Identity, Identification and Identifiability: The Language of Self-Presentation on a Location-Based Mobile Dating App

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ABSTRACT
Location-aware mobile applications have become extremely common, with a recent wave of mobile dating applications that provide relatively sparse profiles to connect nearby individuals who may not know each other for immediate social or sexual encounters. These applications have become particularly popular among men who have sex with men (MSM) and raise a range of questions about self-presentation, visibility to others, and impression formation, as traditional geographic boundaries and social circles are crossed. In this paper we address two key questions around how people manage potentially stigmatized identities in using these apps and what types of information they use to self-present in the absence of a detailed profile or rich social cues. To do so, we draw on profile data observed in twelve locations on Grindr, a location-aware social application for MSM. Results suggest clear use of language to manage stigma associated with casual sex, and that users draw regularly on location information and other descriptive language to present concisely to others nearby.

Author Keywords
Online dating; self-presentation; sex; MSM; impression formation

ACM Classification Keywords
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INTRODUCTION
Location-aware mobile devices have become ubiquitous in recent years and are a common mechanism for initiating social interactions with both known contacts [22] and nearby strangers with similar interests [30] or who are involved in shared activities [21] .

In particular, dating sites and applications have become extremely popular in recent years, with 30% of opposite-sex and 70% of same-sex couples reporting having met

online in a recent survey [27]. One type of mobile application that has gained recent traction is what Handel and Shklovski [13] refer to as the location-based real-time dating (LBRTD) app. These apps are used to locate and interact with nearby strangers who are interested in meeting, often soon, for a date or sexual encounter.

They typically work by displaying photos of nearby users, which can be clicked to reveal a more detailed profile and initiate immediate interaction via text chat. These applications stand in contrast to traditional dating sites which are typically PC/browser-based and where people might engage in weeks or months of online interaction prior to meeting face-to-face [24].

A key challenge in using mobile apps for meeting others is self-presentation. In contrast to traditional dating applications, where users can craft a richer presentation of self through their profiles and online interactions (e.g., [5]), mobile LBRTD apps rely heavily on images and comparatively simple profiles with limited opportunities for expression and self-presentation [1, 11].

While some LBRTD apps (e.g., Tinder) have recently become popular for people seeking opposite-sex partners, there is a longer history of these types of apps (e.g., Jack'd, Scruff, Mister and Grindr) being used by men who have sex with men (MSM) [1, 11, 26, 35]. This prior work notes that, in part, this history stems from two attributes of MSM. First, interest in sex with other men is not a visible trait, so LBRTD apps can help MSM identify each other. Second, interest in sex with men is a trait individuals choose to reveal to others. Self-presentation can then be an important strategy in avoiding stigma or unwanted attention.

These attributes, moreover, can be important in the formative stages of developing identity, exploring sexuality and "coming out" [29]. These might also be important for people engaged in behavior, such as seeking casual sex, that might be normatively acceptable among MSM LBRTD app users (e.g., [26]) but stigmatized by others [3].

Although the majority of the North American users of these systems would self-identify as "gay," a significant minority still do not use that label. Traditionally, the public health literature has used the term MSM to encompass both groups. We adopt that convention in this work as well.

In the paper that follows, we present an analysis of the language used in self-presentation profiles on Grindr, an LBRTD app for MSM. By examining structured and free text elements of user profiles, we seek to better understand how users draw on language and other resources to present themselves in a novel reduced-cue environment.

BACKGROUND
There have been numerous studies of self-presentation tactics on social networks (e.g., [19]) and online dating sites [5, 15, 24, 31]. In general these have found that people carefully select content to share with others to evoke a positive response either from friends (in the network case) or others (in the dating case). They may also embellish slightly, but within warranting constraints [34] and the possibility of a face-to-face meeting or trusting relationship [5]. There has been more limited study of people's language for presenting themselves on these sites and apps, focusing in particular on deception [31] and whether profiles contain words related to health issues or drug use [13].

From a self-presentation standpoint, mobile LBRTD apps raise multiple challenges. Given the physical constraints of a mobile device (e.g., screen size, etc.), people must present information very concisely. This is similar to the reduced cues environment of online chat rooms in Jones [17], where users move from abstract textual representations to more realized photographs, videos, and, at times, face-to-face interactions. LBRTD apps raise three unique questions around impression management where users may quickly from the abstract to the real or concrete. For each question, we draw on data from both large urban environments with diverse populations, and college or university towns where many people may see each other regularly and may also be exploring their sexuality or identity.

Appearing Attractive: Sharing Structured Information
Physical attractiveness has been shown to be a key trait in the success of online dating profiles [15]. On mobile LBRTD apps, attractiveness is typically conveyed via one's photograph and physical attributes entered into the structured elements of the profile [1]. Drawing on Goffman's [8] framework for self-presentation, these attributes in a mobile LBRTD become "given" aspects of impression in the decision to share them online, rather than "given off" in an in-person meeting. Though they are indicators of one's physical appearance (which is not typically malleable when it comes to matters of height and weight), they can be selectively or deceptively disclosed because of constrained cues of the online environment [17, 33].

These elements of the profile are important in mobile LBRTD apps for two reasons. First, they provide a concise summary of one's attributes and, ideally, an impression of attractiveness. Second, if one wishes to meet others face-to-face, the attributes must be reasonably accurate [32]. At the same time, they must also present the user in a positive light if they are to be effective. We therefore first asked:

RQ1: What types of information do mobile LBRTD app users share in the structured elements of the profile and what does this information communicate about them?

Language of Identification
In addition to structured parameters described above, people also have the opportunity to craft short text fragments that are part of their profiles in most LBRTD apps. Beyond creating the appearance of physical attractiveness, these can be used to craft a more detailed presentation. There are several ways in which we might expect this to occur. First, Goffman [8] suggests that setting plays an important part in impression formation. People may wish to identify themselves with their geographic location, such as a neighborhood, city or institution, an act that Jones terms social attraction, or relating oneself to a known group or entity [CITE]. This can serve to establish that they are nearby, and may also convey cues about socio-economic status, race, and other factors that can vary across geographic and institutional boundaries [16].

Identification with specific neighborhoods becomes problematic in many LBRTD apps, however, these apps do not reveal the actual location of others but instead reveal only the linear distance between the user and others signed in. That is, one can see who is nearby and one's distance from these users (in feet, meters, miles etc.), but cannot see their specific location or its name [1]. This differs from several prior location-aware technologies in which location names play a key role in both identifying the location of others for coordination and in self-presentation [12, 22].

In traditional dating sites, for example, people may identify with an explicit metropolitan area or geographic region. On social network sites people often identify with specific institutions (e.g., universities or employers) or cities and other places [19]. Check-in sites like Foursquare also allow people to identify with locations by checking in; and concerns about self-presentation have been shown to affect how people decide where to check in and how they form impressions of other users [12].

When identification cues are taken away, it is worthwhile for researchers and designers to explore how people respond. On the one hand, people might appreciate features that obfuscate location details and opt not to share these due to privacy or other concerns. On the other hand, they might seek strategies to re-insert this information for self-presentation, social attraction, or other goals. We asked:

RQ2: In the absence of overt location identifiers or descriptions, how do mobile LBRTD apps use language to craft identity around setting or other elements of self-presentation?

Seeking Sex? The Language of Stigma
Continuing to draw on Goffman's framework, cues related to sex and sexuality can be complicated in the case of mobile LBRTD apps for MSM. Drawing on Litt's [23] notion of the "imagined audience," we may consider that

people exercise caution in self-presentation on LBRTDs because their ideal imagined audience of potential sex or dating partners may not correlate with the actual audience. This tension is likely to play out in several ways.

First, the notion of an MSM identity itself may be problematic for some in that it violates the norms or expectations of their social communities, in the sense described by Goffman's [9] notion of "stigma." These individuals, such as those on the "down low" described by King [18] or those who are exploring their identity [10, 29], may wish to avoid what Woo [36] refers to as "identifiability" on these apps. That is, they do not wish for their profile information to be easily traced back to their offline identity by others who may log into the app. Some may also wish to connect with others who are similarly concerned about discretion [18, 36].

Second, even for those who do not feel stigmatized, there is often concern about "slut shaming" or being perceived as one who frequently engages in casual sex [1, 3]. Thus, some users may be comfortable with the idea of appearing on an LBRTD app for MSM, but may seek to self-present in a way that distances them from seeking sex.

Third, despite the caveats above, users who are seeking sexual encounters may wish to present specific information about sexual preferences or characteristics specific to themselves [13]. Jones would describe this process as moving interactions from the abstract to the realized, and from social attraction to personal attraction. How they do so while balancing concerns around stigmatized identity, however, is an open question. We therefore asked:

RQ3: Is there evidence of stigma around sexuality for mobile LBRTD app users, and how do they manage it?

METHOD

About the App
Grindr, the LBRTD app we chose to study is one of the more popular MSM-oriented apps. These apps generally have a similar user interface, opening with a grid or list of a certain number of nearby users consisting of a thumbnail image, a username and very brief demographic information (e.g. age and height/weight, at most) for each. They allow the user to tap on a thumbnail to see a larger picture and more detailed description (see e.g., [1, 26] for more detail).

On Grindr, profile information consists of a user-chosen username (which can be omitted if desired); demographic details including age, height, weight, and ethnicity (Asian, black, Latino, Middle Eastern, Mixed, Native American, white, South Asian and other). The user can hide some or all of these attributes. In addition, there is a field called "Looking for," which includes a range of relationship types (from "chat" and "dates" to "friends" with multiple selections possible), and current relationship status (eight options, including "single," "dating," "married," and "open relationship;" this range is typical of MSM-oriented apps.) Both of these fields could also be set to "Do Not Show."

Finally, there was an 80-character "headline," a 255-character "About me" section, and the full image of the thumbnail. App policy requires that users avoid explicit sexual images or text in their profile content.

Data Collection
Our data consist of observations gathered between January 13th and February 13th 2012 from Grindr. We were aware of ethical concerns raised in the past around the use of quasi-public profile data from social networking [37]. We believe it is reasonable to consider these data quasi-public as they are visible to anybody who downloads the free application, and users are instructed by Grindr's privacy policy to share no information that they do not consider to be or wish to be public.

At the same time, we do not wish to further share potentially sensitive information or in any way threaten the privacy of users or the integrity of the user community for the application we studied. In consultation with our Institutional Review Board, which approved this project, we do not report any profile details at the individual level that could in any way be identifying, relying instead on aggregate analyses or substituting similar terms where specific terms or details might be construed as identifying.

To gather data we used a custom-written Java application that emulated the Grindr client app. This application would log in every ten minutes, at a pre-determined, "pinned" location and gather information about all users visible from the pin location. Because of restrictions of the Grindr service, this would max out between 75-125 individuals. The information gathered included a unique user ID, distance from the application's location "pin," as well as their profile information. The profile information was collected anew at each ten-minute interval. We selected 12 locations, dividing these equally between large urban centers in North America, as well as cities and towns identified with large universities in the United States.

Because Grindr limits the number of users it displays, this in the large urban cities the "last" person on the list would often be less than 1km away from the pin, compared to 10-20km away from the pin in college towns. These locations were chosen to enable us to compare differences between urban and college town use of the app.

Analyses
Our data collection method allowed us to have several different units of analysis. For the population demographics, our unit of analysis is the unique user; regardless of the number of times the user was online, only the first observation was used.

We also did several textual analyses to learn about the content of the free text written by users. In these cases, our unit of analysis is the *distinct profile text*. Any change in the profile text (made up of the username, the headline and "about me" text) would generate a new distinct profile observation. So, this is more observations than unique

users, but fewer than every incidence in the entire database. In general, profiles were not changed very often; across the entire set of urban and college town users, we saw about 15% of users change their profile at least once. However, the changes were often substantial. For instance, in one case the first profile included "*easy going and open minded*," while the update was "*Not into hook-ups*," showing a possible change in intentions in using the application. By capturing all variants of profiles, we can better understand the range of presentation styles. We explain details of each text analysis in the sections below.

RESULTS

Demographic statistics reported here are based on observations of 69,950 unique individual profiles observed in six college towns (23,530 profiles) around the midwest and southeast United States and six major urban areas (46,420 profiles) in the United States and Canada.

Structured Self-Presentation

We were first interested in what structured data people chose present, and how this varied across the two types of locations. Results can be seen in Table 1. We first look at general demographic traits overall, and for the specific locations. We note that – because people chose not to share certain traits – this is necessarily not an examination of the user base of this application, but rather an examination of the traits that people chose to share.

	College Town (N = 23591)			Urban (N = 47335)		
	Share	Mean	SD	Share	Mean	SD
Age	78.3%	28.7	8.9	76.5%	31.0	8.4
Height	82.1%	179.5	7.1	83.9%	178.9	6.9
Weight	71.2%	78.0	14.4	74.8%	75.8	12.0

Table 1. Age (in years), height (cm), weight (kg) and the fraction of users sharing each trait, by location type.

We first looked at general traits that people shared (see Table 1). A significant majority of people shared their age (77.0% overall), with similar fractions in both college towns (78.3%) and urban areas (76.5%). Not surprisingly the average age was lower for college towns (28.7 years) than for urban areas (31.0 years), but only by about 2 years.

Interestingly, when it came to physical attributes such as height and weight, both were shared by the majority of users but more people shared height (82.1% college towns; 83.9% urban) than shared weight (71.2% in college towns; 74.8% in urban). This likely reflects the importance of weight in assessing attractiveness of others. It is interesting, however, in that weight is a theoretically mutable trait that was frequently reported to be deceptive in prior studies of dating. Participants here may have found it more useful to simply exclude weight than to exaggerate or otherwise deceive others. As partial support for this argument, we note that the average weight reported by users (76.86 kg) is substantially less than the average for American men over 20 (88.3 kg, [25]). This stands in contrast to height, where

the average height reported by users (178.8 cm) is nearly equal to the national average (176.3 cm).

As Table 2 shows, we looked at whether people shared ethnicity information. In both college towns (73.8%) and urban areas (72.7%), most users chose to share ethnicity or race. The vast majority of those who displayed ethnicity identified as white, though this fraction was higher in college towns (65.6%) than in urban areas (59.0%). The next most common reported ethnicity was "black" with 11.9% in college towns and 4.7% in urban areas.

	College town (N = 23591)	Urban (N = 47335)
Share ethnicity	73.8%	72.7%
Asian	2.4%	8.6%
Black	11.9%	4.7%
Latino	10.9%	14.7%
Middle Eastern	.41%	1.42%
Mixed	6.7%	9.1%
Native American	.4%	.2%
Other	1.5%	1.8%
South Asian	.2%	.4%
White	65.6%	59.0%
Share relationship status	61.5%	58.6%
Dating	2.3%	1.9%
Engaged	.3%	.2%
Exclusive	.9%	.6%
Married	1.4%	.9%
Open	2.5%	3.8%
Partnered	6.0%	5.9%
Single	85.1%	85.9%
Share relationship goals	61.%	54.6%
Friends	56.1%	47.5%
Chat	48.4%	38.5%
Dates	38.2%	38.2%
Networking	29.8%	26.7%
Relationship	27.4%	25.7%

Table 2. Profile attributes and fraction of users sharing each.

We next looked at whether people shared their relationship status. Again, this is an indicator of how people might wish to be perceived. For example, those seeking a relationship may be more likely to identify as "single," whereas those in relationships seeking extra-dyadic encounters (which are stigmatized by some) may be more likely to obfuscate by not sharing a relationship status. Overall, the proportion of users who shared any relationship status was slightly different between college towns (64.3%) and urban areas (58.4%).

Users generally reported being single in both college towns (85.1%) and urban areas (85.9%). The "open" option was not used frequently, but interestingly was used slightly more in urban (3.9%) than college town (2.5%) settings.

We next examined what relationship goals people expressed in using the app. Multiple goals can be expressed in the same profile via checkboxes. We view this as one indicator of how people wished to be seen as users of the app, and what sort of others they might be trying to attract.

As can be seen in Table 2, most users expressed at least one goal, with the fraction reporting being higher in college towns (61.6%) than in urban areas (54.6%). The distribution of goals varied somewhat according to the type of location being examined. While the distribution in both settings is skewed toward friends, it is more even across the different categories in urban environments.

To begin to address the issues in the next section on categorical self-impression using location words, we first wondered whether people allowed others to see their relative position (i.e., distance away). A significant majority of users shared relative position in both college towns (81.2%) and urban environments (83.4%), with similar proportions in both.

Language of Identification
To explore language use in profiles, we searched for any occurrence of words on several categorical lists (categories detailed below), for both the set of all college town (N=32,467) and urban (N=56,273) profiles containing free text. Each instance of a word was tracked, along with the total number of profiles containing at least one of the words in a category. One thing that became immediately clear in our analyses is that there was no apparently dominant strategy in linguistic self-presentation. All of the category analyses described below identified only 10-20% of profiles as using a particular approach. We describe the many approaches we observed.

	College Town (N=3795)	Urban (N=6493)
Neighborhood	22.4%	35.9%
Cities	29.2%	46.3%
States/provinces	28.0%	9.7%
Institutions	20.4%	8.1%

Table 3. Frequency of location and institution word usage.

Locative Language
We were interested in how users drew on language of places and locations to identify themselves in ways that identified them with these locations. To explore this question we first manually examined the text of the profiles in our data set as well as others visible to us through our own use of the app. Through this informal examination, found that users tended to identify with neighborhoods within cities, with cities or states (particularly when they were from elsewhere), and with institutions – particularly universities – in or around their location. We therefore created word lists at each of these levels of analysis. As Table 3 shows, we found that 3795 (11.7%) college town and 6493 (11.3%) urban profiles used location words.

Our list of 1565 neighborhoods was compiled by aggregating lists of neighborhoods from the Wikipedia page for each of the cities where data were collected. As Table 3 shows, of the profiles using at least one location word, 22.4% of college town and 35.9% of urban profiles used neighborhood words. Our list of cities included the 12 cities where we collected data (including common abbreviations and colloquialisms) plus cities in the vicinity of the college towns identified via maps and our own knowledge of the areas. Of the profiles using at least one location word, 36.4% of college town and 47.3% of urban profiles used city words. For states and provinces, we used a list of the 50 US states and all Canadian provinces and 2-letter postal abbreviations. We found that 28% of college town and 9.7% of urban profiles contained these terms.

Finally, we included institutions as locations because they are landmarks with which we found in our informal observations that people frequently seek to identify with. This could be particularly important from a self-presentation standpoint in college towns, where affiliation with a university can be a signal of socio-economic or educational status and where students may wish to meet only other students. We assembled a list of 33 educational institution names, abbreviations, and slang in and around the data gathering sites.Surprisingly, however, a relatively small fraction of college town profiles that used location words explicitly mentioned institutions (25.4%). This occurred much less frequently in urban profiles (8.2%).

From these data, there are two key observations. The first is intuitive in that neighborhoods seem to be used more for identification in larger cities than in smaller ones. From a location-awareness standpoint, this makes sense in that one may wish to signal to others that one is in or is from a particular neighborhood when seeking others or moving about a large urban area where displayed users may change more often given population density. Similarly, institutional identifiers were used much more often in college town profiles than in urban profiles, despite the presence of many universities in the cities where we gathered data. These could potentially be serving a locative function, but are more likely a way for students to identify each other and separate themselves from others in the area.

The second observation is less intuitive. Despite city words presumably being less useful as locative identifiers within cities themselves (i.e., when one is in Chicago, presumably everybody nearby is also in Chicago), they are actually used more frequently in urban environments than in college towns. This suggests that people are using city names for self-presentation, either within their city or when traveling.

To explore this possibility, we then looked for a set of 6 words related to travel and transience (i.e., "visiting," "in town," etc.). We found that 2.4% of college town (773) and 3.1% of urban (1762) profiles contained at least one of these terms. Of those profiles, "visiting" was by far the most common. It accounted for 86.2% and 89.5% of college

and urban profiles respectively. We also looked for the co-occurrence of words related to transience along with the name of at least one city. These co-occurred in 13.3% (college town) and 17.7% (urban) of all city word uses.

	College Town (N=510)	Urban (N=1104)
Twink	11.0%	10.4%
Otter	8.8%	7.4%
Cub	3.7%	2.8%
Bear	14.9%	8.7%
Pup	1.0%	0.8%
Gym Bunny	0.2%	0.4%
Chub	1.2%	0.9%
Daddy	15.9%	15.5%
Gym Rat	2.7%	1.5%
Muscle	18.4%	42.0%
Wolf	3.3%	4.7%
Chaser	2.2%	2.0%
Bull	1.2%	0.5%
Average	21.8%	11.6%

Table 4. Frequency of body descriptor terms.

Personal Descriptors
Our informal observations suggested that people also used certain terms to describe themselves, in ways that were both physically descriptive or indicators of professional status.

For physical description, we compiled a list of words related to body type "cliques" (see Table 4). This list was assembled from the online Gay Cliques Census[1], which reflects historical, informal labels used among MSM (e.g., [20]). Again, a relatively small fraction of overall profiles contained at least one of these terms (3.0% college town; 4.1% urban). Of those who did include clique words, "muscle," occurred less often in college town (18.0%) than in urban settings (42.0%). In contrast to this, "average" (a body type not typically associated with substantial muscles) occurred more often in college towns (21.8%) than in urban settings (11.6%). Of other body type words, most others occurred at relatively similar frequencies with the exception of "bear," which occurred more frequently in college towns (14.9% vs. 8.7%). The key point here is that these category descriptors appear to be relatively universal in their usage in these locations, and that people clearly used these to self-present concisely.

In addition to physical descriptors, we also looked at categorical descriptors related to professional identity or educational status (see Table 5). We found that 6.0% of college town and 3.4% of urban profiles included at least one of these words. Not surprisingly, the words "college" and "student" occurred more often in college town profiles (57.1% "student"; 30.6% "college") than in urban profiles

[1] http://www.studiomoh.com/fun/census/results.php

(30.6% "student"; 8.9% "college"). The opposite was true for the term "professional" (or "prof") and educated. Educated occurred in 11.6% of college town profiles and 22.3% of urban profiles; while "professional" occurred in 18.7% of college town profiles and 48.7% of urban profiles.

	College Town (N=1956)	Urban (N=1927)
College	21.5%	8.9%
Student	57.1%	30.6%
Professional	18.7%	48.7%
Educated	11.6%	22.3%

Table 5. Frequency of status words by location type.

What is interesting here is that the dominant terms both likely convey cues about status to the desired audience. Both students and professionals likely wish to meet others like themselves; these terms allow them to do so.

Language and Stigma
While we noted earlier that people used a wide range of linguistic strategies in self-presentation, we noticed that the most frequently occurring word across all profiles was "looking" (3951 appearances). This word likely occurs frequently because it has several meanings in this context, which were evident in our manual examination of profile text, experience with LBRTD apps, and in literature cited above. Specifically, "looking" can be used on it's own to indicate or verify that one is seeking an immediate sexual encounter (e.g., "looking now"), can be used to indicate what one seeks on the app (e.g., "looking for fun"), or can be used in the negative to indicate what one is *not* looking for on the app (e.g., "not looking for fun"). Given these potential meanings and relationships to adjacent words, we used a more detailed analytic approach.

Looking For "Looking For"
We ran a regular expression script to extract all words following the phrases "looking for" and "not looking for." We then used the frequencies of extracted words to generate an additional list of words for further analysis.

What is most striking in these results (see Figure 1) is the way in which people seem to manage potential stigma around seeking casual sex. Those who are seeking casual sex partners tend to use euphemistic terms (e.g., "fun") or abbreviations (e.g., "nsa," meaning "no strings attached"). Combined, these two terms occurred in 10.4% of college town and 14.1% of urban profiles that included a "looking" clause. The term "hookup" (and variants) was rarely (0.6% college town; 0.7% urban) used in a "looking" clause.

In contrast, people explicitly not seeking casual sex partners very rarely used euphemistic terms or abbreviations. "Fun" and "nsa" are used in a combined 0.0% of college town and 0.5% of urban profiles containing a "not looking for clause." Instead, these users tended to use the term "hookup" much more frequently, in 41.7% of college town and 25.2% of urban profiles containing a "not looking for"
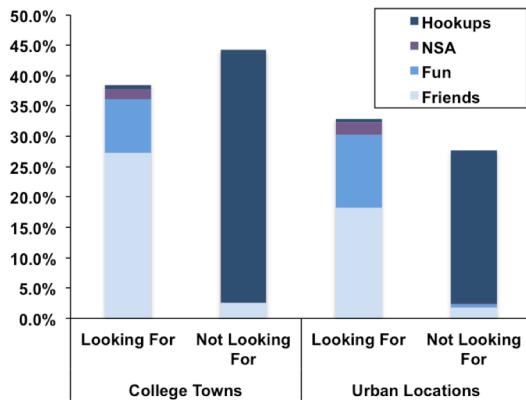
Figure 1. Terms in "looking for" and "not looking for" clauses, by location type.

clause. This is particularly interesting for college towns, where popular press reports suggest that slut shaming or other stigma related to sex might be a greater concern. Thus, people – and particularly those in college towns – seem to be carefully presenting themselves as not looking for casual sex to avoid potential stigma.

Another ambiguous term commonly used in "looking for" or "not looking for" clauses is "friends." Those looking for friends may be seeking genuine friendship, but may also be using the term euphemistically to refer to friendship with a sexual component (e.g., "friends with benefits;" see analysis below). Thus, as with other euphemistic terms potentially related to sex, we would expect to see a large number of people "looking for" friends and a small number of people who explicitly state that they are "not looking for" friends. Indeed, Figure 1 again reveals that this was the case, with 27.3% of college town and 18.2% of urban "looking for" clauses including friends, in contrast to only 2.6% and 1.8% of "not looking for" clauses, respectively.

No Means "No"
We were also interested in how people used the word "no." Again, this can be used in different ways. We found that 2637 college town (8%) and 5903 urban profiles (10.5%) had "no" clauses. The most common way to use a "no" clause was to specify an expectation that others have a face picture (or "pic") available if those others wished to chat or receive a reply. This is evident in that, of those profiles with "no" clauses, 7.5% (college town) and 12.2% (urban) contain "face;" 11.9% (college town) and 10.3% (urban) contain "pic(tures)" or "facepic;" 10.5% (college town) and 12.1% (urban) contain "chat;" and 5.5% (college town) and 5.2% contain "response." These are by far the most common words that occurred in "no" clauses.

The next most common use of "no" clauses was similar to the use of "not looking for" clauses (see above) to define oneself in opposition to certain traits or practices. Examples of terms in this category included "hookups" (10.6% college town; 6% urban) and "drugs" (0.6% college town; 1.6% urban. These terms serve to distance the user (and

others' impressions, presumably) from stigmatized behaviors such as sex or drugs. Relatedly, some others used a "no" clause to mitigate or soften others' impressions of what they were looking for or how actively they were using the app. For example, several people said they had no "agenda" (2.6% college town; 1.5% urban) or "expectations" (1.9% college town; 2.2% urban).

Another common use for "no" clauses was to attempt pre-emptively to avoid interaction with certain others. While no single term was dominant in this regard, people used a wide range of terms. A few examples included: old(ies) (0.7% college town; 0.2% urban), fems/feminine/girly/flamers, referring to stereotypically feminine bodily presentation (1.5% college town; 0.7% urban), fat/chubs (0.4% college town; 0.2% urban), skinny (0.1% college town; 0% urban), married/partnered/couples (0.4% college town; 0.7% urban), smoking/smokers (0.2% college town; 0.4% urban), asians, (0.6% college town; 0% urban), and republicans (0.7% college town; 0.3% urban). These "no" clauses serve an interesting dual purpose from an impression management standpoint. On the one hand, it is may be okay if the categories of people named in the "no" clause form a negative impression of a user, because the user has no interest in them in the first place. On the other hand, the use of certain words in "no" clauses (particularly around sensitive categories such as race or body weight) may cause a negative impression to be formed even by desired others.

Finally, we saw people use "no" clauses to characterize the experience they sought via terms like attitude, bs, strings, games, and drama. Together, these occurred in 8.0% of college town and 4.7% of urban profiles with no clauses.

Discretion and Sex
Having established that many users sought to self-present using terms that referred to sex euphemistically or defined themselves in opposition to sex, many also did use language that indicated sexual preferences more explicitly. Using our initial examination of profiles and our experience as a guide, we aggregated a set of 18 common terms related to sex acts, preferences, and sexually-transmitted infections and HIV status. Of all the profiles we examined, 2227 (6.9%) of college town and 5643 (10.0%) contained at least one sex-related term. This difference likely reflects the concerns around slut shaming and community that are likely more prevalent in college environments or smaller communities, as discussed earlier.

Of those profiles that do contain sex-related terms, the most common terms are those related to preferred roles in sexual intercourse. These roles ("top" or "bottom") describe whether one plays a primarily penetrative (top) or primarily receptive (bottom) role. These terms (including variants e.g. "btm" or "bttm") combined were included in 89.4% of college town and 89.1% of urban profiles that contained sex words. There were substantially more profiles using "top" (55.3% college town; 52.7% urban) than "bottom" (34.4% college town; 36.4% urban).

	College Town (N=2227)	Urban (N=5643)
Making out/kissing	0.7%	1.7%
Positive	1.2%	0.5%
Bottom	34.4%	36.4%
Snuggle	8.1%	9.2%
FB	1.2%	1.0%
Oral	2.9%	1.5%
Negative	3.9%	9.0%
PNP	0.4%	2.1%
FWB	5.8%	2.6%
DDF	5.5%	4.4%
Top	55.3%	52.7%
Pitcher	0.5%	0.6%
Catcher	0.3%	0.8%

Table 6. Frequency of sex-related terms.

Other words related to sexual activities included cuddling/snuggling (8.1% college town; 9.2% urban) and oral (2.9% college; 1.5% urban). Another activity-related term was "pnp" (party n' play; a euphemistic term for drug use and sex together [7]), which occurred more often in urban profiles (2.1%) than in college town profiles (0.4%), though it did not occur frequently in either context.

There were a small number of profiles that mentioned disease or status. The most common of these was "ddf" ("drug and disease free"), which occurred in 5.5% of college town and 4.4% of urban profiles. Negative HIV status occurred in 3.9% of college town and 9.0% of urban profiles using sex terms, and positive status was mentioned in 1.2% of college town and 0.5% of urban profiles. Note that the Grindr app does not support an explicit field for drug use or HIV status, unlike some others.

	College Town (N=836)	Urban (N=743)
Closet	4.9%	2.8%
Not out	11.7%	3.8%
Discreet	67.2%	73.1%
DL	5.1%	5.7%
Curious	20.1%	19.1%

Table 7. Frequency of discretion and exploration words.

Finally, given the stigma associated with MSM identity and the exploratory nature of some sexual behavior, we aggregated terms related to exploration or discretion. As Table 7 shows, 2.6% of college town and 1.3% of urban profiles contained at least one of these terms. Of those profiles, a majority used terms related to discretion. The most common was "discreet" (often misspelled "discrete," but aggregated), which was used in 67.2% of college town and 73.1% of urban profiles. Interestingly, the terms "not out" (11.7% college town; 3.8% urban) and "closet" (4.9% college town; 2.8% urban) were used more often in college towns, likely suggesting that those in college towns may

still be negotiating identity and coming out. The final term related to discretion, "dl," (an abbreviation for "down low," often associated with Afro-Americans and Latinos, see King[18]) was in 5.1% of college town and 5.7% of urban profiles.

The final term in this category was "curious," which is commonly used by individuals portraying themselves as exploring sexuality or identity. Surprisingly, this term was used at about the same frequency in both college towns (20.1%) and urban environments (19.1%).

DISCUSSION

We began with questions about impression formation and self-presentation on mobile LBRTD apps. Our findings have several implications for theories of social engagement using mobile devices and for designing novel mobile apps.

Implications for Theory

Grindr has provided us with an opportunity to explore behavior and assumptions around using mobile applications to meet others in an environment where some users are engaging in stigmatized behaviors or the application itself may be stigmatized in some ways. In using Grindr and apps like it, MSM manage disclosure and risk on several fronts.

Attractiveness and Rejection

The first is the risk of rejection by others. In disclosing information in their profiles that is likely to make the user seem attractive to others, and users arguably aim to make it more likely that their interactions will persist, and that they will transition from an online to face-to-face context when this is desirable. In contrast to the chat rooms observed by Jones [17], however, where most information was revealed progressively over the course of conversation, user profiles on Grindr can reveal substantial information about the user before conversation even begins.

For example, we saw users demarcate ties to particular subgroups that convey aspects of physical appearance (e.g., "muscle", "otter") but that retain anonymity around other aspects of identity. At the same time, we also saw users identify ties to groups or institutions that could be more revealing (e.g., "senior at *University X*").

Identifiability and Stigma

The second type of risk is that of identifiability [36] by others nearby, to whom users may not wish to disclose their interest in sex with men or that they are seeking casual sex partners [1]. This risk is related to notions of privacy on mobile devices in that it concerns the disclosure of personal or identifying information. What is distinct about identifiability, however, is that users in prior work were concerned not primarily by sharing the information with strangers, but rather by sharing it with those who might identify them.

Our results further support this idea in that we saw some users present profiles in a way that publicly distances themselves from stigmatized behaviors (e.g., hookups, homosexuality) for a broad and unknown audience, but may

also provide enough detail to signal their actual intent to others (in ways analogous to social steganography [2]). When they find a potential partner, they can then gauge when it is appropriate to share additional details through more private channels.

There was a clear tension for people around sex and sexuality, particularly with regard to potentially stigmatized behavior such as casual sex or "hooking up." The results for "looking," "not looking" and "no" clauses are particularly telling here. Of those who used "not looking" clauses, the most popular term by far was "hookups," and these occurred frequently in "no" clauses as well. Very few participants, on the other hand, identified themselves as overtly looking for "hookups," using euphemisms such as "fun," "nsa," and "friends" instead.

These results suggest that, in theorizing about how people use mobile applications, we should consider the possibility of stigmatized behaviors or practices. When we consider dating applications, for example, the predominant focus has been on honesty or deception about physical traits or characteristics (e.g., [5, 31]). These settings, however, are importantly distinct from the case we studied here. With Grindr, people appear to be using euphemism as a strategy for negotiating the tension between what Litt [23] refers to as the imagined and actual audiences, or for separating facets of their online lives [6]. This tension is arguably particularly acute in a location-aware application that enables stigmatized behaviors, because one could be visible to neighbors or others who happen to be nearby.

Disclosing Location Information
There is also, of course, some potential risk from sharing location information, which has been identified in past work (e.g., [28])) as a significant user concern even when sharing location with known contacts. We note, however, that this concern has largely not arisen in studies of how MSM use location-aware technologies [1, 11, 26], and does not seem to have hindered widespread adoption of Grindr and related apps.

Contrary to concerns expressed in prior studies about location privacy, in fact, we actually saw our participants re-insert elements of location details that were blurred by Grindr's sharing of only distance information. They did this by using neighborhoods, city names and institutions to identify with these and send signals that would otherwise be obscured by the way Grindr handles location information.

The behavior we observed, in light of past location privacy concerns, suggests that, as we think about the ways that location information is used by mobile apps, it is important to distinguish between notions of knowing that somebody is nearby (as in Grindr), knowing where somebody is in the sense of their geographic coordinates, and knowing the socially defined space that somebody currently identifies with [14]. In some ways, this revives old questions about places and spaces by providing new technological ways of understanding proximity and location. It also raises questions about how people identify location to others in systems that represent location in different ways [4].

Limitations & Future Work
There are several limitations to consider when interpreting these results. One clear limitation is that analysis of profile text does not allow us to verify that app users had particular intentions. Our results are consistent with initial qualitative explorations of apps for MSM in work cited above, but additional qualitative work is needed to understand people's self-presentation tactics. In addition, usage patterns in our data set could be used to understand if self presentation varies by time: would users on a break at work present differently than a user coming home from a bar or club.

In addition, we used relatively simple analysis techniques in understanding the profile data. We attempted automated classification of profiles for more sophisticated analysis, but had some difficulties. We used emergent text categorization algorithms, Latent Dirichlet Allocation and the Correlated Topic Model algorithms. Results were not stable but were indicative of several categories. Based on an analysis of these suggestions, we created a set of six categories, and attempted to hand code. However, two coders were unable to achieve good agreement. Preliminary analysis suggested that the profiles often had aspects of multiple categories. We encourage more sophisticated analysis of self-presentation tactics in these apps, however, to understand how language is used to create different impressions. A first step in this direction may be to examine the features implemented across the different apps available and compare and contrast how they may affect impression formation and management.

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