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Attraction behind "Beauty": Revealing Gay Men's Self-Presentation on a Dating App with Computer Vision

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Abstract

Profile photos, which are fundamental constructs of online self-presentation, are crucial to building successful online relationships. The visual cues embodied in profile photos are factors that help initiate socialization on visual-based gay dating platforms. This study applies app crawler techniques to collect publicly disclosed profile photos from Finka, a Chinese gay men's dating app, and uses computer vision artificial intelligence applications to analyze the visual cues from the photos. The results show that appealing faces are relevant factors of user popularity, seemingly confirming the existence of the gay male beauty myth in the dating community. Photos that expose bodies are also popular, although most profile photos have low body visibility, which may be rooted in gay men's culture in China. Extending existing research, we incorporate the background scene as another theoretical dimension of visual cues. Interestingly, we find an ambiance effect in profile photos—showing background scenes can serve as a self-presentation tactic that potentially influences users' popularity. In particular, private scenes (e.g., locker room and bedroom scenes) can arouse more desire for further interaction with the presenter.

Keywords: computational methods; computer vision; gay; online dating; Finka; visual cues; self-presentation

Introduction

Individuals use symbols to construct situations and present themselves to others (Goffman, 1978). In computer-mediated communication (CMC), controlling social cues is essential for presenting the desired impressions online (Walther, 1996). Modern dating app users apply various tactics to manage the impressions of others and accomplish interpersonal goals, such as finding a partner (Ellison et al., 2006; Toma & Hancock, 2010). Among self-presentation tactics, users' publicly accessible profiles in these apps, which they disclose willingly and purposefully, are essential means of presenting themselves and contain visual social cues that influence others' first judgments (Miller, 2020; Ranzini & Lutz, 2017).

Typical online profiles may include a personal avatar and self-introduction information. Popular dating apps since the 2010s have adopted two major visual styles for displaying profile information: the swipe style and the thumbnail style. Swipe-style apps, such as *Tinder* and *Finka*, use the entire screen to show one user profile picture, and viewers can swipe left or right to express whether they like the person shown. Profile photos in this kind of app are dominant ways of self-presentation and naturally help initiate socialization. By contrast, the user interface of thumbnail-style apps, such as *Grindr* and *Blued*, displays multiple users' avatars on a single page. The image sizes are usually small and less informative.

China is one of the largest markets for gay dating apps. However, Chinese society does not show adequate public acceptance of or government support for gay people. As a result, Chinese homosexuals, as a socially invisible group, are less likely to be open about their identities in real life, which then affects their self-presentation behavior on social media. An online survey revealed that 66.1 % of gay men considered photos the most critical elements in others' profiles (Chan, 2018). Therefore, it is interesting to determine whether they expose themselves less or more in their online profile photos.

The emergence of visual dating platforms has provided not only an unprecedented public venue for gay men's open interaction (Chan, 2017) but also a significant opportunity for academic research on gay users' profiles. However, previous studies have mostly treated profile photos as dependent variables, focusing on gay online dating users' strategies for visual presentation and the factors that impact the cues in photos on the sender's side (Wu & Ward, 2017). We identify two possible improvements from previous research. First, although existing studies have discussed the exposure of various physical visual cues, they have ignored the presence of background scene cues from photos. Second, the relationship between visual cues and their effects

on users' dating popularity remains unclear. Few have empirically measured the effects of these strategies in a real-world online context.

In this study, we will address the above gaps by analyzing users' self-representation through their public profiles in *Finka*, the largest swipe-style gay dating app in China. We use computer vision (CV) techniques to distinguish the different types of visual cues in users' self-presenting profile photos and invigorate the content of the social cues to examine the effects of these cues on users' popularities. This study could also improve our understanding of the construction of online intimacy beyond the gay community and provide insights into intimacy across sexual orientations. Although all of the users' profile data in this study are public—users on the platform can see one another's profile pictures and information without asking for permission—we acknowledge the potential ethical issues in this study. We pay particular attention to collecting, processing, and protecting the dataset to ensure this study's legal compliance and moral standards. We will also address the limitations of the methods at the end of the paper.

Literature Review

Profile photos as self-presentation and the visual cues exposed

People convey information to curate ideal impressions of themselves for others in face-to-face communications (Goffman, 1978). In this regard, the emergence of CMC technologies has provided affordances for managing online impressions and turned self-presentation into an *exhibition* (Hogan, 2010). In CMC settings, individuals can manage others' impressions of them through social cues by engaging in the process of information exchange and impression formation. Social cues in interpersonal communication are indicators of particular social meanings and message elements (Walther, 1996; Xu & Liao, 2020). Under the conditions of asynchronicity and editability, CMC platforms provide users with unlimited time to edit social cues and embellish their presentations in customized profiles (Toma & Hancock, 2010; Walther, 1996). Generally, social cues in CMC can be divided into verbal cues (e.g., chat text and textual bio) and nonverbal cues (e.g., profile photos and emojis). Past research has shown that people can actively collect information to compensate for the lack of nonverbal cues through photos (Walther, 1996, 2008; Walther et al., 2001). In dating apps, photos on the profile page are crucial nonverbal cues to self-presentation and the success of establishing a relationship (Hancock & Toma, 2009). Users construct

these dating apps as *sexual field sites*, where gay men need to follow the unwritten rules in these apps, whether to secure an immediate hook-up or to experience long-term romantic intimacy. *No pic, no reply* is one of such rules. This rule is even more evident in visual-based dating apps, which users see as more of a "platform for self-presentation" (Wu & Trottier, 2021, p. 9). Profile photos are the first step toward building intimacy. Users can maximize their attractiveness (Ward, 2017) and become more popular (Birnholtz et al., 2014) by managing their profile photos and selectively presenting elements in their profile photos. Therefore, profile photos serve as the primary sources of nonverbal cues in visual-based dating apps, and the microscopic elements of profile photos can be regarded as subtle signals to other daters. In our study, we define these subtle elements in profile photos that help to provide impressions for daters as visual cues.

Past research has emphasised the dominance of visual photos in gay men's online dating (Chan, 2018). It comprises two streams. The first research stream measures the factors that influence the presentation of photos, for example, demographic variables (Fitzpatrick et al., 2015; Miller, 2020) and sociocultural variables (Chan, 2016). The second research stream examines how gay men present themselves through photos (Miller, 2015; Toma & Hancock, 2010). These studies all consider photos and personal profiles as dependent variables and focus on the intentions of photo presentations (Wu & Ward, 2017). Moreover, past research has investigated mainly the sender side, while little is known about whether users' profiles are received and returned as expected. Furthermore, problems in online dating, such as authenticity (Guadagno et al., 2012; Toma & Hancock, 2010) and superficial profiles (Chan, 2018), challenge studies of visual representation. However, dating apps are reduced-cue environments, so people then convey impressions to other daters in the desired way. The profile is where the impression is conveyed, and the photos constitute a gateway for future face-to-face dating (Ellison et al., 2012). Cues in the photo seem to partly shape whether the dater is popular in the dating app. The question then becomes whether the manipulated visual cues in profile photos can still play a role in increasing user popularity in online dating.

Several studies have been performed to test the consistency between the sender and the receiver. For example, the lens model approach has been applied to determine whether a user can estimate the expected personality traits as the profile owner presents them in the profile (Hall et al., 2014; Tong et al., 2020). This article draws insights from previous work but argues that some research gaps remain. First, past empirical studies have been

conducted primarily in laboratory settings rather than in the real world. This choice gives rise to the second issue. These studies have been conducted from an individual rather than a collective perspective. Given that the present work concerns online dating apps and that the effects measured in previous studies are relatively singular, a more comprehensive measure of the effectiveness of users' self-presentation should be applied in online dating studies.

Face, body, and background scenes in the photos

Visual cues in our study refer to the subtle elements in profile photos that help provide daters with impressions. However, various visual cues exist in profile photos, and determining which cues should be interpreted is challenging. Although attractiveness is one of the most important assets in online dating (Wongsomboon et al., 2021), and physical attractiveness is the strongest cue (Guerrero & Floyd, 2006), many elements of physical attractiveness have cueing effects. To determine which cues are more critical in shaping user popularity, we divide these cues into central and peripheral cues based on previous literature and ultimately choose two physical cues: face and body. Previous studies have considered the physical attractiveness reflected in profile photos as the primary and predominant element in mate selection (Berscheid & Walster, 1974; Guerrero & Floyd, 2006; Wang et al., 2010), as well as the desired impressions conveyed (Toma & Hancock, 2010). Compared with heterosexuals, homosexuals often devote more to the performance of sexuality and self-presentation (Hakim, 2010). Therefore, we consider the two cues of face and body crucial in gay men's online dating apps. This study also focuses on the cues provided by scenes, which have been neglected in past studies. Contextual cues (Carlson et al., 2004) may affect the attractiveness of self-presentation but are less discussed. This study explores how the disclosure and attractiveness of visual cues relate to the effects of self-presentation.

Facial cues. In the gay community, facial disclosure has been assigned a profound cultural connotation. For gay men, whether a personal photo shows the face is an important consideration when choosing a partner (Miller, 2020) and initiating online communication (Cassidy, 2013). Mowlabocus (2010) noted that facial disclosure concerns gay men's self-perceptions because gay men have historically been invisible and unable to reveal their sexual identities. A bold facial disclosure means that users feel pride in themselves and have higher levels of gay identity. In addition, a face-revealing photo serves as a social passport for the community. Not showing one's face

means anonymity, and it is difficult for anonymous users to communicate with others intimately.

In addition to facial disclosure, the attractiveness of the face is essential. Although many facial features associated with facial attractiveness have been researched in the past, and all measurements can be effective, such as face size, skin condition (Peng, 2018), facial symmetry, proportions, and pupil size (Guerrero & Freud, 2006), the truth is that in everyday life, people always perceive the attractiveness of the face in a holistic way. In addition, whether there is a beauty premium in online domains has increased scrutiny (e.g., Groggel et al., 2019; Jaeger et al., 2019). The beauty premium refers to the notion that more physically attractive workers have better earning advantages (Rosenblat, 2008). In the dating app context, we use the term "facial attractiveness" to reflect the good-looking degree of the face as a composite indicator of the above facial features. We then propose our first research hypothesis:

H1. Facial disclosure and facial attractiveness in profile photos are positively associated with user popularity.

We are aware that there may be disputes regarding the concept of facial attractiveness. Therefore, we will address ways to minimize discrimination and prejudice and follow ethical standards in the Research Methods section.

Apart from the features mentioned above, whether a self-presenter (sender) is facially attractive is also related to the facial movements represented by facial expressions (Gill, 2020). Unlike the features relating to whether one is good looking or not, facial expression relates to the senders' affective states. Research has shown that emotional arousal drives content virality regardless of its positive or negative valence (Berger, 2014). A study on visual media, such as Instagram, shows the positive effect of displaying emotions as a personalization strategy for audience engagement (Peng, 2020). Does the same pattern exist on gay social media? We propose the second research hypothesis and the first research question:

H2. Compared to photos without expressions, the use of facial expressions is positively associated with user popularity.

RQ1. How do the effects of positive and negative facial expressions differ?

Body cues. Men are believed to prioritize physical attractiveness more than women do, and gay men strive to emphasize "objective and physical characteristics" in order to find partners for sex and romance (Deaux & Hanna, 1984, p. 374; Wood, 2004, p. 46). An empirical study found that users with different body shapes may selectively show their faces, affecting whether they attract others' attention (Fitzpatrick et al., 2015). This finding

suggests that body perception is dynamically related to body disclosure. Some gay men noted that they feel pressured by male norms to display a model body and attract the attention of other men (Sánchez et al., 2009). An empirical study of a social networking site for German gay men found that the degree to which individuals present nude photos better predicts offline dating and sexual behavior, which implies that body disclosure may have better social outcomes and that posting nude photos brings users a greater sense of empowerment and psychological satisfaction (Lemke & Merz, 2018). However, similar to the question above, there are many dimensions of body cues, such as body type, physical symmetry, waist-to-hip ratio, and height. Using the same logic, we choose body shape as a composite indicator of body cues. Enlightened by the current findings, the present study measures the relationship between body disclosure cues and social effects and proposes the third hypothesis:

H3. Body disclosure and body shape in profile photos are positively associated with user popularity.

Background scene cues. Because of cultural factors, Chinese gay people prefer not to reveal explicit social cues (e.g., exposing their bodies or showing their faces completely) in their photos (Chan, 2016; Miller, 2015). Therefore, other hidden cues in photos are vital. For example, the background scenes photographed are hidden cues with a wealth of social information. Photos with no background or a blurred background may not provide adequate social cues, but specific spaces may shape a viewer's impression. In our study, background scenes are categorized into public and private scenes. Public scenes are generally accessible to people, such as beaches, lakes, and entertainment venues, usually outdoors; private scenes are personal, intimate places, such as bathrooms and bedrooms, usually indoor places with admission rights and privacy expectations.

A few past works about selfies mentioned scenes/locations; some of these works distinguished this attribute, which is either public (e.g., wilderness, city, and party) or private (e.g., bedroom and apartment) in their coding schemes (Ma et al., 2017; Qiu et al., 2015). Although they did not provide a clear standard for the dichotomy, it can be inferred from the examples that what they call a private location refers to personal scenes. In terms of effect, a study of youth pornographic flirting messages showed that selfies taken in swimming pools, bathrooms, or bedrooms produce stronger sexual cues (Albury, 2015). Peng (2020) examined the settings of politicians' social media photos and revealed that private, nonpolitical scenes could increase their popularity. Our study distinguishes the contextual information in user

profile photos and analyzes which scenes are more socially effective.

H4. Compared to photos without scenes, private and public scenes are positively associated with user popularity.

RQ2. How do the effects of private and public scenes differ?

Computer vision technology

Most visual cue studies in communication studies use lab experiments that rely excessively on well-designed materials and environments with limited subject samples. How social cues with different levels of variability affect social media users in the real world remains unknown. To fill this gap, we use CV techniques in this study to explore the characteristics of social cues revealed from a large-scale user-uploaded photo dataset and their effects on user popularity in gay dating apps. At the same time, as a more direct source of data, online behavior tracking allows researchers to perform a non-invasive analysis of online users' self-representation patterns.

Computer vision is essentially an automated visual content analysis technology. Its applications fall into three common categories: object detection, facial recognition, and visual sentiment analysis (Williams et al., 2020). Traditionally, image and video analysis in communication research has relied on manual coding or qualitative methods, which tend to be more costly and less feasible because of the massive amount of visual data generated by the internet. In the past decade, powerful CV techniques, such as deep neural networks and pre-trained models, have gradually become more user friendly and have therefore become popular among social scientists (Araujo et al., 2020; Joo & Steinert-Threlkeld, 2018). Peng (2020) summarized four CV approaches for social scientists, and the present study uses two approaches: one leverages open-source or commercial CV artificial intelligence (AI) applications (e.g., Face++ and Microsoft Azure) to perform standardized tasks, such as facial recognition and emotion detection, and the other uses supervised learning convolutional neural network (CNN) models trained on a large number of labeled images to help classify images.

Studies applying CV techniques have been fruitful. For example, Peng (2018) and Boxell (2021) used CV applications to study the visual biases of different partisan media in the 2016 US election. Peng (2020) further evaluated the communication effect of visual content by crowdsourcing coding and found that image features, such as facial expressions and image settings, can influence viewers' perceptions. Boussalis and Coan (2020) used an assessable CV tool, the Microsoft Face API, to analyze how the emotional performance of political candidates in televised debates affects

Table 1: User profile data fields

Field	Type	Value range
ID	Text	-
Likes	Numeric	0–47,396
Age	Numeric	18–91
Height	Numeric	140 cm–250 cm
Weight	Numeric	40 kg–150 kg
Distance	Numeric	0.7–9 km / >100 km / Confidential
Active time	Text	1–59 minutes ago / 1–9 hours ago / Confidential / Online
Personal bio	Text	-
Residence	Text	-
Sex role	Text	Vers top / Top / Bottom / Vers / Vers bottom
Relationship status	Text	Single / Open relationship / In a relationship

voter impression formation. Computer vision techniques, such as those used in political (Haim & Jungblut, 2021; Joo & Steinert-Threlkeld, 2022; Lu & Pan, 2022) and pandemic contexts (Dietrich & Ko, 2022), have been found reliable in their instrumental validity across different contexts.

Research Methods

Data

We collected public user profiles from Finka, one of China's largest gay social apps. We simulated users' swiping behaviors using Appium and saved the public profiles pushed to the simulated accounts. Three new accounts were registered to avoid the influence of preexisting user preferences and personalized recommendations. These accounts do not make social connections with other accounts, so only public profile information was retrievable. A total of 10,334 user profiles were collected. User information contains 11 fields: *ID, likes, age, height, weight, distance, active time, personal bio, residence, sex role, and relationship status* (see Table 1). We used regular expressions to clean the emoticons and special symbols in the ID texts and converted the cleared IDs into random codes.

We argue that user profile data shall be considered publicly available social media data according to the International Covenant on Economic, Social and Cultural Rights[1] and 45 CFR 46 Subpart A of the Common Rule

[1]The International Covenant on Economic, Social and Cultural Rights is a multilateral treaty adopted by the United Nations General Assembly on December 16, 1966, through General

[2]. During the data collection period from January 18, 2021 to January 20, 2021, Finka imposed no privacy or copyright policy over data collection (see Appendix A). Our data storage and processing procedures followed the highest standards possible [3].

Measures

Face disclosure and facial attractiveness. We used the open-source Baidu AI Face Detection API 2.0 and the Face++ face detection API to analyze facial features. The Baidu API was first used to determine whether an image contained a human face and the degree of image occlusion, facial attractiveness, and facial expressions (Tang et al., 2018). Then, Face++ was applied to assist in assessing facial attractiveness and facial expressions. It is worth noting that these AI applications can be discriminative, so we trained three human coders with ethical guidance. We ended up using AI outputs that were most consistent with those obtained by the educated human coders. Appendix B reports the validation of the CV outputs with manual coding.

Body disclosure and body shape. We rewrote Yahoo's not suitable/safe for work (NSFW) classifiers, an open-source deep learning model (Mahadeokar & Pesavento, 2016), with the TensorFlow library and measured the degree of human nudity in an image. Not suitable/safe for work images originally referred to violent or erotic items. The output value is an NSFW score, with a larger value indicating a more exposed human body. The CV application outputs generally agree with the manual coding (see Appendix B). Body shape was measured with the body mass index (BMI)[4], the body weight divided by the square of the body height. We defined a BMI below 18.5 and above 28.0 as unhealthy and values within the range as healthy.

Assembly Resolution 2200A (XXI). It came in force on January 3, 1976.

[2]The Common Rule is a 1981 rule of ethics in the US regarding biomedical and behavioral research involving human subjects.

[3]Our data may contain potentially identifiable data revealing one's sexual orientation. Many jurisdictions worldwide have legislated the processing of such data, in which the General Data Protection Regulation (EU) (GDPR) is usually considered an exemplar and the most stringent one. Article 9 of the GDPR (https://gdpr-info.eu/art-9-gdpr/) indicates that the processing of such data is prohibited with certain exceptions. Our study follows the exception listed in point (j), paragraph 2. First, we process the dataset with a scientific purpose. Second, we only report statistical results, which means no individual can be identified. Third, we perform data deidentification and database encryption to maintain data security. Specifically, sensitive text information and selfie images are processed using hash functions and image segmentation technology (see example picture in Appendix A). A password is then set to ensure that our data could not be accessed without the researcher's consent.

[4]National Health and Family Planning Commission of the People's Republic of China. WS/T 428-2013 Criteria of weight for adults [S]. Beijing: China Quality Inspection Press, Standards Press of China, 2013.

Background scenes. We used the *iFlytek* scene recognition API [5] and a pre-trained CNN model ResNet-18 (Zhou et al., 2017) to classify the backgrounds of the profile images into public settings, private settings, and no specific scenes. The image classification process and the agreement with human coding are detailed in Appendix C.

Completeness of textual cues. Moreover, the completeness of textual cues, including demographic information (i.e., age and relationship status) and personal information (i.e., height, weight, distance, active time, personal bio, residence, and sex role), was determined from the user profile pages and used as a control variable. This variable was calculated by dividing the number of complete fields by the total number of fields (nine).

Popularity. On *Finka*, users opt to "like" or swipe away from users, mainly based on the impressions presented in profile photos. As "likes" are decided after the user has seen the profile photo, we consider the number of "likes" to be the effectiveness of the user's self-presentation. In this way, the number of likes is a precise reflection of the receiver's evaluation of the sender's self-presentation and indicates the popularity of the profile photos. Thus, we used the number of likes to measure popularity.

All variables extracted from the user profiles are listed in Table 2

Results

Descriptive analysis of the variables

Independent variables. Nearly half of the 10,334 users (47.97 %) fully disclosed their faces, many users (34.78 %) partially disclosed their faces, and a few (17.25 %) did not disclose their faces (see Fig. 1). By contrast, most users had low levels of body disclosure, accounting for 93.79 % of the total sample. In terms of facial attractiveness and expressions, more than half of the users (52.51 %) had high facial attractiveness, and most users (73.56 %) had no facial expressions. Regarding body shape and photo scenes, most users (82.38 %) had a healthy BMI, and photos of no scenes, public scenes, and private scenes accounted for 37.84 %, 35.37 %, and 26.80 % of all photos, respectively.

Dependent variable. The mean value of likes received was 2,682.93 (median = 1,310.5; standard deviation = 3,952.75), with a cumulative percentage of less than or equal to the mean reaching 69.9 %. The skewed distribution of the dependent variable is square root transformed in the subsequent analysis.

[5] https://global.xfyun.cn/

Table 2: Variables extracted from the user profiles

Variable	Definition	Measurement
Facial disclosure	Extent of facial disclosure in photos	Baidu AI face detection (0_No face/1_Moderate/2_High)
Facial attractiveness	Extent to which the face of the user is good looking in photos	Baidu AI & Face++ face detection (0_Low/1_High)
Facial expressions	Facial expressions in photos	Face++ face detection (0_No expression/1_Negative/2_Positive)
Body disclosure	Extent of body nudity in photos	NSFW (Not Safe for Work) score (0_Low/1_Moderate/2_High)
Body shape	Body shape of the user in photos	Body Mass Index (BMI) (0_Unhealthy/1_Healthy)
Background scene	Background scenes in photos	(0_No scene/1_Public/2_Private)
Completeness of textual cues	Completeness of textual information	Number of complete fields divided by the total number of fields
Popularity	User popularity in the community	Number of "likes"
Residence	Text	-
Sex role	Text	Vers top / Top / Bottom / Vers / Vers bottom
Relationship status	Text	Single / Open relationship / In a relationship

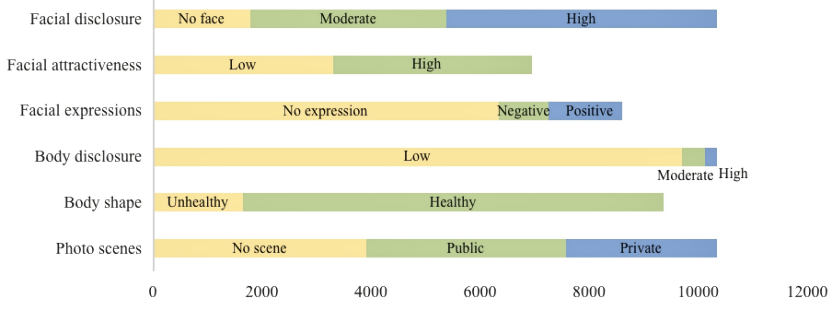


Figure 1: Results of the descriptive analysis of the independent variables

Multiple linear regression analysis

This study's independent variables included three fixed-order and three fixed-class variables. Therefore, we conducted a one-way ANOVA on these variables. The ANOVA results for facial disclosure, body disclosure, facial

Table 3: Results of the multiple linear regression analysis

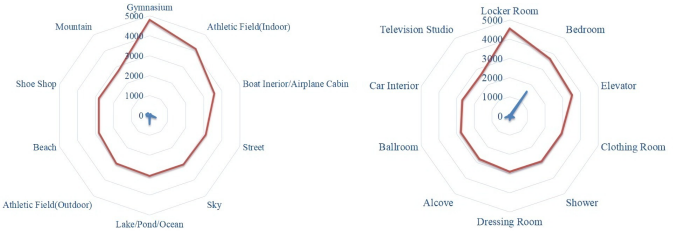
	Model I				**Model II**			
	beta	t	p	VIF	beta	t	p	VIF
Independent variables:								
Facial disclosure (reference group: no face/low)								
Low	0.04	3.08	0.00***	2.00	-	-	-	-
High	0.07	5.05	0.00***	2.01	-0.00	-0.17	0.86	1.10
Body disclosure (reference group: low)								
Moderate	0.07	7.55	0.00***	1.02	0.06	5.28	0.00***	1.01
High	0.04	4.33	0.00***	1.02	0.04	3.31	0.00***	1.01
Photo background scenes (reference group: No scene)								
Public	0.13	11.47	0.00***	1.29	0.12	8.61	0.00***	1.28
Private	0.19	17.86	0.00***	1.26	0.23	17.34	0.00***	1.25
Facial attractiveness					0.04	3.06	0.00***	1.10
Body shape					0.10	8.58	0.00***	1.01
Control variables:								
Text social cues completeness	-0.01	-0.62	0.54	1.00	-0.20	-16.47	0.00***	1.01
N	10,334				6,234			
Adjusted R^2	.038				.104			

*Dependent variable: Square root trans Likes. *p <0.1; **p <0.05; ***p <0.01.*

attractiveness, body shape, and photo background scenes showed heterogeneity. Therefore, we further conducted the Kruskal–Wallis test (K–W test) for facial disclosure, body disclosure, and photo background scenes, and the Mann–Whitney test (M–W test) for facial attractiveness and body shape. The results showed that the distributions of the number of likes at different levels for all five variables were significantly different. In addition, the ANOVA results for facial expressions showed that the distribution of the number of likes exhibited no significant difference regardless of whether the characters had expressions. Therefore, the results support H2 and answer RQ1 by indicating that facial expressions do not play a key role in influencing the popularity of gay socialization.

We also conducted a multiple linear regression analysis to analyze the covariance between the independent variables and to explore the effects of the different visual cues on user popularity (Table 3). We first performed a regression analysis on all samples (N = 10,334) and then added facial attractiveness and body shape to the photos of disclosed faces (N = 6,234).

Model I indicates that the different degrees of facial disclosure signifi-



(a) Public scenes (b) Private scenes

Figure 2: Top 10 common scenes and the average number of likes. The red line represents the average number of likes for the scene, and the blue line represents the frequency of scene use.

cantly affected popularity (beta = 0.042, $p < 0.01$; beta = 0.070, $p < 0.001$). The degree of body disclosure significantly affected popularity as well, as photos with higher body disclosures were more popular (beta = 0.074, $p < 0.001$; beta = 0.042, $p < 0.001$). Regarding photo scenes, public and private scenes significantly influenced photos with no apparent or discernible scenes, which demonstrated the existence of background scene effects, namely, that users of dating apps for gay men prefer photos with specific scenes (H4). Furthermore, the data show that private scenes (e.g., home and bedroom) had a higher coefficient (beta = 0.193) than public scenes (beta = 0.126) when affecting popularity, and these intimate, hidden, and suggestive scenes were the most popular (RQ2). Model II confirms Model I regarding body disclosure and background scene effects. However, there was no significant difference in user popularity between users with low and high facial exposure. The results further indicate the significant influence of facial attractiveness and body shape (beta = 0.038, $p < 0.01$; beta = 0.103, $p < 0.001$), thus confirming H1 and partly confirming H3. These findings demonstrate that whether faces and bodies are disclosed is significantly correlated with popularity during the online socialization of gay men and that facial attractiveness and body shape are of great importance.

We then further analyzed the usage count and the average number of likes for specific scenes. We selected the 10 scenes with the highest frequency among public and private scenes and then drew a radar chart of the likes and scene frequencies. As shown in Figure 2, among public scenes, the *gymnasium* and *athletic field* were the two most popular scenes, with an average of more than 4,000 likes, while among private scenes, the *locker room* and *bedroom* were the most popular. It is worth mentioning that the use frequency of the *bedroom* reached 1,563 times, which was much higher than that of the other scenes.

Discussion

This study examined the effect of visual cues in profile photos in an online dating community for gay men. Focusing on users' self-presented profile photos in the Chinese gay men's visual-based dating app Finka, we selected and operationalized three visual cues: facial cues (including facial attractiveness and expressions), body cues (represented by body shape), and background scene cues. In terms of facial and body cues, (1) most users chose to show their faces in their photos, and whether to show faces is directly related to one's level of popularity. (2) For an exposed face, facial attractiveness was most closely related to popularity. (3) Facial expressions did not have a significant impact on popularity. (4) Photos that exposed users' bodies were more popular, but most users had low body visibility. In terms of background scene cues, (5) the background scene of a photo, as a visual cue, had an important influence on popularity. (6) Private scenes represented by locker rooms and bedrooms were generally more popular than public scenes.

Beauty myth, body disclosure, and visibility inequality in self-presentation

Our findings show that there is indeed a consistent relationship between physical attractiveness (disclosure of the face and body, facial attractiveness, and body shape) and the expected self-presentation effects. Our findings elaborate on the gay male beauty myth phenomenon in online gay social spaces (Campbell, 2004); the pursuit of beauty is an aesthetic cultural norm rooted in the community of gay men. The gay male beauty myth is manifested in facial beauty and body shape. Showing a beautiful face and body in a photo increases the user's capital, thus constructing an excellent personal impression and consequently creating more possibilities for finding a lover and establishing intimacy. This beauty myth determines the differences in popularity among gay men's online social networks.

While body shape is dominant and determines popularity, users who disclose their bodies were the minority in *Finka*. Previous studies on *Jack'd* noted that Asian men tend not to overexpose their bodies (Miller, 2015), and only 36.8 % of Chinese users post at least one facial photo of themselves (Chan, 2016). Therefore, the present study provides large-scale empirical evidence that most Chinese gay men do not tend to disclose their bodies on online dating apps. By contrast, 47.97 % of *Finka* users fully disclosed a facial photo (over 80 % if the partial disclosure is counted). Compared to

the six-year-old data from Chan (2016), we can see that the self-disclosure among gay men in this study was higher but remained low.

Social media apps targeted solely at gay men seemed to function as platforms for these individuals to disclose their identities to some extent. Can we argue that gay men in China are becoming more open and accessible in the self-disclosure of their sexual identities? We do not think it is possible to draw such a conclusion. First, because of the lack of qualitative research, such as interviews with users, it is not possible to examine whether the disclosure is related to self-will or to the technical feature of *Finka*'s visual-based mechanism. As mentioned above, users must submit a photo to make friends, so this self-disclosure is compulsory and does not reflect the subjective intent of users. Second, as noted, Finka is just an internal community for gay men; in China, the potential cultural stigma resulting from the restrictions of a dominant heterosexual culture and strict state regulations impose a double limit on gay men's self-disclosure. These restrictions will also impact the public disclosure of identities. In addition to these contemporary reasons, there are historical reasons. The concept of sexual orientation did not previously exist in Chinese history, and same-sex activities are portrayed in predominantly social rather than sexual terms. During the imperial period, upper-class men with great power, such as emperors or wealthy lords, could dominate and have sex with people in the inferior class, such as concubines or younger male servants. Homosexuality has not been supported or accepted in Chinese culture. However, with the Westernization of modern Chinese society, a homo–hetero binary Western culture was introduced to China. Since the Republican period, homosexuality has been seen as a temporary aberration and mental disease. Consequently, people abandoned their traditional tolerance of gay men (Zhou, 2001). Although sex with men has not been illegal in China since the 1990s, and online dating apps provide a rare space for them to develop digital intimacies, gay men are still constrained by social pressures (Hu & Wang, 2013) to keep themselves anonymous.

While online dating apps function as platforms for gay men to present themselves, our data showed that users on *Finka* prefer good-looking, well-built daters. Not only users but also *Finka* officials prefer such users. Hashtags in *Finka*, such as "fat loss battle" and "my exercise diary," were posted to encourage users to show off their ideal bodies. In its official WeChat account, *Finka* said that photos with high popularity would receive additional official exposure, which means higher visibility in the community. Therefore, the dynamics of visual self-representation are more beneficial to users

who already have higher sexual capital in the offline world. Users better at presenting visual cues are more likely to be liked by other daters in the app and thus find romantic and digital intimacy, while those who are less physically attractive are encouraged to embellish their bodies. Consequently, visual presentation in online dating apps exemplifies the "micro politics of visibility." Self-presentation is sexually objectified as a physical presence. Self-objectification tends to reinforce the "gay male gaze" that already exists in the gay men community and will likely lead to body dissatisfaction among gay men (Wood, 2004).

The ambiance effect of background scenes in self-presentation

We analyzed profile photo backgrounds and discovered an ambiance effect of gay men's online self-presentation. This effect is exhibited in two ways. First, compared with scene-free photos, public and private scenes offer more social cues. These cues help presenters eliminate the ambiguity and uncertainty of the impression. For receivers, the presentation of scene cues enhances and creates a sense of space and presence to compensate for missing cues online through the hyper-personal social process (Walther, 1996). Therefore, we argue that background scenes, as contextual cues in profile photos, play a positive role in online presentations.

Second, private scenes usually attract higher popularity. The five highest scenes are the locker room, bedroom, elevator, clothing room, and shower, with the bedroom ranking first, which shows that the ambiance effect has a hierarchical difference. We speculate that these scenes are numerous because they often involve mirrors, making it easy for people to take selfies. Moreover, these private scenes are often intimate spaces; they are not merely physical spaces. As Hall (1959) said, "space speaks" (p. 187). The way people use and perceive space varies with country, race, and culture, as do the messages that space communicates. When two people talk, a change in the distance that the body moves through in space is essential. For example, talking to a senior diplomat is different from talking to a lover in one's space. Accordingly, Hall divided space into intimate spaces and three other non-intimate spaces (personal, social, and public spaces). Private scenes, such as bedrooms and locker rooms, seem more intimate in digital intimacy, such as online dating. The strong intimacy effect might be rooted in specific social and cultural factors in gay men's socialization. For example, photos including bedrooms placing the body in intimate settings may stimulate an ambiance effect of sexual desire and lust.

The scene desires the body by placing it in an intimate space, providing

the body with a context that is rich in social cues. The context of the photo can provide more social cues to the viewer by helping visualize information that the body and face cannot present. The presentation of profile photos is a kind of situated practice (Weilenmann & Hillman, 2020), and contextual cues play an essential role in gay men's visual socialization. This study provided a new important dimension for exploring the effects of social cues in CMC. It expanded the single perspective of traditional dating behavior research, which focuses only on physical cues. In addition, our emphasis on differences in the ambiance effect reveals that some subtle scene cues can help users perceive positive hints over the internet, just as they would in an offline dating scenario. These findings suggest that selecting background scenes in profile photos can be a new tactic in gay men's online self-presentation.

Ethical concerns and implications of our findings

Fighting against discrimination in AI applications/systems is an emerging computer science subfield dedicated to solving this problem technically (Mehrabi et al., 2021). Fair algorithms address the problem before to after the algorithm trains a model. Before training, one could use fair datasets, such as the Diversity in Faces dataset (Merler et al., 2019), which has "diverse facial features, such as different craniofacial distances, skin color, facial symmetry and contrast, age, pose, gender, resolution, along with diverse areas and ratios," (Mehrabi et al., 2021, p27) and fair features; that is, the use of sensitive variables as features is avoided (Ashurst et al., 2022). During training, fairness can be regarded as an additional training target apart from the ground truth (Berk et al., 2017). After the model has been trained, post-processing calibration deals with already biased outcomes. However, post-processing algorithms have limited effects (Bellamy et al., 2018). We therefore took an intuitive approach here to mitigate the potential unfairness problem in using off-the-shelf AI applications—to pick the least harmful model from a candidate pool—and the standard is set by our educated coders.

On the one hand, our findings help users better understand the *law of the jungle of presenting oneself* in dating apps to intentionally present their ideal selves for social purposes. On the other hand, we acknowledge that our conclusion might be exploited by platform recommendation systems, which might exacerbate differences in the visibility of different users on the platform. The findings may lead to the social stereotype that the gay community always seeks sexual gratification and superficial aesthetics. Things

could worsen if the platform does not play a moderating role as it should (i.e., if platform algorithms and community operations continue to drive the link between attractiveness and popularity). We are concerned that inequalities in visibility on dating platforms will grow with each passing day, and the self-objectification of users could be a further impact. Therefore, we urge dating platforms to be committed to equality in user engagement, rather than getting caught up in algorithmic recommendations.

Methodological implications

This study makes a methodological contribution by using a nonobtrusive research method to observe social media visual presentation in an online gay men's community. The retention of digital traces on social networks and the capacity to collect and analyze massive amounts of data have afforded the potential to transform our understanding of human behaviors and societies (Lazer et al., 2009). Moreover, the explosion in the production of images online allows social scientists to test existing theories in new ways and develop new theories on how images can impact society (Williams et al., 2020). Instead of examining at the individual level, we were dedicated to uncovering objective patterns in a large amount of visual data, providing empirical evidence in a real-world setting and observing the general culture of users in *Finka* from a holistic perspective. We provide a new potential methodological path and complete procedure for researchers on gay men. Our methods differed from traditional methods, such as interviews, corpus analysis, questionnaires, and experiments. On the one hand, these methods are limited in their sample representativeness or effectiveness in the real-world context. On the other hand, because of political censorship and active self-censorship (Engebretsen et al., 2015), there is additional resistance to researchers who use ethnography and interviews to find study subjects. Using specific techniques, we adopted an app crawler and CV to collect and analyze gay users' online behavior. With the help of various open-source AI applications for visual analysis, we conducted a more comprehensive and in-depth study of the visual presentation of an online gay men's community. These analytical tools were then combined with a manual coding verification approach to ensure the confidence level of the automatic visual content analysis. These tools and procedures can likely be applied to a broader range of social science research in the future.

Limitations

This study has some limitations that can be further improved. From a methodological perspective, one limitation is that automated content analysis tools do not perform well when judging subjective metrics. In addition, the lack of relevant tools makes it difficult to analyze the content of photos specifically, which prevents the visual cues in this study from being broken down further. Theoretically, this research focuses on visual cues in the gay dating process; however, textual cues also play a key role as control variables. Previous research has suggested that photos are the primary factors determining whether a social relationship is initiated. However, other factors that identify the quality of a social relationship may be present in textual data, such as chats (Wu & Ward, 2020). In presenting personal data, text, such as occupation and interests, also provides space for others to imagine their identities as textual performances. In the future, it may therefore be insightful to investigate the mechanisms by which visuals and text interact through experimental methods and to explore more profound influences in combination with questionnaires. Moreover, the platform's recommendation mechanism and the timing of users' postings of profile photos can impact user popularity. Future studies should rule out the potential discrimination of recommendation systems and use time-series cross-sectional data to explore more accurate patterns and prediction models in online self-presentation behavior.

References

Albury, K. (2015). Selfies, sexts, and sneaky hats: Young people's understandings of gendered practices of self-representation. *International Journal of Communication, 9*, 1734–1745. https://ijoc.org/index.php/ijoc/article/view/3132

Araujo, T., Lock, I., & van de Velde, B. (2020). Automated visual content analysis (avca) in communication research: A protocol for large scale image classification with pre-trained computer vision models. *Communication Methods and Measures*, *14*(4), 239–265. https://doi.org/10.1080/19312458.2020.1810648

Ashurst, C., Carey, R., Chiappa, S., & Everitt, T. (n.d.). Why fair labels can yield unfair predictions: Graphical conditions for introduced unfairness. *Proceedings of the AAAI Conference on Artificial Intelligence*, *36*, 9494–9503.

Bellamy, R. K., Dey, K., Hind, M., Hoffman, S. C., Houde, S., Kannan, K., Lohia, P., Martino, J., Mehta, S., & Mojsilovic, A. (2018). Ai fairness 360: An extensible toolkit for detecting, understanding, and mitigating unwanted algorithmic bias. *arXiv preprint arXiv:1810.01943*.

Berger, J. (2014). Word of mouth and interpersonal communication: A review and directions for future research. *Journal of Consumer Psychology*, *24*(4), 586–607. https://doi.org/10.1016/j.jcps.2014.05.002

Berk, R., Heidari, H., Jabbari, S., Joseph, M., Kearns, M., Morgenstern, J., Neel, S., & Roth, A. (2017). A convex framework for fair regression. *arXiv preprint arXiv:1706.02409*.

Berscheid, E., & Walster, E. (1974). Physical attractiveness. In *Advances in experimental social psychology* (pp. 157–215). Elsevier.

Birnholtz, J., Fitzpatrick, C., Handel, M., & Brubaker, J. R. (n.d.). Identity, identification and identifiability: The language of self-presentation on a location-based mobile dating app. *Proceedings of the 16th international conference on Human-computer interaction with mobile devices & services*, 3–12.

Boussalis, C., & Coan, T. G. (2021). Facing the electorate: Computational approaches to the study of nonverbal communication and voter impression formation. *Political Communication*, *38*(1-2), 75–97. https://doi.org/10.1080/10584609.2020.1784327

Campbell, J. E. (2014). *Getting it on online: Cyberspace, gay male sexuality, and embodied identity*. Routledge.

Carlson, J. R., George, J. F., Burgoon, J. K., Adkins, M., & White, C. H. (2004). Deception in computer-mediated communication. *Group Decision and Negotiation*, *13*(1), 5–28. https://doi.org/DOI10.1023/B:GRUP.0000011942.31158.d8

Cassidy, E. M. (2013). *Gay men, social media and self-presentation: Managing identities in gaydar, facebook and beyond* (Thesis).

Chan, L. S. (2016). How sociocultural context matters in self-presentation: A comparison of us and chinese profiles on jack'd, a mobile dating app for men who have sex with men. *International Journal of Communication*, *10*, 6040–6059. https://ijoc.org/index.php/ijoc/article/view/5829

Chan, L. S. (2018). Ambivalence in networked intimacy: Observations from gay men using mobile dating apps. *New Media & Society*, *20*(7), 2566–2581. https://doi.org/10.1177/1461444817727156

Chan, L. S., Cassidy, E., & Rosenberger, J. G. (2021). Mobile dating apps and racial preferencing insights: Exploring self-reported racial preferences and behavioral racial preferences among gay men using jack'd. *International Journal of Communication*, *15*, 3928–3947. https://ijoc.org/index.php/ijoc/article/view/16730

Chauncey, G., & Strange, C. (1997). Gay new york: Gender, urban culture & the making of the gay male world, 1890-1940. *Labour*, (39), 261.

Deaux, K., & Hanna, R. (1984). Courtship in the personals column - the influence of gender and sexual orientation. *Sex Roles*, *11*(5-6), 363–375. https://doi.org/Doi10.1007/Bf00287465

Dietrich, B., & Ko, H. (2022). Finding fauci. *Computational Communication Research*, *4*(1), 135–172. https://computationalcommunication.org/ccr/article/view/113

Ellison, N. B., Hancock, J. T., & Toma, C. L. (2012). Profile as promise: A framework for conceptualizing veracity in online dating self-presentations. *New Media & Society*, *14*(1), 45–62. https://doi.org/10.1177/1461444811410395

Engebretsen, E. L., & Schroeder, W. F. (2015). Queer/tongzhi china: New perspectives on research, activism and media cultures. *Gendering Asia*, *11*.

Fitzpatrick, C., Birnholtz, J., & Brubaker, J. R. (n.d.). Social and personal disclosure in a location-based real time dating app. *2015 48th Hawaii International Conference on System Sciences*, 1983–1992.

Gill, D. (2020). Decoding the signals of facial attractiveness: A communication theory perspective. In *Beauty-cosmetic science, cultural issues and creative developments*. IntechOpen.

Goffman, E. (2002). The presentation of self in everyday life. 1959. *Garden City, NY*, *259*.

Groggel, A., Nilizadeh, S., Ahn, Y. Y., Kapadia, A., & Rojas, F. (2019). Race and the beauty premium: Mechanical turk workers' evaluations of twitter accounts. *Information Communication & Society*, *22*(5), 709–716. https://doi.org/10.1080/1369118x.2018.1543443

Guadagno, R. E., Okdie, B. M., & Kruse, S. A. (2012). Dating deception: Gender, online dating, and exaggerated self-presentation. *Computers in Human Behavior*, *28*(2), 642–647. https://doi.org/10.1016/j.chb.2011.11.010

Guerrero, L. K., & Floyd, K. (2006a). *Nonverbal communication in close relationships*. Routledge.

Guerrero, L. K., & Floyd, K. (2006b). *Nonverbal communication in close relationships*. Routledge.

Haim, M., & Jungblut, M. (2021). Politicians' self-depiction and their news portrayal: Evidence from 28 countries using visual computational analysis. *Political Communication*, *38*(1-2), 55–74. https://doi.org/10.1080/10584609.2020.1753869

Hakim, C. (2010). Erotic capital. *European sociological review*, *26*(5), 499–518. https://doi.org/10.1093/esr/jcq014

Hall, B., & Henningsen, D. D. (2008). Social facilitation and human-computer interaction. *Computers in Human Behavior*, *24*(6), 2965–2971. https://doi.org/10.1016/j.chb.2008.05.003

Hall, E. T. (1973). *The silent language*. Anchor.

Hall, J. A., Pennington, N., & Lueders, A. (2014). Impression management and formation on facebook: A lens model approach. *New Media & Society*, *16*(6), 958–982. https://doi.org/10.1177/1461444813495166

Hancock, J. T., & Toma, C. L. (2009). Putting your best face forward: The accuracy of online dating photographs. *Journal of Communication*, *59*(2), 367–386. https://doi.org/10.1111/j.1460-2466.2009.01420.x

Hogan, B. (2010). The presentation of self in the age of social media: Distinguishing performances and exhibitions online. *Bulletin of Science, Technology & Society*, *30*(6), 377–386. https://doi.org/10.1177/0270467610385893

Hu, X. W., & Wang, Y. (2013). Lgb identity among young chinese: The influence of traditional culture. *Journal of Homosexuality*, *60*(5), 667–684. https://doi.org/10.1080/00918369.2013.773815

Huang, G., Cai, M., & Lu, X. (2019). Inferring opinions and behavioral characteristics of gay men with large scale multilingual text from blued. *Int J Environ Res Public Health*, *16*(19), 3597. https://doi.org/10.3390/ijerph16193597

Jaeger, B., Sleegers, W. W. A., Evans, A. M., Stel, M., & van Beest, I. (2019). The effects of facial attractiveness and trustworthiness in online peer-to-peer markets. *Journal of Economic Psychology*, *75*, 102125. https://doi.org/ARTN10212510.1016/j.joep.2018.11.004

Joo, J., & Steinert-Threlkeld, Z. C. (2018). Image as data: Automated visual content analysis for political science. *arXiv preprint arXiv:1810.01544*.

Joo, J., & Steinert-Threlkeld, Z. C. (2022). Image as data: Automated content analysis for visual presentations of political actors and events. *Computational Communication Research*, *4*(1). https://doi.org/https://doi.org/10.5117/CCR2022.1.001.JOO

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159–74. https://www.ncbi.nlm.nih.gov/pubmed/843571

Lazer, D., Pentland, A., Adamic, L., Aral, S., Barabasi, A. L., Brewer, D., Christakis, N., Contractor, N., Fowler, J., Gutmann, M., Jebara, T., King, G., Macy, M., Roy, D., & Van Alstyne, M. (2009). Social science. computational social science. *Science*, *323*(5915), 721–3. https://doi.org/10.1126/science.1167742

Lemke, R., & Merz, S. (2018). The prevalence and gratification of nude self-presentation of men who have sex with men in online-dating environments: Attracting attention, empowerment, and self-verification. *Cyberpsychology, Behavior, and Social Networking*, *21*(1), 16–24. https://doi.org/https://doi.org/10.1089/cyber.2016.0691

Lu, Y., & Pan, J. (2022). The pervasive presence of chinese government content on douyin trending videos. *Computational Communication Research*, *4*(1). https://doi.org/http://dx.doi.org/10.2139/ssrn.3794898

Ma, J. W., Yang, Y. S., & Wilson, J. A. J. (2017). A window to the ideal self: A study of uk twitter and chinese sina weibo selfie-takers and the implications for marketers. *Journal of Business Research*, *74*, 139–142. https://doi.org/10.1016/j.jbusres.2016.10.025

Mahadeokar, J., & Pesavento, G. (2016). Open sourcing a deep learning solution for detecting nsfw images. *Retrieved August*, *24*, 2018.

Mehrabi, N., Morstatter, F., Saxena, N., Lerman, K., & Galstyan, A. (2021). A survey on bias and fairness in machine learning. *Acm Computing Surveys*, *54*(6), 1–35. https://doi.org/Artn11510.1145/3457607

Merler, M., Ratha, N., Feris, R. S., & Smith, J. R. (2019). Diversity in faces. *arXiv preprint arXiv:1901.10436*.

Miller, B. (2015). "dude, where's your face?" self-presentation, self-description, and partner preferences on a social networking application for men who have sex with men: A content analysis. *Sexuality & Culture*, *19*, 637–658. https://doi.org/https://doi.org/10.1007/s12119-015-9283-4

Miller, B. (2020). A picture is worth 1000 messages: Investigating face and body photos on mobile dating apps for men who have sex with men. *Journal of Homosexuality*, *67*(13), 1798–1822. https://doi.org/https://doi.org/10.1080/00918369.2019.1610630

Mol, A., & Law, J. (2004). Embodied action, enacted bodies: The example of hypoglycaemia. *Body & society*, *10*(2-3), 43–62. https://doi.org/https://doi.org/10.1177/1357034X04042932

Mowlabocus, S. (2010). Look at me! images, validation, and cultural currency on gaydar. In *Lgbt identity and online new media* (pp. 215–228). Routledge.

Peng, Y. (2018). Same candidates, different faces: Uncovering media bias in visual portrayals of presidential candidates with computer vision. *Journal of Communication*, *68*(5), 920–941. https://doi.org/https://doi.org/10.1093/joc/jqy041

Peng, Y. (2021). What makes politicians' instagram posts popular? analyzing social media strategies of candidates and office holders with computer vision. *The International Journal of Press/Politics*, *26*(1), 143–166. https://doi.org/https://doi.org/10.1177/1940161220964769

Peterson, J. C., Uddenberg, S., Griffiths, T. L., Todorov, A., & Suchow, J. W. (2022). Deep models of superficial face judgments. *Proc Natl Acad Sci U S A*, *119*(17), e2115228119. https://doi.org/10.1073/pnas.2115228119

Qiu, L., Lu, J. H., Yang, S. S., Qu, W. N., & Zhu, T. S. (2015). What does your selfie say about you? *Computers in Human Behavior*, *52*, 443–449. https://doi.org/10.1016/j.chb.2015.06.032

Ranzini, G., & Lutz, C. (2017). Love at first swipe? explaining tinder self-presentation and motives. *Mobile Media & Communication*, *5*(1), 80–101. https://doi.org/10.1177/2050157916664559

Rosenblat, T. S. (2008). The beauty premium: Physical attractiveness and gender in dictator games. *Negotiation Journal*, *24*(4), 465–481. https://doi.org/10.1111/j.1571-9979.2008.00198.x

Sanchez, F. J., Greenberg, S. T., Liu, W. M., & Vilain, E. (2009). Reported effects of masculine ideals on gay men. *Psychol Men Masc*, *10*(1), 73–87. https://doi.org/10.1037/a0013513

Tang, X., Du, D. K., He, Z., & Liu, J. (n.d.). Pyramidbox: A context-assisted single shot face detector. *Proceedings of the European conference on computer vision (ECCV)*, 797–813.

Toma, C. L., & Hancock, J. T. (2010). Looks and lies: The role of physical attractiveness in online dating self-presentation and deception. *Communication Research*, *37*(3), 335–351. https://doi.org/10.1177/0093650209356437

Tong, S. T., Corriero, E. F., Wibowo, K. A., Makki, T. W., & Slatcher, R. B. (2020). Self-presentation and impressions of personality through text-based online dating profiles: A lens model analysis. *New Media & Society*, *22*(5), 875–895. https://doi.org/https://doi.org/10.1177/1461444819872678

Wah-Shan, C. (2013). Homosexuality and the cultural politics of tongzhi in chinese societies. *Gay and lesbian Asia: Culture, identity, community*, 27–46. https://doi.org/https://doi.org/10.1300/J082v40n03_03

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, *23*(1), 3–43. https://doi.org/Doi10.1177/009365096023001001

Walther, J. B. (2008). Social information processing theory. *Engaging theories in interpersonal communication: Multiple perspectives*, *391*.

Walther, J. B., Slovacek, C. L., & Tidwell, L. C. (2001). Is a picture worth a thousand words? photographic images in long-term and short-term computer-mediated communication. *Communication research*, *28*(1), 105–134. https://doi.org/https://doi.org/10.1177/009365001028001004

Wang, S. S., Moon, S. I., Kwon, K. H., Evans, C. A., & Stefanone, M. A. (2010). Face off: Implications of visual cues on initiating friendship on facebook. *Computers in Human Behavior*, *26*(2), 226–234. https://doi.org/10.1016/j.chb.2009.10.001

Ward, J. (2017). What are you doing on tinder? impression management on a matchmaking mobile app. *Information, Communication & Society*, *20*(11), 1644–1659. https://doi.org/https://doi.org/10.1080/1369118X.2016.1252412

Weilenmann, A., & Hillman, T. (2020). Selfies in the wild: Studying selfie photography as a local practice. *Mobile Media & Communication*, *8*(1), 42–61. https://doi.org/10.1177/2050157918822131

Williams, N. W., Casas, A., & Wilkerson, J. D. (2020). *Images as data for social science research: An introduction to convolutional neural nets for image classification*. Cambridge University Press.

Wongsomboon, V., Sietins, E., & Webster, G. D. (2022). Predictors of face and body visibility in online dating applications among young men who have sex with men. *Journal of Homosexuality*, *69*(13), 2305–2325. https://doi.org/10.1080/00918369.2021.1938469

Wood, M. J. (2004). The gay male gaze: Body image disturbance and gender oppression among gay men. *Journal of Gay & Lesbian Social Services*, *17*(2), 43–62. https://doi.org/https://doi.org/10.1300/J041v17n02_03

Wu, S. W., & Trottier, D. (2021). Constructing sexual fields: Chinese gay men's dating practices among pluralized dating apps. *Social Media + Society*, *7*(2), 20563051211009014. https://doi.org/Artn20563051211009014.1177/20563051211009014

Wu, S., & Ward, J. (2019). Looking for "interesting people": Chinese gay men's exploration of relationship development on dating apps. *Mobile Media & Communication*, *8*(3), 342–359. https://doi.org/10.1177/2050157919888558

Xu, K., & Liao, T. (2020). Explicating cues: A typology for understanding emerging media technologies. *Journal of Computer-Mediated Communication*, *25*(1), 32–43. https://doi.org/10.1093/jcmc/zmz023

Zhou, B., Lapedriza, A., Khosla, A., Oliva, A., & Torralba, A. (2018). Places: A 10 million image database for scene recognition. *IEEE Trans Pattern Anal Mach Intell*, *40*(6), 1452–1464. https://doi.org/10.1109/TPAMI.2017.2723009