Can the Ambiance of a Place be Determined by the User Profiles of the People Who Visit It?

Lindsay T. Graham[1], Samuel D. Gosling[2]

Department of Psychology A8000, University of Texas, Austin 78712, USA

[1] lindsaytgraham@gmail.com, [2] samg@mail.utexas.edu

Abstract

Recently, several online social networking sites (OSNs; e.g., FourSquare) have emerged that allow people to record and broadcast their presence at physical locations. We examined the viability of using images of frequent patrons listed on an establishment's FourSquare page to infer the ambiance of the establishment. In Study 1, 10 judges independently rated 25 bars and 24 cafes in Austin, Texas. Ratings were based on the profile pictures of 25 randomly selected persons who frequented each establishment. Ratings tapped ambient physical and psychological qualities (e.g., loud, creepy), typical-patron personalities (e.g., extraverted), and likely patron activities (e.g., dancing). Results indicated considerable inter-judge consensus across the attributes rated (mean ICCs averaged .32, .69. and .33 for the ambiance, patron-personality, and patron-activity variables respectively). In Study 2, a second team of 10 observers visited each target establishment during business hours and rated each location on the same set of variables. These ratings also showed strong inter-judge consensus (mean ICCs averaged .69, .79. and .62 for the ambiance, patron-personality, and patron-activity variables respectively). Correlations between the ratings obtained in Studies 1 and 2 showed surprisingly strong convergence suggesting that the profile photos conveyed valid information about the target establishments.

Introduction

Over the past decade people have been connecting to friends, family, and members of their communities with the help of online social networking sites (OSN; e.g., Facebook, MySpace, LinkedIn). OSNs have varied in design, but all have functioned to connect people to other people they know, or wish to know. With the advent of wireless Internet capacities on personal mobile phones, a new type of OSN has emerged. OSN such as GoWalla, Foursquare, Facebook's Places and others are location-based social networks that implement GPS technology to connect peo-ple to physical locations (e.g., eateries, businesses, museums) in their home cities and those they visit. Upon visiting a location, users of these networks "check-in" using their mobile devices (e.g., Blackberries, IPhones) to alert those within their network that they are visiting that particular space. Over time, users accumulate a record of the locations they have visited and are rewarded by the OSN with medals and titles, which are posted on the users' profile pages. In addition, the establishments themselves have profile pages, which list the users who check in to those places frequently. Thus, the OSN provide a means of tracking which places a person frequents (from users' profiles) and which people frequent a place (from establishments' profiles). The existence of establishment profiles raises the possibility that individuals (and possibly organizations) could use the information conveyed by the photos of users who frequent an establishment to make predictions about the establishment, in terms of its ambiance, clientele, and the activities that are likely to occur there.

Past research and theory in Social Psychology can offer accounts for why people might want to know what a place is like. Past research in the field of person perception provides evidence for the viability of forming accurate impressions on the basis of small amounts of information. We next turn to these literatures.

Selection, Manipulation and Evocation of Environments

In the field of Social Psychology, investigators have proposed several theories regarding the ways in which people select, manipulate, and evoke situations in their environments. In an influential article, Buss (1987) proposed three mechanisms by which people can alter their immediate social and physical environments: (a) Selection refers to the fact that people can choose to enter or avoid existing environments; for example, people deliberately select mates and peers that they prefer and avoid those with whom they prefer not to interact; (b) Manipulation refers to the

fact that individuals may directly alter or change their environments; for example, a person high on need for control may reinforce dependency behaviors in others to maintain that control; (c) Evocation refers to the fact that individuals may unintentionally but predictably elicit reactions from others; for example, a hypercritical individual may cause others to disengage from interactions with them to avoid harsh criticism. These mechanisms may inform decisions made in daily life about the people and places with which one chooses to interact.

These theories were largely developed in the context of social environments but they can also be applied to physical environments. For instance, people tend to select environments that are consistent with their personalities, values, and attitudes (Bishop 2009, Florida 2008, Rentfrow, Gosling, and Potter 2008) and manipulate spaces to bring them in line with characteristic attitudes and habitual behaviors (Gosling et al. 2002). There is evidence that these processes—especially selection—can operate at a range of levels, resulting in a non-random distribution of individuals. At a broad level, certain personalities are more prevalent in specific geographic regions (Rentfrow, Gosling, and Potter 2008). For example, within the United States, New Yorkers tend to be higher in neuroticism and less likely to interact with strangers than Midwesterners. Similarly, people that share similar attitudes and life goals tend to gravitate to specific cities (Florida 2008). For instance, artists and musicians are relatively highly concentrated in cities such as New York, Austin, and Seattle, which are more conducive to their professional trades (Florida 2008). Research suggests that when a person and city are "properly matched" individuals will experience higher life satisfaction (Florida 2008). A person's values also have strong influence on residency choices at a narrower regional level, with the result that people often cluster into neighborhoods consisting of people with similar political attitudes (Bishop 2009). These broad patterns, expressed at the level of region and neighborhood, are the aggregate results of many people making individual decisions about where to live.

These processes are also played out at a more local level, with individuals constantly making decisions about what to do and where to go on a daily basis. These decisions about where to go will be informed by estimates about what a place is like, what kind of people can be found there, and what kind of activities are suitable there. These estimates can draw on a broad range of sources including past experience, reputational information, stereotypes, and base-rate guesses. The advent of location-based OSNs raises the possibility that people might make use of establishment profiles to inform their decisions about where to go.

But can such establishment profiles, which typically contain little information beyond the profile pictures of the people who frequent them, convey valid information about the establishments? Previous research on person perception suggests that even these impoverished stimuli may convey valid social information.

Past research on Person Perception

Research in the field of person perception, a subfield of Social Psychology, suggests people are able to make accurate impressions of others based solely on appearance cues (Ambady, Hallahan, and Rosenthal 1995, Kenny 1994, Naumann et al. 2009). For example, physical features such as facial expression, posture, and clothing style can act as cues that inform judges about an individual's personality (Naumann et al. 2009). These findings suggest that physical appearance cues convey some valid information about personality. Valid cues based on appearance are present and utilized in virtual worlds too (Back et al. 2010, Gosling et al. in press; Graham, Sandy, and Gosling, in press). For example, the photo that a person chooses as his or her profile picture on the OSN Facebook conveys valid information about his or her personality.

Past research on Person Perception

If accurate impressions can be formed about a person just by looking at their outward appearance, what can be learned about a *place* by viewing the appearances of the people who visit it? The task of forming valid impressions of an establishment based on profile pictures of the establishment's patrons requires a series of successful inferences.

First, observers must accurately judge the characteristics of individuals based on their profile pictures. As noted above, previous research of impressions based on standardized photographs (Naumann et al. 2009) suggests that observers can accurately judge some traits based on photographs alone. However, the profile pictures on FourSquare profiles are not standardized and often present images of the user taken from unusual angles or providing only partial views (e.g., extreme close-ups, shots taken from a great distance). Moreover, a subset of profile pictures do not even depict the user him- or herself, with some users instead presenting some other image, such as a pet, a child, an object, a celebrity, or a cartoon character. Nonetheless, it is possible that valid information about the target is conveyed by non-standardized photographs or images of others. Indeed, it is likely that the user has specifically chosen the image with some care precisely to serve as an identity claim that conveys some information about his or her personality (Gosling 2008, Gosling, Gaddis, and Vazire 2008).

Once an observer has made impressions about the individuals associated with each establishment, he or she must combine that information. There is no past research examining how observers combine information of several indi-

viduals to form an overall impression of the group. However, it seems likely that observers do more than simply averaging the individual impressions of the targets. Instead, observers almost certainly take a higher-level configural approach; for example, if a set of targets seemed to vary widely in their personalities, it seems likely that an observer would view the group as "diverse", rather than averaging the impressions to arrive at an impression of "middle of the road."

Once the observer has formed an impression of the group as a whole, he or she must then make guesses about the kind of establishment that group might frequent. Again, there has been no past research to inform how this process might work. However, it seems likely that observers would draw on their personal experiences of the clientele they typically see at different establishments to make these inferences. The observers must then characterize those locations in terms of the items on our rating instrument (see Methods below).

In the present study we examine three kinds of judgments that observers might make about an establishment: Judgments about what the ambiance of an establishment is like in terms of its physical and psychological qualities, about the personality traits of the people who can typically be found there, and about the kinds of activities that are suitable there. For observers to make accurate judgments of the personality traits of typical patrons (e.g., extraverted, open minded), only the first step is required to achieve accurate impression formation (assuming observers think the profile pictures are reasonably representative of the establishment's general clientele). For observers to make accurate judgments of the ambiance of the establishment (e.g., artsy, modern), all three steps are required. For observers to make accurate judgments of the activities typically performed at an establishment (e.g., dancing, dating), two inference paths are possible. Observers could make inferences in the order noted above (i.e., from impressions of individuals to impressions of the group, then to impressions of the establishment that group is likely to frequent, then to the kinds of activities that are likely to occur at that establishment). Or they could take a more direct route; going from the impressions of individuals to the kinds of activities in which they think those individuals might engage.

Thus, all other things being equal, the judgments of the personality (which require the fewest inferences) should be the most accurate. If observers use the more direct inference processes noted above, and if that inference process is correct, then judgments about likely patron activities should be the next most accurate. If observers do not use the more direct inference process or if that inference process is incorrect then judgments about typical patron activities should be the least accurate, along with judgments about the ambiance of the establishment.

The present research is designed to explore and document the basic question of whether accurate judgments about an establishment are even possible based on the profile pictures of the people who frequent the establishment. Study 1 examines whether consensual impressions can be formed about a place based on the profile pictures of the people who frequent it. Study 2 obtains information about the establishments with which to validate the impressions (from Study 1) based on OSN profiles alone. Note, that the current design does not permit us to test questions about the specific inference processes used by observers.

Study 1

The goal of Study 1 was to determine whether consensual impressions could be formed about an establishment based upon a set of profile pictures of people who frequent the establishment.

Method

Target Section

To gather potential target establishments (bars and cafes) a comprehensive search was completed on Yelp!, GoWalla, and Foursquare, restricting the searches to the city of Austin, Texas, USA (where the research was to take place). The keywords "bar", "café", and "coffee" were used to search for venues. To avoid selection bias, venues with multiple locations were listed only once. For example, though there are 10 Starbucks locations in Austin "Starbucks" was listed only once in the final list of potential locations. To permit creation of a standardized set of target stimuli (see below), establishments were included only if their FourSquare.com pages included at least 25 profile pictures. 25 bars and 25 cafes were randomly selected from the comprehensive list of candidate bars and cafes.

Target Stimulus and Observer Ratings

To obtain photo stimuli of persons who frequented each target establishment, profile pictures were obtained from Foursuqare.com. Each member of the Foursquare community has an online profile that displays a photo chosen by the user and records the places that he or she has visited; the visits tend be recorded using a mobile device (e.g., iPhone, Blackberry). In addition to each member of the network having profiles, each establishment within a city has a profile page. This page contains general information about the establishment, directions to the establishment, and at the time of data collection (June 2010), and a block of up to 50 photos of people who visit that location.

25 profile pictures of people who visited each target establishment (according to Foursquare.com) were randomly selected. Following collection, photos were put into a 5 x 5 block of profile photos. The blocks of photos served as the

target stimuli, which the observers viewed as the basis for forming their impressions of each location. It was not possible for the observers to identify the source establishments on the basis of the profile information provided. Ten observers (5 male 5 female; mean age 20. 5, SD= .97) viewed photo blocks of patrons for 49 of the selected target locations (one café target establishment was excluded because an insufficient number of profile pictures could be retrieved from Foursquare.com when it was time to save the profile photos). Upon viewing the photo stimuli observers made ratings of the target location's psychological and physical ambiance, the typical-patron personality, and the typical-patron activities.

Rating Instrument

In designing the rating instrument, we tried to balance two goals. Our first goal was to be relatively comprehensive in covering of the range of potential ambiances, personality traits, and activates. Our second goal was to create an instrument that was manageable in terms of length and completion time. So to create a large pool of possible attributes on which establishments could be rated, a panel of six researchers generated as many items as they could for each response category resulting in 74 items for ambiance, 10 for personality, and 24 for possible activities. To ensure comprehensiveness in the personality domain, trait terms representing each of the Big Five personality dimensions were included; additionally the two authors of this report supplemented the list with eight more terms. To avoid redundancy and make the list more manageable, overlapping items were eliminated. The resulting rating instrument had 76 items (see Table 1)—41 ambiance items,18 personality items, and 14 activity items.

After examining the final set of items, we realized that the ambiance variables and likely-patron-activities tended to be more categorical in nature and the typical-patron personality variables tended to be more continuous. So the likely-activity items were rated using a three-point scale, with *yes*, *maybe*, and *no* as the three options. The items assessing typical-patron personality were rated using a seven-point Likert scale, ranging from *strongly disagree* (1) to *strongly agree* (7).

Analyses

Inter-observer consensus

Inter-observer consensus was determined by computing the pair-wise intraclass correlations (ICC) among observer's ratings of the target stimuli (i.e., the blocks of profile pictures). ICCs provide an index of rating reliability by comparing the variability of different ratings of the same subject to the total variation across all ratings and all subjects (Uebersax 2006).

Results

Inter-observer consensus

As shown in Figure 1, the ICCs varied across the three categories, with strongest agreement for the ratings of the predicted personalities of the patrons who typically attend the establishment (mean ICC = .69; 100% were positive and significant). There was weaker, but still substantial agreement for the observers' predictions about the establishment's ambiance (.32; 70%) and typical patron activities (.33; 50%). However, as shown in the first data column of Table 1, these broad trends hide a more complex pattern, with ICCs varying substantially within the three categories. For example, within the ambiance category, ratings of how traditional the establishment was elicited strong levels of agreement (ICC = .61) but ratings of how cheesy the place was elicited poor agreement (.12)
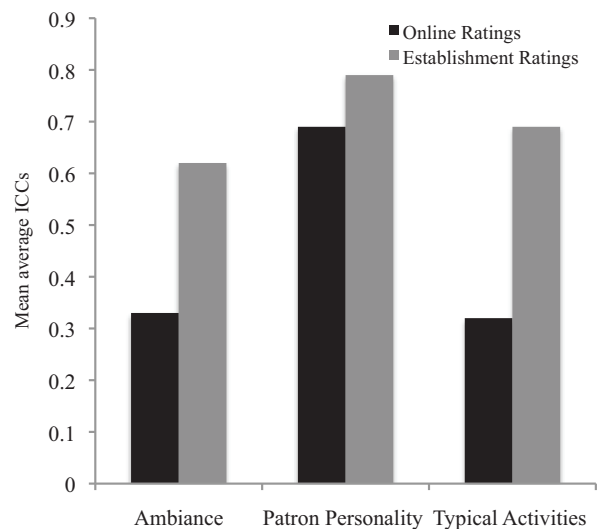

Figure 1: Online ratings vs. establishment ratings: Mean ICCs for ambiance, patron- personality, and typical-activities

Discussion

Results suggest that consistent impressions can be formed about a place based solely on the profile photos of the people who frequent it. However, the results indicate that some characteristics of a place are judged more consistently across observers than are others. For instance, of the characteristics measured here, personality traits of the typical- patron were most easily discerned from the profile photos. These profile photos are of actual patrons so it makes sense that ratings of likely patrons elicit the most consensus; as noted above, the personality ratings require only that the observers make inferences about the targets they can see whereas the other ratings require that the observers first make inferences about the targets and then

Characteristics of Target Location	Profile Picture Ratings (Single & Avg. ICCs)	Establishment Ratings (Single & Avg. ICCs)	Online vs. Establishment Ratings (r)
Ambiances			
Artsy	.05 (.34)*	.14 (.63)**	.25
Bland	.09 (.50)**	.12 (.58)**	.08
Blue collar	.05 (.31)*	.07 (.43)**	.08
Bohemian	.08 (.45)**	.17 (.67)**	.34*
Cheesy	.01 (.12)	.06 (.40)**	.12
Clean	.05 (.32)*	.14 (.62)**	-.21
Comfortable	.02 (.18)	.08 (.47)**	.06
Conservative	.08 (.47)**	.26 (.77)**	.39**
Cozy	.11 (.54)**	.09 (.50)**	.04
Cramped	.06 (.40)**	.04 (.27)	.31*
Creepy/Shady	.03 (.26)	.29 (.81)**	.32*
Dark	.04 (.28)*	.33 (.83)**	.41**
Dingy	.11 (.53)**	.23 (.74)**	.17
Douche-y	.11 (.54)**	.17 (.67)**	.43**
Eclectic	.09 (.50)**	.12 (.57)**	.29*
Edgy	.03 (.21)	.13 (.61)**	.21
Energetic/Stimulating	-.00 (-.04)	.04 (.28)*	-.08
Formal	.07 (.42)**	.31 (.82)**	.07
Homey	.05 (.36)*	.14 (.63)**	.37**
Kitsch/Campy	.01 (.11)	.07 (.42)**	.00
Loud	.02 (.18)	.22 (.74)**	.18
Luxurious	.04 (.31)*	.34 (.84)**	.05
Modern	-.02 (-.28)	.20 (.71)**	.06
Old-fashioned	.01 (.05)	.17 (.67)**	.27
Out of the way, off beaten path	.07 (.43)**	.21 (.73)**	.40**
Pleasant	.05 (.34)*	.12 (.55)**	.41**
Pretentious	.05 (.35)*	.10 (.53)**	.24
Relaxed/Laid back	-.01 (-.08)	.09 (.50)**	.22
Romantic	.06 (.39)**	.15 (.63)**	.16
Simple	.03 (.20)	.10 (.52)**	.16
Sophisticated	.02 (.15)	.19 (.70)**	.15
Sterile	.01 (.13)	.13 (.58)**	.14
Strange/Weird/Off beat	.13 (.59)**	.21 (.72)**	.48**
Stuffy/Dull	.07 (.44)**	.05 (.31)*	.23
Stylish	.06 (.38)**	.23 (.75)**	-.01
Traditional	.14 (.61)**	.12 (.58)**	.32*
Trendy/Hip	.04 (.28)*	.12 (.58)**	.18
Unique	.06 (.38)**	.13 (.60)**	.13
Up-scale	.05 (.34)*	.24 (.76)**	.45**
White collar	.06 (.39)**	.17 (.68)**	.34**
A meat market	.11 (.49)**	.21 (.73)**	.44**
Patron Personalities			
Extraversion	.15 (.64)**	.42 (.88)**	.50**
Conscientiousness	.12 (.55)**	.49 (.91)**	.39**
Agreeableness	.19 (.70)**	.18 (.69)**	.31*
Emotional Stability	.15 (.65)**	.29 (.80)**	.33*
Openness	.15 (.64)**	.28 (.79)**	.41**
Artsy	.19 (.70)**	.50 (.91)**	.60**
Politically Conservative	.16 (.66)**	.46 (.90)**	.62**
Trendy	.10 (.51)**	.28 (.80)**	.34*
Open minded	.16 (.65)**	.28 (.80)**	.50**
Quirky	.15 (.63)**	.28 (.80)**	.61**
Cheerful	.18 (.68)**	.07 (.44)**	-.00
Friendly	.19 (.71)**	.04 (.28)	.13
Attractive	.23 (.75)**	.24 (.76)**	.43**
Thinks too much of self	.12 (.57)**	.34 (.84)**	.43**
Funny	.10 (.49)**	.11 (.55)**	-.10
Likes to be center of attention	.13 (.59)**	.40 (.87)**	.34*
Imaginative	.12 (.58)**	.33 (.83)**	.40**

Adventurous	.03 (.21)**	.19 (.70)**	.18
Patron Activities			
Go dancing	.12 (.58)**	.56 (.90)**	.56**
Get a drink of snack	.00 (.01)	-.01 (-.07)	.10
Go on a date	.06 (.38)*	.07 (.41)**	.13
Hang out with friends	.01 (.05)	-.00 (-.03)	-.03
Listen to music	-.01 (-.05)	.05 (.33)*	.28*
Meet new people	-.03 (-.45)	.08 (.46)**	.06
People watch	-.02 (-.06)	-.01 (-.17)	.13
Pick up people, flirt	.02 (.19)	.11 (.55)**	.39**
Read	.22 (.74)**	.53 (.92)**	.81**
Relax	.09 (.49)**	.38 (.86)**	.51**
Schmooze, impress people	.01 (.11)	.10 (.52)**	.41**
Study	.13 (.60)**	.66 (.95)**	.76**
Work	.14 (.61)**	.63 (.94)**	.73**
Surf the Web	.21 (.73)**	.66 (.95)**	.74**

*Table 1: Comparison of Study 1 and Study 2 Findings: Observer Ratings of Target Location After Viewing User Profile Photos vs. Observer Ratings After Viewing Actual Establishments (Note: ** = p < .01; *= p, .05)*

make the additional inference about the kinds of places those people would frequent and the likely ambiance of those places and the activities that might go on there.

A potential concern with using profile photos as the stimuli is that the profile owners may have strategically chosen, edited, or even falsified their profile photos. However, even if a photo is not an accurate depiction of what the patron looks like, valid information could still be conveyed by the photo; for example, valid information may be conveyed by whether a patron's profile depicts a glamorous photo of the patron, a puppy, or a cartoon character.

One reason why judgments of likely-patron activities were associated with relatively low interjudge consistency could be that different people may use the same space in different ways. For instance, one observer may see a lively, noisy café as a perfect place to hang out with friends, whereas another observer might see this as too distracting and not conducive to conversing. Therefore, even if judges agree about the ambiance of a place, they could still disagree about the about the activities suitable for that ambiance.

Together the findings from Study 1 raise the possibility that the patron profile photos on websites such as Foursquare could have an impact—perhaps only implicitly—on the decisions being made by individuals when deciding whether to visit an establishment.

Study 2

The goal of Study 2 was to determine whether consensual impressions could be formed about an establishment based upon visiting it. Further, the study aimed to validate the observer impressions made in Study 1.

Method

Target Section

The same 50 establishments originally selected for inclusion in Study 1 were used as target establishments. However, in Study 2, none of the establishments needed to be eliminated from the original list of 50. So 25 bars and 25 cafes served as target establishments.

Target Stimulus and Observer Ratings

Ten (5 male, 5 female) trained observers receiving undergraduate research course credit visited each of the selected 25 bars and 25 cafes. All observers were over 21 years (mean = 22.4; SD = 1.96). The observers were split into two groups of five. To ameliorate the potential effects of the date and time at which a location was visited, each establishment was visited twice on different days and times, once by each rating group. All 50 establishments were assessed over a two-week period.

Prior to the experiment, observers were instructed on the procedures, were shown the rating instrument, and were given the definitions of the items. Observers were instructed to go into each venue, make silent observations, and to avoid discussion or contact with any persons in the establishment. They were given up to ten minutes at each establishment. Observers were instructed not to consume alcohol. Observers were instructed to leave the establishment once they felt they had formed an accurate and substantial impression of the place. Observers then immediately completed independent ratings of the psychological and physical ambiance of the establishment, the typical-patron personality, and the typical-patron activities. After visiting the establishments, the observers indicated whether they had been to there before; most of them had not, with the

assessment being the first visit to the establishment for an average of 7.2 (SD = 2.2) of the 10 observers.

Rating Instrument

Ratings were made on the same 76- item survey used in Study 1, tapping each target establishment's psychological and physical ambiance, typical-patron personality, and typical-patron activities.

Analyses

Inter-observer consensus

Inter-observer consensus was determined by computing the pair-wise intraclass correlations (ICC) among observer's ratings across the target stimuli.

Accuracy

To validate the accuracy of the observer ratings of target locations obtained in Study 1 (based on patron photos), observer ratings from Study 2 were used as an accuracy criterion. Correlations were computed for all of the 76 variables across the 50 establishments.

Results

Inter-observer consensus

As shown in the second data column of Table 1 and similar to the findings of Study 1, the ICCs varied across the three categories of characteristics being measured (ambiances, personality, and activities). However, unlike the Study 1 results, the ICCs for most of the ambiance variables were positive and statistically significant with the exception of the item, "cramped," which was positive but not significant. All but one (the item "friendly) of the typical-patron personality traits were positive and significant. Measures of typical-patron activities findings resulted in less variability in consensus than in Study 1. The ICCs for almost all the activities were positive and significant with the exception of items assessing whether or not the location was a good place to get a snack or a drink, a place to hang out with friends, or a place to people watch. The mean ICCs for ambiance, typical-patron personality, and typical patron activity were .69, .79, and .62.

Observer- accuracy

Given the strong consensus, the ratings derived from Study 2 (i.e., the impressions based upon the physical spaces of the target locations) could serve as the criterion against which the accuracy of the profile-based ratings (from Study 1) could be evaluated. As shown in the third data column of Table 1, correlations between the observer ratings derived from Studies 1 and 2 were strong for many of

the ambiance variables. The same is true for almost all of the typical-patron personality characteristics (except cheerful, friendly, funny, and adventurous), and typical-patron activities (except being a place to get a drink or a snack, go on a date, hang out with friends, meet new people, or people watch).

Discussion

Findings demonstrate that consistent impressions can be made about what an establishment is like by observing the space itself. Judges agreed quite strongly about the ambiance associated with the establishments they visited. Consistent ambiance impressions suggests there are specific cues found in establishments that predispose a person to experience certain feelings and vibes while in the space. Additionally, typical-patron personality can also be consistently judged by observers. Finally, the kinds of activities that are likely to go on in a space can be inferred by visiting the space. As in Study 1, those activities that were less easily judged might reflect the judges' idiosyncratic preferences regarding the activities suitable for various ambiances.

The findings revealed strong links between the impressions elicited in Studies 1 and 2. Impressively, impressions made about an establishment by viewing these two very different types of stimuli (profile photos and the physical spaces themselves) can be quite similar. However, there were cases in which there were strong differences in the impressions formed. For instance, patron-friendliness elicited strong consensus from profile pictures but not from visits to the establishment. These findings suggest that each type of stimuli may furnish different clues observers.

General Discussion

The findings of both Studies 1 and 2 indicate that observers are able to form consensual impressions of an establishment based upon the profile photos of the people who visit it or the physical location itself. Comparisons of the findings across the two studies suggest that consistent impressions can be made about a space from each source of information, but the type of stimuli on which those impressions are based is important as well. Each type of stimuli—profile pictures and physical features of a place—appear to provide a unique set of information that observers can use to form opinions about what the location and its visitors are like. Future research should focus on identifying the specific cues that observers use —both in the virtual and physical worlds— to form impressions and which of these cues are valid in aiding accurate impression formation. Understanding how these cues are used will provide the foundation for examining the inference processes that promote accurate and inaccurate perceptions of establishments

based on their online profiles. And research is needed to establish whether individuals actually make use of the profile photos to make selections of venues or take other actions that affect the venue.

At a theoretical level the findings underscore the importance of location choice in the process of identity presentation. That is, individuals may broadcast their visits to certain establishments as part of their broader self-presentation strategies, which could also be manifested in the Foursquare profiles themselves (e.g., in the choice of profile picture). However, even deliberate self-presentation need not be deceptive; self-verification theory suggests that individuals want to bring others' views into line with self-views so people are motivated to present themselves authentically (Swann 1999).

Knowledge of how observers use profile information to make decisions about where to go, could help OSN designers build in features that connect people to locations and others within the network more effectively. In the light of research showing that a good fit between persons and environments improves well-being, OSN users could benefit from the features that allow them to get to where they want to be.

The findings also suggest that information conveyed by the photos of users who frequent an establishment could be used to make predictions about the establishment, in terms of its ambiance, clientele, and the activities that are likely to occur there. Marketers can use such information to target online and offline advertising with messages tailored to the audiences that attend each venue. In addition, the knowledge about the kinds of people who frequent an establishment and the impressions those people convey to others about the establishment could be used by the establishments themselves in promoting their business, catering to new clientele, and generating new revenue streams (e.g., through advertising).

Acknowledgements

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