Dating Apps Are Used for More Than Dating: How Users Disclose and Detect (Non-)Sexual Interest in People-Nearby Applications

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Use and design of dating apps has evolved in recent years to accommodate other interaction goals beyond dating, prompting some researchers to now refer to these apps as people-nearby applications (PNAs). With this expansion of use comes increased potential for misinterpretation of users' goals for meeting face-to-face, which can pose risks to user safety particularly when disparities in sexual expectations occur. We present a survey study (n=132) with users of several PNAs and with various motivations for PNA-use to understand how interaction goals are disclosed and detected. The study finds such practices to be far from consistent, with some appearing highly susceptible to misinterpretation such as purposely delaying self-presentation of interaction goals until meeting face-to-face, and implying sexual expectations through vague references to "fun." We conclude by suggesting a modified version of the "swiping" feature in PNAs to facilitate consistent and overt self-presentation of interaction goals in ways that accommodate user tendencies discovered in the study.

CCS Concepts: • **Human-centered computing → Collaborative and social computing → Empirical studies in collaborative and social computing**

KEYWORDS: social matching; people-nearby applications; PNA; online dating; dating apps; self-disclosure; sex; safety

1 INTRODUCTION

Dating apps are no longer just for dating. Market-leading apps like Tinder and Bumble are now often used [37,47,56,57]—and advertised [11,58]—for non-dating purposes such as friendship, activity partners, and even employment needs. This ongoing transformation of dating apps into multi-purpose social matching systems has sparked a new term in the literature, people-nearby application (PNA) [37,38,50,59], which we will also use.

The expansion of interaction goals for dating apps-turned-PNAs has been considered a positive development because it provides more opportunities for users to amass social capital [37]. Yet the expansion of motivations for PNA-use can obfuscate a user's purpose on the application, which can lead to misinterpretation of intent to interact and meet face-to-face. This can culminate in uncomfortable and harmful user experiences during face-to-face meetings, particularly when disparities in sexual expectations occur. Most notable is the risk of sexual violence, or acts of a sexual nature without consent. Several quantitative studies have reported alarming statistics about PNA-facilitated sexual violence [14,29,30,49,51,52,63]. In a recent qualitative study of Tinder, participants described instances of unwanted sexual touching from users they met for non-sexual reasons; other participants often assumed sexual interest without attempting to clarify [70].

If PNAs are to safely accommodate a variety of use cases their interfaces must enable consistent and reliable conveyance of expectations for meeting. Yet the state of PNA design for supporting disclosure of interaction goals is in flux—some do not explicitly support presentation of interaction goals, while others include a profile section for users to indicate broadly the interaction goals they are interested in, and others (e.g., Bumble at the time of this writing) separate the user discovery interface into sections, such as a dating mode, an employment mode, and a friend mode.

There is little sense of best practices for supporting disclosure and detection of interaction goals in PNAs. In order to inform future design patterns we explore strategies for disclosing and detecting interaction goals with 132 users of different PNAs, most of whom had multiple interaction goals. The study finds that self-presentation and evaluation of interaction goals is far from consistent, with four overarching strategies being discovered along with various sub-strategies. Three of the strategies appear highly susceptible to misinterpretation, including:

- Indirect signals of interaction goals, such as inferring sexual intent from spelling errors and implying one's own sexual intent through vague references to having "fun."
- Listing qualifications for a meeting partner such as political affiliations but without clarifying the goal for meeting.
- Purposely delaying self-presentation of interaction goals until meeting face-to-face.

The fourth strategy—direct "looking for" statements—seems the least likely to incur misinterpretation, however it was seldom reported for presenting sexual goals and in many cases participants discouraged clear expressions of sexual intent. We conclude by proposing an expanded version of the "swiping" feature in PNAs as a design pattern to facilitate overt self-presentation of interaction goals with specific partners in ways that accommodate user tendencies from the study.

2 BACKGROUND

2.1 From Dating Apps to Multi-Purpose Social Matching Systems

Whether we call them dating apps or PNAs, such applications are examples of social matching systems, or recommender systems that recommend and introduce people to people [55]. For decades the HCI community has pursued a vision of multi-purpose social matching systems that involves introducing users for an indefinite number of social goals. Early attempts were usually mobile apps that computed matches through similarities amongst profiles and user proximity as informed by Bluetooth [20], RF location data [54], and social networking IDs [4]. In response to technological advances in smart phones, research into opportunistic social matching has explored the potential role of ample contextual data to inform users of nearby others for immediate, serendipitous encounters [44,45].

Despite the research interest in multipurpose social matching, commercial social matching systems have traditionally been designed for narrow use cases such as dating and ride sharing

(e.g., Lyft, Uber [36]). Online dating is perhaps the most historically successful type of social matching system in the commercial space by sheer use [3,12], having come to prominence in the 1990s with match.com and eHarmony—websites marketed mainly for finding long-term romance. In the following years the number of online dating platforms grew and shifted from websites to mobile apps leveraging real-time device location for user recommendation. Popular modern examples include Tinder, Bumble, Grindr, OkCupid, Hinge, Coffee Meets Bagel, and Plenty of Fish.

There has always been some variation in usage motivations for dating apps, particularly between users looking for long-term romantic relationships and those looking for short-term sexual encounters [7,8,17,68,72]. Yet in recent years the use of dating apps for reasons unrelated to romance and sex has come more into view in areas such as the United States [37,56], Canada [47], and Belgium [56,57], making clear that the vision of multi-purpose social matching systems is already a reality in some parts of the world. For example, Timmermans found 13 different motivations for using Tinder [56], Van De Wiele and Tong discovered Grindr to be used by men to find friends in addition to casual sex [67], Hsiao and colleagues [37] reported Tinder and other dating apps being used broadly for building social capital, and Petrychyn and colleagues found "hookup apps" to play an important role in building friendships and a sense of community amongst women [47]. Crucially, dating app companies themselves have begun marketing for goals beyond dating. For example, Tinder's website includes the tagline "Dating, Make Friends & Meet New People" [58]. Bumble's website says quite blatantly: "We're not just for dating anymore" [11]. With the purpose of dating apps now beyond dating some researchers have adopted the broader term people-nearby applications (PNAs) to refer to any mobile social matching apps that make user recommendations based on geographic proximity [37,38,50,59].

2.2 Presentation and Evaluation of User Information in People-Nearby Applications

Users engage primarily in two processes while using PNAs: impression management and impression formation. Impression management, or self-presentation as originally described by Goffman [31], involves deliberate disclosure of information in order to shape how one is perceived by other users [5,22,27]. Impression formation entails evaluating information about other users to determine appropriateness for one's interaction goal [9,28]. Impression management and formation are certainly consequential in other social media contexts beyond PNAs, such as job searching on LinkedIn [13], context collapse on Facebook [64], and peer production on GitHub [42]. Yet impression management and formation carry uniquely heightened risks in PNA-use, such as physical harm and sexual violence, due to the prospect of meeting strangers face-to-face and in contexts through which sexual activity is a potential—and sometimes expected—outcome.

PNAs provide two main interface components—profiles and one-on-one messaging—to support impression management and formation [24]. The literature on PNA-use portrays consistent struggles with both impression management and formation. Evaluation of other users has been challenging because of motivations for deception and exaggeration[21,32–34,60,61], as well as struggles to evaluate personality and other "experiential" traits [26,71] that do not lend themselves to deliberate and concise presentation. Impression management has also proven difficult, with users turning to Reddit and self-proclaimed experts for advice on how to best present themselves [43,69]. Users have also opted not to disclose sensitive information due to social and safety implications. This includes transgender status [23], disabilities [48], sexual orientation [6,9,16], and HIV status [35,65].

2.2.1 Presentation and Evaluation of Interaction Goals. With the expansion of PNA-use beyond dating comes an amplified necessity to self-present and evaluate *interaction goals*, a term we use to comprise reasons for using a PNA as well as intentions for meeting a particular user face-to-face. As of this writing there are three design patterns exhibited in PNAs for supporting

presentation of interaction goals. One, exemplified by Her and OkCupid, is a "looking for" field on user profiles in which users can select interaction goals from a pre-defined list. Bumble has exemplified another design pattern in which there is a different user discovery interface for each of the app's three supported interaction goals. Users select whether they want to be in the Bumble Dating, Bumble Bizz (business connections), or Bumble BFF (friendship) mode and are introduced only to other users who are currently in that mode. Other PNAs do not explicitly support or encourage presentation of interaction goals at all, but rather let users populate their profile with any content of their choosing. Notably, no PNAs currently support presentation of expectations for interacting with or meeting a specific user. The closest design pattern for expressing user-specific interest is a "swiping" feature in which two users cannot exchange messages through the app until they both "swipe" on each other's profile, indicating a general interest in messaging interaction.

There has been no research to our knowledge that specifically investigates how PNA users self-present and evaluate interaction goals, particularly ones that go beyond dating, although there is some research that has shed light on self-presentation and evaluation of casual sex goals. Users still commonly carry the view that particular PNAs like Tinder and Grindr are intended for sex [15,25,40,53], and so impressions of sex-related interaction goals may be assumed purely by the platform a user is discovered on [70]. Blackwell and colleagues [9] found that, due to slut shaming (stigma around disclosing casual sex interest), Grindr users sometimes erroneously indicate in their profiles that they are looking for friends. Zytko and colleagues [72] found users of OkCupid opting not to disclose casual sex interest in their "looking for" profile field, also because of perceived stigma. Other PNA research has applied signaling theory [18,19] to describe a user's tendency to indirectly infer or imply casual sex interest. For example, Grindr users have interpreted profile content about PrEP use (an HIV preventative medication) to signal desire for unprotected sex [66]. A study of Tinder users found men to interpret myriad types of messages, including the mere existence of a message response, as validation of a user's interest in sex [70].

To inform PNA interface designs that can support overt and consistent presentation of interaction goals we sought to go beyond study of a single PNA and a single interaction goal by exploring how users of several different PNAs leverage interface tools to present and evaluate myriad interaction goals. Specifically, our research questions were:

> RQ1.   How do users express their interaction goals through PNAs?
> RQ2.   How do users evaluate the interaction goals of others on PNAs?
> RQ3.   How do users want others to self-present their interaction goals through PNAs?

3 METHOD

We conducted a survey study with 132 users of various PNAs about self-presentation and evaluation of interaction goals. A survey method was chosen to garner user representation from multiple PNAs and with multiple interaction goals; a goal that would be relatively harder with methods like interviews that typically have smaller sample sizes. Two strategies were used to recruit users from a variety of PNAs. Posts were made on 12 different subreddits (online message boards hosted on the website Reddit) advertising the study without financial compensation. Nine subreddits were themed around specific PNAs such as r/Bumble, r/Tinder, and r/hingeapp; others were themed around online dating (e.g., r/DatingApps) and one was themed around finding survey participants (r/SampleSize). The reddit strategy yielded 65 completed survey responses. Other participants were simultaneously recruited through Amazon Mechanical Turk with $2 USD compensation, producing an additional 68 completed survey responses.

Both strategies used the same recruitment criteria: participants must have logged into a dating app in the past 12 months, be at least 18 years old, and live in the US. We opted to use the term "dating app" in the survey because through pilot rounds we discovered that participants were unfamiliar with the term people-nearby application. "Dating app" was more recognizable and not

considered to preclude non-dating usage. We restricted the survey to those living in the US because, one, the survey was piloted with US citizens and had question-wording tailored to their suggestions. Two, evidence of PNAs being used for myriad interaction goals has tended to come from studies of users in particular countries (e.g., the US [37,56], Canada [47], Belgium [56,57]), and we could not assume that these patterns of use are applicable globally, particularly in regions that have persistent cultural stigma around PNA-use [2,6]. While we recognize that this limits generalizability of the findings to regions outside of the US, we wanted to ensure that our survey captured responses from PNA users with myriad interaction goals.

Most participants (102) indicated having multiple interaction goals, which we organized into five categories: long-term romantic relationship (76 participants), face-to-face meeting for reasons other than sex but that could potentially involve sex at some point (76), hookups/meetings for casual sex (42), friendship or face-to-face meetings with no potential for romance or sex (26), and online interaction with no intention of meeting face-to-face (18). Participants used over 10 different PNAs, and in many cases used more than one at a time, including: Tinder (84), OkCupid (54), Bumble (50), Hinge (36), Plenty of Fish (28), Coffee Meets Bagel (22), Match (21), eHarmony (14), Her (2), The League (2), and others (6).

Of the 132 participants, 74 identified as men, 57 as women, and 1 as a different gender. Most identified as heterosexual (113); 10 were bisexual, 7 were homosexual, and 2 identified with a different sexual orientation. Participants lived in 29 different states, with the most popular being California (23 participants). Most identified as living in an urban area (103) with 29 living in a rural area. A majority worked full time (97), while 26 worked part time or were students, and 4 did not work. On average participants had met 5.59 people from a PNA in the past 12 months.

3.1 Data Collection and Analysis

The survey comprised 11 open ended questions, divided into three sections. See Supplementary Materials for sample survey questions. Section 1 involved self-report of strategies personally used by the participant for presenting their own interaction goals and evaluating interaction goals of other users. Participants were prompted to identify which interaction goals their self-presentation and evaluation strategies pertained to. Sections 2 and 3 leveraged a PNA user persona to explore evaluation and self-presentation regarding interest in sex; we focused on sex specifically in sections 2 and 3 because of the harms that can be triggered by misinterpreted sexual intent relative to other, platonic interaction goals. Section 2 involved the participant reviewing a user's profile page and evaluating that user's interest in sex (Fig. 1), with the intention of garnering more granular reports of interaction goal evaluation. Heterosexual men saw a profile representing a woman (Angela), heterosexual women saw a profile representing a man (Brad), and all other participants saw a profile matching their identified gender or of a random gender if their gender was not identified. The profiles consisted of a profile picture taken from a public domain images website and text content closely based on a real profile belonging to an acquaintance of the research team who used PNAs for multiple interaction goals including long-term romance and friendship. The text content remained the same for both profile variations. In section 3 participants were asked to give advice to the user from the profile they previously saw about how they would want interest in sex to be presented by the user through a PNA interface, specifically the profile and private messages. The intent of this section was as an indirect prompt for design ideas that could better support interpretable self-presentation of sex-related interaction goals.

To analyze the data, a three-person research team engaged in a semantic approach to reflexive thematic analysis [10] in the form of synchronous meetings to collectively and iteratively code survey responses. Survey answers were recoded over multiple iterations to reflect updates to the codebook. The team then collectively identified relationships between codes and organized them into a hierarchy. See the final codebook in Supplemental Materials. Each survey question response included the section of the survey it came from to enable differentiation of self-reported user strategies, evaluations of the persona profile, and strategies recommended to the persona.
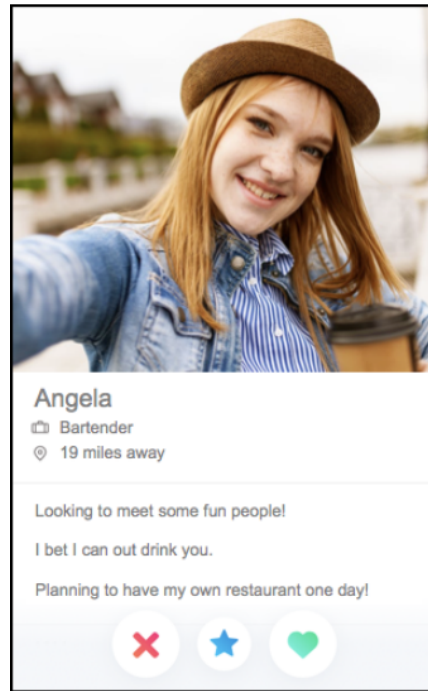
Fig. 1. The PNA profile for our persona "Angela" used in section 2 of the survey.

4 FINDINGS

Data analysis produced four overarching strategies for self-presenting and evaluating PNA interaction goals: 1) content that directly states what the user is "looking for"; 2) inferring and implying interaction goals; 3) listing partner qualifications for undisclosed interaction goals; and 4) purposely delaying self-presentation of interaction goals until meeting face-to-face. We unpack each of these strategies below.

One might question whether all of these strategies were personally adopted by participants in their PNA-use considering that section 2 of the survey asked participants to evaluate interaction goals of a persona profile within the survey interface (which may not match their evaluation tendencies in a more ecologically valid context), and section 3 asked participants to recommend an interaction goal strategy to the persona. Our analysis revealed that all strategies described in sections 2 and 3 were also discovered in the self-report section of the survey—although not necessarily by the same participant. This means that all strategies for presenting and evaluating interaction goals were indicative of those personally adopted by at least some of the participants.

4.1 Directly Stating Interaction Goals Through "Looking For" Content

This strategy involves providing, or scanning for, statements and content in user profiles and messages that directly state a given user's interaction goal(s). Some participants used interface elements provided in PNAs for this, including Bumble's user discovery interfaces separated by interaction goal as well as "looking for" sections on profiles that let users select interaction goals from a predefined list. As one user described their use of Her, a PNA for LGBTQ+ people: "*The app "Her" lets you select your expectations in a "Facts" section, so in other user's profiles I can see one or more of "Don't Know", "New Friends", Something Casual", Monogamous Relationship" or "Polyamorous Relationship". This conveys expectations really thoroughly.*" Such interface elements are not available across all PNAs however, and use was relatively uncommon in our survey.

A majority of personal practice of the direct "looking for" strategy involved free-text fields in profile pages to describe interaction goals in one's own words. This often took the form of concise statements such as *"Looking to make friends"* or *"I am looking for a long term commitment with intent to be married."* In other cases, these statements directly conveyed interaction goals that the user was not interested in, such as: *"Not looking for casual sex."*

"Looking for" statements became lengthier when users had multiple interaction goals or a preferred process of transitioning from one interaction goal to another with the same person. One process mentioned by a few participants was the goal of starting a friendship that may evolve into a romantic relationship over time. As one participant explained: *"I have something in my profile about how I'm interested in getting to know someone as a friend before starting a romantic relationship with them--that I'm not looking to rush into anything."* Other users provided their current relationship status to contextualize the different interaction goals they were open to. This practice was mostly mentioned by users in polyamorous relationships as a way to inform potential partners of circumstances directly applicable to their interaction goals. As one participant described: *"I listed my relationship status (married, polyamorous), and the types of relationships I was open to and how I make a practice of keeping an open mind about what type of relationship will evolve naturally with an individual."*

Some participants used private messaging to elaborate on the "looking for" statements from their profiles and also to prompt their messaging partners to do the same. As another participant in a polyamorous relationship explained: *"I've answered questions regarding the rules/boundaries of my polyamorous marriage, including safer sex expectations, and what types of commitment I'm open to outside of my marriage. I've also asked other users the same types of questions."* Messaging was important for users with multiple relationship goals because it was an opportunity to clarify which particular goal(s) they wanted to pursue with a given messaging partner.

4.1.1 Aversion to Directly Stating Interest in Sex. Participants used "looking for" statements to convey a variety of interaction goals, however use of such statements to convey interest in casual sex was relatively rare with the exception of PNAs for men seeking men *("Most gay men on hook up sites/apps are very clear, that's what we use those apps for: casual sex only.")*. Several participants recommended that users interested in sex should *avoid* direct statements of sexual interest when asked in section 3 of the survey to recommend strategies for presenting sex-related interaction goals on PNAs. Responses such as *"don't be too explicit or forward about [wanting sex]"* and *"avoid even mentioning sex, bodies, or fantasies"* were typical. Some participants instead encouraged purposely indirect suggestions of sexual interest such as *"Just don't say it directly. Find a way to allude to sex."* We explore this strategy of indirect statements further in the next finding. A reason at least some of the participants encouraged avoidance of direct statements of sexual interest is because such statements can come off as crude, aggressive, or sexually objectifying depending on how they are written. Several users mentioned particular phrases that they considered inappropriate for statements of sex-related interaction goals. Examples from one participant included: *"Anything rude or demeaning to potential partners, (e.g. using the word "sluts") or being crude (e.g. talking about "banging" or "a quick fuck")."* Other common phrases that participants disapproved of included *"DTF"* and *"hookup."*

4.2 Signaling Interaction Goals: Inferences and Allusions

Opposite the prior strategy, several participants described a tendency to infer and imply interaction goals, typically through statements and content that the research team considered to not be objectively connected to the goal. We refer to such content as signals of interaction goals. For example, one participant included the line *"Let me be your dog's mom"* in their profile with the intention of conveying interest in *"something serious, like a relationship as opposed to a hookup or friend with benefits set up."* Another included the profile text *"Looking for someone to treat me like shit and then ghost me,"* which was *"intended to convey openness to casual hook ups."* While

members of the research team struggled at times to recognize the connection between reported profile content and the interaction goal intended to be signaled, some participants insisted that their content conveyed *"exactly"* what they were looking for, or they assumed that *"everyone knows"* what they are really alluding to.

While we found examples of various interaction goals being inferred and implied, this strategy was most commonly applied to casual sex goals. Participants inferred casual sex goals in other users through a wide range of content types including the use of *"emojis"* and even spelling errors ("*Profile filled out without much effort, proper capitalization [means they're] looking for something more casual"*). Yet there were three primary forms of content that were mentioned most often by participants for implying and inferring casual sex interest: use of the word *"fun"* in profile text and messaging, invitations to meet face-to-face, and physically revealing profile pictures such as bathing suits. We elaborate on the first two below.

4.2.1 Signaling Interaction Goals Through the Word "Fun." One of the more common pieces of content used to personally infer a casual sex goal was the word "fun." Several participants described statements found in profiles like *"looking to have fun"* as *"obvious"* signals of interest in sex. As one participant described: *"[If they] say they are looking for fun or adventure or to "see where it goes" [it] means they just want sex."* A few also reported asking other users through messaging if they were looking for *"fun"* as a way to actively evaluate a user's interest in sex ("*I asked [in messaging] how much fun they are looking to have").*

The persona profile in section 2 of the survey, which was based on a real profile of a research team acquaintance who used PNAs for multiple goals including friendship and dating, also included the line "Looking to meet some fun people!" While the person that the profile was based on claims that the line is intended to convey openness to friendship if there was no romantic connection, some participants identified it as a key reason they concluded that the persona had interest primarily in sex. In one participant's words: *"Looking to meet fun people is an indicator they just want to hook up."* Furthermore, several suggestions for conveying a sexual goal in section 3 of the survey involved making statements in profiles and messaging about *"wanting to have fun."* It should be noted that survey questions involving the persona profile came after questions about participants' personal strategies for presenting and evaluating interaction goals, and so the persona profile content would not have biased reporting of personally adopted strategies.

4.2.2 Signaling Interaction Goals Through Invitations to Meet Face-to-Face. Some participants found the wording and circumstances of face-to-face meeting invitations to signal casual sex intent even when sex was not explicitly mentioned. They used this for both inferring and implying interest in sex. For example, one participant inferred a user's impending travel—and therefore an inability to maintain interaction beyond one face-to-face meeting—as a signal of intent to meet for sex: *"I head back to Australia tomorrow night but I'm free tonight if you wanted to grab a drink and waste my time. [This] conveyed his expectation to meet up for casual sex."*

Most examples of casual sex signals through meeting invitations were based on references to alcohol, such as meeting at a bar or for the purpose of drinking. Likewise, the line in the persona profile "I bet I can out drink you" in section 2 of the survey was commonly mentioned by participants as a signal of interest in sex. Participants repeatedly connected alcohol and casual sex interest on the basis of lowered inhibitions due to drunkenness and also a perceived personality correlation (e.g., one participant thought people who *"drink a lot"* are *"irresponsible"* and therefore more likely to engage in casual sex).

4.3 Listing Qualifications for Undisclosed Interaction Goals

A strategy that some participants adopted for presenting and evaluating interaction goals involved a focus on qualifications or personal traits that the participants thought were important for the type of interaction they were seeking. These users were interested not in presenting and

evaluating an interaction goal itself, but compatibility for an otherwise undisclosed interaction goal. This sometimes took the form of requirements or "must-have" traits in an interaction partner, but without actually stating the envisioned interaction. Political affiliations, hobbies, and nebulously-worded personality traits were typical of these requirements (see examples below).

"I said I didn't like Trump (I forget the wording). [I used this line] to convey that I don't want to waste my time with people whose ideals are very different from mine."

"[I include the line] Must love going to concerts and be able to be silly with me at times"

Other users subscribing to this strategy mentioned their own personality traits and qualifications in their profiles and messages to attract a partner for their still-undisclosed interaction goals. These tended to be similar to partner trait requirements although some statements, particularly in regard to personality, were quite abstract such as *"[I described myself in my profile as] wanderer of the universe and master locksmith. It described my thinking nature."* A few also elaborated on the importance of messaging interaction to assess compatibility for goals through extended or *"deep"* conversations.

This strategy slightly overlaps with the next, in which participants describe wanting to evaluate compatibility with a potential user before disclosing their interaction goals. The difference here is that responses coded with "listing qualifications" (this findings section) made no indication that interaction goals are clarified at any point after compatibility has been assessed.

4.4 Purposely Delaying Disclosure of Interaction Goals Until Meeting Face-to-Face

There were several participants who explained that they do not attempt to disclose or detect interaction goals at all prior to meeting face-to-face. A few of them explained that they stay intentionally vague about their interaction goals before meeting, such as *"I just mention that I'm looking for interesting people to spend time with [in my profile]. I leave most of the content [about my interaction goals] for when we actually meet in person."* Others portrayed the face-to-face meeting as a superior stage *for "getting to know"* a potential partner relative to a profile or messaging interaction and so they would delay any evaluation until meeting.

Some participants noted that their interaction goals with a specific user may change over the course of interaction (or cease to exist altogether), and so they refrain from disclosing their interaction goals until they are confident that a user is a desirable partner for that goal. As one participant explained: *"I generally don't discuss expectations in PMs [private messages]. I keep it light, and if we click meet up for a drink or coffee. Going over expectations is more contingent if [the meeting] goes well."* A few participants referred to *"expectations"* for future interaction when explaining their strategy to delay presentation of their interaction goals. This delay was in part to help them crystalize their own expectations for future interactions with a given user, but for some it was also to prevent other users from developing expectations or hopes for future interaction that might not come true. These participants opted not to disclose their interaction goals through the PNA because they did not want to put a weight of *"expectation"* on another user to be a suitable partner for their goal, which may cause users to act unnaturally and ultimately *"lead to disappointment"* for both sides. None of these participants acknowledged in their responses, however, that delaying presentation of interaction goals could incur the very outcome they wanted to avoid: disappointment due to unchecked misalignment in goals.

5 DISCUSSION AND CONCLUSION

Motivations for using people-nearby applications (PNAs) have grown quite diverse in recent years beyond dating to also include friendship, business connections, and other intentions. The goal of the study presented here was to understand how PNA users present and evaluate interaction goals (motivations of app-use), and how that knowledge can inform interface designs to support overt and consistent presentation of interaction goals and mitigate misinterpretation. We conducted an open-ended survey study with 132 users of over 10 different people-nearby

applications (PNAs) and with various interaction goals for using PNAs. The study discovered four strategies for presenting and evaluating interaction goals.

Concerningly, three of the discovered strategies seem highly susceptible to misinterpretation, which can result in unenjoyable face-to-face meetings and can put users at risk of harm, especially when disparities in sexual interest occur. In two of the strategies users do not attempt to present their interaction goals through PNA interfaces at all. One involves users purposely waiting until during or after the first face-to-face meeting to disclose their goals, and the other involves users presenting qualities and traits that are important to their interaction goals but without clarifying the goals themselves. In a third strategy users attempt to infer and imply interaction goals indirectly, however such signals could be misunderstood or entirely undetected by others. Furthermore, a disparity in strategies adopted can result in confusion. For example, some participants reported interpreting invitations to meet face-to-face for drinks as signals of a casual sex goal. One's earnest attempt to arrange a face-to-face meeting at a bar for other reasons such as friendship could thus be interpreted, unbeknownst to them, as announcing their interest in sex.

The fourth strategy seems the most reliable for avoiding misinterpretation: directly stating what one is "looking for" on a PNA through profiles and messaging. Yet the strategy was inconsistently applied across interaction goals and was particularly rare for users with interest in sex, who instead opted to indirectly signal their sexual goals. This finding is consistent with prior reports of how interest in sex is disclosed and detected through PNAs [9,66,72]. The psychology literature indicates that this reluctance to overtly present interest in sex is not unique to PNAs [41], nor is a tendency to infer sexual interest indirectly [62] despite misperceptions being common [1,39,46]. It is posited that indirect conveyance of sexual interest is popular because it acts as a protection mechanism against embarrassment and rejection [41].

5.1 Designing PNAs to Support Presentation of Myriad Interaction Goals

These findings make clear that current design patterns in PNAs for supporting presentation of myriad interaction goals are far from adequate. "Looking for" fields on profile pages as popularized on OkCupid let users select interaction goals from a predefined list, which are then clearly displayed on their profile. Yet if users are willing to convey some goals but not others then such fields are unlikely to be entirely accurate and can lose credibility. There is also a limitation when a user has multiple interaction goals—a "looking for" field might convey the goals driving a user's general use of a PNA, but it does little to clarify which goals are driving interest in a particular messaging/meeting partner. Bumble's design pattern takes a different approach at the time of this writing by partitioning interaction goals into separate user discovery interfaces, yet it suffers a similar limitation when users have multiple interaction goals. What if a user discovers a person in the "friendship" mode, but is also sexually attracted to them? Is one supposed to pass on these users because their interaction goal for that particular person does not align with the interface "mode" that they are discovered in? And then there is the third design pattern long exemplified by Tinder: a complete absence of any explicit interface support for presenting interaction goals. Our study shows that users could—and do—take the onus upon themselves to describe interaction goals in free-text portions of their profiles, but this practice is not consistent.

A unifying limitation of current design patterns is the inability to support users in clarifying goals for interaction with a particular partner. PNAs actually already have one design pattern that could be expanded and modified for this purpose: the "swiping" feature used to unlock one-on-one messaging after two users mutually like or "swipe" on each other's profiles. The feature could be modified to have users select particular interaction goals or expectations behind their swiping decision. The interface would notify users not simply of a "match," but of matching interaction goals (see Fig. 2). Respective to concerns of embarrassment and rejection that may fuel inaccurate reporting of interaction goals, unreciprocated goals would not be broadcasted to both users. We do envision users being privately notified of which interaction goals were not reciprocated so as to mitigate any potential doubt. This expanded swiping interface could also be incorporated in

other stages of interaction, such as when users attempt to organize a face-to-face meeting in order to accommodate possible changes in interaction goals during messaging.
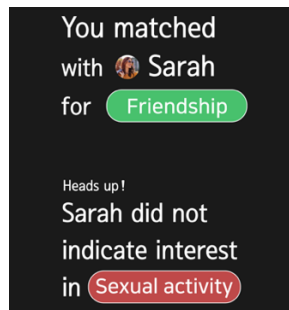

Fig. 2. The PNA "swiping" feature could clarify matches and misalignments in interaction goals

5.2 Future Work

There are several directions for future work. One is research of specific interaction goals, especially newer ones in the PNA space like friendship and social activity partners [11,58], to assess challenges uniquely felt by these users. Given the years of research into PNA-use for dating [e.g., 22, 26], equally in-depth research of PNA-use for platonic goals is relatively lacking (recent exceptions include [37,38,47]). Another path for future work is exploration of how self-presentation and evaluation of interaction goals varies across geographic areas, particularly ones with persistent stigma around PNA-use [2,6] and common associations of PNA-use with sex [15]. The present study focused only on users in the US, which limits generalizability to other regions. Perhaps the most important direction for future work is involving end-users in the design and assessment of interface designs intended to better support presentation and evaluation of various interaction goals and how such designs can mitigate harms incurred by misinterpretation. To this end, our own future and ongoing work is in participatory design. This entails users of various demographics and with various interaction goals in not only assessing and modifying researcher-produced interface designs (such as in Fig. 2), but in developing their own ideas for how PNAs can support them in making informed face-to-face meeting decisions for particular interaction goals and ultimately avoiding harm during such meetings.

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