathering, Party, Show, Valentine's day, etc.	0.10 [−0.19, 0.38]	**0.17**** [0.06, 0.28]	0.07 [−0.22, 0.37]
Celebrity ($n = 35$)	Actor, Famous non-political person, etc.	−0.14 [−0.45, 0.17]	**0.14*** [0.02, 0.26]	0.28 [−0.04, 0.60]
Emotions ($n = 12$)	Anger, Brag, Cute, Happy, Love, Scary, Smile, etc.	−0.10 [−0.59, 0.40]	−0.12 [−0.31, 0.07]	−0.02 [−0.53, 0.48]
Family & Friends ($n = 81$)	Baby, Children, Couple, Family, Father, Friend, Kids, Mother, Parent, Pregnant, etc.	**0.29*** [0.05, 0.53]	**0.60***** [0.50, 0.69]	**0.30*** [0.06, 0.55]
Food ($n = 39$)	Beverage, Broccoli, Cake, Celery, Chicken, Dessert, Dinner, Fish, Meat, Stew, Turkey, Wine, etc.	0.12 [−0.19, 0.43]	0.03 [−0.09, 0.15]	−0.09 [−0.41, 0.23]
Humor ($n = 65$)	Cartoon, Clown, Comic, Funny, Joke, Joker, Meme, Parody, Sarcasm, Satire, etc.	**−0.28*** [−0.51, −0.04]	**−0.39***** [−0.48, −0.30]	−0.12 [−0.35, 0.12]
Individuals ($n = 97$)	Ballerina, Clown, Man, Nun, Portrait, Selfie, Woman, etc.	**0.26*** [0.04, 0.48]	**0.38***** [0.30, 0.47]	0.12 [−0.10, 0.35]
Objects ($n = 42$)	Balloon, Basket, Chair, Computer, Crystal, DVD cover, Furniture, Instruments, Kaleidoscope, Keyboard, Laptop, Magazine, Plate, Sign, Sphere, Vase, Window, etc.	0.06 [−0.24, 0.35]	−0.07 [−0.18, 0.05]	−0.12 [−0.43, 0.18]
Quotes ($n = 18$)	Game screenshot, Score screenshot, App screenshot, etc.	−0.15 [−0.57, 0.27]	0.11 [−0.05, 0.28]	0.27 [−0.16, 0.69]
Screenshot ($n = 69$)	App screenshot, Game screenshot, Score screenshot, etc.	−0.09 [−0.34, 0.15]	**−0.25***** [−0.35, −0.16]	−0.16 [−0.29, −0.03]
Sociopolitical ($n = 9$)	Banner, Politics, Protests, etc.	−0.07 [−0.65, 0.50]	**−0.52***** [−0.74, −0.30]	−0.45 [−1.04, 0.14]
Travel ($n = 70$)	Auditorium, Meeting room, Museum, Playground, Restaurant, Store, Theme park, Water park, etc.	0.17 [0.05, 0.30]	−0.05 [−0.14, 0.05]	−0.22 [−0.47, 0.03]

$^{*} : p < 0.05;$ $^{**} : p < 0.01;$ $^{***} : p < 0.001$

and Individuals were viewed favorably by posters (posters: Individuals $\beta = 0.26$, CI = [0.04, 0.48], $p = 0.017$; Family and Friends $\beta = 0.29$, CI = [0.05, 0.53], $p = 0.016$). Posters seems to feel that

Table 2. Regression results predicting viewer reactions based on the themes contained in the photos ($n = 451$). The Normalized Reactions and Total Reactions columns show the respective coefficients (β) and corresponding confidence intervals in the regression models.

Themes	Normalized Reactions		Total Reactions	
	Poisson		*Linear*	
Intercept	**0.52***	[−0.76, −0.28]	**81.03*****	[53.71, 108.37]
Activity ($n = 28$)	0.02	[−0.32, 0.28]	−14.37	[−35.72, 6.98]
Advertisement ($n = 30$)	0.14	[−0.16, 0.44]	3.57	[−39.65, 46.80]
Animals ($n = 58$)	**−0.62***	[−0.93, −0.31]	**−44.54****	[−78.15, − 10.92]
Art ($n = 25$)	−0.22	[−0.58, 0.14]	−17.08	[−62.37, 28.21]
Celebration ($n = 27$)	0.25	[−0.09, 0.58]	9.32	[−12.18, 30.80]
Celebrity ($n = 34$)	−0.07	[−0.35, 0.21]	− 0.41	[−39.32, 38.51]
Emotions ($n = 9$)	**0.87***	[0.43, 1.31]	65.51	[−04.15, 135.17]
Family & Friends ($n = 73$)	**−1.17*****	[−1.51, −0.83]	**−32.88***	[−65.44, − 0.31]
Food ($n = 28$)	**−1.57****	[−2.16, −0.97]	**−50.26***	[−94.90, − 5.63]
Humor ($n = 46$)	−0.33	[−0.62, −0.04]	− 29.34	[−63.44, 4.75]
Individuals ($n = 72$)	**−0.61***	[−0.90, −0.32]	− 23.01	[−53.54, 7.53]
Objects ($n = 31$)	**−1.12***	[−1.59, −0.65]	− 40.97	[−82.28, 0.34]
Quotes ($n = 14$)	−1.19	[−1.89, −0.49]	1.71	[−56.01, 59.43]
Screenshot ($n = 60$)	−0.02	[−0.28, 0.24]	− 9.99	[−43.42, 23.45]
Sociopolitical ($n = 9$)	−0.19	[−0.71, 0.33]	**90.64***	[20.14, 161.14]
Travel ($n = 65$)	**−0.87****	[−1.20, −0.53]	**−35.16***	[−67.71, − 2.61]

* : $p < 0.05$;   ** : $p < 0.01$;   *** : $p < 0.001$

such photos will make viewers judge them in a positive light. Outsider judgments of photos in these thematic categories confirmed that this was indeed the case (Outsiders: Individuals $\beta = 0.38$, CI = [0.30, 0.47], $p < 0.001$ and Family and Friends $\beta = 0.60$, CI = [0.50, 0.69], $p < 0.0001$). In contrast, 'funny' photos (i.e., Humor) were assessed negatively by both parties (posters: $\beta = −0.28$, CI = [−0.51, −0.04], $p = 0.023$; Outsiders: $\beta = −0.39$, CI = [−0.48, −0.30], $p < 0.001$).

Outsider ratings indicate that they judged the poster favorably based on photo posts containing the themes Animals ($\beta = 0.41$, CI = [0.31, 0.50], $p < 0.001$), Art ($\beta = 0.15$, CI = [0.01, 0.28], $p = 0.038$), Celebration ($\beta = 0.17$, CI = [0.06, 0.28], $p = 0.003$), and Celebrity ($\beta = 0.14$, CI = [0.02, 0.26], $p = 0.029$) and negatively for the theme Sociopolitical ($\beta = −0.52$, CI = [−0.74, −0.30], $p < 0.001$).

Overall, posters and outsiders seem to agree that photos of Family and Friends and Individuals create a favorable impression of the poster while photos containing Humor do not. Despite the agreement, poster ratings are more neutral than those of outsiders. On the other hand, posters and outsiders differ notably when judging the self-presentation impact of Animals, Art, and Celebrity photos.

4.2.2 Theme-Wise Judgments: Posters vs. Friends. Given the interactive nature of social media services, it is critical to understand the reactions of the audience. To that end, we analyzed the reactions[7] received by the photos on the social media platforms since these indicate how a poster's

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[7]Note any user who can view the photo can provide a reaction. Therefore, reactions for publicly viewable photos can include social media users other than the poster's Friends.

Table 3. Regression results predicting self-assessment scores and viewer reactions across social media platforms. The rows show the adjusted means. The Normalized Reactions column indicates incidence-rate ratios.

Platform	Poster	Outsider	Normalized Reactions	Total Reactions
	Linear	*Linear*	*Poisson*	*Linear*
Facebook ($n = 149$)	3.49***	4.44***	0.09***	22.62**
Instagram ($n = 171$)	3.65	4.58**	1.76	40.03
Snapchat ($n = 119$)	3.61	4.39	N/A	N/A
Twitter ($n = 134$)	3.42	4.22***	8.93***	105.02***

<div align="right">* : $p < 0.05$;   ** : $p < 0.01$;   *** : $p < 0.001$</div>

intended audience might have received the photo post. Since there is no simple way to collect reactions from Snapchat, we excluded Snapchat from this analysis. Viewer reactions across the other three platforms (i.e., Facebook, Instagram, and Twitter) varied based on reaction-related mechanisms available to the users of the service. Facebook in particular provides a wider range of reactions compared to other platforms. For instance, Facebook reactions included Like, Love, Haha, Love, Wow, Sad, and Angry; Twitter reactions covered Love, Retweet, and Engagement, and Instagram contained Like. To obtain a uniform measure of the audience reactions applicable across platforms, we calculated the total of the number of reactions (i.e., Like, Love, Number of comments, etc.) received by the photo. Only five of the posts in our data received a reaction expressing a negative sentiment. In all five cases, the reported negative sentiment was the Sad reaction on Facebook. Given the rarity with which negative reactions were expressed, we removed these five negative Facebook reactions from our analyses to ensure consistency.

Participants reported receiving between 0 to 1,014 total reactions for a photo (mean = 53, median = 18, sd = 104.7). On average, participants were connected to 414 Friends on social media, ranging from 1 at the low end to 8,000 at the high end. Approximately half of the participants received 0–20% of the total reactions from their Friends. We removed responses of three outlier participants from further analysis because of inconsistencies in the number of Friends or reactions. Two of these participants reported 0 Friends, and the third reported an abnormally high number of reactions (6,371,000 reactions despite having only 34 Friends).

We normalized the reactions by calculating the ratio of the total number of reactions to the number of Friends of the poster. Since we did not know the number of views for the photos in our data, we chose to normalize based on the size of the typically expected audience (i.e., Friends). Although the reactions/Friends ratio might not provide a precise measure of audience reaction, we consider it an acceptable compromise since we have no means of collecting the number of photo views (especially for Facebook and Instagram where only video posts provide view counts). Note that the reactions/Friends ratio can take a value greater than 100% because public posts can be viewed by an audience larger than one's Friends. In our sample, 26 photos received no reactions, and 45 Twitter posts received reactions greater than 100% due to the public nature of the Twitter platform.

We then carried out a Poisson regression for the 451 photos collected from Facebook, Instagram, and Twitter with *normalized reactions* as the dependent variable and the themes of the photos as the dependent variables (see Table 2). For many of the themes, we did not find statistically significant differences in reactions. Surprisingly, the regression model indicates that photos of Family and Friends are a negative predictor of audience reactions. Such photos received significantly fewer

Table 4. Linear regression results predicting self assessment scores and viewer reactions for each social media platform. Column 'n' is the number of photos in the respective theme. Posters, Outsiders, and Total Reactions columns present the respective coefficients (β) in the linear regression models.

Facebook ($n = 149$)	n	Poster	Outsider	Total Reactions
Overall mean	—	3.41***	4.20***	19.66***
Animals	28	−0.20	0.40***	− 3.20
Family & Friends	33	0.39	0.76***	11.73
Humor	19	−0.44	−0.36***	− 0.81
Individuals	27	0.39	0.48***	10.55
Screenshot	13	0.06	−0.34**	0.92
Travel	22	0.11	0.10	− 6.27

Instagram ($n = 171$)	n	Poster	Outsider	Total Reactions
Overall mean	—	3.57***	4.47***	36.09***
Animals	20	0.21	0.26***	7.76
Family & Friends	37	0.37*	0.42***	26.81*
Humor	9	−0.84**	−0.53***	− 13.11
Individuals	33	0.16	0.28***	− 1.02
Screenshot	14	−0.12	−0.18*	0.93
Travel	29	−0.03	−0.11	3.14

Snapchat ($n = 119$)	n	Poster	Outsider	Total Reactions
Overall mean	—	3.50***	4.30***	—
Animals	25	−0.08	0.48	—
Family & Friends	8	0.16	0.70***	—
Humor	19	0.09	−0.22***	—
Individuals	25	0.25	0.41	—
Screenshot	8	0.11	−0.14	—
Travel	5	1.08**	−0.05	—

Twitter ($n = 134$)	n	Poster	Outsider	Total Reactions
Overall mean	—	3.42***	4.27***	143.98***
Animals	10	−0.17	0.53***	− 81.65
Family & Friends	3	−0.42	0.68**	− 97.65
Humor	18	−0.10	−0.42***	− 55.11
Individuals	12	0.17	0.30*	46.25
Screenshot	34	−0.11	−0.30***	− 44.94
Travel	14	0.46	0.04	− 69.05

*: $p < 0.05$;   **: $p < 0.01$;   ***: $p < 0.001$

viewer reactions (mean = −1.17, CI = [−1.51, −0.83], $p = 0.0005$) than the overall average ($\beta = 0.52$, CI = [−0.76, −0.28], $p < 0.05$). Apart from Family and Friends, photos in the Food, Individuals, Objects, and Travel themes received notably fewer reactions from the audience. On the other hand, Emotions received significantly greater viewer reactions.
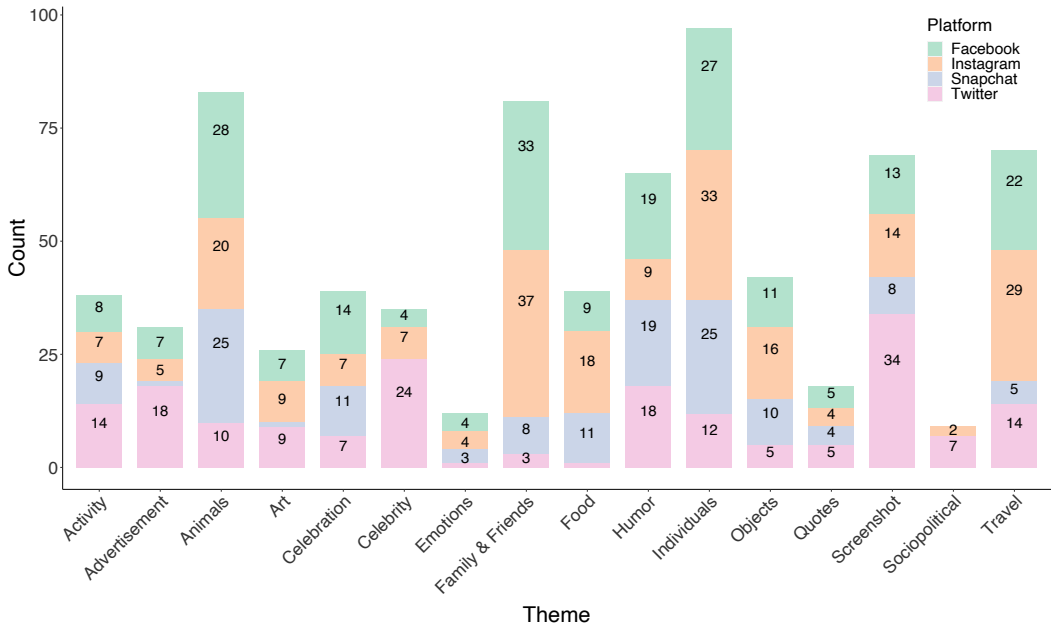
Fig. 1. Number of photos in each theme across the social media platforms covered in our study.

To delve deeper, we conducted a separate linear regression analysis for *total* reactions without normalization. The model without normalization suggests that photos related to Sociopolitical content garnered significantly more total reactions from viewers, and photos related to Animals, Family and Friends, Food, and Travel received comparatively fewer reactions (see Table 2). Although outsiders judge photos of Animals and Family and Friends favorably, social media connections do not seem to react much to such content. On the other hand, Sociopolitical photos generate a large amount of engagement from the social media audience, despite being rated lower by outsiders.

4.3 Differences across Social Media Platform (RQ3)

We analyzed the influence of the social media platform via four separate regressions where we used participant self-assessment, Outsider assessment, normalized reactions, and total reactions as the respective dependent variables and the platform as the independent variable. We used linear regression for the poster and Outsider assessment scores as well as for total reactions. We employed a Poisson model for predicting normalized reactions. Table 3 presents the results of all four regression models.

Table 3 shows that self-assessments of posters are independent of the platform. Using Facebook as the baseline, we found no statistically significant differences in poster scores when comparing across platforms. However, there were statistically significant differences in Outsider scores across platforms. Outsiders rate Instagram photos more positively (mean = 4.58) and Twitter photos less favorably (mean = 4.22) than those from Facebook (mean = 4.44). Table 3 further shows the normalized and total reactions reported across the different social media platforms. With the Facebook model as the baseline, we found that photos posted on Twitter receive statistically significantly more total reactions from viewers (mean = 105.02, CI = [75.72, 134.31], $p < 0.001$). The result holds when considering normalized reactions as well. These findings appear to be connected to the specifics of the service, with Instagram geared toward photo-based interaction and Twitter

typically employed for broad dissemination to a large audience. As Twitter photos are typically posted to a public audience much larger than the number of Friends, normalized reactions can be significantly higher than 100%.

When split by platform, many themes contain relatively few photos (see Figure 1). Therefore, we examined the relationship between photo content and platform by analyzing photos from the six themes that contained more than 60 photos across all platforms taken together: Animals, Family and Friends, Humor, Individuals, Screenshot, and Travel. The corresponding linear regression results are provided in Table 4. Similar to the previous analyses, we used separate linear regression models to predict the poster and Outsider assessment scores and total reactions for each platform. The results of the Poisson regression model for normalized reactions were similar to those of the linear regression model for total reactions.

Overall, the pattern of outsiders being more favorable in their judgments than posters holds across platforms. Outsiders consistently expressed higher positive views regarding photos in the Animals, Family and Friends, and Individuals themes posted to any platform, while judging Humor and Screenshot photos more negatively. Such reactions are expected given that Humor and Screenshot photos do not seem to represent the poster positively to outsiders. Interestingly, we found that Family and Friends photos posted on Instagram received statistically significantly more positive reactions in contrast to other platforms. Notably, Instagram viewers are aligned with outsiders in considering photos of Family and Friends as presenting them positively and Humor photos presenting them negatively.

5 DISCUSSION AND IMPLICATIONS

Our findings highlight opportunities for improving impression management in the context of online photo sharing. We propose a few design and algorithmic modifications that can improve people's photo sharing and viewing experiences on social media by achieving better alignment between expectations of posters and their audiences.

5.1 Photo Posts vs. Text Posts

In comparison to Wang et al.'s [64] finding related to text posts, we found that the corresponding results for photo posts are not the same. Wang et al. [64] found that posters evaluate their text posts more positively in comparison to the evaluations of outsiders, whereas we found the opposite to be true for photos, i.e., outsiders evaluate photos more positively than posters. Further, the (mis)alignment between posters and outsiders varies by photo content. We believe this difference between text and photo posts likely stems from the differences in the interactive functions of the two modes of sharing. Our findings highlight that text and photo posts may serve different interactive purposes, which may further vary by the features and practices associated with the underlying platforms. As a result, findings related to social media text content, such as posts and comments, may not necessarily generalize to visual communication via photos. Photo posts need to be studied in their own right.

Our results show that photos can have varying interpretations depending on the audience. For example, compared to the posters themselves, outsiders assess personal photo categories, such as Family and Friends, more positively and Humor photos more negatively. One obvious implication is that posters avoid sharing photos that are likely to be judged more negatively by outsiders. To that end, the photo-posting user experience can be augmented with computational techniques that warn users when they try to post photos that Friends, Followers, and outsiders might view less favorably. For example, prior research has looked into predicting access control policies for photos based on their tags [35].

At the same time, our results show that posters *underestimate* the extent of positive reception for their photos. Underestimating positive reception may lead people to post *fewer* photos about certain topics even though their audience may actually want to see more. Addressing this gap is especially critical at a time where social media posts are increasingly used to seek social support [2, 47]. Therefore, tools that *encourage* photo posts of interest to a user's audience might be helpful. Such tools could, for instance, suggest that users share more pictures of Family and Friends as these are likely to be judged favorably even if they do not garner many explicit audience reactions. We suggest exploration of designs that seek to help posters form reasonably accurate *a priori* judgments of the impact of their photo posts and improve mechanisms for conveying audience engagement back to the posters.

5.2   Metadata for Photo Posts

Discussion among the independent coders indicated that additional information beyond the caption would have been desirable to facilitate more accurate judgments. It might therefore be useful to develop mechanisms that encourage posters to attach textual metadata, such as tags, to help align audience perception with poster intentions. Potential content for such metadata could be offered as automatically-generated suggestions personalized to the poster. For instance, similar to hashtag suggestions for a text post, computer vision-based solutions could suggest and/or improve photo captions to reduce potential misjudgments [30]. For instance, Chen and Zitnick [10] developed a model that generated novel photo captions, surpassing human captioning 21% of the time. High-quality descriptive captions help convey the context intended by the poster, and machine-assisted captioning could improve communicating that context. Moreover, better captioning and text metadata can create the curb-cut effect [8] of improving accessibility by serving audience members with visual impairments. While a photo may be "worth a thousand words," it may still need the additional words in the metadata to convey the context that can help interpret the *act* of sharing the photo.

5.3   Feedback from Audience

In general, social networks need better tools to assist users in assessing audience reaction to photos. Machine learning techniques, for example, could attempt to predict audience reaction. However, current services suffer from the very mismatch that we find in this paper: although some platforms allow 'downvoting,' on major social media platforms, such as Facebook, Instagram, and Twitter, there is no explicit mechanism for the audience to convey dissatisfaction *directed at the poster*. For example, the Anger reaction on Facebook typically signals anger at the *content* of the post, i.e., an agreement with the poster, and does not usually indicate that the post itself was not appreciated. That said, posters may not welcome direct mechanisms for conveying dissatisfaction about their posts (e.g., people may not appreciate 'Dislikes' from their social media contacts, and neither would the contacts want to implicate themselves with identifiable negative feedback [49]). Indeed, Hoyle et al. [24, 25] found that conveying merely that a particular social media contact viewed a post can create a chilling effect on the audience. Currently, Facebook allows viewers to Snooze posts based on posters or content similarity, but posters are not aware that their posts are being filtered.

To balance the issue of being sensitive to the emotions of the posters and the privacy concerns of the audience, we suggest that social networks allow audience members to tell the *platform* (but not the poster) their negative reactions regarding a photo, without necessarily sharing these directly with the poster. Such mechanisms provide viewers a direct way to express negative feedback without risking confrontation or damaging the social relationships with the posters at whom the sentiment is directed. It should be emphasized that such mechanisms ought to be designed carefully to provide interactive utility. For instance, the mechanisms should help surface constructive feedback that

posters may find useful for improving their self-disclosure practices but may not otherwise receive because viewers find it socially awkward to convey it.

Aggregated feedback could be further combined with computer vision-based analyses of images to make useful predictions and suggestions. For instance, posters can be warned if they are about to share photos that could be unappealing to their audience. Conversely, photos in a user's library could be annotated with the likelihood of being received positively if shared. Such features could help create a positive sharing experience for posters and viewers alike. Given that people are increasingly engaging in the creation of online content, such design and architectural changes would be highly valuable for those who want to improve their engagement with their audiences.

5.4 Impact on Viewers

We hesitated to compare poster evaluations and viewer reactions received on social media. Unlike Outsider reactions obtained using the same scale, the relationship between poster evaluations based on the self-assessment scale and viewer reactions received via social media mechanisms is not clear-cut. For instance, the number of audience reactions does not clearly capture the number of people who actually viewed the photo. Moreover, the number of reactions for public or semi-public photos includes those of viewers who are not the poster's Friends. Recently, Twitter has started providing Total Engagements that includes detail such as Profile Clicks, Likes, Link Clicks, and Hashtag Clicks. In a similar vein, there is an opportunity for research on measuring and conveying the 'audience impact' of a photo.

Various audience-related measures could be summarized with the metric of impact. In turn, machine learning models [54] and analytics [29] could use this metric to predict user engagement based on the estimated impact of the photo post. For example, Jaakonmäki et al. [29] propose predicting user engagement by analyzing the visual and textual content of social media posts. Similarly, DeVito et al. [16] argue for taking into account aspects of platforms that affect self-presentation by using a systematic taxonomy based on presentation flexibility, content persistence, identity persistence, content association, feedback directness, audience transparency, and visibility control. Such approaches can be used to improve measurement of the impact for a photo post. Such mechanisms could then be applied to help posters gain better awareness of viewer perceptions.

5.5 Control over Audience

Platforms such as Facebook permit users to control who can see their posts by enacting granular access restrictions, such as Friends, Friends of friends, Friends except. . . , Specific friends. . . , and Only me. We found that most participants who post photos on Facebook restricted viewing to Friends or Friends of friends. However, other platforms, such as Instagram or Twitter, do not provide granular audience control, typically following the 'all or none' policy critiqued by researchers [11]. On these platforms, all posts of a public profile are public and visible to everyone. We suggest that all platforms allow posters to control the audience for a photo instead of making it available to everyone. That said, the low use of such controls when available indicates that there is a lot more work to do to make these mechanisms sufficiently usable and useful to achieve wide adoption and mitigate context collapse.

6 LIMITATIONS AND FUTURE WORK

Our data is affected by the limitations of self-selection and self-reporting. Participants in the study were based in the United States. Therefore, further work is needed to study whether these findings generalize to other cultures.

We followed Wang et al.'s [64] approach to compute outsider judgments based on the opinions of four independent coders. A further study could simulate a more representative audience by

collecting assessment scores from a larger sample of outsiders. The coders used the photos as well as their captions, when available. While coding based on photo and the caption taken together mimics how people form judgments on social media in the real world, it would be interesting to evaluate photos without the associated captions to examine the impact of the additional context provided by captions.

The number of photos we collected did not provide sufficient statistical power to detect differences between posters and outsiders separately for each photo theme. This factor was partially related to the challenges of having participants share personal photos. We further recognize that social media reactions do not paint a complete picture of the perceptions of the audience. However, reaction information is readily available on social media and is a common means of providing real-time feedback to posters. That said, Snapchat users do not receive reactions because replies to a story are sent as direct messages to the poster. To protect participant privacy, we did not ask for the direct messages associated with the stories uploaded by the participants, choosing instead to exclude Snapchat from the analyses involving reactions of the poster's Friends.

7 CONCLUSION

To understand the impact of photo sharing on online self-presentation, we studied the alignment between poster expectations and viewer reactions to photos posted on social media. Contrary to prior findings regarding text-based posts [64], we found that outsiders feel that photo posts portray posters more positively than the self-presentation judgments of the posters. We further found that the judgments of viewers differ depending on the photo content. Surprisingly, photos assessed positively by outsiders may not necessarily garner explicit reactions from viewers on social media, as illustrated by photos of the poster's family and friends. Differences in social media platform features and mechanisms may additionally have a small influence on viewer engagement with photo posts. Our findings highlight a general lack of effective mechanisms for social media audiences to provide posters with feedback on their photo posts and indicate sharing expectations. We call for further research on mechanisms that convey constructive, collaborative feedback to help users achieve their intended self-presentation through photos posted on social media. Most significantly, our findings indicate that photo sharing on social media is a distinct form of communication that needs to be studied and supported in its own right.

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A   STUDY QUESTIONNAIRE

The study used the following questionnaire. The beginning of the study included a study information sheet that described the study procedures and sought informed consent for participation.

A.1   Commitment

We care about the quality of our data. In order to get the most accurate measures of your knowledge and opinions, it is important that you thoughtfully provide your best answers.

Do you commit to thoughtfully providing your best answers to each question?

- Yes; I will provide my best answers.
- No; I will not provide my best answers.
- Unsure; I cannot promise either way.

A.2   Screening

(1) What is your year of birth? <DROP DOWN>
(2) How long have you lived in the United States?
- Less than 1 year
- Between 1 year and 2 years
- Between 2 years and 3 years
- Between 3 years and 4 years
- Between 4 years and 5 years
- 5 years or more
- I don't live in the United States
(3) What is your native language?
- English
- Spanish
- Chinese
- French
- Tagalog
- Vietnamese
- Hindi
- Arabic
- Korean
- German
- Other. Please specify:
(4) Which social media platform(s) do you use at least once a week? (*Select all that apply.*)
(NOTE: The following options were randomized.)
- Facebook
- Flickr
- Google+
- Instagram
- LinkedIn
- Pinterest
- Snapchat
- Tumblr
- Twitter
- Other. Please specify:

(5) (If Facebook or Twitter used at least once a week:) What kind of content have you ever posted on Facebook/Twitter? (*Select all that apply.*)
- Text
- Photos
- Videos
- Other. Please specify:

(6) (If Snapchat used at least once a week:) Do you have a recent story on Snapchat (i.e., a story that is currently available to view)?
- Yes
- No

Participants who met the screening criteria were randomly assigned to *one* of the question blocks below corresponding one of the four social media platforms: Facebook (Section A.3), Instagram (Section A.4), Snapchat (Section A.5), or Twitter (Section A.6). The assignment procedure ensured that participants were assigned to the question block for a platform that they indicated using at least once a week.

Although the questions for each social media platform are generally the same, we made minor adjustments as necessary to account for platform-specific terminology and provided platform-specific screenshots when providing instructions and guidance.

A.3 Facebook

(1) Please upload the most recent photo you posted on Facebook. (Instructions and corresponding screenshot for finding and uploading the most recent photo post.) <UPLOAD BUTTON>

(2) What is the caption of the above photo? (*In case the photo has no caption, please enter "N/A" or leave the answer blank.*) (Instructions and corresponding screenshot for finding and pasting the caption.) <TEXT BOX>

(3) Who can see the above photo? (Instructions and corresponding screenshot for finding the audience setting for the photo.)
- Public
- Friends and Friends of Friends
- Friends
- Friends except…
- Specific Friends
- Only Me
- Custom

(4) Please select the date on which you posted the above photo: <DATE PICKER>

(5) Please indicate your level of agreement with the statements below: (1: Not at all to 7: Completely)
- To what extent does this photo involve personal information about yourself or people close to you, such as accomplishments, family, or problems you are having?
- To what extent does this photo involve personal thoughts on past events, future plans, appearance, health, wishful ideas, etc.?
- To what extent does this photo involve your feelings and emotions, including concerns, frustrations, happiness, sadness, anger, and so on?
- To what extent does this photo involve what is important to you in life?
- To what extent does this photo involve your close relationships with other people?

(6) Please elaborate and provide more information about your answers above: <TEXT BOX>

(7) Think about the time when you posted this photo. How much do you agree with the following statements? (1: Disagree strongly to 7: Agree strongly)
- It was important for me to present myself positively in this photo.
- I was concerned about how I would come across in this photo.
- Select the option marked as moderately disagree. (NOTE: Attention-check question.)
- This photo reveals more desirable than undesirable things about myself.
- I didn't care what other people would think of me from this photo.
- In this photo, I worried about making a good impression.

(8) Please elaborate and provide more information about your answers above: <TEXT BOX>

(9) Please tell us how you would characterize your Friends' reaction to the above photo? (1: Strongly negative to 7: Strongly positive)
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(10) What are the reactions that this photo received on Facebook? (*Please tell us the number of each type of reaction received.*) (Instructions and corresponding screenshot for finding the number of reactions.)
- Likes: <TEXT BOX>
- Love: <TEXT BOX>
- Haha: <TEXT BOX>
- Wow: <TEXT BOX>
- Sad: <TEXT BOX>
- Angry: <TEXT BOX>
- Number of Comments: <TEXT BOX>
- Others: <TEXT BOX>

(11) How many days in the past week did you use Facebook?
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(12) How frequently do you post a photo on Facebook?
- More than once a day
- Once a day
- Once a week
- Few times a week
- Once every two weeks
- Once a month
- Less often than once a month

(13) How many Friends do you have on Facebook? (Instructions and corresponding screenshot for finding the number of Friends.) <TEXT BOX>

(14) How many Followers do you have on Facebook? (Instructions and corresponding screenshot for finding the number of Followers.) <TEXT BOX>

(15) How many people are you following on Facebook? (Instructions and corresponding screenshot for finding the number of people followed.) <TEXT BOX>

(16) How many photos have you posted on Facebook? (Instructions and corresponding screenshot for finding the number of posted photos.) <TEXT BOX>

A.4 Instagram

(1) Please upload the most recent photo you posted on Instagram. (Instructions and corresponding screenshot for finding and uploading the most recent photo post.) <UPLOAD BUTTON>

(2) What is the caption of the above photo? (*In case the photo has no caption, please enter "N/A" or leave the answer blank.*) (Instructions and corresponding screenshot for finding and pasting the caption.) <TEXT BOX>

(3) Who can see the above photo? (Instructions and corresponding screenshot for finding the audience setting for the photo.)
   - Public
   - Followers

(4) Please select the date on which you posted the above photo: <DATE PICKER>

(5) Please indicate your level of agreement with the statements below: (1: Not at all to 7: Completely)
   - To what extent does this photo involve personal information about yourself or people close to you, such as accomplishments, family, or problems you are having?
   - To what extent does this photo involve personal thoughts on past events, future plans, appearance, health, wishful ideas, etc.?
   - To what extent does this photo involve your feelings and emotions, including concerns, frustrations, happiness, sadness, anger, and so on?
   - To what extent does this photo involve what is important to you in life?
   - To what extent does this photo involve your close relationships with other people?

(6) Please elaborate and provide more information about your answers above: <TEXT BOX>

(7) Think about the time when you posted this photo. How much do you agree with the following statements? (1: Disagree strongly to 7: Agree strongly)
   - It was important for me to present myself positively in this photo.
   - I was concerned about how I would come across in this photo.
   - Select the option marked as moderately disagree. (NOTE: Attention-check question.)
   - This photo reveals more desirable than undesirable things about myself.
   - I didn't care what other people would think of me from this photo.
   - In this photo, I worried about making a good impression.

(8) Please elaborate and provide more information about your answers above: <TEXT BOX>

(9) Please tell us how you would characterize your Followers' reaction to the above photo? (1: Strongly negative to 7: Strongly positive)
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7

(10) What are the reactions that this photo received on Instagram? (*Please tell us the number of each type of reaction received.*) (Instructions and corresponding screenshot for finding the number of reactions.)
  - Likes: <TEXT BOX>
  - Number of Comments: <TEXT BOX>
(11) How many days in the past week did you use Instagram?
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
(12) How frequently do you post a photo on Instagram?
  - More than once a day
  - Once a day
  - Once a week
  - Few times a week
  - Once every two weeks
  - Once a month
  - Less often than once a month
(13) How many Followers do you have on Instagram? (Instructions and corresponding screenshot for finding the number of Followers.) <TEXT BOX>
(14) How many people are you following on Instagram? (Instructions and corresponding screenshot for finding the number of people followed.) <TEXT BOX>
(15) How many photos have you posted on Instagram? (Instructions and corresponding screenshot for finding the number of posted photos.) <TEXT BOX>

A.5 Snapchat

(1) Please upload the most recent story you posted on Snapchat. (Instructions and corresponding screenshot for finding and uploading the most recent story post.) <UPLOAD BUTTON>
(2) What is the caption of the above story? (*In case the story has no caption, please enter "N/A" or leave the answer blank. If there are multiple captions, please type all captions, one on each line.*) (Instructions and corresponding screenshot for finding and pasting the caption.) <TEXT BOX>
(3) Who can see the above story? (Instructions and corresponding screenshot for finding the audience setting for the story.)
  - Everyone
  - My Friends
  - Custom
(4) Please select the date on which you posted the above story: <DATE PICKER>
(5) Please indicate your level of agreement with the statements below: (1: Not at all to 7: Completely)
  - To what extent does this story involve personal information about yourself or people close to you, such as accomplishments, family, or problems you are having?
  - To what extent does this story involve personal thoughts on past events, future plans, appearance, health, wishful ideas, etc.?

- To what extent does this story involve your feelings and emotions, including concerns, frustrations, happiness, sadness, anger, and so on?
- To what extent does this story involve what is important to you in life?
- To what extent does this story involve your close relationships with other people?

(6) Please elaborate and provide more information about your answers above: <TEXT BOX>

(7) Think about the time when you posted this story. How much do you agree with the following statements? (1: Disagree strongly to 7: Agree strongly)
- It was important for me to present myself positively in this story.
- I was concerned about how I would come across in this story.
- Select the option marked as moderately disagree. (NOTE: Attention-check question.)
- This story reveals more desirable than undesirable things about myself.
- I didn't care what other people would think of me from this story.
- In this story, I worried about making a good impression.

(8) Please elaborate and provide more information about your answers above: <TEXT BOX>

(9) Please tell us how you would characterize your Friends' reaction to the above story? (1: Strongly negative to 7: Strongly positive)
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(10) How many days in the past week did you use Snapchat?
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(11) How frequently do you post a story on Snapchat?
- More than once a day
- Once a day
- Once a week
- Few times a week
- Once every two weeks
- Once a month
- Less often than once a month

(12) How many Friends do you have on Snapchat? (Instructions and corresponding screenshot for finding the number of Friends.) <TEXT BOX>

(13) How many photos and videos have you posted in your current story on Snapchat? (Instructions and corresponding screenshot for finding the number of posted photos and videos in the current story.) <TEXT BOX>

A.6 Twitter

(1) Please upload the most recent photo you tweeted on Twitter. (Instructions and corresponding screenshot for finding and uploading the most recent photo Tweet.) <UPLOAD BUTTON>

(2) What is the caption of the above photo? (*In case the photo has no caption, please enter "N/A" or leave the answer blank.*) (Instructions and corresponding screenshot for finding and pasting the caption.) <TEXT BOX>

(3) Who can see the above photo? (Instructions and corresponding screenshot for finding the audience setting for the photo.)
   • Public
   • Followers

(4) Please select the date on which you tweeted the above photo: <DATE PICKER>

(5) Please indicate your level of agreement with the statements below: (1: Not at all to 7: Completely)
   • To what extent does this photo involve personal information about yourself or people close to you, such as accomplishments, family, or problems you are having?
   • To what extent does this photo involve personal thoughts on past events, future plans, appearance, health, wishful ideas, etc.?
   • To what extent does this photo involve your feelings and emotions, including concerns, frustrations, happiness, sadness, anger, and so on?
   • To what extent does this photo involve what is important to you in life?
   • To what extent does this photo involve your close relationships with other people?

(6) Please elaborate and provide more information about your answers above: <TEXT BOX>

(7) Think about the time when you tweeted this photo. How much do you agree with the following statements? (1: Disagree strongly to 7: Agree strongly)
   • It was important for me to present myself positively in this photo.
   • I was concerned about how I would come across in this photo.
   • Select the option marked as moderately disagree. (NOTE: Attention-check question.)
   • This photo reveals more desirable than undesirable things about myself.
   • I didn't care what other people would think of me from this photo.
   • In this photo, I worried about making a good impression.

(8) Please elaborate and provide more information about your answers above: <TEXT BOX>

(9) Please tell us how you would characterize your Followers' reaction to the above photo? (1: Strongly negative to 7: Strongly positive)
   • 1
   • 2
   • 3
   • 4
   • 5
   • 6
   • 7

(10) What are the reactions that this photo received on Twitter? (*Please tell us the number of each type of reaction received.*) (Instructions and corresponding screenshot for finding the number of reactions.)
   • Replies: <TEXT BOX>
   • Retweets: <TEXT BOX>
   • Media engagements: <TEXT BOX>
   • Link clicks: <TEXT BOX>

- Hashtag clicks: <TEXT BOX>
- Detail expands: <TEXT BOX>
- Profile clicks: <TEXT BOX>
- Total engagement: <TEXT BOX>
- Other: <TEXT BOX>

(11) How many days in the past week did you use Twitter?
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(12) How frequently do you post a photo on Twitter?
- More than once a day
- Once a day
- Once a week
- Few times a week
- Once every two weeks
- Once a month
- Less often than once a month

(13) How many Followers do you have on Twitter? (Instructions and corresponding screenshot for finding the number of Followers.) <TEXT BOX>

(14) How many people are you following on Twitter? (Instructions and corresponding screenshot for finding the number of people followed.) <TEXT BOX>

(15) How many photos have you posted on Twitter? (Instructions and corresponding screenshot for finding the number of photos posted.) <TEXT BOX>

A.7 Demographics

(1) What ethnicity do you identify as? (*Select all that apply.*)
- American Indian or Native American
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White / Caucasian
- Hispanic
- Other. Please specify: <TEXT BOX>
- Do not wish to specify

(2) Which Gender do you identify with the most?
- Female
- Male
- Other. Please specify: <TEXT BOX>
- Do not wish to specify

(3) Are you currently a student?
- Yes
- No

(4) (If student:) What is/was your major or field of study? <TEXT BOX>

(5) What is the highest level of education you have completed? (*If currently enrolled, highest degree received.*)
- Less than high school
- Some high school
- High school diploma
- Vocational training
- Some college
- College graduate (B.S., B.A., or other 4 year degree)
- Master's or Professional degree (e.g., Law, Medical, Business, etc.)
- Doctoral degree
- Other. Please specify: <TEXT BOX>
- Do not wish to specify

(6) What is your current employment status?
- Employed full time
- Employed part time
- Unemployed looking for work
- Unemployed not looking for work
- Retired
- Homemaker
- Unable to Work
- Do not wish to specify

(7) (If current employment status is Employed full time or part time:) What is your current occupation? <TEXT BOX>

(8) What is four plus two? (NOTE: Attention-check question.)
- 1
- 2
- 3
- 4
- 5
- 6
- 7

(9) What is your current annual household income?
- Less than $10,000
- $10,000 to $19,999
- $20,000 to $29,999
- $30,000 to $39,999
- $40,000 to $49,999
- $50,000 to $59,999
- $60,000 to $69,999
- $70,000 to $79,999
- $80,000 to $89,999
- $90,000 to $99,999
- $100,000 to $149,999
- $150,000 or more

(10) What is your current relationship status?
- Single, never married
- Married
- Widowed

- Divorced
- Separated
- Do not wish to specify

(11) How many children do you have?
  - 0
  - 1
  - 2
  - 3
  - 4
  - More than 4
  - Do not wish to specify

(12) Is there anything else you would like to tell us? <TEXT BOX>

(13) (For Amazon Mechanical Turk:) What is your Amazon Mechanical Turk ID? <TEXT BOX>

(14) (For other recruitment channels:) What is your email address? (Your email address will be stored separately from your responses and will be used only for the purposes of contacting you if you are selected in the random drawing for a $15 Amazon gift certificate or the grand prize of an Apple Watch.) <TEXT BOX>

B CODING INSTRUCTIONS

Thank you for agreeing to help code the photos collected in our study. We want to formalize the coding process to make it systematic and consistent. Before proceeding to code, please carefully read the instructions below. Feel free to ask any questions if you need clarification or further information.

To perform the coding, you will follow the steps below in the listed order:

(1) Complete the online ethics training module of the Collaborative Institutional Training Initiative (CITI). You should login using your University ID and password and complete the module on Social/Behavioral research. Please send your certificate of completion to us. You MUST complete the training before continuing with the rest of the coding procedures.

(2) The photos to be coded are located in an online folder at: <LINK>. Access to the folder is restricted to authorized users, so you will need to login with your credentials to access the folder. Please access the photos only via the Web browser; you should NOT download the photos.

(3) Go through each photo in the folder and assign them one or more of the themes from the following list of themes with corresponding illustrative examples in parentheses:
  - Activity (Baking, Ballet, Bragging, Climbing, Drinking, Eating, Exercising, Gardening, Playing, Relaxing, Sports, Swimming, Watching TV, etc.)
  - Advertisement (Advertising any product, Advertising own brand, Branding, etc.)
  - Animals (Cat, Dog, Fish, Grasshopper, Insect, Leopard, Pets, etc.)
  - Art (Abstract, Artistic, Colors, Drawing, Fractal, etc.)
  - Body parts
  - Celebration (Christmas, Concert, Conference, Entertainment, Event, Festival, Gathering, Party, Show, Valentine's day, etc.)
  - Celebrity (Actor, Famous non-political person, etc.)
  - Crowd
  - Emotions (Anger, Brag, Cute, Happy, Love, Scary, Smile, etc.)
  - Family and Friends (Baby, Children, Couple, Family, Father, Friend, Kids, Mother, Parent, Pregnant, etc.)

- Fashion (Beauty product, Clothing, Costume, Filter, Hairstyle, Magazine, Makeup, Mask, etc.)
- Food (Beverage, Broccoli, Cake, Celery, Chicken, Dessert, Dinner, Fish, Meat, Stew, Turkey, Wine, etc.)
- Gaming (Board game, Chess, Game, Leaderboard, etc.)
- Humor (Cartoon, Clown, Comic, Funny, Joke, Joker, Meme, Parody, Sarcasm, Satire, etc.)
- Individuals (Ballerina, Clown, Man, Nun, Portrait, Selfie, Woman, etc.)
- Mundane
- Nature (Beach, Clouds, Earth, Field, Flower, Forest, Garden, Grass, Landscape, Minerals, Mountain, Ocean, Outdoors, Planet, Rainbow, Sea, Season, Soil, Sunset, Tree, Universe, Winter, etc.)
- Objects (Balloon, Basket, Chair, Computer, Crystal, DVD cover, Furniture, Instruments, Kaleidoscope, Keyboard, Laptop, Magazine, Plate, Sign, Sphere, Vase, Window, etc.)
- Politician
- Quotes (Greetings, Inspirational text, Message, etc.)
- Screenshot (App screenshot, Game screenshot, Score screenshot, etc.)
- Sociopolitical (Banner, Politics, Protests, etc.)
- Travel (Auditorium, Meeting room, Museum, Playground, Restaurant, Store, Theme park, Water park, etc.)
- Transportation (Car, Scooter, Traffic, etc.)
- Other (Please provide label(s):)

Note that your coding should capture the *essence* or *intent* that the photo is trying to convey (to the extent you are able to judge it) rather than simply indicating objects that the photo happens to contain. For example, a photo of a restaurant may be coded as an Activity (dining out) and/or Family and Friends and/or Travel (in case the restaurant is visited on vacation), but may not be coded as Objects simply because it happens to contain a clock on the wall in the background. In contrast, a photo that prominently features a clock would be coded under Objects. Remember that the themes are NOT mutually exclusive, i.e., multiple codes may be applicable to a given photo. If you feel that a photo needs a code that is not in the provided in the list above, please code it as Other and provide your own coding label. You may include further notes in a separate column at the end.

(4) In addition to coding each photo, please answer the following question regarding each photo. Think about the time when the poster uploaded this photo. How much do you agree with the following statements? (1: Disagree strongly to 7: Agree strongly)
- It was important for the poster to present himself or herself positively in this photo.
- The poster was concerned about how he or she would come across in this photo.
- This photo reveals more desirable than undesirable things about the poster.
- The poster did not care what other people would think of him or her from this photo.
- In this photo, the poster worried about making a good impression.

(5) Once you have completed the above steps for all photos in the folder, please email the researcher. We will set up a meeting to discuss and resolve discrepancies among the coders.

(6) Once all discrepancies in the coding of the first set of photos are resolved, you will code the remaining set of photos following the same steps as above. Depending on the extent of the match among the coders for the second set, an additional meeting may required to discuss and resolve discrepancies.