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## Partner preference and age: User's mating behavior in online dating

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### Abstract

**Objective:** We test whether real online-user mating behavior corresponds with expectations from both the sociobiological and social perspectives and explore the age differentials that individuals opt for when searching for a mate and how this evolves relative to the user's age and gender.

**Background:** Age plays a vital role in partner choice. Previous studies have focused primarily on age differences between couples and their self-reported preferences for partners of a certain age. However, little is known about how age affects behavior in the online dating market.

**Method:** We use behavioral data from a Czech online dating app, Pinkilin and analyze 197,519 invitations that users sent to each other in July 2017.

**Results:** Men strongly prefer young women, and women prefer partners of their age or slightly older. At older ages, men's preference for younger women widens, while women's preferences become more diverse. Homogamous tendencies are stronger among younger users and women.

**Conclusion:** Overall, our results corroborate those of previous research on online dating, but we extend this research in terms of age differences in the Czech context.

**Key words:** Online dating, partner preference, age homogamy, Czechia



## 1. Introduction

Age is an important factor in mating. From an evolutionary perspective, it influences human reproduction opportunities and, thus, is linked to individual reproductive strategies, with youth being a fertility cue by females and mature age signaling the ability of males to provide for offspring (Buss & Schmitt 1993). From a sociological perspective, we observe the impact of social norms: Our peers might be deemed more appropriate partners by our family and friends. Therefore, age guides our choice of partner: Individuals have explicit or implicit age intervals that they apply during a partner search, and even the most basic online dating services will require a preferred partner age in order to match users. Moreover, age most likely influences the type of relationship an individual will form as well as its outcome: Couples with a smaller age difference tend to share similar values, life experiences, and opinions (Fiore & Donath 2005; Fučík 2006).

In terms of patterns in age homogamy, examinations of national marriage data probably constitute the oldest and richest research tradition (i.e., Atkinson & Glass 1985; Qian 1998; van de Putte et al. 2009). These findings, although representative and usually comparable among countries, lack partner search dynamics. By looking only at actual couples, we miss out on details regarding how individual partner age preferences manifest in the dating market and cannot separate the effects of individual choice and age-structured social systems that support age homogamy, such as schooling (Kalmijn 1998; Katrňák 2008). Since the late 1920s, partner preference research has regularly employed self-reports from questionnaires undertaken to evaluate mate-selection criteria. These studies offer more detail regarding individual partner choice, but they often focus only on younger populations and are prone to social desirability bias (Schwarz & Hassebrauck 2012). Evolutionary theory posits that partner preferences can change as people age, although there is little data to support this claim (Buunk et al. 2002). However, the evidence does suggest differences between declared partner preference and real-life dating behavior (Rudder 2014; Skopek, Schmitz, & Blossfeld 2011).

A relatively new strand of research has used online dating data to examine partner preferences (i.e., Fiore & Donath 2005; Potarca 2017; Skopek et al. 2011). With around 75% of singles in the United States looking for partners online and with a similar trend in Europe, including the Czech Republic, the Internet has been gradually replacing traditional meeting places for partners (Dinh, Gildersleve & Yasseri 2018; Nielsen Admosphere 2018; Rosenfeld & Thomas 2012). Moreover, contrary to the stigma involved, online dating sites are considered places to find a serious relationship: 35% of US marriages between 2005 and 2012 began online (Cacioppo et al. 2013).

The use of data from online dating to study partner preferences brings important benefits. First, unlike declared preferences, we can observe authentic dating behavior. Second, online dating sites record all user activity, and thus, we have access to more detailed data than even extensive questionnaires with large samples, thereby enabling richer analyses. Although there are obvious limits with regard to the representativeness of online dating data, as the analysis is usually focused on one service only and skewed toward younger users, it is a logical next step toward expanding partner preference research.

In this article, we build on the existing online dating research using digital trace data from the Czech online dating mobile app Pinkilin in order to understand partner preferences with regard to age. Aside from examining overall mating patterns relating to age and gender, our data allow us to explore the age interval that users opt for when searching for a mate and how the interval varies relative to an individual's age and gender. This evidence further develops our knowledge about partner preference and age, but it is also intriguing as a case study of partner preferences in the Czech Republic, as this is the first local attempt at using online dating data to study age dynamics. Furthermore, as most online dating studies share a common flaw—they are limited to one online dating site—cumulative evidence is crucial to assess whether the observed patterns are truly present or merely a by-product of the design of particular sites.

## 2. Age homogamy

When we look at actual couples, we often observe a strong tendency toward homogamy, i.e., partners resembling each other. This pattern holds across various cultures, times, and characteristics, including age (i.e., Blossfeld & Timm 2003; Hamplová 2009; Kalmijn 1998). It is relatively easy to study age homogamy because marriage data involving partner age are widely available. However, marriage patterns show only part of the story: They represent the end product of the partnering process, which could have been brought about by various mechanisms. They show successful couples who have transitioned from strangers to spouses. Age homogamy could be explained by individuals' preference for age homophily—the tendency to like partners of the same age—but other factors such as our physical opportunities and the social forces around us are also at play (Kalmijn 1998; Katrňák 2008; Schwartz 2013). An individual's preference for a partner of different age (heterophily), of a lower age (hypophily), or of a higher age (hyperphily) can also translate into homogamous marriage. To illustrate, a man over 60 could have a strong preference to date a woman in her 20s, but if their social circles do not overlap and the man's preference is not reciprocated, such a couple is unlikely to form.

Studying partner preferences can enhance our understanding of the forces behind mating outcomes, and it could be a mistake to assume that age-related marriage patterns are the result of a partner's age preferences (Skopek et al. 2011). However, it is also a topic that is interesting in itself, as partner preference dynamics expand our knowledge of the early stages of the mating process. This is especially true when using online dating data, which removes the structural constraints of the offline world, where the social environment is structured in such a way that it increases our probability of meeting some people while decreasing the probability of meeting others. Online dating expands the dating pool by allowing a wider variety of people of different ages and other characteristics to be in the same virtual place. Furthermore, the costs of initiating a contact are relatively low in terms of time and money, as such contact is easily undertaken on mobile devices in a matter of moments. Additionally, the psychological costs are also presumably lower in online dating, since there is no face-to-face interaction while initiating contact, and a potential non-response does not have to be interpreted as a rejection (Kreager et al. 2014).

Thus, the Internet could bring partner preferences and real dating behavior more in line, as the barriers are easier to cross than in traditional settings, and individuals can choose counterparts who are closer to their liking.

So far, the evidence from online dating research points to preferences for similarity in some aspects and dissimilarity in others (Blackwell & Lichter 2004; Fiore & Donath 2005; Hitsch, Hortaçsu & Ariely 2010). In terms of age, the evidence seems to be mixed. On one hand, Skopek et al. (2011) observed a non-random preference for contact with same-age partners on a German dating site. On the other hand, Rudder (2014) analyzed data from an American dating site and found a preference for same-age partners among women but not among men. This discrepancy can be due to different cultural contexts or differences in the dating sites studied.

As stated above, homogamy or heterogamy is an outcome of the mating process. There are two theoretical perspectives that aim to explain the forces underlying this outcome. The first perspective is evolutionary theory, which links age to fertility and views mating dynamics between men and women through the perspective of different reproductive strategies (Buss et al. 2001; Buss & Schmitt 1993; Eagly & Wood 1999; Kenrick & Keefe 1992). We refer to the second perspective as the sociological perspective because it emphasizes the impact of social norms and the dynamics of the mating market (e.g., Casterline, Williams & McDonald 1986; Gustafson & Fransson 2015; Hakim 2010; Skopek et al. 2011). We elaborate on these two perspectives in the two following subsections.

### 3. Evolutionary theory

Evolutionary theory posits that partner preferences, including age, are linked to human reproductive strategies and should vary according to an individual's gender and age (Buss et al. 2001; Buss & Schmitt 1993; Eagly & Wood 1999; Kenrick & Keefe 1992).

#### 3.1 *Men's partner preferences with regard to age*

Within this perspective, academics argue that men are looking for a fertile partner with quality care potential and, thus, find young women the most attractive. Women are at their fertility peak in their early 20s, and the younger they are, the higher the likelihood they will survive labor and be able to physically care for their offspring. Men should, therefore, have stronger preferences for traits that signal a female's ability to reproduce. Partner preference research confirms this expectation: In samples across various cultures, physical attractiveness, youth, and domestic skills tended to be more important for men than for women (Buss et al. 2001; Shackelford, Schmitt & Buss 2005; Sprecher, Sullivan & Hatfield 1994), including in the Czech Republic (Hamplová, Klímová Chaloupková & Topinková 2019; Katrňák & Fučík 2009; Šetinová & Klímová Chaloupková 2019; Vymětalová 2000). However, only a few studies have looked at preferred partner age intervals or partner preferences in relation to age. In those that have, men seemed to consider female partners up to 10 years their junior but only about five years their senior.

As men get older, their willingness to approach younger women increases, but their low acceptance of older women remains constant (Conway et al. 2015; Kenrick & Keefe 1992; Schwarz & Hassebrauck 2012).

Male age preferences are also demonstrated on the dating market. Young women have a prominent position in online dating sites and are heavily approached by men of all ages, with digital trace data showing that men often go below their stated age preference when messaging single women (Fiore & Donath 2005; Rudder 2014). As men age, they avoid contacting older women and grow more ambitious in contacting even younger women (Skopek et al. 2011). According to the life history model, this can be understood by males' longer fertility (Kenrick & Keefe 1992). This could also explain why women, at the end of their fertility window (circa 40 years), have trouble finding suitable partners and experience the so-called "marriage squeeze" (Ní Bhrolcháin 2005).

### *3.2 Women's partner preferences with regard to age*

According to evolutionary theory, as women's investment in motherhood is greater than that of their partner, they must choose a different reproductive strategy, which is reflected in their mating preferences (Buss & Schmitt 1993). Women look for a fertile and healthy partner, but they also need someone who will be able to provide for them and their children. This has become evident in partner preference research: Across cultures and age groups, women highlight the importance of a partner's income, education, and status (Sprecher, Sullivan & Hatfield 1994). As men's financial security tends to correlate with age, women might use it as a cue for a potential partner's income and status (Conway et al. 2015). However, male fertility declines with age, and at some point, a man's ability to provide is threatened due to aging. Women should, therefore, prefer a partner roughly around their age or a bit older (Kolk 2015).

In examining data that support this theoretical expectation, we find that women demonstrate tolerance for partners up to eight years their senior and five years their junior. As women age, their upper limit for a partner's age decreases, but they grow to accept men who are significantly younger than they are (Conway et al. 2015; Schwarz & Hassebrauck 2012). Users' behavior on online dating sites confirms these trends. On one of the biggest international dating sites, OkCupid, women's attention is largely focused on men their age, with the oldest allowable match being about five years older than them (remaining roughly constant as the woman ages). Although young women up to 28 years old are not very tolerant of younger men, this changes when they reach 30, and their acceptance of younger partners grows with age (Rudder 2014). An analysis of a German dating site reached a similar conclusion: Women reach out to older men, but as they grow older, their willingness to contact older males decreases in absolute terms. They then grow open to younger partners (Skopek et al. 2011).

As mentioned earlier, research on Czech partner preferences largely reflects the gendered expectations of evolutionary theory: For decades, we have observed the above-mentioned gender-specific partner preferences (Fialová et al. 2000). Although there is no research that focuses specifically on partner preferences and age, general partner preference research maintains that males seek youth and beauty, whereas females focus on income and status (Katrňák & Fučík 2009; Šetinová & Klímová Chaloupková 2019;

Vymětalová 2000). Therefore, we expect that the gendered age preferences discussed in evolutionary theory and demonstrated in international research will also hold for the Czech dating site.

### 3.3 *Sociological perspective*

Evolutionary theory reduces dating to reproductive strategies. However, dating is a social behavior that takes place in a wider societal context, with individuals engaging in it to fulfill various needs—not limited to finding a life partner and reproducing. Sexual pleasure, company, status acquisition, self-realization, and societal expectations are all reasons why people choose to engage in active dating (Weigel 2016). Macro-level social forces, context, and individual preferences all influence partner preferences when dating, including expectations regarding age.

### 3.4 *Mating market dynamics*

It is widely accepted that mating occurs within a “market” where individuals exchange various forms of capital to attract desirable mates. The final pairing is a result of individual preference, bargaining power, and partner availability (Becker 1985; Hakim 2010; Oppenheimer 1994; Skopek et al. 2011). Within this market, individuals wish to maximize their utility, which can stem from partner similarities. This is so because relationships with a partner from a similar background tend to enjoy a sense of easiness, since the couple often shares similar attitudes and lifestyle, making it easier to communicate, fall in love, and raise children (Kalmijn 1994; Lewis 2016). This holds true for partner age preferences: Partners of a smaller age difference are more likely to share common values, life experiences, and opinions as they have experienced important life stages in similar times (Fiore & Donath 2005; Fučík 2006). Age-homogamous relationships are also more likely to be rewarding and stable, egalitarian, and with lower incidences of domestic violence (Gustafson & Fransson 2015; Kolk 2015). In this view, individuals should prefer age-similar relationships regardless of their age.

Another dynamic of the mating market is social exchange. There is strong evidence to suggest that males, in particular, trade their financial and social capital for female erotic capital, i.e., female physical attractiveness and fertility (Buss & Schmitt 1993). According to some authors, for women, the marriage market is even as important as the labor market with regard to status attainment (Hakim 2000). We can assume that partner age preferences are an important part of this status–beauty exchange. In particular, with the growing importance of physical attractiveness in self-service mating markets, such as online dating, age can correspond with the erotic capital of a potential mate (Hakim 2010). Although we commonly see males trading their status for female youth, the dynamic has been increasingly seen to work inversely: Older, wealthier women choose to date younger, more attractive men (Rudder 2015). To sum up, individuals’ awareness and experience of interactional dynamics within the social exchange can influence their preferences, and in particular, those who are aware of their higher status can be more ambitious with regards to a partner’s age (Lewis 2016).

An individual's dating strategy will also impact their behavior on the mating market, including in relation to a potential partner's age interval (Alterovitz & Mendelsohn 2013; Shackelford et al. 2005; Stewart et al. 2000). Physical attractiveness, which is closely linked to age, is more important in short-term relationships. Both genders are more selective when the goal is to search for a long-term partner. For males, beauty is of high importance in long-term relationships; for females, resource acquisition skills and signals (i.e., status, degree) and personal characteristics (i.e., kindness) (Stewart et al. 2000) are more important. An individual's own age can influence their choice of dating strategy, although this does not seem to substantially impact their stated partner preferences, especially in young adults (Bleske-Rechek & Ryan 2015; Shackelford et al. 2005). However, it is important to note that studies looking at how partner preferences develop over time commonly work exclusively with short intervals (e.g., three years), do not focus on preferred partner age, and mostly rely on self-reported preferences. This can be especially problematic as it assumes that individuals are conscious of their preferences and that preferences conform to future actions (Schmitz et al. 2009). The situation might be different in the context of behavioral data from online dating and various age groups, as we know that preferred partner age intervals do change with age (Skopek et al. 2011).

### 3.5 *Social norms*

Besides market dynamics, partner age preferences may also result from social norms guiding mate choice. Individuals internalize socially shared conceptions about appropriate partner age differences and then select their mates accordingly. Family and friends approve and reward "good choices" and penalize pairings that violate norms. Social norms can vary across countries as well as across social groups (Kalmijn 1998). Nevertheless, it appears that partners of similar age should be fairly widely accepted, as age homogamy features in most industrialized countries and seems to be on a rise (Esteve, Cortina, & Cabré 2009; Ní Bhrolcháin 2005). We can assume that in the context of Czechia, the norm of age homogamy is fairly strong: Age homogamy has increased from the 1950s onward, with husbands being the same age or a couple of years older than their wives. Currently, the most common age difference between spouses is just one year. Indeed, age at marriage is an important factor behind age homogamy in Czechia: The lower the age, the higher the chances of a homogamous spouse (Katrňák 2008). By becoming a social norm, the already prevalent pattern of age homogamy may be further reinforced through expectations and sanctions. As the chances for age homogamous marriages are lower for older individuals, the perceived norm may be less binding for them.

Another factor impacting social norms seem to be gender relations. While older-female unions are mostly avoided, the acceptable age difference for men seems to be more flexible and varies across countries (Casterline et al. 1986). In societies with lower incomes and fewer educational opportunities for women, larger age differences are more frequently accepted and occur more often than by chance (Casterline et al. 1986; Ní Bhrolcháin 2005). In more egalitarian societies characterized by social and economic development and more educational opportunities for women, the age difference between partners is generally smaller, and larger age gaps are avoided (Casterline et al. 1986; Ní Bhrolcháin 2005).



In the last few decades, the position of women has undergone significant change: Women's participation in the labor market has increased, making them less economically dependent on their spouses. Women have also become more educated, currently outperforming men on every educational benchmark (Hamplová 2020; Klesment & Van Bavel 2012). With the rise of dual-earner families, the traditional male breadwinner model, which is assumed by evolutionary theory, has become less prevalent (Kulik 2011).

These social developments have challenged traditional gender roles, potentially affecting partner preferences. As women's status improves, they may be less inclined to mate with older men to provide them with resources they may otherwise lack. This is in line with previous findings on marital age, as younger women often enter marriages with older partners, while the difference for older women is far smaller (Katrňák 2008). This may be because older women have already established their position in the labor market and are more economically independent. Thus, these macro-level changes could promote women's preference for age-homogamous partners. This could be especially true in the context of online dating, where women have a better position in this market and can be more selective because there are generally fewer women than men (Dinh et al. 2018; Rudder 2015).

In the European context, the Czech Republic is an interesting hybrid case in terms of welfare regime classification and female employment patterns (Hamplová et al. 2019: 2829). Despite having one of the highest female employment rates in Europe (OECD, 2019), when small children are present in the household (< 3 years), the employment rate plummets to one of the lowest in Europe. This is visible in social policies (i.e., long maternity leave) as well as in the overall support for the male breadwinner model and the traditional division of domestic labor (Hamplová et al. 2019; Hašková 2005). We also observe a higher incidence of age hypogamy in relation to males and age hypergamy in relation to females in comparison to other developed countries (Katrňák 2008). Based on the sociological perspective, women's participation in the labor market and higher levels of education should decrease the age gap between partners. However, the support in the local environment for traditional gender roles likely highlights the age and gender dynamic, thereby allowing for greater differences.

### 3.6 Hypotheses

Considering the expectations from evolutionary theory and the sociological perspective, as well as past research on partner preferences and evaluations of the local context, we anticipate the following in our data set:

Overall preference for a partner of roughly the same age (H1)

- The lower the age of the individual, the more likely the preference for a partner of the same age (H1a).

Men show a strong preference for younger women (H2).

- Men will approach significantly younger women (H2a) but only slightly older (H2b). As they age, their acceptance of younger women widens (H2c), but the acceptance of older partners remains stable (H2d).

Women have mixed age preferences (H3).

- Women will consider men significantly older (H3a) and slightly younger (H3b). As they age, their acceptance of younger men widens (H3c), and their acceptance of older men decreases (H3d).

#### 4. Data

Our analysis relied on data from Pinkilin, a Czech mobile online dating app operating in the local market between years 2016 and 2019. It was available exclusively for mobile phones, and during the three years of its existence, over 50,000 users downloaded it. Compared to other dating sites operating in the Czech Republic at the time, the app had a minor share of the market and was heavily marketed as the “Czech Tinder.”<sup>1</sup> The app’s algorithm was quite simple: It used GPS location and connected users who were physically nearby. We verified with the app’s providers that there was no other, more sophisticated algorithm (e.g., taking previous choices into account) that would suggest potential matches based on criteria other than physical proximity. As with Tinder, users had to approve each connection before they could chat. Every user was offered a selection of potential partners nearby and chose the ones they liked. Selected users received an invitation to chat, and if they accepted, a chat window would open.

We obtained our data after reaching an agreement with the application’s administrators, who provided the data in an anonymized form, whereby each user was represented by a unique code. The data set traces the online behavior of users who sent or received at least one invitation in July 2017. Each row in the data set contains information about an invitation sent between two users. Only the first messages were recorded. Each row contains information about the sender (their ID, gender, and age) and the receiver of the invitation. We restricted the sample to heterosexual searches, as there was insufficient data on same-sex search patterns. Additionally, we restricted the sample to users between 18 and 50 years old. We did so for two reasons: First, there were few users older than 50; second, of those few users, many were obviously fake profiles of users claiming to be over 100 years old. The final sample included a total of 10,528 unique users, of which 68% were male, and 32% were female. Users sent each other 196,206 invitations to chat, with 69% sent by males to females ( $n = 135,380$ ) and 31% sent by females to males ( $n = 60,826$ ). The median age of the men was 28 years, while the median age of the women was 25 years. On average, men contacted women who were four years their junior, while women contacted men who were three years their senior.

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1 Tinder is an online dating app that is especially popular among younger users. With more than 100 million downloads on Google Play, it is currently one of the most popular dating sites in the world. There is one significant difference between Tinder and Pinkilin: When user A is interested in user B on Tinder, neither one is notified unless the match is successful, i.e., users are showing interest in each other anonymously. In contrast, on Pinkilin, when user A is interested in user B, user B is immediately notified and has to choose whether to accept or reject user A – similar to Tinder’s “superlike” function.

*Table 1: Age by gender (%)*

Age categorized	male	female	Total
18-19	3.14	15.36	7.03
20-24	23.55	31.83	26.19
25-29	34.99	25.75	32.05
30-34	20.78	14.92	18.91
35-39	10.63	6.65	9.37
40-44	4.97	3.82	4.61
45-50	1.94	1.67	1.85
Total	100.00	100.00	100.00
N	7176	3352	10528

Although the analysis of online dating data follows a novel trend in mating research and is unique in the context of Czechia, there are some limitations to our data set.<sup>2</sup> First, it is based on a single mobile dating app. Thus, our data are not representative of the Czech population or online daters in general. Therefore, the conclusions from our analyses are limited to this sample, and we do not attempt to draw conclusions about the population at large. Second, unlike population survey data, our data set is not custom-made, meaning that it was not made for the purpose of academic research (Salganik 2018). The nature of the data is readymade and contains only limited information about users, such as the initial contact of partners, but no information about relationship development (i.e., the number of messages exchanged or whether the “matches” met offline). Third, it is still quite rare for women to actively pursue mates by initiating contact (Rudder 2014). Consequently, the sample of women who initiated contact may differ from the passive majority.

Another caveat of analyzing online dating data is the possible presence of bots, i.e., “autonomous third-party programs trying to make users engage into contact and eventually into an over-priced and useless external product” (Schmitz, Yanenko & Hebing 2012: 320). In the context of online dating, bots typically pose as attractive young women who attempt to lure male users into clicking on malicious links under various pretexts, e.g., offering escort services (Huang, Stringhini & Yong 2015). Since we were aware of this issue, we replicated our analyses with samples in which we omitted the users whom we suspected to be bots. In particular, we suspected as potential bots women who sent or received a high number of invitations and accepted all invitations received. We chose to include both criteria because a woman who gets a great deal of attention does not have to be a bot; she can simply be highly desirable. However, if she receives tens or hundreds of messages and accepts all of them, this would reasonably arouse suspicion about the profile. Similarly, a woman who accepts all invitations does not have to be a bot if she receives only a few invitations. We only deleted the suspected bots as “senders” of invitations because they could skew the preferences of women. However, we kept them as “receivers,” since we did not take reciprocity into account, and even though bots are not

<sup>2</sup> An extensive discussion on the methodological aspects of using web-generated (digital trace) data versus traditional approaches to study mate choices can be found in Schmitz et al. (2009).

real women, men's interest in them is real.<sup>3</sup> None of these restrictions altered the results considerably.

#### 4.1 Analytical strategy

To answer our hypotheses regarding the age gaps and changing preferences over the lifetime, we adapted the approach used by Skopek et al. (2011). For each sender (initiator of the invitation), we calculated the fraction of contacts they sent to users of different ages. We then averaged these fractions by the sender's age and gender. Following Skopek et al. (2011), we also constructed the expected fractions of relations by age and gender that assumed a random match and took into account the gender-specific age distribution on the app. In this way, we obtained a baseline fraction of invitations that referred to situations in which users displayed no specific preferences, as these were governed by the app's age structure.

Unlike Skopek et al. (2011), however, we were not only interested in whether the users contacted others of the same age, older, or younger; we also asked how much older or younger the parties were willing to pursue. Thus, we constructed several categories of age gaps between the sender and receiver of the invitation. First, we constructed a category of age homophily, i.e., situations where partners (sender and receiver) are either of the same age or two years apart.<sup>4</sup> The other categories were contacting a partner who was three to five years younger, six to nine years younger, 10+ years younger, three to five years older, six to nine years older, and 10+ years older than the sender. Although the range of age differences spanned a maximum of 32 years, we decided to include extreme categories of ten and more years of difference, as these observations were rare. Additionally, we experimented with different cutoffs, and the results were unaffected (results available upon request).

#### 4.2 Descriptive statistics

Table 2 shows the overall descriptive findings, which do not account for users' age or the age distribution on the app. As shown in Table 2, men were more willing to initiate contact with younger women than women with younger men. Additionally, women were more willing to initiate contact with older men, while men tended to avoid contact with women older than themselves.

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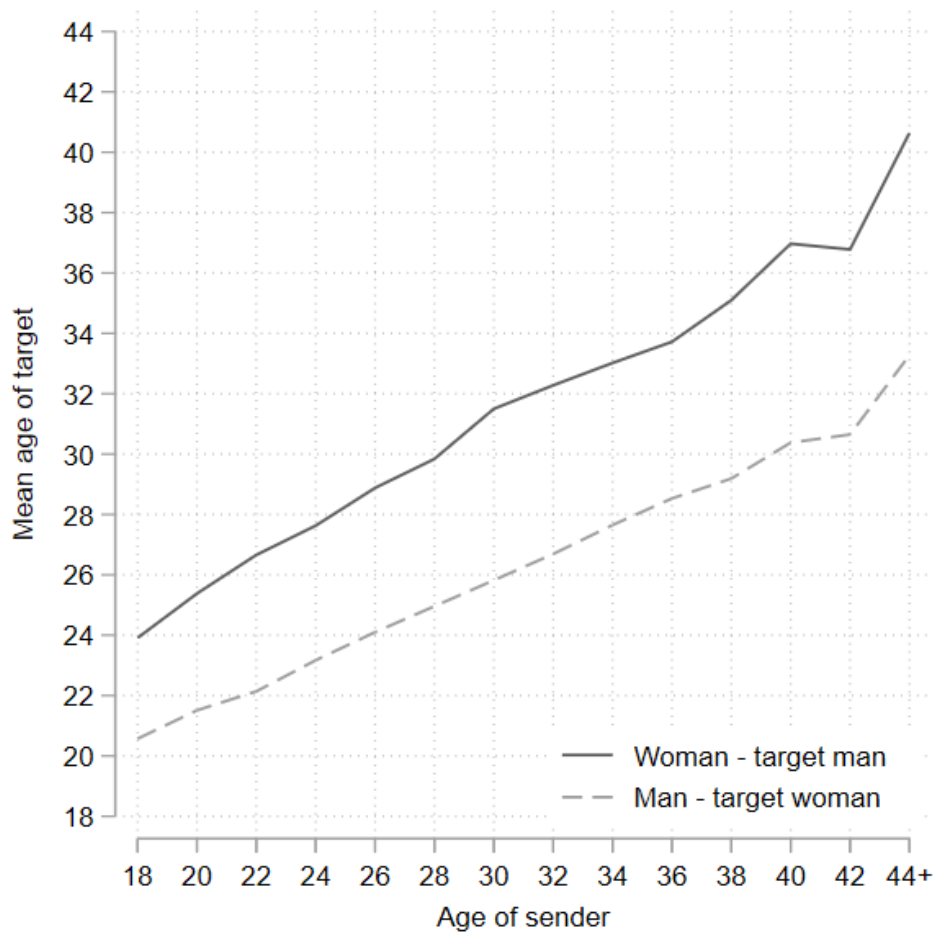
3 We tried various thresholds for identifying bots. The most restrictive cutoff of at least 10 received and accepted invitations resulted in deleting 655 women as senders of 26,266 invitations. The more relaxed cutoff of 30 received and accepted invitations resulted in deleting 272 women as senders of 19,695 invitations. This is in line with previous research showing that bots account for a large amount of traffic on online dating sites (Schmitz et al. 2012; Huang et al. 2015).

4 Here, we follow the range for homophily used by Skopek et al. (2011). Like them, we also experimented with different cutoffs.

Table 2: Age differences (categorized) by gender

	Younger partners				Older partners			Total
	10+	6-9	3-5	0-2	3-5	6-9	10+	
male	17.15	20.43	22.06	29.17	6.19	3.17	1.82	100.00
female	1.95	3.73	7.18	35.04	24.16	18.66	9.27	100.00
Total	12.44	15.25	17.45	30.99	11.76	7.98	4.13	100.00

Figure 1: Mean age contacted by men and women, by their age



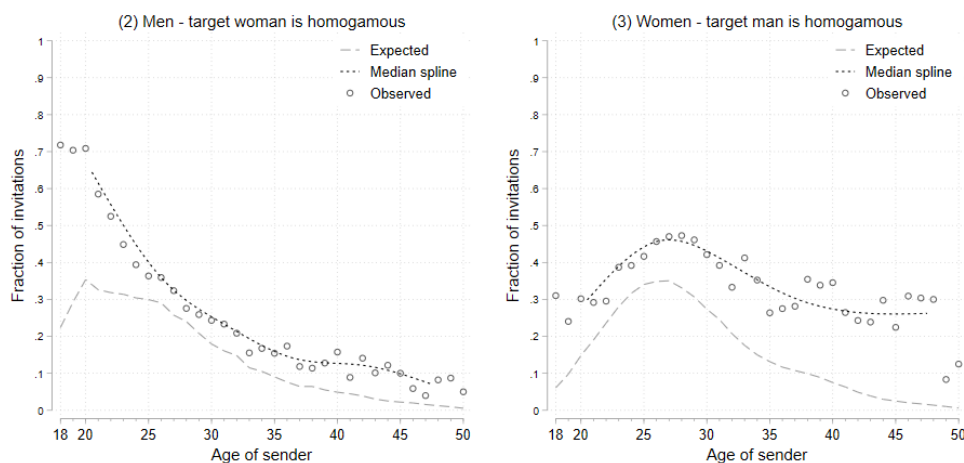
In Figure 1, we can observe that other than the youngest men in the sample, men on average initiated contact with younger women, and the gap widened even more for older men. For example, 30-31-year-old men contacted women who were on average four years younger, while 38-39-year-old men were more likely to contact women who were on

average almost nine years their junior. Women, however, had a different starting point. The youngest women in the sample contacted men who were on average seven years their senior. As they aged, the gap between them and their desired partner decreased. Around their 30s, the difference almost disappeared to the point that the oldest women contacted younger men than themselves.

## 5. Results

Although both men and women sought partners of the same age or two years apart from themselves, which was more than would be predicted by chance (H1), the pattern was quite different for men and women (Figures 2 and 3). While men strongly preferred age homophily at a young age, this preference steadily decreased as men's age increased. Between 50 and 70% of invitations from 18–23-year-old men targeted women their age, while for 30-year-old men, it was only about 25%, with the proportion declining even further with age. In the case of men, we found evidence to support H1a, which proposed that the younger the man, the more likely he is to contact someone his age. By contrast, only around 30 to 40% of invitations by 18–23-year-old women targeted men in their age group. The peak for homophily was around 27 years old when the chances for homophilic contact were also peaking. Unlike men, and in contrast with H1a, older women initiated contact with men their age far more often than expected under random conditions and at a similar rate as the youngest women in the sample. These results corroborate the findings of Skopek et al. (2011).

Figure 2 and 3: Observed and expected fractions of initial messages sent to age-homogamous partners

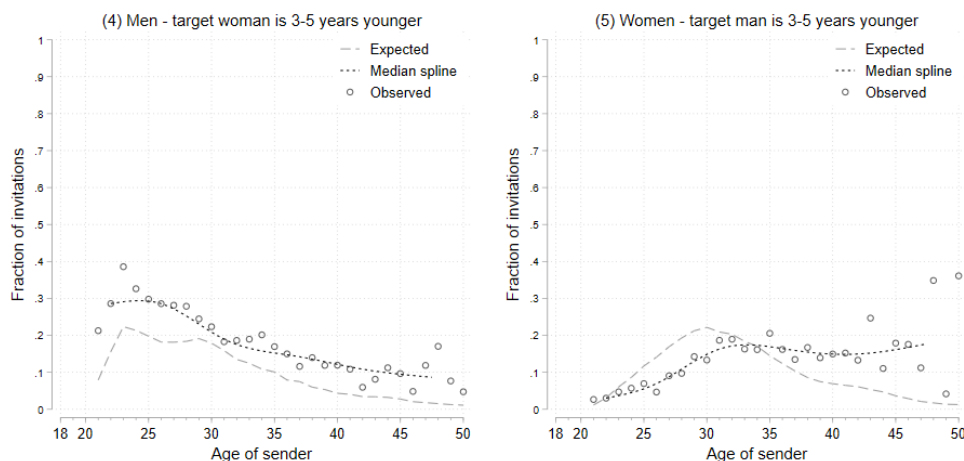


Men were willing to pursue younger partners more often than by chance (H2) and, on average more often than women, whose preferences seemed to be more diverse with

increasing age. Figure 4 shows that men started pursuing women who were three to five years their junior immediately after such women appeared on the app and that they continued to contact them more often than expected by chance, even at older ages. However, this preference started to decline slowly around their mid-twenties when they moved to even younger women. This is in line with H2c, which proposed that the older the man, the younger the partner he is willing to pursue.

In contrast, Figure 5 shows that, less often than expected, women contacted men who were three to five years their junior until their mid-thirties. After that, they initiated contact with them more often than by chance, as around 20% of their invitations targeted them.

Figure 4 and 5: Observed and expected fractions of initial messages sent to 3-5 years younger partners



A similar pattern could be observed with invitations sent to potential partners who were six to nine years younger. As with the previous category, men were again willing to pursue younger partners sooner than women (Figure 6). Men in their late twenties sent around 30% of their invitations to women six to nine years their junior, while women in the same category seemed to avoid pursuing such mates. Overall, until the age of 40, women contacted such men less often than expected by chance (Figure 7).

Both men and women initiated contact with partners who were more than nine years their junior less often than expected by chance (Figures 8 and 9). Nevertheless, it is clear that men were not only more willing to do so, they were also doing so sooner than women. While 40% of invitations sent by 35-year-old men targeted women who were more than nine years their junior, only around 10% of women approached men this young. Such contacts were most frequent among women over 40 years of age, who sent 30% of their invitations to men more than nine years their junior. Conversely, 40-year-old men sent almost 60% of their invitations to women in this category, with older men doing

so even more frequently. This is in line with H2a, which proposed that men would be willing to pursue partners more than nine years their junior. In H3c, we hypothesized that as women age, they are more open to contacting younger men. We found support for this hypothesis in our data. Additionally, we saw that not only were older women more willing to pursue younger partners, they were also more likely to cross a wider gap toward them. However, there was a significant lag compared to men in terms of when the shift happens.

Figure 6 and 7: Observed and expected fractions of initial messages sent to 6-9 years younger partners

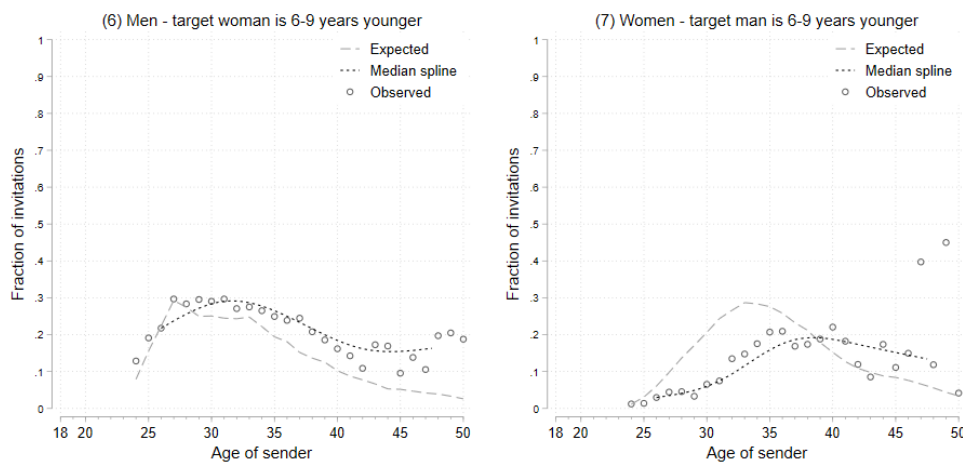
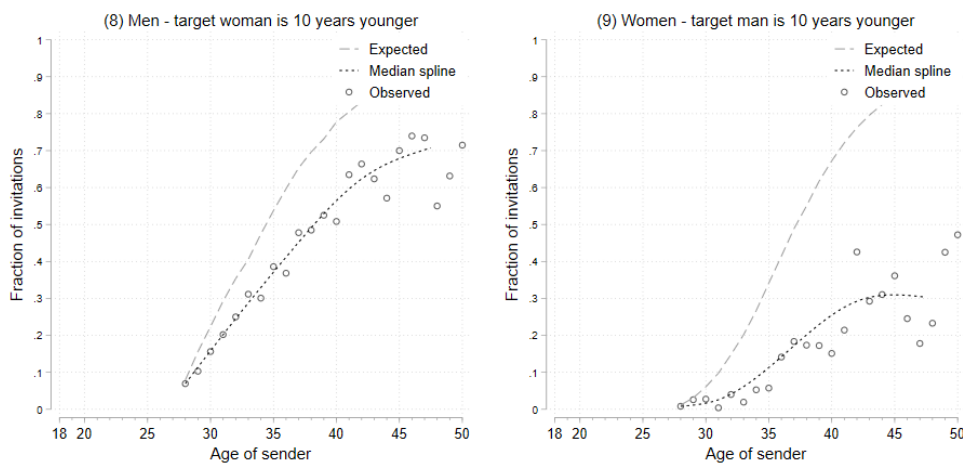


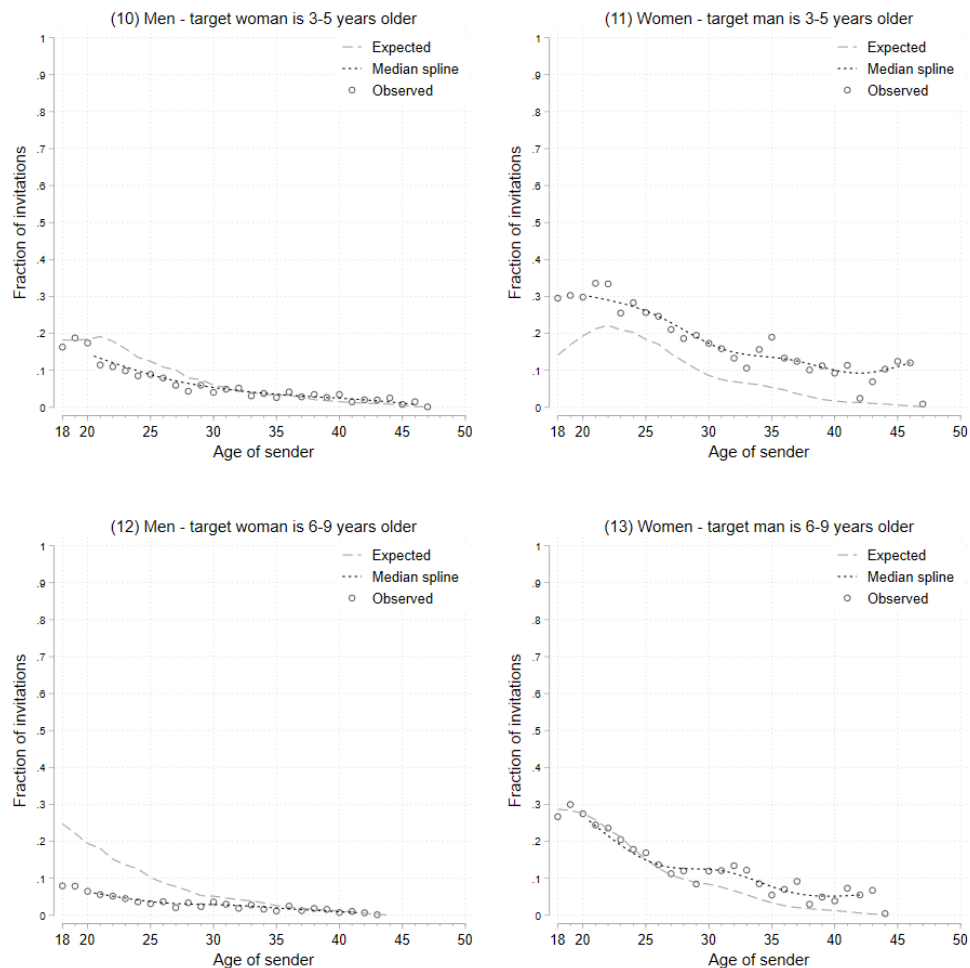
Figure 8 and 9: Observed and expected fractions of initial messages sent to 10+ years younger partners





Looking at the other end of the spectrum, it is apparent that men showed little interest in older partners (Figures 10, 12, 14). Thus, we found no support for H2b, which proposed that men would be willing to initiate contact with women up to five years their senior. In H2d, we proposed that, as opposed to men's growing preference for younger partners, their preference for older partners would remain stable. We found support for this hypothesis, as the avoidance of older women seemed to be more or less stable throughout men's age ranges. The only exception were the youngest men who were more willing to initiate contact with older women.

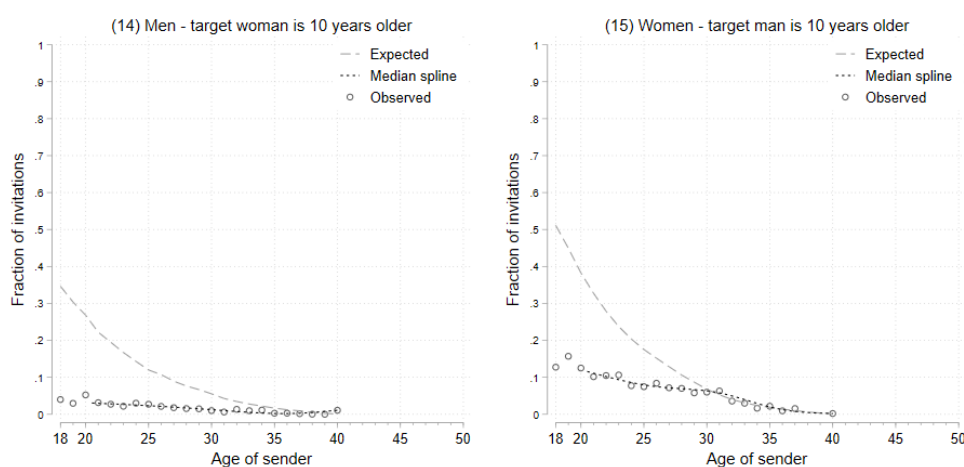
Figure 10, 11, 12, 13, 14, and 15: Observed and expected fractions of initial messages sent to older younger partners



When contacting an older partner, women seemed to be more generous than men (Figures 11, 13, 15). This was especially true for the youngest women, who sent roughly

the same proportion of messages (around 30%) to men of their age, three to five years older, and six to nine years older. Although the proportion of contacts women sent to older men declined with age, it was still above the expected proportion. However, both men and women seemed to avoid contacting partners who were more than nine years older (Figures 14 and 15). This is in line with H3a, which proposed that women were unwilling to pursue significantly older men.

Figure 10, 11, 12, 13, 14, and 15: Observed and expected fractions of initial messages sent to older younger partners (continued)



## 6. Discussion and conclusion

Age plays a vital role in partner choice because it is linked to reproduction and relationship dynamics. Although it is relatively easy to study self-reported partner preferences and age differences in couples, connecting these factors with expressed partner age preferences in the dating market is often restricted by extensive data limitations, making such research scarce. In this paper, we explored partner preferences with regard to gender and age on the Czech online dating site Pinkilin to analyze 196,206 invitations to chat that users sent to each other in July 2017. To do so, we adapted the methodology used by Skopek et al. (2011), and our results largely corroborated their findings.

Following the tradition of partner preference research, our main focus was the interplay between age and gender. Evolutionary theory (i.e., Buss & Schmitt 1993) looks at mating through the lens of reproductive strategies and has very specific expectations regarding male and female partner age preferences. Men seek high levels of fertility and, therefore, find younger women attractive. Women need a partner who will be fertile but will also provide for their offspring. This translates to preferring males of the same age or

older. Previous research (i.e., Buss et al. 2001), as well as our findings, mainly support these tendencies.

In surveys, men state an acceptable partner age interval of 10 years younger and five years older. As they age, their willingness to pursue younger women increases, but their non-acceptance of older women remains constant (Conway et al. 2015; Schwarz & Hassebrauck 2012). Data from online dating confirm men's strong preference for young women and their avoidance in terms of contacting older partners (Fiore & Donath 2005; Rudder 2014; Skopek et al. 2011). Our research is in line with the previous evidence. Young men showed a preference for women their age. However, this preference declined with age, and they gradually shifted to younger partners. With age, they grew more ambitious and were willing to cross larger age gaps toward younger partners. Overall, the men in our data set avoided older women, including women who were only slightly their senior. This avoidance was stable for all ages, thereby confirming that although the men indicated a willingness to pursue slightly older partners in surveys, they rarely acted on these statements in real-life dating. This highlights the importance of mixing digital trace data with traditional surveys, as stated preferences may not necessarily translate to future actions (Schmitz et al. 2009).

As for women, their stated partner age interval was eight years older and five years younger. With age, they grew accepting of younger partners and became less willing to contact older men (Conway et al. 2015; Schwarz & Hassebrauck 2012). Looking at the online dating market, women showed a tendency to mate with partners of their age and slightly older. Women under 30 were not open to contact from younger men, but as they aged, their openness toward younger partners increased (Rudder 2014; Skopek et al. 2011). Again, this was largely supported in our Czech data set. The youngest women had a preference for older partners over partners their age. However, up to 30 years old, they preferred partners of the same age or up to nine years their senior. As women aged, they were more open to younger men and more restrictive toward older men. The older the woman was, the more willing she was to cross larger age gaps toward younger partners. As mentioned earlier, the same trend could be observed for men. However, there was a lag as to when this shift toward younger partners occurred. Women started initiating contact with significantly younger men (5–9 years younger) later, in their mid-forties, while men developed this preference around their mid-thirties.

The support for evolutionary theory in our analysis is, therefore, fairly strong. Two interesting findings are noteworthy. First, in comparison to previous research, men were, from an early age, very hesitant to contact older women. This can be seen as an impact of strong local gender norms that, at least in men's eyes, may highlight the importance of reproduction in dating and support the paradigm that the husband should be older than his wife. Men's tendency to avoid older women in the early stages of dating could also be one of the mechanisms behind the higher incidence of male age hypogamy in Czechia (Katrňák 2008). Second, we observed older women around their mid-forties contacting significantly younger men. This tendency was visible in past online dating research (Rudder 2014; Skopek et al. 2011) but did not fully correspond with expectations from evolutionary theory. Perhaps older women are aware of the marriage squeeze and believe they have more chances with a younger partner who might be attracted to their experience and status. Alternatively, they may be more economically independent than younger

women and may not be drawn to older partners because they already have their own resources (Rudder 2014, confirms that response rates to older women's messages from younger males are fairly high). Growing levels of female hypogamy by older women in Czechia might support this hypothesis (Katrňák 2008). Another interpretation could be related to seeking a sexual partner rather than one for reproduction. Not all dating site users are in search of a serious relationship, and older women seeking younger males for sexual pleasure, called "cougars" in popular culture, can offer noncommitted sex and demand no financial provision or status from men in return (Lowen 2019). Furthermore, in the post-reproductive phase, women may not place such importance on status, even when seeking a serious relationship. Without further data, however, it is difficult to understand the reason behind these two inconsistencies.

In our analysis, we examined users' behavior as a proxy for expressed partner preference. We mainly built on the literature concerning partner preferences, but we were also curious about how the observed dating behavior corresponded to final mating outcomes with regard to age. Developed countries, including the Czech Republic, show high levels of age homogamy, especially at a young marital age, so it is natural to ask how gendered partner preferences translate to homogamy patterns (Katrňák 2008). Is this tendency visible at the point of first contact on dating sites, or does it form later in the mating process? Some online dating studies have confirmed that, starting early on, there is a non-random preference for contact with partners who share similar sociodemographic characteristics (Blackwell & Lichter 2004; Fiore & Donath 2005; Hitsch et al. 2010; Skopek et al. 2011). Upon examining the data, when we did not consider the ages of users or structural opportunities, we did not observe preferences for same-age partners; however, when we did consider users' ages and structural opportunities, same-age contacts occurred more often than by chance. We also observed a more frequent occurrence of homogamous contact in lower age groups. Specifically, only the youngest men contacted their peers, but this preference rapidly disappeared, and at 30, they avoided contact with women of the same age. Although the youngest women were contacting older partners, women roughly between 25 and 35 showed the strongest preference for same-age partners. Considering the dynamics with online dating sites, where men outnumber women, it is likely that women's preferences guide the final outcome. Men may prefer younger mates, but if their contact is not reciprocated, they choose their peers rather than older women. This seems to have been the case in other online dating samples in terms of going beyond the first contact (i.e., Kreager et al. 2014), but we lacked the data to explore such a dynamic on our Czech dating site.

To summarize, our research largely confirmed expectations from both evolutionary and sociological theories. Men strongly preferred young women, and women preferred partners of their age and slightly older. Men were restrictive toward older women, as posited in evolutionary theory and expectations arising from social norms. We did not anticipate older women's strong readiness to contact younger men, although this might be a sign that Czech gender norms are relaxing or that women, too, are willing to trade social status for men's youth and attractiveness. Homogamous tendencies occurred more often than by chance, and they seemed to be stronger among younger users and women in general. Future mating processes will probably encourage homogamous pairings. Although our analysis was constrained by important limitations—it was restricted to one

dating service, limited by information about first user contacts only, and the analysis was rather descriptive—we believe that it represents a useful introduction to online dating research in the context of the Czech Republic.

## Acknowledgments

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## Information in German

### Deutscher Titel

Partnerpräferenz und Alter: Paarverhalten von Nutzerinnen und Nutzern beim Online-Dating

### Zusammenfassung

**Fragestellung:** Wir testen, ob das Paarungsverhalten von realen Nutzern mit den Erfahrungen aus soziobiologischer und sozialer Perspektive übereinstimmt, indem wir den Altersunterschied untersuchen, den Individuen wählen, wenn Sie nach einem Partner suchen, und wie sich dieser Unterschied relativ zum Alter und Geschlecht des Nutzers entwickelt.

**Hintergrund:** Das Alter spielt eine markante Rolle bei der Partnerwahl. Vorherige Studien haben sich vor allem auf Altersunterschiede zwischen schon gebildeten Paaren und selbst berichteten Präferenzen für Partner eines bestimmten Alters konzentriert. Es ist jedoch wenig darüber bekannt, wie das Alter das Verhalten auf dem Dating-Markt beeinflusst.

**Methode:** Wir verwenden Verhaltensdaten einer tschechischen Online-Dating-App, Pinkilin. Wir analysieren 197.519 Einladungen, die Nutzer einander im Juli 2017 gesendet haben.

**Ergebnisse:** Männer präferieren stark junge Frauen, und Frauen präferieren Partner ihres Alters oder leicht älter. Bei höheren Altersgruppen erweitert sich die Präferenz der Männer für jüngere Frauen, während die Präferenz der Frauen diverser wird. Homogene Tendenzen sind unter jüngeren Nutzern und Frauen stärker.

**Schlussfolgerung:** Insgesamt untermauern unsere Ergebnisse frühere Untersuchungen zu Online-Dating und erweitern diese, indem sie im tschechischen Kontext die Altersunterschiede betrachten.

**Schlagwörter:** Online-Dating, Partnerpräferenz, Altershomogamie, Tschechien

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