Meeting Opportunities and Partner Selection: A Field Study*

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Abstract

Much empirical evidence shows that female and male partners look alike along a variety of attributes. It is however unclear how this positive sorting comes about, because marriage is an equilibrium outcome arising from a process that entails searching, meeting and choosing one another, a process that is usually a black box to social researchers. This study exploits unique field data from a large speed dating agency to shed light on the forces driving choices at the earliest stage of a relationship — after a first meeting. We find that both women and men value physical attributes, such as age and weight, and that choices are assortative along age, height, and education. However, we find that meeting opportunities play a dominant role in determining dating proposals. These results have important implications for our understanding of the degree of social openness and mobility.

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1 Introduction

A well established tradition of social science research has documented the strong resemblance of traits and socioeconomic status between husbands and wives. Both men and women tend to choose mates of similar age, race, education, and physical appearance (see, e.g., Weiss [1997], Kalmijn [1998], Schwartz and Mare [2005], Kurzban and Weeden [2005], and Choo and Siow [2006] for recent analyses and reviews). But isolating the forces that lie behind this pattern of positive marital sorting is challenging, because marriage is an equilibrium outcome arising from a process that entails searching, meeting, and choosing one another.

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In a frictionless world, positive sorting may arise simply as a result of individual preferences or technological complementarities in the marital production function (Gale and Shapley, 1962; Becker, 1981). For instance, positive sorting can be consistent with aligned or agreed-upon preferences (whereby everyone values the same attributes) as well as with assortative preferences (whereby people prefer partners who are similar to themselves).

Search frictions, on the other hand, may lead to positive sorting through alternative mechanisms. In particular, matches could be determined by who meets whom, who proposes to whom, and who searches where. The first force, who meets whom, implies that meeting opportunities play a key role in the matching process. There is evidence that people tend to meet individuals who are like themselves (Kalmijn and Flap, 2001), and this alone could lead to positive sorting. But even in an environment where everyone can potentially meet everyone else, search frictions, combined with aligned preferences on the partner's type, give rise to positive sorting. As shown in Burdett and Coles (1997), a class structure will emerge in equilibrium, whereby the optimal strategy is to propose to and accept proposals from potential partners only in a fixed type interval. Finally, if individuals can choose not only who to propose to and whom to accept proposals from, but also where they search (and therefore who they are likely to meet), then segmentation will emerge in equilibrium, that is, the marriage market will be segmented in a number of sub-markets organized around classes of types (Tan and Jacquet, 2009).

Disentangling all such different channels is challenging, as it is to identify whether mating preferences are aligned or assortative. A major problem, in fact, is that analysts only observe "final matches" (i.e., marriages and cohabitations), but seldom observe the whole pool of potential partners, nor do they have information on the process of proposals and rejections that prelude the formation of a relationship. As a result, we are typically unable to unravel the separate influence of the forces that underlie this union formation.[1] A few recent studies, however, shed light on the importance of such mechanisms by examining dating choices (e.g., Kurzban and Weeden, 2005; Fisman et al. 2006 and 2008; Finkel, Eastwick, and Matthews, 2007; Todd et al., 2007).

This paper contributes to this new growing literature by using unique data from a large commercial speed dating agency in Britain, and makes two substantive original contributions. First,

[1] At the cost of model-specific functional form identifying restrictions, this has been achieved with the estimation of structural parameters of marriage (final match) models as in Wong (2003), Bisin, Topa, and Verdier (2004), and Choo and Siow (2006).

we study a larger sample of speed daters who have a more diverse set of attributes than those analyzed in earlier studies. This allows us to focus on an extensive set of dyadic interactions and analyze individual patterns of mate choices over several attributes, many of which (such as education and occupation) are directly relevant to socioeconomic mobility. Second, precisely because we have information on many speed dating events with a wide variation in the composition of the pool of participants across events, we can — for the first time — assess the importance of meeting opportunities relative to that of other forces driving mate choices (such as preferences for partners with certain attributes) in explaining the observed patterns in dating behavior.

The speed dating protocol offers considerable advantages in comparison to other settings. First, it shares some of the key useful features of an experimental setup. Subjects meet a number of potential partners (22 on average in our data) in a sequence of short dates that are always organized exactly in the same way: participants meet in pairs (a man and a woman), sit at a table, and chat for three minutes.[2] This is a compelling example of a naturally occurring market as in other field studies (e.g., Harrison and List, 2004 and 2008): that is, speed daters are not a convenience sample but a population observed in a natural environment, without experimental frame. Subjects' choices in these speed dating sessions constitute real behavior with actual consequences. The *speed* aspect of each dyadic meeting — lasting 3 minutes only — is a powerful feature here, in line with the huge bulk of evidence demonstrating that individuals can make remarkably sophisticated social judgements (from mate choice to consumer choice) based on "thin slices" of social observations or interactions lasting just a few minutes (e.g., Ambady and Rosenthal, 1992; Miller and Todd, 1998; Jones et al., 2007; Finkel, Eastwick, and Matthews, 2007; Finkel and Eastwick, 2008; Iyengar, 2009).

Second, matches are formed via a fully anonymized central process, whereby participants report who they wish to meet again to the dating agency and have no limit to the number of proposals they can make. The agency, in turn, exchanges contact details only between participants who have proposed to each other. This setting therefore offers us detailed information on the dyadic choices made by each party as well as whether they form a match or not, enabling us to analyze the determinants of mate choices and to underpin the process through which matches are formed. Third, mate choices in this context are made at the earliest stage of a union, that is,

[2]Throughout the paper, we will refer to 'subjects' as the participants making the proposals and to 'partners' as the participants receiving proposals.

after a first meeting. Since social mixing can only be achieved if people choose to engage further with each other after a first encounter, these early choices are crucial for our understanding of the long-term formation of partnerships.

Finally, subjects have no prior information about whom they will meet and they can propose only after the event. This differs from studies of other forms of mediated dating, such as small ads (Lynn and Shurgot, 1984) or on-line dating (Hitsch, Hortaçsu, and Ariely, 2009), where people choose whom to meet first and, only after, they possibly meet. Thus, our setting provides us with a unique source of exogenous variation in opportunities (participants choose the venue but do not choose who they meet) and gives us the possibility to isolate the role of meeting in mate selection. This is bolstered by the fact that we have information on a large number of events (84 in total), and in each of these events, we observe several participants (approximately 22 men and 22 women in each event) who face exactly the same pool of potential partners (i.e., the same choice set), and we observe their choices within this choice set.

Despite such methodological advantages, there may be questions about the external validity of our results.[3] An argument could be raised on the self-selection of speed daters ('who goes speed dating?'). Although this cannot be summarily dismissed, we should stress the growing popularity of speed dating events in Britain and elsewhere which gather individuals from all walks of life with ample variation in age, socioeconomic position, and physical attributes. In Section 3, we will provide detailed information on our estimation sample and discuss further the issue of its statistical representativeness. Another source of concern is whether the choices made in the speed dating context are informative at all about household formation. Speed daters could be driven by considerations that are not shared by individuals who seek to form durable unions. This idea is not strongly supported by the data, though. Indeed, even though there is no limit on the number of proposals that can be made, a significant share of participants (38 percent of men and 46 percent of women) do not propose to anyone, and only 7 percent propose to more than half of potential partners, while only 1 percent propose to everyone. These figures will be hard to reconcile with the notion that speed daters are primarily looking for short-term casual relationships.

Our analysis yields three main findings. First, both women and men value easily observable

[3]Interestingly, Finkel and Eastwick (2008) argue that the speed dating setup exhibit *stronger* external validity than do most of the other highly controlled procedures for analyzing mate selection and romantic attraction.

physical attributes: women prefer men who are young and tall, while men are more attracted to women who are young and thin. We also find that partner's education and occupation have an impact on desirability, irrespective of gender. Second, there is evidence of mild positive assortative preferences (rather than agreed-upon preferences) along a number of characteristics, with both women and men preferring partners of similar age, height, and education. Third, in the aggregate, we find that the impact of dating preferences is limited while opportunities play a dominant role. This result emphasizes the notion that mating requires meeting: the pool of potential partners shapes the type of people whom subjects propose to and, ultimately, with whom they form durable relationships.[4]

The rest of the paper is organized as follows. Section 2 discusses the related literature. Section 3 introduces the speed dating protocol and describes our data, comparing them to other representative data on British singles and documenting the variety of participants' attributes in the sample. In Section 4, we discuss our main findings on attribute demands. The aim is to identify the determinants of mate selection and to establish whether, already at this early stage, a pattern of positive sorting emerges. Section 5 presents a picture of the patterns of dating proposals observed in the aggregate in each speed dating session, while Section 6 looks at matches, that is, cases in which individuals propose to each other. Section 7 discusses our main findings emphasizing caveats and interpretations, and Section 8 concludes.

2 Related Literature

Early studies on human mating date back to Westermarck (1903) and Hamilton (1912). The economics literature, which has grown out of Becker's (1973; 1974; 1981) seminal work, has produced models that can generate wide arrays of marital sorting (Lam, 1988; Bergstrom and Bagnoli, 1993; Burdett and Coles, 1997; Shimer and Smith, 2000; Choo and Siow, 2006; Smith, 2006).[5] The focus of most of these studies is different from ours, in that they try to characterize the conditions under which positive assortative matching may arise and to explain *why* matching is assortative. They pursue this goal in a variety of ways by, for example, imposing transferable utilities between partners, or allowing for frictions in the matching process with nontransferable

[4]Of course, preferences for attributes which we cannot observe (e.g., ethnicity, ambition, and intelligence) may still play a substantial role.

[5]Kalmijn (1998), Cooper and Sheldon (2002), Blossfeld and Timm (2003) and Buss (2003) provide broad surveys of studies by sociologists and psychologists.

utilities, or modeling a household production function with spousal trait complementarities.

A slightly different issue concerns the *nature* of mating preferences. Some argue that individuals prefer those who are similar to themselves on relevant dimensions (Berscheid et al., 1971; Thiessen, Young and Delgado, 1997). For example, similarity of values and tastes gives partners' a better chance to participate in joint activities, leads to mutual confirmation of each other's behavior and lifestyle, and creates a common basis for conversation and affection (DiMaggio and Mohr, 1985; Kalmijn 1994). A natural outcome of this "likes-attract" mechanism is positive marital sorting. Other analysts claim that mate preferences are shared across all individuals and primarily reflect traits that are evolutionarily advantageous (Trivers, 1972; Waynforth and Dunbar, 1995; Burdett and Coles, 1997; Buss, 2003; Buston and Emlen, 2003). People compete with others to search for mates with valuable resources. The result of this competition is that the most attractive candidates select amongst themselves while the least attractive ones must rely on one another. Competition for salient resources on the marriage market, therefore, leads again to an aggregate pattern of positive assortative mating.

A small but burgeoning number of recent studies have analyzed mate selection taking advantage of the experimental setting of speed dating. Kurzban and Weeden (2005) use data from HurryDate, a large dating company operating in major metropolitan areas in the United States, to investigate the choices that approximately 2600 subjects make in dating partners. Their main estimates show that female and male subjects have strong agreed-upon preferences rather than assortative preferences: they are equally attracted by physically observable attributes like weight, height, and age, and much less so by other attributes such as education and religion. They also report evidence of small positive assortative patterns along race and height.[6]

Within the economics literature, Fisman et al. (2006) base their experimental design on the HurryDate format to analyze a sample of about 400 students at Columbia University, with the objective of identifying gender differences in dating preferences. Their results slightly differ from those found by Kurzban and Weeden (2005). Only men exhibit a preference for physical attractiveness while women respond more to intelligence and race. They too find some evidence of positive sorting, with male subjects valuing women's intelligence or ambition only if it does not exceed their own. They also document the importance of group size, whereby women (but

[6]Other noteworthy contributions in the speed dating literature include Todd et al. (2007), Eastwick and Finkel (2008), and Lenton, Fasolo, and Todd (2009).

not men) become more selective in larger meetings. In a companion paper using the same data, Fisman et al. (2008) investigate racial preferences in dating. Their finding that women have stronger racial preferences than men is not consistent with the results reported in Kurzban and Weeden (2005).

Hitsch, Hortaçsu, and Ariely (2009) follow a different approach. They use data from a large sample of users of a major on-line dating service in Boston and San Diego to analyze how individual characteristics affect the likelihoods of having a personal profile browsed, being contacted, and exchanging contact information via e-mail. Although on-line daters do not physically meet, Hitsch and colleagues's study confirms some of the previous evidence based on speed dating and final match data. For example, in line with the results discussed in Fisman et al. (2006), they find that women put more weight on a partner's income than men do; and, consistent with Fisman et al. (2008), women have a more pronounced preference to form a match with men of their own ethnicity. Finally, Lee (2009) also uses data from an on-line dating service in Korea, and compares sorting as observed in the general population to the simulated sorting that arises among daters using the Gale-Shapley algorithm. She finds more sorting along age and less sorting along socioeconomic attributes among daters than among individuals in the general population, and argues that on-line dating services may alleviate constraints on people's choice sets.

The advantage of speed dating data in comparison to on-line dating is that, in on-line dating, part of the selection process occurs *before* the first actual (physical) meeting. People typically browse through profiles and their choices can only possibly be based on the information available in these profiles. In a speed dating setting, the choices are made *after* a meeting, and people do not choose whom they will meet (they only choose to attend the event). This gives us direct observation on the choice set, and enables us to evaluate the role of opportunities directly.

3 Data

3.1 The Speed Dating Protocol

Speed dating offers single individuals the opportunity to meet a large number of potential mates over a short pre-determined period of time. It has become very popular among dating agencies, with several commercial companies organizing events in countries like the United States, Canada, Australia, Germany, France, and the United Kingdom.[7]

[7] An updated list of agencies is available at `http://dmoz.org/Society/Relationships/Dating/Speed-Dating`.

We use data from one of the biggest UK private agencies that operates in small and large cities across the country. Participants register for an event that takes place in a specific location during the evening in a bar or club. Participants pay a fixed fee, which varies with location and occasional discounts. There is no specified maximum number of women and men who can participate in each session, although there are rarely more than 30 women and 30 men. Events are stratified by age (23-35 and 35-50 are typical age ranges) so that individuals of roughly the same ages participate in the same session.[8] Bookings are made on the Internet or, less frequently, by phone. Individuals can book for an event as long as there are enough places available. The agency does not screen participants, nor does it intervene in the allocation of participants across events. Hence, each event gathers a broad set of individuals with fairly heterogeneous attributes (see the next section).[9]

In general, participants arrive for the event and, at registration, are given a starting table number, a label tag with a film star alias, and a pen and a card to indicate the alias of the people they wish to meet again (we shall refer to this choice as a *proposal*). Half an hour after registration, the host explains how the evening works, and then the session begins. People sit at the assigned table, with women usually staying seated at the same table and men moving around. Each date lasts for three minutes. After a date, men have about 30 seconds to move to the next table, and a new date begins. After eight individual dates the session stops, and participants can move around and get a quick drink before another round of eight three-minute dates starts. A typical evening consists of three such rounds, after which participants leave.

Participants communicate their proposals to the agency right after the event. There is no limit to the number of proposals subjects can make from the pool of participants. In fact, each individual can be matched more than once. The agency collects all these proposals and exchanges contact details only between participants who have a *match*, i.e., those who propose to each other. Participants are recommended to create a personal profile on the agency's website reporting information on age, education, occupation, basic physical characteristics (weight, height, eye color, and hair color), interests (hobbies and activities outside work), smoking habits, and family

[8]The suggested age range is only a guideline and it is not binding; anyone is free to participate, even outside her/his age range. Events with asymmetric age ranges (e.g., women 27-40, men 28-42) are also run occasionally. They represent, however, a small proportion of the sessions contained in our data set.

[9]The size of a market may be not fully random because the agency tries to organize events with 20-25 individuals on each side (profitability and participants' interest being the main reasons for this target size). This information, however, is not known to speed daters. Furthermore, to the best of our knowledge, no meeting had to be canceled because of excess or paucity of participants.

situation (presence of children). This information is self-reported and is not verified by the agency in any formal way. Profiles are accessible by all participants *after* the event only, and can be consulted before communicating the proposals. Some characteristics in the profile are presumably easier to verify than others. Because participants have already personally met, they are likely to have a good idea of each other's physical appearance. Thus, differently from other forms of mediated dating — such as small ads or on-line dating — the incentives to lie about characteristics that are easily verifiable are perhaps reduced.

3.2 Descriptive statistics

We have data on approximately 1800 women and 1800 men who participated in 84 speed dating events organized between January 2004 and October 2005. Table 1 presents the summary statistics of these meetings. On average, an event gathers 22.3 men and 22.3 women. Most events do not have exactly equal numbers of women and men, but the difference in numbers rarely goes beyond three. The participation fee across all markets is just below £20 per session (the median is £20), and ranges from £10 to £25. About 38 percent of men and 46 percent of women do not choose anyone, and three-quarters of the non-proposing men and almost half of the non-proposing women in the sample go back another time. Proposers too go back another time, albeit at a smaller rate on average (about 10 and 20 percent for women and men, respectively).

Striking gender differentials in proposal behavior are observed in the data. In line with sexual selection theory (Trivers, 1972; Buss, 2003), women are much choosier than men. On average, women select 2.6 men and see 45 percent of their proposals matched, while men propose to 5 women and their proposals are matched in only 20 percent of the cases. About 1 in 3 men and 1 in 10 women do not get any proposal. Overall, we observe 22 matches per event, an average of roughly one per participant. Our data do not contain information on race or ethnicity. However, given that none of the events was aimed at a specific ethnic/religious group and with anecdotal corroborative evidence from the agency's management, the fraction of nonwhite participants is small (and most certainly below 5 percent).

To have a better understanding of speed daters' characteristics, we compare them to a representative sample of singles taken from the British Household Panel Survey (BHPS).[10] For this

[10]Since 1991, the BHPS has annually interviewed a representative sample of about 5500 households covering more than 10000 individuals. More information on the BHPS can be found at `http://www.iser.essex.ac.uk/ulsc/bhps/doc/`.

comparison, we use information from the fourteenth wave (2004) of the BHPS, and restrict the BHPS sample to individuals aged between 20 and 50.

The summary statistics by sample are reported in Table 2. The differences across samples are notable. Speed dating participants are more educated on average (about two thirds of men and women have at least a university degree, against 20 percent of singles in the BHPS), and are more concentrated in relatively high-skilled occupations (83 percent of men and 76 percent of women are in 'skilled non-manual' and 'professional and managerial' jobs, as opposed to 40 percent in the BHPS). Our sample therefore fits the popular view about speed dating markets, according to which they seem to attract a disproportionate fraction of career people (Kurzban and Weeden, 2005).

Speed daters are also older than their BHPS counterparts (especially men, who are 5 years older on average). But if we restrict the BHPS sample to individuals with at least a university degree, the age differentials are reversed: male and female speed daters are 1 to 4 years *younger*, respectively. The average height is similar in both samples, slightly below 180 centimeters for men and around 165 centimeters for women. The average weight is comparable among men in the two samples, but it is much lower for female speed daters, and this difference does not disappear even if the BHPS sample is restricted to highly educated women. Dividing weight (measured in kilograms) by height squared (measured in meters), we obtain the Body Mass Index (BMI), which we include in our empirical analysis. General health guidelines associate 'normal' weight with a BMI between 18.5 and 25, and define 'underweight' when BMI is below 18.5 and 'overweight' when BMI is above 25. The shares of overweight men and, in particular, women are substantially larger in the BHPS sample than in the speed dating sample. The two sets of figures do not get closer even when the BHPS sample is restricted to more educated respondents.

It is worthwhile noting that in the speed dating sample there are substantially fewer women reporting weight information than men. Our demand analysis in Section 4 will try to minimize the resulting loss in sample size by assigning participants with missing weight information to the (base) normal weight category and identifying them with a missing weight dummy variable. We shall proceed in a similar fashion for all the variables with missing information (except age, because we restrict the sample to individuals with valid age data). Alternative assignment rules (e.g., substituting missing values with market mean or modal values computed on valid cases)

have delivered exactly identical results to those discussed below and are, therefore, not reported. However, we will discuss the estimates for the dummy variables that record missing information.

Finally, smoking is more prevalent among BHPS respondents, with 36 percent of men and 38 percent of women smoking against 9 and 13 percent respectively in the speed dating sample. Limiting the BHPS sample to highly educated individuals does not eliminate the differences but reduces them by more than half. Speed daters may believe that smoking reduces their overall desirability and, consequently, are more likely to misreport smoking information.

Despite the sample selection issue,[11] our analysis does not suffer from the "articulation effect" mentioned in Fisman et al. (2006). This emerges when subjects are asked to rate their partners on particular attributes at the same time as they propose to them. In such cases, it is possible that the proposal decision is affected by the reasoning on which the rating itself is determined. Because in our data set subjects do not have to articulate reasons for their proposals and are never asked to rate partners (other than choosing them), the results below should not be driven by reason-based choice.

We have already mentioned that an attractive feature of the speed dating protocol is that no one has prior information about who will be attending an event. Events are filled up on a first-come/first-served basis, that is, the agency does not screen participants ex ante. But because individuals select a meeting with specific age bands, location and time, and because these aspects of the event could be correlated with individuals' attributes, the choice set faced by participants may not be entirely exogenous to their preferences. In fact, it could be argued that individuals choose to attend specific events because they anticipate to meet certain desired types of potential partners. For example, speed daters might prefer people who have similar characteristics to theirs, so that they select events where they expect to meet people with attributes correlated to theirs. If this were the case, we should observe a systematic (non-zero) correlation in female and male characteristics across sessions with the odds of meeting partners with similar attributes being greater than the odds of meeting partners with different attributes. This, however, does not compromise the identification of the effect of opportunities on proposals, as long as there is enough variation in partners' attributes in each event. Admittedly, the coefficients of variation reported in Table 2 (in italics) provide evidence of a lower degree of dispersion in the speed

[11] Concerns of sample selection also apply to all the other existing studies of speed dating experiments and online dating.

dating sample than in the general population of singles along most of the observed characteristics, especially education and higher-level occupations. But we do not find significant differences in terms of other attributes, including age, height and weight.

To provide additional evidence, Figure 1 plots the distribution of female and male characteristics (means for age and height, and shares for the other attributes) across sessions. It shows a fairly widespread distribution of participants along all traits, except for age, which is not surprising. This is broadly confirmed by the correlation estimates reported in the first column of Table 3. Apart from age and smoking, the correlation between female and male attributes is close to zero and not significant. The second column of Table 3 reports odds ratios for all the female-male pairs in our sample.[12] Contrary to the correlation results, the odds of meeting a similar partner are slightly (but significantly) greater than those of meeting a different partner for almost all attributes, with the exception of occupation and weight. Despite this result, such odd ratios are very close to one and much lower than those generally found for women and men in final matches (Mare, 1991; Kalmijn, 1994; Pencavel, 1998). We, therefore, take these results as evidence of only mild sorting ex ante. We shall return to the potential of non-random selection in the next two sections.

4 The Determinants of Individual Proposals

We now estimate attribute demands using a method similar to that adopted by Fisman et al. (2006). We look at all the proposals a subject can possibly make in a given market and examine which of the potential partner's observed attributes trigger a proposal. At this stage, we remain agnostic on the mechanisms that might drive such proposals, in particular whether they reveal specific mating preferences or strategic considerations. Later in the section, we will come back to this issue.

[12] Odds ratios are an appealing measure of endogamy because they have a simple interpretation: odds ratios greater than unity indicate that there is more endogamy than one would expect if individuals met at random. Moreover, odds ratios allow us to compare endogamy across attributes or groups as they are independent of the relative size of the groups under considerations. For a more detailed description, see Goodman (1979).

4.1 Baseline estimates

We begin by investigating the association of partner's attributes with the probability of making a proposal. Our basic regression specification is of the form

$$d_{ijm} = \mathbf{X}'_{jm}\beta + \mu_i + \epsilon_{ijm}, \tag{1}$$

where d_{ijm} is the proposal decision that subject i takes with respect to partner j in market m. This is equal to one if i proposes to j, and zero otherwise. The vector $\mathbf{X}_{jm}$ contains socio-demographic characteristics of potential partners in market m, μ_i is a subject-specific permanent effect, and ϵ_{ijm} is an idiosyncratic shock. For ease of interpretation, we estimate (1) with linear probability models using least squares regressions, which assume μ_i to be zero but account for the potential correlation of observations within markets, and random-effects regressions. Similar results were obtained with probit models which are therefore not reported.

The estimates are shown in Table 4.[13] Although the OLS and RE estimates are qualitatively similar, few differences along some of the attributes are statistically significant. However, because the hypothesis that μ_i is zero is always strongly rejected, our discussion focuses on the random-effects results. Both OLS and RE models, however, explain relatively little (at most, between 4 and 9 percent) of the overall variation in proposals. This is an important point to which we will turn again in Section 5. Notice also that the hypothesis that the RE estimates are equal to those obtained from fixed-effects models cannot be rejected at conventional levels of statistical significance (as revealed by the p-value of the Hausman specification tests at the bottom of the table), suggesting that the correlation between potential partners' (and subjects') attributes and the unobserved propensity to propose is likely to be modest.[14]

More educated women are 10 percent more likely to receive a proposal than less educated women, but there is no evidence of a similar pattern on the other side of the market (i.e., in the case of women's demand). Men and women in manual and low-skill occupations are about 10 percent less likely to get a date than their professional/managerial counterparts. Partner's

[13] In the analysis below, we enter age (in years) and height (in centimeters) linearly, distinguish individuals with degree or higher qualifications, have three occupational dummies, and separate overweight people from the others. We have tried a number of other specifications (e.g., polynomials in age and height, and more dummies for occupation and BMI), but all our main results were unchanged.

[14] As shown by the p-value of the 'joint significance' tests, none of the indicators of missing information on partner's traits is significant in the female proposal regressions. The likelihood of male proposals, however, is slightly reduced by women not reporting information on their weight. Women who do not report their weight may be less desirable because they might be overweight.

education and occupation, therefore, have a powerful impact on the desirability of both men and women.

Similarly, physically observable attributes have an effect on desirability. Men are more likely to receive proposals if they are young and tall, and women receive more proposals if they are young and slim. For example, an additional year of age reduces female desirability to men by 1 percentage point (which represents a 5 percent reduction in the male proposal rate) and male desirability to women by 0.5 percentage point (or 4 percent reduction in the female proposal rate). On average, five extra centimeters (nearly one standard deviation increase in men's height) will increase female proposals by almost 1 percentage point (a 9 percent increase in female proposal rates). An overweight woman, instead, will see her chance to get a proposal reduced by about 13 percentage points (a 60 percent reduction), which is consistent with earlier findings in the psychology and evolutionary biology literatures (Tovée et al., 1998; Thornhill and Grammar, 1999). If a woman smokes, her likelihood of receiving a proposal is reduced by almost 4 percentage points, and, if a man does, his likelihood goes down by almost 2 percentage points.

It is worthwhile noticing that socioeconomic position and physical attributes are correlated in our sample. For male subjects, education is strongly positively correlated with both own age and height. For female subjects, instead, we find that height and weight are correlated with neither own education nor occupation, but age is negatively related to higher educational attainment. Regardless of gender, smoking is negatively associated with both education and occupation. When formulating their proposals, therefore, individuals (and, in our data, women especially) may be using partners' desirable physical attributes, such as height and age, as strong signals of their socioeconomic position (Hoppe, Moldovanu, and Sela, 2009).

4.2 Are Dating Choices Assortative?

To gain a further insight into the way individuals formulate their mate choices, we extend our previous analysis by taking subjects' own traits into account, and examine if subjects propose to partners who are similar to themselves rather than to partners with different attributes. Specifically, we estimate the influence of subjects' characteristics on their own demand for partners.[15]

[15]For this analysis, we use differences in age and height between men and women. In particular, we distinguish pairs in which the man is 7 centimeters taller from other pairs. Although this cutoff is arbitrary, 7 centimeters correspond to one standard deviation in the height distribution of married men and women aged 20-50 in the 2004 BHPS. Seven centimeters are also about half of the gender height difference among married couples. Similar considerations apply to the case of age, for which we distinguish men who are 5 or more years older than women.

The random-effects estimates of this specification are in the last two columns of Table 4. For both men and women, the direct effects of partner's attributes are similar to those discussed earlier, with the exceptions of education in the case of male proposals and smoking in the case of female proposals (which both lose their statistical significance), and male height which retains significance but halves its impact on women's proposals.[16]

The remaining estimates in Table 4 offer mild evidence of positive assortative choices. As before, physical attributes are important. Women are 4 percentage points (or 35 percent) less likely to propose to men who are shorter than they are and prefer partners who are 7 or more centimeters taller. Women are also more incline to choose men of similar age, being 27 and 44 percent less likely to propose to younger partners and partners who are more than 5 years older respectively. Men too prefer women who are younger by no more than 5 years and shorter by no more than 7 centimeters, and they are 27 percent less likely to propose if their potential partner is taller. Subjects who smoke prefer smokers (but these effects are not statistically significant at conventional levels), even though smoking is not seen as a desirable attribute.

Partner's desirability is also influenced by educational similarity. All subjects prefer partners with their own level of education to partners who are less educated than they are. In addition, both men and women tend to propose more to partners who are more educated, but this tendency is never statistically significant. We, instead, do not observe any positive sorting along occupational attributes, perhaps because these are difficult to assess more precisely or — as pointed out earlier — because subject may use physical attributes to proxy socioeconomic position.[17]

In sum, the attributes considered here have a relatively limited impact on dating choices, in terms of their ability to explain the observed variation across speed daters. This does not mean that preferences can have only a minor effect on mate selection: it is well established, in fact, that even mild preferences for certain attributes may lead to high levels of segregation (Schelling, 1971; Fisman et al. 2008). There are two other findings that are worth stressing. First, the effects of partners' physical attributes (height, BMI, and age) on male and female dating proposals are comparable to the effects of partners' socioeconomic position (education and occupation), with

[16]We also looked at the direct effect of subject's own attributes on proposal behavior. Both women and men are choosier (i.e., are less likely to propose) if they are older and more educated. We do not find any significant effect for the other attributes.

[17]We also performed a number of sensitivity checks, e.g., including indicators for the presence of children, partner's popularity, and common interests variables. All the estimates in Table 4 are robust to the inclusion of such variables and thus, for the sake of brevity, these sensitivity results are not presented.

gender differentials in attribute demands being relatively small. These results are not entirely consistent with those found by Fisman et al. (2006 and 2008) and Hitsch, Hortaçsu, and Ariely (2009) but confirm the findings presented in Kurzban and Weeden (2005), the only other study based on speed dating data from a large commercial company. Second, we find some evidence of *positive sorting* along many observable attributes (age, education, and height). This confirms earlier findings based on final match data, despite the short span of time that characterizes a speed dating meeting.

4.3 Preferences or Strategic Concerns?

An important question arising from the previous analysis regards the interpretation of the mechanisms driving dating proposals: proposals, in fact, might be driven by *preferences* or by *strategic considerations* (anticipation of rejection). Choices could be assortative either because speed daters have preferences for partners with similar attributes or because they have strategic concerns. For example, a low-education woman may be more likely to propose to a low-education man not because she prefers a partner with similar education to hers, but because she anticipates that she will not be chosen by a man with greater levels of education.

As already emphasized, the room for strategic incentives in the way in which speed daters express their preferences is likely to be limited in our setting. Proposals are made online and require only a tick of an anonymous (alias) name. Even if a proposal is not reciprocated (i.e., it is not matched), the rejection goes through a third party (the speed dating agency) rather than on a face-to-face basis, and participants are unlikely to meet again. In addition, there is no limit to the number of proposals they can make. Thus, both the cost of proposing and the fear of rejection are arguably modest at this early stage of the process and in our speed dating setup, and these in turn should reduce the scope for strategic considerations.

Another way of gauging the salience of strategic incentives is by looking at unmatched proposals. By definition, a proposal is successful only if it is matched. Now, if speed daters are strategic and propose only to participants who are expected to propose back, we should find a large positive correlation between proposals with a substantial proportion of proposals being matched. As documented in Section 3, men propose to an average of five women per session and women propose to an average of two men; the small number of male proposals is matched in only 20 percent of the cases, while the even smaller number of female proposals is matched

in 38 percent of the cases. As a result, the overall correlation between proposals is positive but relatively small (less than 0.15). This evidence therefore does not seem to fit well with the notion that speed daters formulate their proposals on the basis of strategic concerns about the chances of a future date or simply because they have high expectations of an abundance of dates. Rather, it suggests that choices, even at this early stage, are likely to reveal participants' dating preferences.

5 Dating Proposals at the Market Level

The estimates of the previous section have given us mild evidence in favor of positive sorting along a number of attributes. These same attributes, however, could explain only a small fraction of the overall variation in dating proposals. This finding emerges from the most disaggregated analysis based on all dyadic relationships in a given local event (market). But our data allow us to broaden the analysis to the market level. In what follows, we present a picture of the pattern of dating proposals at the this wider level and describe how the distribution of opportunities shapes the distribution of proposals.

We start by presenting a simple conceptual framework which will guide our empirical analysis and the interpretation of our results. Notice we have information on 84 events, each of them involving two pools of potential partners, one on each side of the market. Consider a specific speed dating event, m ($m = 1, ..., 84$). Although, the full choice set is the product of distributions of all the observable attributes on all potential partners in m, we focus for simplicity on one attribute at the time, which is denoted by X, and represent X's distribution over partners by its mean, $\overline{X}^p_m$. For each m, we also observe the mean attribute of all partners who have been proposed to, which we will refer to as the *proposal set* $\overline{X}^{(c)}_m$.[18]

Now, suppose that dating proposals are exclusively formulated on the basis of meeting opportunities, that is, subjects have no intrinsic preferences for any specific attribute. In this environment, the mean attribute of partners who have been proposed to in market m will have to be equal, on average, to the mean attribute of all potential partners in m, that is, $\overline{X}^{(c)}_m = \overline{X}^p_m$. For instance, the share of highly educated women who have been proposed to by every man in

[18] By definition, and regardless of whether X is binary or continuous, $\overline{X}_m = (\sum_{j=1}^{J_m} X_{jm})/J_m$ and $\overline{X}^{(c)}_m = (\sum_{j=1}^{J^{(c)}_m} X^{(c)}_{jm})/J^{(c)}_m$, where j indexes partners, J_m is the total number of potential (other-sex) partners in market m, and $J^{(c)}_m$ is the number of partners who receive a proposal in market m.

a given event should be equal to the share of highly educated women in that same event. In a scatter plot of $\overline{X}_m^{(c)}$ against $\overline{X}_m^p$, we would predict the data points to be scattered along the 45-degree line. This is what we refer to as the 'opportunity-only' (O-O) model. The O-O model corresponds to the following constrained regression:

$$\overline{X}_m^{(c)} = \overline{X}_m^p + u_m, \tag{2}$$

where u_m is an idiosyncratic shock to market m. Clearly, if there is a commonly-shared preference for X, then we will observe $\overline{X}_m^{(c)} > \overline{X}_m$, and if there is a commonly-shared distaste, then $\overline{X}_m^{(c)} < \overline{X}_m^p$. Such possibilities imply that (2) becomes:

$$\overline{X}_m^{(c)} = \alpha_0 + \alpha_1 \overline{X}_m^p + u_m, \tag{3}$$

and the O-O model simply corresponds to the constrained version of (3) in which $\alpha_0 = 0$ and $\alpha_1 = 1$.

For each of the attributes used so far, panel A of Table 5 reports the results from regressions (3) by subject's gender. To ease interpretation, the estimates are complemented by Figures 2 and 3. The aggregate picture reveals some striking patterns. The O-O model cannot be rejected in eight out of the 12 attribute-proposal patterns analyzed here, while it can be rejected in the case of age (both for male and female proposals), smoking (for female proposals) and education (for male proposals).

Consider the four cases in which the O-O model is rejected. In line with our earlier analysis, younger partners (regardless of gender), more educated women, and men who do not smoke tend to receive more proposals on average. But, interestingly, in each of these cases, there is a switch in the aggregate proposal pattern depending on whether the attribute is abundant or not. The tendency to propose to participants who are younger than the average in a given session is weaker in events in which there is an abundance of older-than-average partners, despite the fact that speed daters generally prefer younger partners. Similarly, the propensity to propose to men who are not smoking decreases when there are more male smokers present in the market. The scarcity of a desirable attribute (young age and nonsmoking) reduces its desirability, rather than heightening its demand. The opposite pattern is observed in the case of female education. Although women who are highly educated tend to be less popular than the average woman in

sessions where there are only few of them, they become more desirable in markets where there are more of them. Therefore, even though the O-O model is rejected in such cases, market opportunities seem to affect the observed patterns of mate choice. Dating proposals, then, cannot be just a function of potential partners' characteristics but also of the environment in which subjects meet partners.

Along the other attribute-proposal combinations, the O-O model cannot be rejected: that is, observed proposals appear to be driven primarily by meeting opportunities. Such combinations refer to occupation, height, and weight for both women and men, education in the case of female proposals, and smoking in the case of male proposals. In these instances, the intercept α_0 is always equal to zero, and the slope parameter α_1 is never statistically different from 1. These results strongly suggest that meeting opportunities are likely to play an essential role in shaping the observed pattern of mate selection in our sample.

Our analysis so far has assumed that proposals are determined only by partners' characteristics and attribute distributions. Of course, they may be influenced also by subjects' characteristics and distributions. For example, highly educated women may receive a larger share of proposals in sessions with a greater concentration of highly educated male subjects; and, conversely, they may receive a smaller share of proposals when the pool of subjects is relatively less educated.

To explore this possibility, we analyze a relationship similar to equation (3), in which, on the right-hand side, $\overline{X}^p_m$ is replaced with the observed mean of X computed over all subjects in m, $\overline{X}^s_m$, i.e.,

$$\overline{X}^{(c)}_m = \beta_0 + \beta_1 \overline{X}^s_m + v_m. \tag{4}$$

The idea here is that if, given m and X, subjects' proposal behavior, summarized by $\overline{X}^{(c)}_m$, is independent of subjects' attribute distribution, captured by $\overline{X}^s_m$, (or, in other words, $\beta_1 = 0$), then dating proposals are expected to be shaped mainly by market conditions.

The results are in panel B of Table 5. Except for the cases of age and smoking, the distribution of subjects' attributes turns out to be uncorrelated to subjects' demands. This means that, in our speed dating context, subjects' characteristics do not influence subjects' proposals. These instead continue to be largely determined by the opportunities of meeting specific partners with specific attributes.

6 From Proposals to Matches

Because our data contain information on proposals made from both sides of the market, we can gain further insights on the nature of the matches arising after a first encounter. A natural question, in fact, is to ask whether greater positive sorting is found when we observe a match, that is, when two people propose to each other.

Repeating the analysis reported in Section 3, we compute attribute odds ratios for the female-male pairs for which there is a match. To ease our exposition, these estimates are presented in Table 3, close to the corresponding odds ratios computed on all female-male meetings. The odds of getting matched to a partner of similar age are 11 times greater than those of getting matched to a partner of different age, which represents an almost five-fold statistically significant increase with respect to the corresponding odds ratio computed on all speed daters. The odds ratios for matched pairs on the other attributes increase too, and, as indicated by the last column of the table, this increase is significant in the cases of education and occupation. But the magnitude of such odds ratios is always modest, especially if compared to the estimates found with final match data (Mare, 1991; Kalmjin, 1994 and 1998; Pencavel, 1998; Schwartz and Mare, 2005). Thus, preferences (in particular, on age and education) influence match formation in this environment, but much less than what we observe amongst partners in cohabiting or marital unions. Again, meeting opportunities seem to have a dominant role among speed daters and, perhaps more generally, at the early stages of all relationships.

In Section 4, we mentioned some results of assortative preferences along a measure of agreed-upon popularity, a proxy of potential partners' consensual value (see footnote 17). To provide further evidence of how such preferences operate in mate selection and partnership formation, we estimated odds ratios on the whole sample of female-male pairs and on the subsample of pairs for which there is a match using such a measure. The odds ratio increases from about 1 (t-value=0.8) in the former sample to 4.7 (t-value=10.4) in the latter, suggesting that a highly popular individual is almost 5 times more likely to get a date with another highly popular mate than with a less popular individual. Not only are popular individuals more likely to receive proposals and propose to each other, but they are also more likely to get a date with one another. Assortative preferences therefore may trigger this positive sorting on market value, but the measure itself reveals again the importance of the market within which it is determined.

7 Discussion

The previous section has documented one important new result: proposals and dating matches alike are determined to a large extent by meeting opportunities in the dating market. Although mate selection and final matches are undoubtedly affected by individual preferences over partners' attributes, their overall import at this early stage is modest giving way to the role of market opportunities. This indicates that dating and mating require meeting: the pool of available interaction partners is shaped by various institutionally organized arrangements (e.g., schools, work places, neighborhoods, family networks, voluntary associations, bars and clubs) and these constrain the type of people with whom we form personal relationships and eventually durable unions.

The importance of the environment in which individuals choose their partners and friends has been already stressed in earlier studies in different contexts (e.g., Bisin, Topa, and Verdier, 2004; Marmaros and Sacerdote, 2006). Our result adds to such contributions and has ramifications for our understanding of social structure and socioeconomic mobility. It also provides us with fresh underpinnings to interpret the existing results on mate selection highlighted in the speed dating context (Kurzban and Weeden, 2005; Fisman et al., 2006 and 2008; Todd et al. 2007) or in other mediated and unmediated environments (Plomin, DeFries, and Roberts, 1977; Lynn and Shurgot, 1984; DiMaggio and Mohr, 1985; Wong, 2003; Choo and Siow, 2006; Lenton, Fasolo, and Todd, 2008; Hitsch, Hortaçsu, and Ariely, 2009). Even in settings in which the amount of positive assortative matching is considerable (such as in final matches), the pool of available partners is likely to be salient. This suggests a continued emphasis not on assortment, but rather on identifying institutional and social milieux where people meet and mate as well as formulating a more precise definition of marriage markets (Pawł}owski and Dunbar, 1999). Put differently, our result calls us to pay attention to the 'how' — and not just the 'who' — of mate selection, as some evolutionary anthropologists and psychologists have also begun to stress (Miller and Todd, 1998).

We have long known that the chances to marry endogamously are higher the more often one meets people within the "group" (however this is defined) and the more often one interacts with group members on a day-to-day basis (see, among others, Kalmijn [1998]). Stone (1977) offers a fascinating account of the development of a series of county marriage markets, centered on the

facilities of county towns (such as balls, card parties, annual fairs, and horse-racing events), and a national marriage market, centered on London and Bath, for the British aristocracy during the first half of the eighteenth century. Despite this, our knowledge of marriage markets is rather patchy and anecdotal. In fact, the operationalization of the very notion of marriage markets is challenging.

Economists have typically studied specific aspects of the number of women and men in a reference population, such as sex ratios among immigrants or ethnic groups or after events (such as wars) that lead to exogenous sex ratio changes (e.g., Chiappori, Fortin, and Lacroix, 2002; Angrist, 2002; Acemoglu, Autor, and Lyle, 2004). But this can offer only a coarse view of the institutional mechanisms by which the courting process comes about. A well established strand of sociological research has focused on the geographic distribution of ethnic groups, such as Asian-Americans in California or Jewish-Americans in New York City (Lieberson and Waters, 1988; Bills, 2005). Others have examined local marriage markets such as schools or workplaces (Bozon and Héran, 1989; Kalmijn and Flap, 2001). But the demographic (including gender) composition of a specific population cannot be seen separately from the regional distribution of groups. If people base their decision to live in a given area on factors that are not independent of in-group preferences, then mating preferences cannot be distinguished from partners' availability. Here is where the speed dating setup of our study turned out to be very important. Despite this, a more precise definition and a better measurement of the concept of marriage markets are needed.

The result that many traits (including education and occupation) can explain little of the variation in people's desirability in speed dating events is also noteworthy, especially because these attributes have been reported as important determinants of mate preferences in other circumstances (Hout, 1982; Mare, 1991; Kalmijn, 1994; Pencavel, 1998). It is of course possible that these traits do not show up strongly in speed dating events, not because they are intrinsically unimportant, but because they are traits for which it is difficult to gain reliable information in a short interaction (Hoppe, Moldovanu, and Sela, 2009). It is however unclear why speed daters are substantially less able to assess each others' schooling or wealth than individuals in the context of personal ads or online dating, where researchers have found consistent preferences for status and education (Lynn and Shurgot, 1984; Pawłowski and Koziel, 2002; Hitsch, Hortaçsu, and Ariely, 2009) and where the reliability of the information posted cannot be easily checked. More broadly,

these findings underline the need to build a more cohesive picture of the attributes of individuals that make them more desirable in the mating market and how the set of such attributes may change in different dating environments.

8 Conclusion

This paper analyzes dating behavior using new data from a large UK speed dating agency. It pursues two primary goals. The first is to shed light on the nature of people's preferences when selecting mates. We find that speed daters' proposals are primarily driven by assortative preferences and less by generally agreed-upon mate values, with both women and men preferring partners of similar age and education. We also find that women and men equally value observable physical attributes: women prefer men who are young and tall, while men are more attracted to women who are young and thin. And partner's education and occupation too have an impact on desirability, irrespective of gender.

The second goal of the paper is to provide empirical evidence on the importance of meeting opportunities in explaining patterns of dating proposals and matches. Our results indicate that the role of preferences is generally overshadowed by that of meeting opportunities. This finding stresses the need to gain deeper insights and a better measurement on the wide variety of formal and informal institutions that give rise to what we call marriage markets and that shape mate selection, dating behavior, courtship, and matchmaking.

This work contributes to the growing economics literature that emphasizes the importance of studying mate selection and estimates individual preferences in dating partners (Bisin, Topa, and Verdier (2004); Choo and Siow, 2006; Fisman et al. 2006 and 2008; Hitsch, Hortaçsu, and Ariely, 2009) as well as to the broader scientific literature that increasingly uses speed dating procedures to study the evolution of mate choices and relationship dynamics (e.g., Kurzban and Weeden, 2005; Finkel, Eastwick, Matthews, 2007; Todd et al. 2007). A number of extensions would be desirable, even within our speed dating context. First, incorporating how speed daters learn about their potential partners' characteristics (either during the meeting or browsing their profiles) would give us a deeper understanding of dating preferences, which may also have ramifications for theory. Second, a methodology similar to that applied here could be used to analyze different substantive issues (such as the extent to which dating preferences differ by ethnicity), different rules of the game (e.g., allowing participants to interact for more/less than three minutes

or letting them know they have received a proposal even if they do not reciprocate), different agencies that target specific populations (in terms of age, occupation, race, or religion), and speed daters in different countries. Finally, an ambitious extension is to follow speed daters over time and observe how their matches evolve. This will allow us to have a better view on how they screen potential partners and eventually form durable long-term relationships.

References

[1] Acemoglu, Daron, David H. Autor, and David Lyle. 2004. "Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury." *Journal of Political Economy* 112, 497–551.

[2] Ambady, Nalini, and Robert Rosenthal. 1992. "Thin Slices of Expressive Behavior as Predictors of Interpersonal Consequences: A Meta-Analysis." *Psychological Bulletin* 111, 256–274.

[3] Angrist, Josh. 2002. "How Do Sex Ratios Affect Marriage and Labor Markets? Evidence from America's Second Generation." *Quarterly Journal of Economics* 117, 997–1038.

[4] Becker, Gary S. 1973. "A Theory of Marriage: Part I." *Journal of Political Economy* 81, 813– 846.

[5] Becker, Gary S. 1974. "A Theory of Marriage: Part II." *Journal of Political Economy* 82, S11–S26.

[6] Becker, Gary S. 1981. A Treatise on the Family. Cambridge, MA: Harvard University Press.

[7] Bergstrom, Theodore C., and Mark Bagnoli. 1993. "Courtship as a Waiting Game." *Journal of Political Economy* 101, 185–202.

[8] Berscheid, Ellen, Karen Dion, Elaine Waster, and G. William Walster. 1971. "Physical Attractiveness and Dating Choice: A Test of the Matching Hypothesis." *Journal of Experimental Social Psychology* 7, 173–189.

[9] Bills, David B, ed. 2005. *The Shape of Social Inequality: Stratification and Ethnicity in Comparative Perspective.* Amsterdam: Elsevier.

[10] Bisin, Alberto, Giorgio Topa, and Thierry Verdier. 2004. "Religious Intermarriage and Socialization in the United States." *Journal of Political Economy* 112, 615–664.

[11] Blossfeld, Hans-Peter, and Andreas Timm. 2003. *Who Marries Whom? Educational Systems as Marriage Markets in Modern Societies.* Amsterdam: Kluwer Academics.

[12] Bozon, Michel, and François Héran. 1989. "Finding a Spouse: A Survey of How French Couples Meet." *Population* 44, 91–121.

[13] Burdett, Kenneth, and Melvyn G. Coles. 1997. "Marriage and Class." *Quarterly Journal of Economics* 112, 141–68.

[14] Buss, David M. 2003. *The Evolution of Desire: Strategies of Human Mating.* New York: Basic Books (revised edition).

[15] Buston, Peter M., and Stephen T. Emlen. 2003. "Cognitive Processes Underlying Human Mate Choice: The Relationship between Self-Perception and Mate Preference in Western Society." *Proceedings of the National Academy of Sciences* 100, 8805–8810.

[16] Chiappori, Pierre-André, Bernard Fortin, and Guy Lacroix. 2002. "Marriage Market, Divorce Legislation, and Household Labor Supply." *Journal of Political Economy* 110, 37–72.

[17] Choo, Eugene, and Aloysius Siow. 2006. "Who Marries Whom and Why." *Journal of Political Economy* 114, 175–201.

[18] Cooper, M. Lynne, and Melanie S. Sheldon. 2002. "Seventy Years of Research on Personality and Close Relationships: Substantive and Methodological Trends Over Time." *Journal of Personality* 70, 783–812.

[19] DiMaggio, Paul and John Mohr. 1985. "Cultural Capital, Educational Attainment, and Marital Selection." *American Journal of Sociology* 90, 1231–1261.

[20] Eastwick, Paul W., and Eli J. Finkel. 2008. "Sex Differences in Mate Preferences Revisited: Do People Know What They Initially Desire in a Romantic Partner?" *Journal of Personality and Social Psychology* 94, 245–264.

[21] Finkel, Eli J., and Paul W. Eastwick. 2008. "Speed-Dating." *Current Directions in Psychological Science* 17, 193–197.

[22] Finkel, Eli J., Paul W. Eastwick, and J. Matthews. 2007. "Speed-dating as an Invaluable Tool for Studying Romantic Attraction: A Methodological Primer." *Personal Relationships* 14, 149– 166.

[23] Fisman, Raymond, Sheena S. Iyengar, Emir Kamenica, and Itamar Simonson. 2006. "Gender Differences in Mate Selection: Evidence from a Speed Dating Experiment." *Quarterly Journal of Economics* 121, 673–697.

[24] Fisman, Raymond, Sheena S. Iyengar, Emir Kamenica, and Itamar Simonson. 2008. "Racial Preferences in Dating." *Review of Economic Studies* 75, 117–132.

[25] Gale, David, and Lloyd S. Shapley. 1962. "College Admissions and the Stability of Marriage." *American Mathematical Monthly* 69, 9–15.

[26] Goodman, Leo A. 1979. "Simple Models for the Analysis of Association in Cross-Classifications Having Ordered Categories." *Journal of the American Statistical Association* 74, 537–552.

[27] Hamilton, Cicely M. 1912. *Marriage as a Trade.* London: Chapman and Hall.

[28] Harrison, Glenn W., and John A. List. 2004. "Field Experiments." *Journal of Economic Literature* 42, 1009–1055.

[29] Harrison, Glenn W., and John A. List. 2008. "Naturally Occurring Markets and Exogenous Laboratory Experiments: A Case Study of the Winner's Curse." *Economic Journal* 118, 822–843.

[30] Hitsch, Günter J., Ali Hortaçsu, and Dan Ariely. 2009. "Matching and Sorting in Online Dating." *American Economic Review*, forthcoming.

[31] Hoppe, Heidrun C., Benny Moldovanu, and Aner Sela. 2009. "The Theory of Assortative Matching Based on Costly Signals." *Review of Economic Studies* 76, 253–281.

[32] Hout, Michael. 1982. "The Association between Husbands' and Wives' Occupations in Two-Earner Families." *American Journal of Sociology* 88, 397–409.

[33] Iyengar, Sheena S. 2009. *Spoiled for Choice.* New York, NY: Twelve.

[34] Jones, Benedict C., Lisa M. DeBruine, Anthony C. Little, Robert P. Burriss, and David R. Feinberg. 2007. "Social Transmission of Face Preferences among Humans." *Proceedings of the Royal Society of London B* 274, 899–903.

[35] Kalmijn, Matthijs. 1994. "Assortative Mating by Cultural and Economic Occupational Status." *American Journal of Sociology* 100, 422–452.

[36] Kalmijn, Matthijs. 1998. "Intermarriage and Homogamy: Causes, Patterns, Trends." *Annual Review of Sociology* 24, 395–421.

[37] Kalmijn, Matthijs, and Henk Flap. 2001. "Assortative Meeting and Mating: Unintended Consequences of Organized Settings for Partner Choices." *Social Forces* 79, 1289–1312.

[38] Kurzban, Robert, and Jason Weeden. 2005. "HurryDate: Mate Preferences in Action." *Evolution and Human Behavior* 26, 227–244.

[39] Lam, David. 1988. "Marriage Markets and Assortative Mating with Household Public Goods: Theoretical Results and Empirical Implications." *Journal of Human Resources* 23, 462–87.

[40] Lee, Soohyung. 2009. "Marriage and Online Mate-Search Services: Evidence From South Korea." Unpublished manuscript, University of Maryland.

[41] Lenton, Alison P., Barbara Fasolo, and Peter M. Todd. 2009. "The Relationship between Number of Potential Mates and Mating Skew in Humans." *Animal Behaviour* 77, 55–60.

[42] Lieberson, Stanley, and Mary C. Waters. 1988. *From Many Strands: Ethnic and Racial Groups in Contemporary America.* New York: Russell Sage Foundation.

[43] Lynn, Michael, and Barbara A. Shurgot. 1984. "Responses to Lonely Hearts Advertisements: Effects of Reported Physical Attractiveness, Physique, and Coloration." *Personality and Social Psychology Bulletin* 10, 349–357.

[44] Mare, Robert D. 1991. "Five Decades of Educational Assortative Mating." *American Sociological Review* 56, 15–32.

[45] Marmaros, David, and Bruce Sacerdote. 2006. "How Do Friendships Form?" *Quarterly Journal of Economics* 121, 79–119.

[46] Miller, Geoffrey F., and Todd, Peter M. 1998. "Mate choice turns cognitive." *Trends in Cognitive Sciences* 2, 190–198.

[47] Pawłowski, Boguslaw, and R.I.M. Dunbar. 1999. "Impact of Market Value on Human Mate Choice Decisions." *Proceedings of the Royal Society of London* (Series B) 266, 281–285.

[48] Pawłowski, Boguslaw, and Slawomir Koziel. 2002. "The Impact of Traits Offered in Personal Advertisements on Response Rates." *Evolution and Human Behavior* 23, 139–149.

[49] Pencavel, John. 1998. "Assortative Mating by Schooling and the Work Behavior of Wives and Husbands." *American Economic Review Papers and Proceedings* 88, 326–329.

[50] Plomin, Robert, J.C. DeFries, and M.K. Roberts. 1977. "Assortative mating by unwed biological parents of adopted children." *Science* 22, 449–450.

[51] Schwartz, Christine R., and Robert D. Mare. 2005. "Trends in educational assortative marriage from 1940 to 2003." *Demography* 42, 621–646.

[52] Schelling, Thomas C. 1971. "Dynamic Models of Segregation." *Journal of Mathematical Sociology*, 1, 143–186.

[53] Shimer, Robert, and Lones Smith. 2000. "Assortative Matching and Search." *Econometrica* 68, 343–69.

[54] Smith, Lones. 2006. "The Marriage Model with Search Frictions." *Journal of Political Economy* 114, 1124–44.

[55] Stone, Lawrence. 1977. *The Family, Sex and Marriage in England 1500–1800.* London: Weidenfeld & Nicolson.

[56] Jacquet, Nicolas L., and Serene Tan. 2007. "On the Segmentation of Markets", *Journal of Political Economy* 115, 640–664.

[57] Thiessen, Del, Robert K. Young, and Melinda Delgado. 1997. "Social Pressures for Assortative Mating." *Personality and Individual Differences* 22, 157–164.

[58] Thornhill, Rany, and Karl Grammar. 1999. "The Body and the Face of Woman: One Ornament that Signals Quality?" *Evolution and Human Behavior* 20, 105–120.

[59] Todd, Peter. M., Lars Penke, Barbara Fasolo, and Alison P. Lenton. 2007. "Different Cognitive Processes Underlie Human Mate Choices and Mate Preferences." *Proceedings of the National Academy of Sciences* 104, 15011–15016.

[60] Tovée, Martin J., S. Reihardt, Joanne L. Emery, and Piers L. Cornelissen. 1998. "Optimal Body-Mass Index and Maximum Sexual Attractiveness." *The Lancet* 352, 548.

[61] Trivers, Robert L. 1972. "Parental Investment and Sexual Selection." In *Sexual Selection and the Descent of Man*, edited by Bernard Campbell. Chicago: Aldine.

[62] Waynforth, D. and R.I.M. Dunbar. 1995. "Conditional Mate Choice Strategies in Humans: Evidence from Lonely Hearts Advertisements." *Behaviour* 132, 755–779.

[63] Weiss, Yoram. "The Formation and Dissolution of Families: Why Marry? Who Marries Whom? And What Happens Upon Divorce." In M.R. Rosenzweig and O. Stark (eds) Handbook of Population and Family Economics (Amsterdam: Elsevier Science) 81–123.

[64] Westermarck, Edward A. 1903. *The History of Human Marriage.* London: Macmillan.

[65] Wong, Linda Y. 2003. "Structural Estimation of Marriage Models", *Journal of Labor Economics* 21, 699–727.

Table 1
Sample Characteristics of Speed Dating Events

	Mean	Std. dev.	Min	Max
Number of female subjects (N_m = 84)	22.3	3.9	15	31
Number of male subjects (N_m = 84)	22.3	3.9	15	30
Number of proposals made per meeting by:				
Female subjects (N_i = 1868)	2.6	3.1	0	30
Male subjects (N_i = 1870)	5.0	5.8	0	30
Number of proposals received per meeting by:				
Male partners (N_j = 1870)	2.6	3.1	0	18
Female partners (N_j = 1868)	5.0	4.4	0	22
Number of matches per meeting	22	20	2	117
Share of proposals matched (as a fraction of all proposals) for:				
Female subjects (Obs = 4119)	0.45			
Male subjects (Obs = 9467)	0.20			

Note: N_m is the number of events (or markets), N_i is the number of subjects, N_j is the number of partners, and 'Obs' refers to the number of subject-partner pairs in which the subject has made a proposal.

Table 2
Summary Statistics of Subjects' Attributes

	Women		Men	
	Speed dating	BHPS	Speed dating	BHPS
Age (years)	34.5 (7.5)	32.7 (9.4)	35.8 (6.9)	30.5 (9.1)
	0.217	*0.287*	*0.193*	*0.298*
	[1,776]	[1,351]	[1,828]	[1,200]
University degree or greater qualification	0.66	0.20	0.65	0.20
	0.322	*0.797*	*0.339*	*0.803*
	[974]	[1248]	[1071]	[1053]
Occupation				
Professional and managerial	0.36	0.33	0.43	0.24
	0.611	*0.672*	*0.521*	*0.755*
Skilled non manual	0.50	0.19	0.40	0.16
	0.486	*0.802*	*0.583*	*0.827*
Other occupations[a]	0.14	0.48	0.17	0.60
	0.877	*0.520*	*0.827*	*0.403*
	[1008]	[862]	[1110]	[905]
Height (cm)	165.4 (6.7)	163.8 (6.4)	179.1 (6.9)	178.4 (7.4)
	0.041	*0.039*	*0.039*	*0.041*
	[1008]	[1270]	[1139]	[1095]
Weight (kg)	57.8 (5.9)	66.4 (14.0)	77.6 (10.0)	79.9 (15.5)
	0.102	*0.211*	*0.129*	*0.194*
	[334]	[1192]	[774]	[1067]
Share underweight[b]	0.05	0.04	0.00	0.02
Share overweight[c]	0.05	0.38	0.29	0.45
Smoking	0.13	0.38	0.09	0.36
	0.824	*0.619*	*0.886*	*0.636*
	[844]	[1278]	[1045]	[1101]

Note: In each cell, we report the mean, the standard deviation in parentheses, the coefficient of variation (which, in the case of the speed dating sample is a weighted average by market, with weights given by the number of participants over the total population of speed daters) in italics, and the number of subjects in square brackets. Standard deviations are not reported for dummy variables.

[a] Includes workers in manual occupations, self-employed, full-time students, and individuals in other jobs.

[b] If BMI<18.5.

[c] If BMI>25.

Table 3
Correlation Coefficients and Odds Ratios in Female and Male Attributes

	Female-male correlation (all speed daters)	Odds ratios		
		All speed daters	Matched pairs	Test of equality (*p*-value)
Age[a]	0.904** (0.002)	2.39** (0.003)	11.01** (0.97)	0.000
University degree or greater qualification	0.091 (0.413)	1.10** (0.002)	1.54** (0.13)	0.004
Professional and managerial occupations	0.052 (0.652)	1.01 (0.02)	1.25* (0.12)	0.013
Height[a]	0.103 (0.389)	1.04* (0.05)	1.08 (0.09)	0.933
Overweight	0.031 (0.780)	1.00 (0.16)	0.69 (0.76)	0.421
Smoking	0.232** (0.030)	1.18** (0.01)	1.81* (0.41)	0.059

Note: The figures in the first column are correlation coefficients between male and female attributes. Their standard errors (in parentheses) are bootstrapped from 100 replications. The figures in the second and third columns are odds ratios obtained from logistic regressions. Standard errors are in parentheses. In the column labelled 'Test of equality' we report the *p*-value of the test that the odds ratio in the second column equals the corresponding odds ratio in the third column.

[a] Odds ratios for this attribute are computed using two distinct groups, that is, individuals who are above the average age or height, and individuals who are at the average or below.

The '**' in the first column indicates that a correlation is significantly different from zero at the 1 percent level. The '*' and '**' in the second and third columns indicate that an odds ratio is significantly different from one at the 5 and 1 percent level, respectively.

Table 4
Demand for Partner's Attributes

	Subject's gender					
	Female		Male		Female	Male
	OLS	RE	OLS	RE	RE	RE
Age (years)	-0.004**	-0.005**	-0.010**	-0.011**	-0.004**	-0.011**
	(0.0009)	(0.0002)	(0.001)	(0.0003)	(0.0003)	(0.0004)
University degree or	0.003	-0.0005	0.021	0.021**	-0.020	-0.011
greater qualification	(0.010)	(0.004)	(0.012)	(0.005)	(0.013)	(0.017)
Skilled non-manual	0.011	0.008*	-0.002	-0.004	0.010*	-0.004
	(0.008)	(0.004)	(0.012)	(0.005)	(0.004)	(0.006)
Other occupations	0.0006	-0.010*	-0.014	-0.024**	-0.009	-0.027**
	(0.016)	(0.005)	(0.018)	(0.008)	(0.005)	(0.008)
Height (cm)	0.0015**	0.0014**	0.0009	0.0011**	0.0007**	0.0011**
	(0.0006)	(0.0002)	(0.0007)	(0.0003)	(0.0003)	(0.0004)
Overweight	0.0001	0.0005	-0.155**	-0.132**	0.002	-0.114**
	(0.009)	(0.005)	(0.028)	(0.023)	(0.005)	(0.025)
Smoking	-0.019	-0.016**	-0.047**	-0.039**	-0.019	-0.058*
	(0.012)	(0.006)	(0.014)	(0.008)	(0.019)	(0.026)
Man is 5+ years older					-0.050**	-0.066**
					(0.004)	(0.006)
Woman is older					-0.031**	-0.068**
					(0.004)	(0.006)
Man is more educated					0.010	-0.055**
					(0.013)	(0.016)
Woman is more educated					-0.032**	0.015
					(0.011)	(0.017)
Both are in professional/					0.009	0.002
managerial occupations					(0.007)	(0.010)
Both are in skilled non-					-0.005	0.0002
manual occupations					(0.007)	(0.009)
Both are in other					-0.001	0.028
occupations					(0.016)	(0.021)
Man is 7+ cm taller					0.026**	-0.016*
					(0.006)	(0.008)
Woman is taller					-0.039**	-0.060**
					(0.006)	(0.008)
Both are overweight					0.047	-0.071
					(0.034)	(0.053)
Both smoke					0.055	0.049
					(0.029)	(0.038)
Both are not smoking					0.002	-0.016
					(0.018)	(0.025)
Joint significance of missing partner's information (*p*-value)	0.138	0.095	0.090	0.077	0.078	0.068

Joint significance of missing subject's information (*p*-value)					0.192	0.114
Joint significance of all missing information variables (*p*-value)					0.133	0.072
Hausman test of RE model versus FE model (*p*-value)		0.176		0.180	0.147	0.171
R^2	0.017	0.016	0.042	0.042	0.041	0.091
Mean dependent variable		0.113		0.222	0.113	0.222
Observations		41782		40544	41782	40544

Note: OLS = ordinary least squares; RE = random effects; FE = fixed effects. Estimates are obtained from linear probability models. In the OLS regressions, robust standard errors clustered by market are in parentheses. Observations are at the subject-partner meeting level. Other variables included in all regressions are dummy variables recording missing partner's information on education, occupation, height, weight, and smoking. In addition, the regressions reported in the last two columns contain the same missing information dummy variables for the subject.
* significant at 5 percent; ** significant at 1 percent.

Table 5
Mate Selection and the Distribution of Partner/Subject Attributes

	(1) Age (mean)	(2) University degree or greater qualification	(3) Professional and managerial occupations	(4) Height (mean)	(5) Overweight	(6) Smoking
Panel A. Partner's attributes						
Female subject						
α_0	-8.75**	-0.06	-0.02	-8.75	-0.05	-0.02*
	(1.87)	(0.06)	(0.06)	(17.63)	(0.04)	(0.01)
α_1	1.18**	1.11**	1.03**	1.05**	1.19**	1.30**
	(0.05)	(0.09)	(0.13)	(0.10)	(0.13)	(0.10)
F test $(\alpha_1 = 1)$	0.001†	0.268	0.806	0.636	0.122	0.005†
F test $(\alpha_0 = 0, \alpha_1 = 1)$	0.000	0.399	0.896	0.130	0.297	0.018
R^2	0.864	0.633	0.433	0.585	0.538	0.657
Observations	84	81	81	82	81	84
Male subject						
α_0	-7.34**	0.10*	0.03	7.18	0.00	-0.01
	(1.56)	(0.04)	(0.02)	(10.47)	(0.02)	(0.01)
α_1	1.13**	0.90**	0.94**	0.96**	0.86**	1.09**
	(0.04)	(0.06)	(0.07)	(0.06)	(0.04)	(0.07)
F test $(\alpha_1 = 1)$	0.005†	0.085	0.388	0.509	0.140	0.202
F test $(\alpha_0 = 0, \alpha_1 = 1)$	0.000†	0.000	0.465	0.229	0.194	0.263
R^2	0.886	0.762	0.717	0.737	0.787	0.729
Observations	84	84	78	84	80	84
Panel B. Subject's attributes						
Female subject						
β_1	0.88**	0.10	-0.09	0.11	0.09	0.10*
	(0.07)	(0.14)	(0.10)	(0.12)	(0.05)	(0.05)
R^2	0.647	0.012	0.009	0.010	0.042	0.042
Observations	84	83	82	82	79	82
Male subject						
β_1	1.13**	0.001	0.02	0.10	-0.002	0.04
	(0.08)	(0.12)	(0.11)	(0.15)	(0.008)	(0.08)
R^2	0.704	0.001	0.003	0.005	0.001	0.003
Observations	84	83	82	82	79	82

Ordinary least squares estimates; standard errors in parentheses. Figures in panel A are obtained from the estimation of equation (3); those in panel B are from equation (4) which includes a constant (see text). Observations are at the meeting level. In the rows labelled 'F test', we report the *p*-value of the test that α_1=1.
* significant at 5 percent; ** significant at 1 percent.
† indicates that equality is rejected (at 1 percent).

Figure 1
Joint (Female and Male) Average Distribution of Attributes

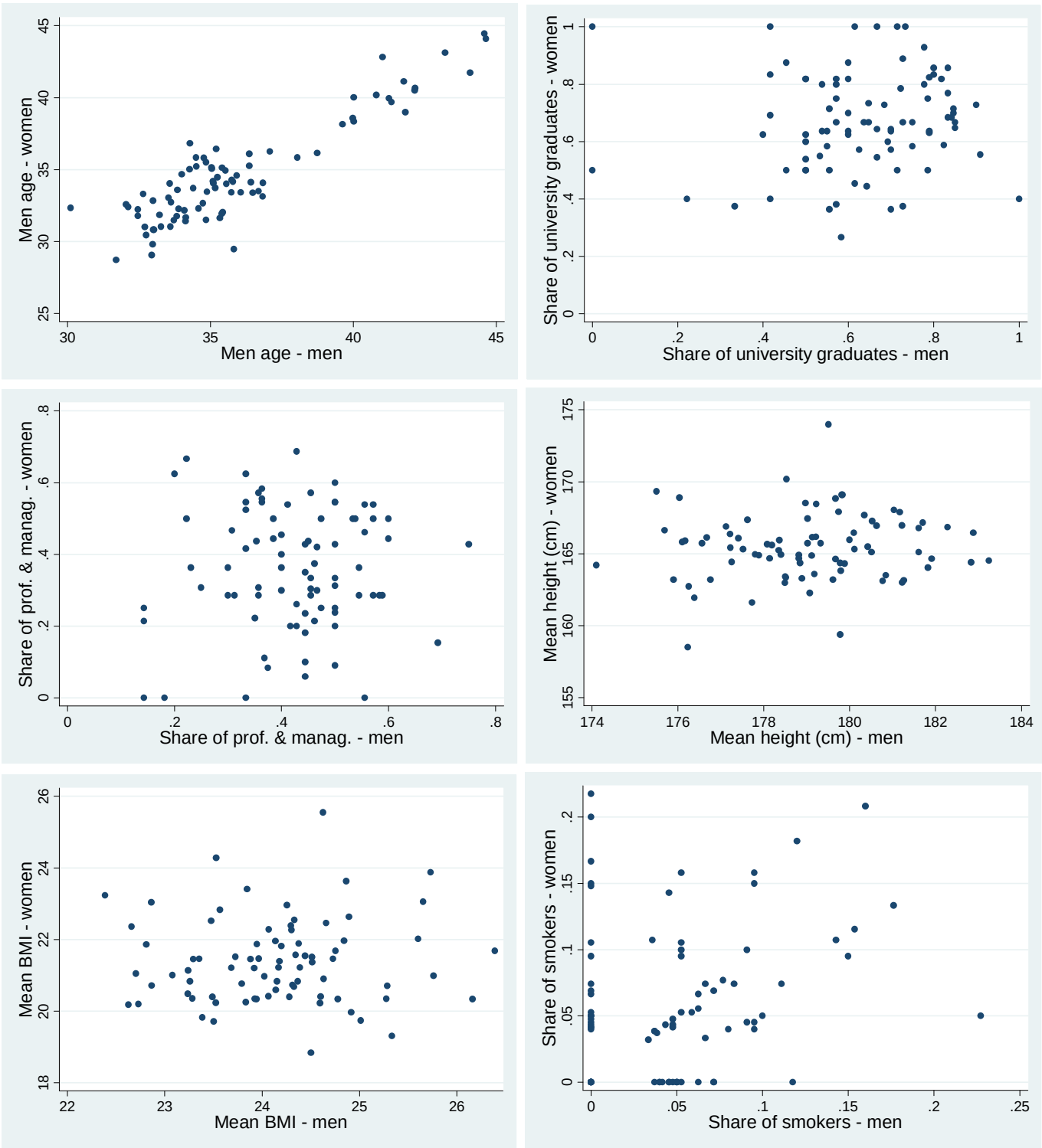
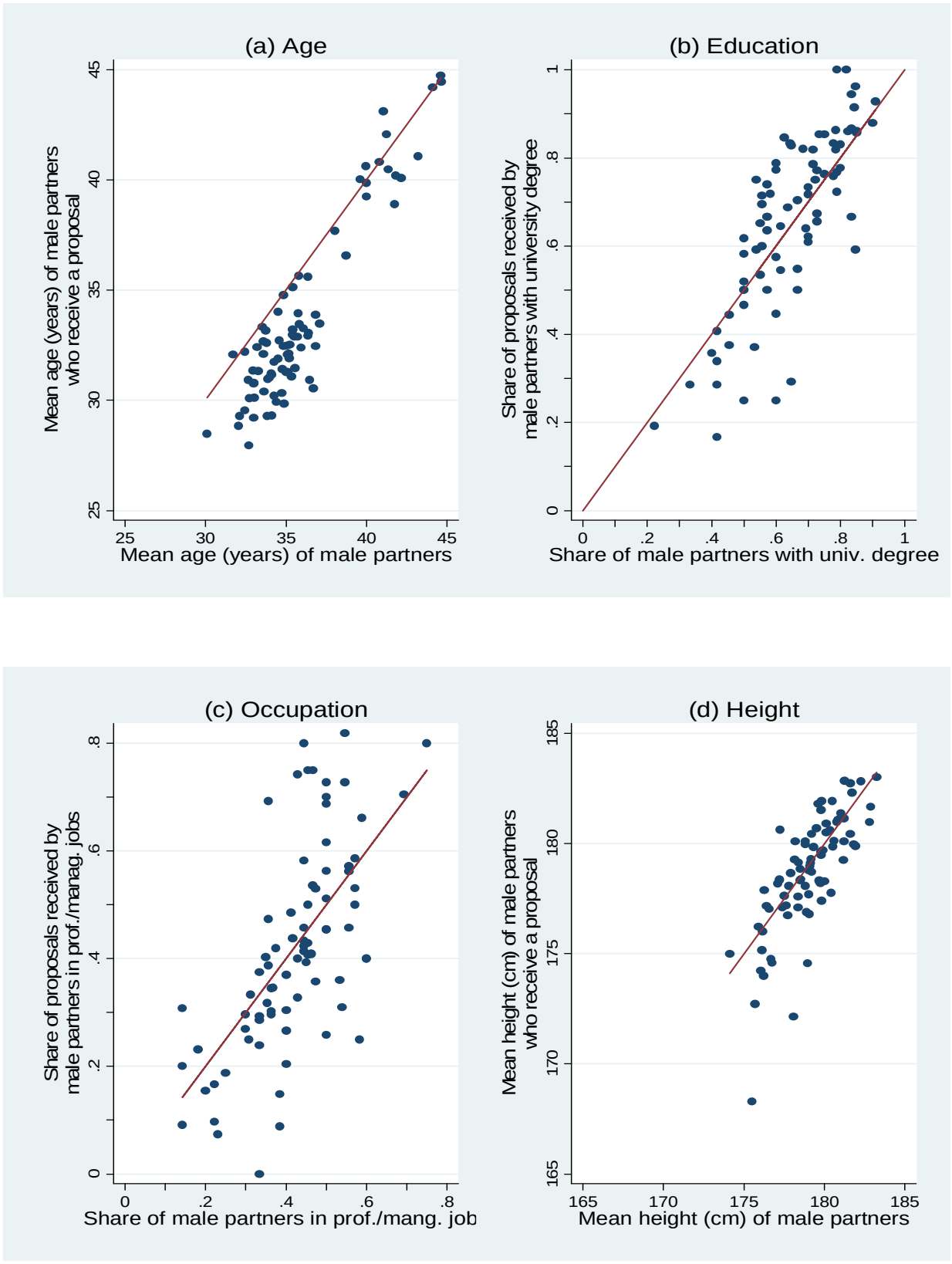
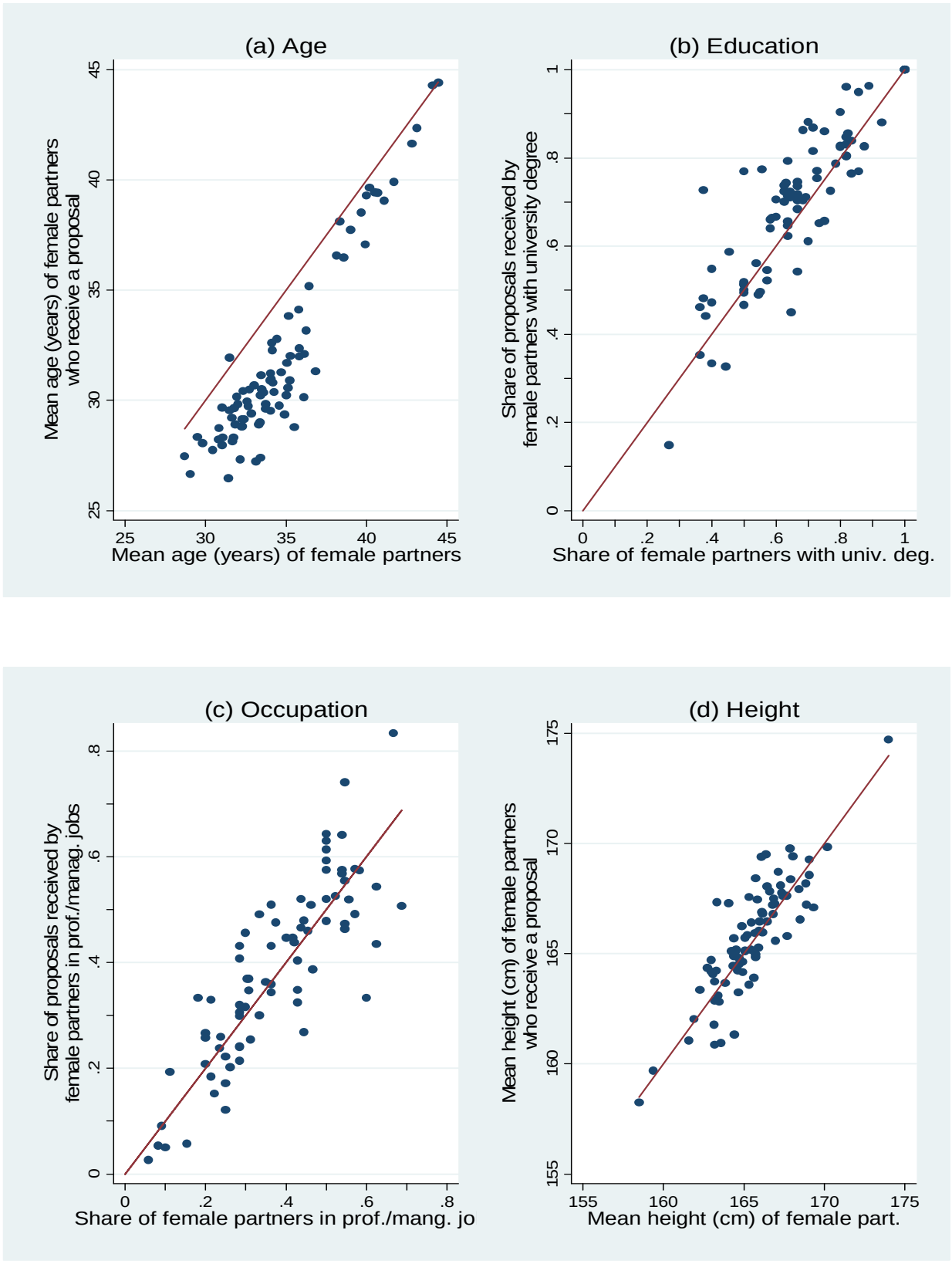


Figure 2
Mate selection and partners' supply – Female subjects



Each dot represents means or shares of characteristics of partners in a specific meeting. The straight line is the 45 degree line.

Figure 3
Mate selection and partners' supply – Male subjects



Each dot represents means or shares of characteristics of partners in a specific meeting. The straight line is the 45 degree line.