Is selectivity an aphrodisiac?

¿Es la selectivividad un afrodisiaco?

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Abstract

In a recent article, Eastwick, Finkel, Mochon, and Ariely (2007) reported data to indicate that selectivity might be an important factor in determining romantic desire. Using a speed-dating paradigm, they found that individuals who, on average, rated potential dates as highly desirable were likely to receive lower average ratings from their dates, as evidenced by what they termed as negative generalized correlations. However, the dyadic correlations were positive, suggesting that, across pairs, desire was somewhat reciprocated. Eastwick et al. go as far as to claim that "... daters somehow broadcast their unselectivity... " (page 318), which we find to be a deeply dissatisfying explanation. We present an alternative and more principled approach in order to account for the disassociation between the generalized and dyadic correlations. We implemented a multi-agent model that allows an assessment of the relative contributions of selectivity and matching on ratings of attractiveness. The model suggests that the match between potential daters' attractiveness is the most important predictor of romantic desire. We believe that Eastwick et al's (2007) article is just another example of a dangerous pattern in social psychology research: spectacular claims are made on the flimsiest of evidence.

Keywords authors
Dating, Modeling, Attraction, Mating, Causation vs correlation
Key words plus
Explanations, Cognitive Science.

Resumen

En un artículo reciente, Eastwick, Finkel, Mochon y Ariely (2007) reportaron datos que indicaban que la selectividad podría ser un factor importante para determinar el deseo romántico. Usando un paradigma de citas rápidas, se encontró que los individuos que en promedio calificaron posibles citas como altamente deseables eran los que recibían más bajas calificaciones en promedio de sus citas, como lo que demuestra lo que ellos denominan como correlaciones negativas generalizadas. Sin embargo, las correlaciones diádicas fueron positivas, lo que sugiere que, a través de pares el deseo era algo recíproco. Eastwick et al. (2007) van más lejos al afirmar que " ... personas que se citan de alguna manera difunden su no selectividad... " (p 318), donde encontramos una explicación profundamente desalentadora. Presentamos una aproximación alternativa y un enfoque basado en la disociación entre las correlaciones generalizadas y diádicas. Hemos implementado un modelo multi-agente que permite una evaluación de las contribuciones relativas de la selectividad y la congruencia en las calificaciones de la atracción. El modelo sugiere que la igualación entre el atractivo potencial de personas que se citan es el predictor más importante del deseo romántico. Creemos que el artículo de Eastwick et al (2007) es sólo otro ejemplo de un patrón peligroso en la investigación en el campo de la psicología social: las afirmaciones espectaculares son realizadas con la evidencia más débil.

Palabras clave autores
Citas, modelamiento, atracción, causación vs. correlación.
Palabras clave descriptores
Explicaciones, ciencia cognitiva, psicología social.

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One of the cardinal rules of dating holds that a person who is selective is considered to be more desirable than others who appear overly anxious to forge a union. The seminal study by Walster, Walster, Piliavin and Schmidt (1973) added some important qualifications to this rule. Playing hard to get increases one's desirability only when the selectivity appears directed towards everyone except to the potential suitor. Being selectively hard to get increases a person's desirability because she is perceived as warm, friendly, flexible, and popular. Although important, Walster et al.'s (1973) findings have two limitations. First, their study only considered the desirability of women (and not men) who appear selective. Second, and more importantly, their experiments examined the effects of selectivity aggregated across raters, but did not address the effects of selectivity in the contexts of dyads (i.e., potential couples).

Recently, investigators have developed research programs to address these oversights by using speed dating. This methodology has the advantage of providing individuals with a real-world dating situation in a relatively controlled environment (Finkel, Eastwick & Matthews, 2007). It allows individuals interested in meeting potential romantic partners to attend an organized event where they go on a series of brief dates, each lasting a set amount of time (average of 4 minutes), with other attendees. After each speed-date, individuals indicate whether or not they would desire a future interaction with their date. If there is a match between daters (both daters indicating that they would like to see their date again), they are given the ability to contact each other. This paradigm allows researchers to study aspects of initial desire and might lead to a better understanding of how individuals evaluate others' romantic potential during an initial encounter.

In this manuscript, we present a simple model to account for an intriguing finding: different patterns of effects of reciprocity in romantic and nonromantic situations. These findings were recently reported by Eastwick, Finkel, Mochon, and Ariely (2007; EFMA07 from now on). EFMA07 used a speed-dating paradigm to explore the interaction of romantic selectivity and reciprocity. They distinguished between two different indicators of reciprocity: (1) dyadic, which is the correlation between the reciprocal liking measures across all couples, and (2) generalized, which is the correlation between how much each individual tends to like other people, and how much he/she tends to be liked back (Kenny, 1994; Kenny & Nasby, 1980). In nonromantic contexts, both the generalized and the dyadic correlations are positive. In other words, people tend to like people who like them back, and individuals who tend to like more people, are, in turn, more likable. This is not the case in romantic contexts, as reported by EFMA07, where a more complex pattern emerges.

EFMA07 provided participants with a questionnaire after each "speed-date", that asked them to estimate the "desire" and the "chemistry" they felt for their speed-dating partner. There were positive *dyadic* correlations (0.14 for desire and 0.20 for chemistry), which indicates that on a couple-by-couple level, participants tended to reciprocate romantic desire. But surprisingly, there were negative *generalized* correlations (-0.41 and -0.32), which indicated that individuals who rated others highly, were rated as less desirable (to compute the generalized correlations, the average ratings *by* each dater are correlated to the average ratings *to* each dater. EFMA07 interpreted this dissociation as evidence for selectivity being an important component of desirability. We call this explanation selectivity-as-an-aphrodisiac, and it is, at first glance, an appealing one, as evidenced by the notoriety EFMA07's short report has gained in national and local media like the New York Times (Tierney, April 10, 2007), Chicago-Public-Radio (February 14, 2007), and others.

In spite of the appeal of the selectivity-as-an-aphrodisiac explanation, we believe that a more stringent test for this hypothesis is in order. Let us begin with a conceptual issue: because participants were not able to observe their dates' behavior towards other people, selectivity would be hard to estimate. EFMA07 proposed that: " ... participants who desired everyone somehow broadcasted their unselectivity on their speed-dates, which ultimately proved costly." (page 318). Unfortunately, this explanation is somewhat ambiguous with regard to

the mechanism at play in the ratings. How could selectivity be communicated, and in turn, used by the daters? And, perhaps more importantly, what does "somehow broadcasting" mean? These are important questions because the selectivity-as-an-aphrodisiac hypothesis would require the dater to assess how his/her counterpart behaved towards others in the absence of any direct observation, making it hard to know if-and-when the other dater is hard to get (see Walster et al, 1973). It is important to note that our approach is to make a good faith attempt to interpret EFMA07's claims, although there is some level of ambiguity in what exactly they mean by selectivity, and what the mechanism in play might be.

This report emerges from the need to better understand the meaning of the dyadic/generalized dissociation, and to provide an explanation for EFMA07's results that is grounded on simple yet plausible decisional processes and current interpersonal relationship theories. The direction of the causal relationship could be the opposite of the one claimed by EFMA07. Instead of selectivity being a desirable feature in a potential mate, individuals who, through interactions with others, perceive themselves to be highly desirable, can afford to be selective. At the center of our argument is an effort to implement the selectivity-as-an-aphrodisiac hypothesis (as well as a competing hypothesis) in a simple computational model.

Computational models of mate selection have been used before to gain insights into the dynamics of populations (e.g., Pashler, Mozer & Harris, 2001). In the social sciences, and across almost all scientific disciplines, there are clear advantages of implementing computational or mathematical models. For example, ideas that might be vague or ambiguous would have to be made precise, and their explanatory power would be improved (Hunt, 2007).

In the following two sections, we present and evaluate two different approaches: (1) we attempt to implement EFMA07's selectivity-as-an-aphrodisiac explanation in computational models, and (2) we provide an alternative explanation that assumes that daters tend to prefer others who have similar or higher attractiveness than themselves; we term this the *Matching Model*. All models were implemented in R[1] and are inspired by multi-agent modeling principles: units represent agents that have a collection of attributes that allow them to relate to other agents in order to generate a romantic-desire measure. For simplicity, the models do not assume gender-based mating; all units rate all other units. This is appropriate because EFMA07 reports no differences between males and females.

Simulation Studies

It is important to clarify the meaning of the three different components of the models described below: (1) *desire*, that refers to the willingness or interest of establishing a romantic relationship with; (2) *attractiveness*, which is a one-dimensional random variable that aggregates a person's worth across all relevant dimensions (e.g., physical and intellectual: a dater's "market value"); and (3) *selectivity*, which is a variable that is inversely related to desire.

Models of Selectivity as an Aphrodisiac

We interpret EFMA07's claim to be that there is psychological process that determines the desire from a person *i* to another person *j*. To make explicit our interpretation of EFMA's claim, we propose that the *Selectivity-as-aphrodisiac* hypothesis implies that romantic desire can be described with a function Ψ such that:

$$desire_{i\ to\ j} = \Psi(attractiveness_j, selectivity_{i\ \&\ j}). \quad (1)$$

The goal of the first set of simulations is to explore some possible forms of the Ψ function.

The different versions of the selectivity-as-an-aphrodisiac models implement EFMA07's idea of an individual's selectivity as an important factor that contributes to his or her desirability. In order to give this explanation the best possible chance to produce the desired pattern of results, we tried different im-

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plementations that share the same basic principle: selective individuals tend to be more desirable. We assumed that attractiveness and selectivity were independent, which we believe was the spirit of EFMA07 proposal: attractive and unattractive individuals are equally likely to be selective or non-selective.

The simulations were carried out as follows: (1) the population of daters was set up as a matrix with N rows, and two columns, where N is the number of individuals (we set it up to 200), while one column corresponds to the attractiveness values and the other corresponds to the selectivity values. The attractiveness and selectivity values were obtained from normal distributions N (*mean* = 0.5, *SD*= 0.1, bounded within 0 to 1). Note that across several simulations different distributions of values were used, but they produced qualitatively similar results; the reader can easily explore all the implementations in the online appendix . All agents rated their desire for all other agents.

The desire of agent *i* for agent *j* was assumed to be a function of the attractiveness of *j* and the selectivity of both *i* and *j*. Several functions that related selectivity and attractiveness were attempted (e.g., attractiveness and selectiveness of the partner had additive or multiplicative relationships that were mediated, or not, by the dater's own selectivity). Although most of these models easily accounted for the negative generalized correlations, none of them produced positive dyadic correlations. To summarize, the conclusion that emerges from these simulations is that functions that monotonically relate selectivity to romantic desirability, might produce negative generalized correlations, which is what we and EFMA07 might have expected; however, the other piece of the dissociation seems to be elusive: the model-generated dyadic correlations are not positive. This might be because, if by appearing selective, individual *j* is more desirable to individual *i*, this very same selectivity will make it less likely for *j* to reciprocate towards *i*.

To summarize, although EFMA07's claims are intriguing, they are somewhat ambiguous. In order to remove some of the ambiguity, we have tried to formalize their claims in a way that might allow us to implement a computational model. We have made a good faith effort interpret EFMA07's claims in different ways, and none of them seem to capture the reported pattern of results. In the following section we present an alternative explanation for EFMA07's data.

Matching Model

An alternative to the selectivity-as-an-aphrodisiac formulation can be developed from three principles that have emerged in the social psychology literature on attraction: (1) individuals show romantic desire for attractive others (again, broadly defined) (Walster et al., 1966); (2) individuals tend to select partners who match their level of attractiveness (Berscheid, DionElaine, & Walster, 1971; Feingold, 1988); and (3) for many features like physical attractiveness (but not the gender stereotypical attributes), individuals desire the highly attractive mates, even if their self-rating is low (Eastwick & Finkel, 2008; Fisman, Iyengar, Kamenica, & Simonson, 2006). Although these principles are seemingly at odds, we propose that selectivity is a byproduct of attractiveness [2]. In a recent article by Montoya (2008) it was reported that the objective of physical attractiveness of raters affected the way how they evaluated other people's attractiveness, and that "the entire range of approachable others, shifted as a function of perceivers' objective physical attractiveness. The low and moderately attractive individuals have a lower limit for evaluating others as physically attractive and, as such, are evaluating their partner as attractive" (page 1328).

Of particular relevance to the present work is the research by Hitsch et al. (2010), that used large databases of online dating sites and concluded that similarity was an important driving force in dating preferences, and that daters use thresholds of "market value" to initiate contact.

2 This phenomenon has been observed even within non-humans animals, for example Holveck & Riebel (2010) found that low-quality female Zebra-finches prefer low-quality males' songs.

Assumptions of the Model

We believe that the desire function is not the one described in Equation 1. Instead, it is Ψ:

$$desire_{i\ to\ j} = \Psi\ (attractiveness_{i\ \&\ j}) \quad (2)$$

In other words, the psychological process that generates romantic desire is not a function of selectivity, but of the attractiveness of the two daters.

A well known advantage of formal modeling is that it forces researchers to make explicit their assumptions. The proposal presented in this note is based on the following sets of assumptions derived from the attraction literature:

1. Through their history of failures and success in initiating intimate relationships, most adults likely have a relatively accurate self-assessment of their attractiveness; however, the implementation of the development of the self assessment is beyond the scope of this model.
2. Individuals use their self assessment to compare themselves to potential mates:
   (a) Individuals use their self-assessment as a standard to evaluate potential mates' attractiveness. Horton (2003) showed that self-ratings on attractiveness moderate the impact of the target attractiveness on desire.
   (b) A critical component of early romantic attraction is the level of match in the attractiveness of two individuals. We use a resonance metaphor to implement the match of attractiveness between daters.
   (c) The importance of these last two factors can change according to situations or expectations. (e.g., romantic and non-romantic context as discussed by EFMA07).
3. Rating interest for potential mates is a deliberative decision making process that likely shares features with other decision processes (e.g., accumulation of evidence based on tokens of information as described by Busemeyer, 1993).

We implemented these assumptions in a multi-agent model in which each agent has an attractiveness value, and the desire among agents is calculated with a function. The desire function from $dater_i$ to $dater_j$ is given by:

$$desire_{i\ to\ j} = \Gamma(attrac_j - attrac_i) +. \quad (3)$$

where attractiveness (attrac) is a normally distributed random variable with a mean of .5 and bounded by 0 and 1. The first term of the function relates to assumption 2a: individuals use their self perceived attractiveness as a standard or threshold (Hitsch, et al. 2010) to evaluate potential mates. The second term relates to assumption 2b: we use a Lorentzian resonance equation with a damping parameter (Γ) to implement this idea. The value of the damping parameter relates to assumption 2c: the size of the resonance will decrease with larger values.

The third assumption is also related to the use of the resonance metaphor. Gordon (1983), for example, proposed that when a reader is presented with a word, a resonance between the stimulus and the internal representations of the lexical items takes place. Other influential perceptual decision making models, like Ratcliff's (1978) diffusion model, assume having explained accumulation of evidence as a consequence of a resonance between stimulus and response alternatives.

We believe that the internal deliberation that occurs while assessing a potential mate might be best described as a diffusion/random walk model (see Busemeyer & Townsend, 1993, for a discussion of model of deliberative decision making). The idea is that the desire for a dater might increase or decrease through tokens of interaction. At the end of the interaction in the speed-dating context the rating will be a function of this process. One can think of the resonance as summarizing the accumulation of evidence process in which the outcome is the decision of whether do contact the potential mate again, or in the case of the EFMA07 speed dating paradigm, how to rate the "date".

Model simulations

The matching model's desire function has only one parameter: the damping parameter (Γ), which modulates the contribution of the match (resonance) to desire. We found that the parameter value that produces the correct pattern of results is Γ = 0.54, which generates a dyadic correlation of 0.12 and a generalized correlation of -0.30. We can assume that as the relationship between two daters progresses, the impact of attractiveness (the first component in the equation), might become less significant while the match becomes more significant. We believe that the "chemistry" question in EFMA07's questionnaire might emphasize the match component. Consequently, if Γ decreases, the dyadic correlation becomes higher, and the generalized correlation becomes less negative. In addition, this model predicts a highly positive correlation between attractiveness and the average received rating (0.81 with Γ = 0.54).

In our simulations we found that in this model, the EFMA07 pattern of results only occur under certain conditions that relate to the composition of the daters pool. We found that if attractiveness is normally distributed, the dissociation between dyadic and generalized correlation is present, but not if there are many very unattractive, or many very attractive daters. This model makes the prediction that EFMA07's findings occur because in the speed dating context there are few individuals on the extremes in the attractiveness dimension.

Conclusion

Although it would not be realistic to expect a comprehensive quantitative/computational model of all effects reported in the literature, we believe that even the simplest models can provide a test that would rule out incorrect and/or ambiguous explanations and would likely produce more robust theories. In this note, the modeling approach leads us to a rather conservative and parsimonious conclusion: the interaction of attractiveness and match might underlie the effects of selectivity. EFMA07 claim to have found an important variable in initial romantic desire: selectivity. In this article we have shown that EFMA07's findings are likely to be a byproduct of a mating mechanism that we have know about for decades: match. Hence, to account for EFMA07 data there is no need for "broadcasting of selectivity". Our alternative model is consistent with many other findings and mathematical models in the interpersonal relationships and mating literature: notably, the ubiquitous finding that people (and some animals) tend to mate with others who share their level of attractiveness.

To summarize, we argue that EFMA07 presents a very interesting finding that unfortunately is explained in a non-parsimonious way. Based on correlational data EFMA07 advances a causal explanation (selectivity makes people attractive), that is not supported by our analysis.

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