The science of online dating

Can the application of science to unravel the biological basis of love complement the traditional, romantic ideal of finding a soul mate?

Giovanni Frazzetto

As the saying goes, “love defies all calculation”. Yet, this apparently obvious assertion is challenged by the intrusion of science into matters of love, including the application of scientific analysis to modern forms of courtship. An increasing number of dating services boast about their use of biological research and genetic testing to better match prospective partners. Yet, while research continues to disentangle the complex factors that make humans fall in love, the application of this research remains dubious.

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With the rise of the internet and profound changes in contemporary lifestyles, online dating has gained enormous popularity among aspiring lovers of all ages. Long working hours, increasing mobility and the dissolution of traditional modes of socialization mean that people use chat rooms and professional dating services to find partners. Despite the current economic downturn, the online dating industry continues to flourish. With subscription prices between €20 and €30 per month, romance-seekers are turning away from the traditional—and often expensive—strategies of meeting people casually in bars and restaurants, and are instead opting for less spontaneous, but practical, cheap online services that allow them to find a soul mate from the comfort of their desk.

EasyDate.biz, one of the most popular websites that match people according to

their hobbies, preferences and interests, has increased annual profits 30-fold since 2006 and has made around £6 million in revenues this year (Espinoza, 2009). Large metropolitan cities boast the highest number of active online dating accounts, with New York totalling a greater number of subscriptions on Match.com than any other city in the USA—accounting for 8% of the company’s active members (Sherman, 2009).

Most dating services match subscribers based on metrics that include education and professional background, personal interests, hobbies, values, relationship skills and life goals. These websites use a range of personality tests and psychological assessments to build lists of traits that individuals seek in an ideal partner. Yet, in this modern era of personalized genomes and DNA-based crime fighting, the new generation of online dating services has added one more parameter: biology. “Love is no coincidence”, they proclaim, promising to provide longer-lasting matches based on the science of attraction and romantic love.

Indeed, biological anthropologists and neuroscientists are already dissecting the chemical ingredients of love, from the basic sex drive to romantic love, including the feeling of security that we achieve when we are attached to a specific mate for the long term (Bartels & Zeki, 2000; 2004; Fisher *et al*, 2002; Zeki, 2007). Such studies aim to unravel both the genetic factors and the neural circuits that underlie love. So far, scientists have revealed that the relevant regions of the brain are mainly those involved in motivational and reward systems and are orchestrated by hormones and neurotransmitters (Aaron *et al*, 2005). Love has

accordingly been described as a chemical phenomenon and compared with a state of addiction (Meloy & Fisher, 2005).

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“We fall in love with someone who has a different chemical profile for dopamine, serotonin, estrogen and testosterone that complements our own,” explained Helen Fisher, professor of anthropology at Rutgers University (New York, NY, USA) and chief scientific advisor to Chemistry.com. She created a test for the website—used by about eight million people to date—in which questions are designed to establish a range of basic information about brain and body chemistry associated with specific aspects of temperament and personality. For instance, measuring the ratio between the length of the index finger and the ring finger of the right hand, which is a marker for testosterone levels in the prenatal brain, is assumed to provide information about assertive, verbal, musical or analytical capabilities (Wilson, 1983). Other questions determine a propensity to be curious or a tendency to seek novel experiences, supposedly based on dopamine levels in the brain.

Science-based dating services such as ScientificMatch.com or GenePartner.com promise lasting relationships on the basis of genetic information and match people based on differences between their immune systems. This approach draws on a study performed by Claus Wedekind and colleagues at the University of Bern in

Switzerland, who asked female volunteers to smell T-shirts that had been worn by men for three consecutive days and to rank them by attractiveness (Wedekind *et al.*, 1995). It turned out that the majority of the women were attracted to men whose immune systems differed most from their own—fulfilling the maxim that ‘opposites attract’.

What accounted for the immune system differences at the genetic level were sequences in the genes encoding the human leukocyte antigen (HLA).

HLA genes control the activation of the immune response and are crucial for acquiring immunity; the greater the variety in the HLA genes, the greater the variety and success of the immune response. From an evolutionary point of view, it makes sense that individuals with opposite varieties would attract each other as this would lead to offspring with a broader range of HLA genes.

The customers of online dating services seem to buy the ‘hard science’ sell. “We are receiving requests from a lot of customers who wish to know whether they can test their genetic compatibility with other subscribers in the same area where they live,” commented Tamara Brown, chief scientific officer at GenePartner.com, a company affiliated with the Swiss Institute for Behavioural Genetics (Adliswil, Switzerland). “Right now, the number of established couples willing to know whether their compatibility is confirmed genetically equals the number of singles who ask us to match them with other subscribers in our database.” Brown emphasised that the company uses biological compatibility to complement social, psychological and intellectual information, which, she said, will continue to play an important role in the formation of lasting relationships.

Some of the claimed advantages of having genetically compatible partners are a

more satisfying sex life, a higher fertility rate and healthier children. Members of the gay community have complained about their exclusion from these benefits. However, research is already underway to find specific pheromone-induced brain responses in both homosexual men and women (Berglund *et al.*, 2006; Savic *et al.*, 2005).

Although sequencing DNA to find a soul mate might sound like a ludicrous application of genetics, investigating the genetic compatibility of couples is already routine practice for groups or populations that have a high risk of specific severe genetic diseases. For instance, genetic tests are available in many Mediterranean

countries that have a high prevalence of β -thalassaemia, a heritable disease of the blood that affects the body’s ability to produce haemoglobin. To avoid having a child afflicted with this disease, β -thalassaemia carrier detection is mandatory for couples in Iran and several other Arab countries and is required by the religious authorities in Cyprus (Zlotogora, 2009). The couples have to be informed of the test results before their marriage, but the choice is theirs of whether or not to marry. Genetic screening is also common among Ashkenazi Jews, who have a higher risk of suffering from one of several monogenetic diseases such as cystic fibrosis, Tay–Sachs or Bloom syndrome. These screening programmes have reduced considerably the number of babies affected by these diseases (Kronn *et al.*, 1998).

There is a kind of irony in online dating in that courtship and romantic love are profoundly physical experiences that manifest with symptoms including sweaty palms, reddened cheeks or tied tongues; but internet dating, owing to its virtual nature, is utterly disembodied. For Eva Illouz, professor of sociology and anthropology at the Hebrew University in Jerusalem, Israel, this rearticulates the relationship between corporeality and emotions: in the absence of the body, emotions are supposed to flow freely between authentic aspects of the core self (Illouz, 2007). Knowledge of another person therefore precedes the bodily attraction.

Websites such as ScientificMatch.com or GenePartner.com would thus include a ‘physical’ factor by making genetic information the starting point for finding a match. Illouz pointed out that although online platforms are supposed to give subscribers the chance to highlight their own uniqueness, their self-representation frequently follows established canons of ‘conformity, standardization and reification’. By contrast, genetic information on biological compatibility is not standardized and genuinely represents an individual’s uniqueness.

The use of biological information seems to reassure customers that they will find a better match. Nevertheless, the real question

remains as to whether the use of genetics is proving more effective than traditional matching methods. Indeed, there is a good deal of skepticism concerning the reliability of DNA-based dating services. For example, there is some debate about the extent to which HLA diversity is actually reflected in a person’s scent, and therefore whether such differences can genuinely be picked up by the body’s olfactory bulbs.

Deciphering the genetics and neurochemistry of love might, therefore, cast a disenchanting shadow over some cultural practices

“I think that matching people by personality types or interests may be very useful. However, I do not believe that any service that claims to use genetic information, or any estimation of neurochemistry (based on personality or genotype) has any basis in reality,” argued Larry J. Young, a principal investigator in the Laboratory of Social Neurobiology at Emory University (Atlanta, GA, USA). Young, who investigates the genetics and molecular mechanisms behind social attachment, pointed out that although we might be beginning to understand how some genes contribute to social relationships, or how certain neuropeptides or transmitters are involved in the formation of relationships

in rodents, “the situation is far, far too complex to begin to think we can pick ‘the perfect match’ based on this information. These companies are taking advantage of a public who have been educated by the media.”

Courtship, seduction and romantic love are complex phenomena that involve many genes and a multitude of social and cultural factors. Deciphering the genetics and neurochemistry of love might, therefore, cast a disenchanting shadow over some cultural practices. In this regard, a Shakespearean sonnet, or other works of classical romance might still prove more instructive and interesting for anyone desirous to understand the rules and excitement of courtship and love than would taking a genetic test.

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“You can know any single ingredient in a piece of chocolate cake and still find it delicious. You can know every single part of an engine in a Bentley or a Ferrari, and still feel the rush and joy of driving it. The same applies to love,” Fisher said. “The more you know about the brain circuitry of romantic love, the more you can operate with innate natural wisdom to make better decisions.” She also suggested that finding the chemical or genetic basis for why love sometimes fails might well be more effective than spending years trying to decipher intangible psycho-analytical reasons. “The primordial ways by which men and women flirt and fall in love will just continue. A little bit of knowledge about the relevant brain mechanisms just refines this ancient process. So, I don’t think that you can equate knowledge with lack of magic,” Fisher said.

More serious concerns have been raised about the possible misapplication of the growing knowledge of emotional chemistry to manipulate the brain and enhance or diminish emotions for others—in essence, the creation of love potions. The idea is not too far-fetched: experiments have shown that a squirt of the hormone oxytocin enhances trust in other people (Kosfeld *et al*, 2005), and internet drugs sellers are already marketing products such as ‘Enhanced

Liquid Trust’, which claims to “boost the dating and relationship area of your life” (www.verolabs.com).

“I don’t think that these kinds of science-based approaches are going to become any more popular than the many other approaches out there designed to find a match. People will always be selling the ‘new’ way to find true love,” Young commented. “Regarding the manipulation of feelings with drugs, I am not sure how this will turn out in the public in the long term. We already try that by buying our prospective partners flowers, candy, romantic settings, hugging and kissing, all of which stimulate the chemistry of love, such as dopamine or oxytocin.”

More generally, the use of genetic knowledge and technology to predict intimate aspects of our lives confirms the persistence of naive biological determinism among the public. Indeed, it is the belief in the informative value of such tests that evokes the simplistic talk of a ‘gene for’ a given human trait. In the case of finding the perfect mate, modern changes to contemporary lifestyles and social connectedness, as well as the difficulty of actually finding the right partner, mean that this simplistic view of the role of genes is driving would-be lovers to services that claim to offer science-based fixes.

In addition to the potentially disenchanting effect of using science to prescribe romance, emotional compatibility and loving relationships, the increasing tendency to apply genetics to multiple areas of social interaction and behaviour raises more general issues about the growing encroachment of genetics and neuroscience into personal lives. The use of technologies that read whole genomes and profile brain activities in order to provide people with an assessment of their chances of finding love with a certain person might be a part of what sociologist Sir Anthony Giddens at the London School of Economics in the UK has called the ‘colonisation’ of the future (Giddens, 1991). Haunted by the inherent uncertainties of life, people are drawn to any service or person that promises to predict the future—from tarot cards to palm readers, and even to genetic tests. Perhaps it was therefore only a matter of time before biology became entangled in attempting to predict the budding of love and the outcome of relationships. But love is ambiguous, unpredictable and hardly respectful of

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laws. As the Roman poet Horace said to one of his lovers: “Don’t ask (it’s forbidden to know) what final fate the gods have given to me and you, Leuconoe, and don’t play with Babylonian horoscopes.”

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