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Big Dating: A Computational Approach to Examine Gendered Self-Presentation on Tinder

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ABSTRACT

GPS-based dating apps have changed the way users find potential partners. Their minimalistic design, aimed at encouraging fast transitions between online match and offline encounter, leaves little space for users' verbal self-presentation. As such, biographies become important tools of impression management. Based on an anonymized sample of 50,406 biographies, we analyze how users employ words to attract the right partner, and explore gendered differences in word choice and use.

CCS CONCEPTS

- **Social and professional topics** → User characteristics; Gender
- **Mathematics of computing** → Contingency table analysis

KEYWORDS

ACM proceedings; online dating; self-presentation; big data

ACM Reference format:

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1 INTRODUCTION

The emergence of dating apps has contributed to a true shift in the way users choose, connect to and meet each other in real life. As such, users' choices in self-presentation become fundamental, not just for users to present themselves authentically, but also in order to attract potential others who could be successful matches.

Compared to “old-school” dating sites, however, GPS-based dating apps offer very limited space for self-presentation, which is mostly approached visually. The presence of text is generally left up to users; in this sense, the words users choose for their profiles can be very revealing of how they wish to be seen and whom they want to attract.

This study wishes to explore the word-based self-presentation carried out by Tinder users, based on a fully anonymized sample of 50,406 Dutch Tinder biographies. This initial exploration will hopefully help us better understand the role words play in establishing desirability and reducing uncertainty.

2 THEORETICAL BACKGROUND

2.1 Dating Apps affordances

The emergence of GPS-based real time dating apps has introduced a few specific affordances in the way users connect and interact with each other.

Primarily, if compared with “old-school” dating platforms such as OkCupid, user profiles are predominantly visual, with large space dedicated to pictures and only a few lines of text allowed [1]. The information users are required to provide is also limited to names and age. Whenever access to an app is only possible through a Social Network Site log in, as in the case of Tinder and Happn, users' basic demographics are automatically collected, as a way of “anchoring” online identities [2].

Previous research interpreted the affordances specific of dating apps as incentivizing the speedy transition between an online match and an offline encounter [3]. Blackwell et al. have identified “co-situation” as another important affordance of GPS-based dating apps: users “are visible not just on the basis of interest or

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geography, but a combination of these elements” [4]. These affordances might introduce important differences in the way users represent themselves, with the hope of attracting a significant other who happens to be nearby.

2.3 Impression Management on Dating Apps

Users of GPS-based dating apps operate on a platform where available space for word-based self-presentation is minimal and the options to *filter* other users are extremely limited [5]. This could reinforce the “profile as promise” framework identified by Ellison et al. [6]: because the likelihood of an encounter becomes more immediate, users might find themselves more pressured to construct authentic online identities. On the other hand, if users are looking for a casual encounter rather than a potential relationship—a use that gave Tinder fame as “a hookup app”—they might favor representation of idealized versions of themselves [5]. Previous research has identified different motivations for using dating apps [3, 5, 7] that include entertainment and meeting people non-romantically. Such different purposes of use influence the degree of authenticity users put in their self-presentation [3].

Aside from communicating an authentic image of themselves, users of dating apps have been found to employ strategic self-presentation as a mean of uncertainty reduction [8]. By framing their representation under a certain lens, users aim to attract peers who are more likely to “match” with them. As such, impression management on dating apps has both a function of spreading a desirable image, and making sure that such image is desired by the correct audience.

2.4 Gendered Self-Presentation

Differences in online self-presentation across genders have been identified in studies on Social Network Sites [9, 10]. An early study among teenagers on Myspace found that, while a reification of profiles was rather common for all users, girls reported higher concerns about their self-presentation, as well as a pressure to both present themselves as sexy and not attract judgment by peers [9]. Later studies have also found gendered differences in how Facebook and Instagram users present themselves, however the focus of studies has shifted from profile wording to pictures [11].

Gendered differences in self-presentation in the context of dating have been found in terms of authenticity. Hancock et al. [12] found that male users were more likely to overstate their height, and that female users were more likely to underreport their weight.

Research on gendered differences in self-presentation on dating apps is currently very limited. With the present paper, we wish to explore how and whether verbal self-presentation differs among male and female users of Tinder. In this paper, we examine gendered word use of three *content* word types (i.e., pronouns, nouns, and adjectives) and pronouns. In an online dating context, pronouns indicate the focus of one’s biography (i.e., self or other) and content words indicate the topics (noun), attributes of topics (adjectives), and actions (verbs) that constitute someone’s online self-presentation.

3 METHODS

3.1 Corpus

To explore gendered differences in self-presentation, we conducted an automated content analysis of Dutch Tinder biographies. A near complete corpus of 224,258 Tinder biographies was collected in the Netherlands, using *Pynder* [13], a freely available Python package. *Pynder* is essentially a desktop version of the official Tinder app, though it does not require a smartphone to be operated.

In order to guarantee anonymity of the users that wrote the biographies, names and images were not recorded. Also, any textual information that could be used to identify specific users (e.g., social media handles, phone numbers, web links) was deleted directly after data collection. The main analyses were performed on an aggregated level, meaning that only differences between men and women (as groups) were examined. A so called “bag of words” procedure ensured that the *individual* was eliminated from the dataset, and only aggregated group data remained. This study was approved by the ethical committee of the University (case number: 2017-CS-7635).

3.2 Procedure

Prior to data collection, two Tinder profiles were set up—one as a female user and one as a male user. The age search range of the profiles was set to maximum, as these profiles were used to request all profiles from the opposite sex in the area. A Python script that automated data collection was written by one of the researchers. This script ran a three-step procedure and would (i) request a Tinder profile matching the search criteria, (ii) save all relevant information (i.e., biography, gender, age), and (iii) swipe the profile left to make sure that it would never show up again. These three steps automatically repeated until there were no profiles left in the area.

To use automatic language processing techniques, it is key that there is (a) textual data, and (b) all texts are written in the same language. Empty Tinder biographies, as well as biographies containing non-Dutch language, were therefore omitted after data collection. A final corpus of 50,406 Dutch language biographies (23.5% female) remained; see Table 1 for descriptives.

Table 1: Descriptive Statistics Corpus

| | Dutch Tinder biographies | | |
|--------------------|--------------------------|--------------|--------------|
| | Females | Males | Total |
| Amount of profiles | 11,864 | 38,542 | 50,406 |
| Age | 22.45 (3.76) | 28.41 (7.44) | 27.01 (7.21) |

Note: the table shows the total amount of biographies and the corresponding average age (standard deviation) of the users.

Part-of-Speech tagging. To facilitate the analyses, the syntactic roles of all words in the biographies were determined. *Frogr*, an R client [14] of the natural language processing module *Frog* [15], was used to automatically part-of-speech (POS) tag all words in the biographies. The package automatically assigned a POS code to all words, corresponding to the syntactic role of the word in the sentence (for example, ADJ for adjective). Additionally, *Frogr* calculates a confidence score between 0 and 1 that corresponds with the probability a word is tagged correctly. To assure reliability,

words assigned a confidence score lower than .80 were omitted from further analyses.

4 PRELIMINARY RESULTS AND DISCUSSION

Going forward, four word types were considered (i.e., pronouns, nouns, adjectives, and verbs). See Table 2 for descriptive statistics of word type counts per gender. Contingency table analyses determined whether specific words were more likely to be used by females than by males in their biographies, or vice versa. Relative frequencies and odds ratios were calculated for a selection of personal, reflective, and reciprocal pronouns; see Table 3 for overview. In addition, the fifteen most common nouns (Table 4), adjectives (Table 5), and verbs (Table 6) were reported. Relative frequencies were determined, and odds ratios were calculated for the odds that a word was used in a female biography, rather than in a male biography.

Table 2: Word Counts per Word Type

| | Females | Males | Total |
|-------------|----------------|-----------------|-----------------|
| Pronouns | 17,248 (9.0%) | 63,587 (8.6%) | 80,835 (8.9%) |
| Nouns | 40,618 (21.1%) | 145,439 (20.2%) | 186,057 (20.4%) |
| Adjectives | 15,862 (8.2%) | 64,402 (9.0%) | 80,264 (8.8%) |
| Verbs | 21,530 (11.2%) | 80,151 (11.2%) | 101,681 (11.2%) |
| Total words | 192,621 | 718,432 | 911,053 |

Note: word type word counts include only words labeled by the *Frog* algorithm with a confidence score higher than 80%. Percentages (relative frequencies) are given per column. The *Total words* row shows the total amount of words found in the biographies—including, but not limited to, the words stated above, prepositions, determiners, & conjunctions.

4.1 Pronouns

The overview in Table 3 shows that women use different pronouns than men. Syntactically, pronouns are indicators of the subject of a sentence. By examining the pronouns that are used in Tinder biographies, it is possible to determine the focus of the biographies—being either a focus on oneself (*self-focus*) or on the other (*other-focus*).

For the next four tables: percentages indicate relative frequencies of words. Words more often used by females are shown in bold; those more often used by men in italics. Odds ratios show the odds that, when a word is used, it is used in a female biography. * $p < .05$

Table 3: Relative Frequencies Most Used Pronouns

| Type | Pronoun (in Dutch) | Females | Males | Odds ratios |
|------------|--------------------|---------|-------|-------------|
| Personal | I (ik) | 32.2% | 27.7% | 1.24* |
| | You | 15.2% | 15.4% | 0.99 |
| | <i>Him</i> | 0.2% | 0.4% | 0.50* |
| | Her | 0.4% | 0.2% | 2.30* |
| | <i>We</i> | 1.5% | 2.2% | 0.71* |
| | You | 0.2% | 0.1% | 0.45 |
| | They | 0.4% | 0.4% | 1.14 |
| Reflective | <i>Myself</i> | 0.6% | 0.7% | 0.78* |
| | <i>Yourself</i> | 0.4% | 0.4% | 0.97 |
| Reciprocal | <i>Each other</i> | 0.3% | 0.5% | 0.68* |

Note: see explanation above.

Women seem more likely than men to use the personal pronouns "I" and "her". This implies that women, more than men, explicitly focus on themselves (*self-focus*) in their biographies. Men however, seem more likely to employ a variety of foci in their biographies: "him", "we", "myself", and "each other". The reflective pronoun "myself" also indicates a *self-focus*, however this word has a substantive lower relative frequency than the pronoun "I". Besides, the increased likelihood of using "we" and "each other" for men imply that they lack a clear *self* or *other-focus* in their biographies. Both men and women are equally likely to use the pronouns "you", "they", and "yourself", implying they are equally likely to have a clear *other-focus*.

4.2 Nouns

The results in Table 4 show that women and men use different nouns in their biographies. In an online dating context, nouns represent "interests" and "personality traits". They (assuming that they were put in the biographies with a reason) give an indication of what the writer finds important. For example, if a woman mentions the noun "honesty" in her biography, we can assume that she finds "honesty" important to communicate to her potential match—either as a personality trait of herself or as something she is looking for in a potential match.

Table 4: Relative Frequencies Top 15 Nouns

| # | Noun (in Dutch) | Females | Males | Odds ratios |
|----|------------------------------------|---------|-------|-------------|
| 1 | Music (muziek) | 2.2% | 2.3% | 0.98 |
| 2 | <i>Film</i> (film) | 1.6% | 2.0% | 0.80* |
| 3 | Friend (vriend) | 1.6% | 1.7% | 0.93 |
| 4 | Student (student) | 2.3% | 1.0% | 2.24* |
| 5 | Festival (festival) | 1.5% | 1.5% | 1.00 |
| 6 | Conviviality (gezelligheid) | 1.6% | 1.3% | 1.19* |
| 7 | <i>Thing</i> (ding) | 1.2% | 1.3% | 0.89* |
| 8 | Party (feest) | 1.5% | 1.0% | 1.49* |
| 9 | <i>Humor</i> (humor) | 0.9% | 1.6% | 0.55* |
| 10 | Series (serie) | 1.3% | 1.2% | 1.10 |
| 11 | <i>Life</i> (leven) | 1.0% | 1.3% | 0.77* |
| 12 | Year (jaar) | 1.2% | 1.0% | 1.16* |
| 13 | Wine (wijn) | 1.3% | 0.7% | 1.93* |
| 14 | <i>Fitness</i> (fitness) | 0.9% | 1.2% | 0.73* |
| 15 | <i>Soccer</i> (voetbal) | 0.7% | 1.2% | 0.59* |

Note: see explanation above Table 3.

Women seem more likely than men to use the nouns "conviviality", "party", and "wine". These words are all positive amusement-related nouns. This might indicate that amusement, or *having fun*, is more important to women than to men (compared to other things). Additionally, women are more likely to use the study-related nouns "student" and "year". A reason for why women are more likely to mention study-related nouns, is the fact that the proportion of female users with an age usually associated to being a student (18-25 years) is simply greater for women than for men. This could inflate the relative frequency of study-related nouns and hence explain our findings. Alternatively, it could also mean that women find it more important to mention that they are studying than men.

Men are more likely than women to mention the general nouns "film", "thing", and "life". Additionally, men are more likely to

mention the noun "humor" in their biographies; highlighting their perceived importance of "humor". Men are also more likely to use sports-related nouns: "fitness", and "soccer". This implies an emphasis on physical fitness as topic of interest in their biographies. Additionally, the nouns "music", "friend", "festival", and "series" are equally likely used by men and women in their biographies.

4.3 Adjectives

The results in Table 5 show that women and men also tend to use different adjectives in their biographies. Adjectives are descriptive words, used in texts to modify nouns. Similarly to the nouns, the use of specific adjectives indicates a perceived importance of these attributes of nouns, for the person that wrote the biography.

Table 5: Relative Frequencies Top 15 Adjectives

| # | Adjective (in Dutch) | Females | Males | Odds ratios |
|----|-------------------------------|---------|-------|-------------|
| 1 | <i>Fun</i> (leuk) | 5.4% | 6.4% | 0.84* |
| 2 | Good (goed) | 3.9% | 4.1% | 0.94 |
| 3 | <i>Nice</i> (lekker) | 2.2% | 2.6% | 0.87* |
| 4 | Spontaneous (spontaan) | 2.6% | 2.2% | 1.19* |
| 5 | <i>Cozy</i> (gezellig) | 2.1% | 2.5% | 0.86* |
| 6 | <i>Athletic</i> (sportief) | 1.6% | 2.8% | 0.57* |
| 7 | Tall (lang) | 1.8% | 1.7% | 1.07 |
| 8 | Complete (heel) | 2.0% | 1.5% | 1.31* |
| 9 | <i>Ordinary</i> (gewoon) | 1.5% | 1.7% | 0.84* |
| 10 | Really (echt) | 1.5% | 1.4% | 1.09 |
| 11 | Far (ver) | 1.5% | 1.5% | 1.00 |
| 12 | <i>Honest</i> (eerlijk) | 1.0% | 1.8% | 0.57* |
| 13 | Serious (serieus) | 1.4% | 1.4% | 0.97 |
| 14 | <i>Beautiful</i> (mooi) | 1.0% | 1.6% | 0.61* |
| 15 | Small (klein) | 1.7% | 0.8% | 1.96* |

Note: see explanation above Table 3.

Women seem more likely than men to use the adjectives "spontaneous", "complete" and "small". This implies that "spontaneous", "complete", and "small" are attributes more important to mention for women than for men (or at least perceived as such). Men were more likely than their counterparts to state the adjectives: "fun", "nice", "cozy", "athletic", "ordinary", "honest", and "beautiful". Men seem more likely to focus on *positivity*, by using the words "fun" and "nice" and on what is *normal*, by using the words "cozy" and "ordinary". Also, it seems that they find mentioning honesty and physical fitness important. In addition, the adjectives "good", "tall", "really", "far", and "serious" are as likely to be used by women as by men.

Additionally, women seem more likely than men to mention the adjective "left", where men seem more likely to mention the adjective "right". On Tinder, these directions are used to indicate whether you *like* someone ("right") or want to *skip* someone ("left") [1]. Using the adjective "left" could therefore imply that the writer of the biography actively filters (in their eyes) incompatible matches, prior to matching—by suggesting them to swipe left (e.g., swipe left if you smoke). This can be considered a form of verbal strategic self-presentation, used to reduce uncertainty. In that case, the biography is (strategically) used to *minimize the risk* of matching with an incompatible match. Men seem more likely to do the opposite. They urge potential matches to swipe "right", which

means that they encourage, rather than filter, with their biographies (e.g., just swipe right).

4.4 Verbs

The results in Table 6 show that men and women use different verbs in their biographies. Verbs are action-words and indicate the action of the subject in a sentence. Examining verbs could therefore offer insight into the motives of the subject (in most cases the writer of the biography), and the actions being taken with the nouns.

Women seem more likely than men to mention the verbs "to love" and "to find". This implies that women focus on describing what they "love" themselves (to do, for example) and (likely) also what they "love" in other people. Additionally, they seem to write about what they are trying to "find". Mentioning what one is *looking* for is another tactic to minimizing the risk of matching with an incompatible match. Men are more likely to use the verbs "to come", "to shall", and "to enjoy" in their biographies. These words imply that men are more likely to talk about where they "come" from, what they "shall" (or "should") do in the future, and about what they "enjoy" doing. This suggests that men are likely to simply give a description of themselves in their biographies, without explicitly stating what they are looking for. This is in contrast with what we found for women. Additionally, men and women were equally likely to use the verbs: "to be", "to have", "to can", "to go", "to cook", "to look", "to make", and "to must".

Table 6: Relative Frequencies Top 15 Verbs

| # | Verb (in Dutch) | Females | Males | Odds ratios |
|----|-----------------------------|---------|-------|-------------|
| 1 | To be (zijn) | 20.9% | 20.7% | 1.01 |
| 2 | To love (houden van) | 8.2% | 6.2% | 1.35* |
| 3 | To have (hebben) | 4.9% | 5.0% | 0.98 |
| 4 | To can (kunnen) | 3.1% | 3.2% | 0.96 |
| 5 | To want (willen) | 2.9% | 2.8% | 1.02 |
| 6 | To do (doen) | 2.8% | 2.6% | 1.05 |
| 7 | To go (gaan) | 2.3% | 2.4% | 0.94 |
| 8 | To find (vinden) | 2.0% | 1.6% | 1.26* |
| 9 | To cook (koken) | 1.6% | 1.7% | 0.92 |
| 10 | To look (kijken) | 1.6% | 1.6% | 0.99 |
| 11 | To make (maken) | 1.5% | 1.5% | 0.95 |
| 12 | <i>To come</i> (komen) | 1.0% | 1.3% | 0.75* |
| 13 | To have to (moeten) | 1.1% | 1.1% | 0.96 |
| 14 | <i>Shall</i> (zullen) | 1.0% | 1.2% | 0.81* |
| 15 | <i>To enjoy</i> (genieten) | 0.9% | 1.2% | 0.72* |

Note: see explanation above Table 3.

5 CONCLUSION

In this study we explored the role of gender in word-based online self-presentation in online dating. A large corpus of Dutch Tinder biographies was analyzed using automatic language processing techniques. The results showed that, when writing biographies, men and women differ in their use of specific pronouns, nouns, adjectives, and verbs. This offered insight into the focus, topics, and motives of Dutch Tinder users.

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