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Love in the Age of Algorithms

Anna Longo

Once, the purpose of knowledge was to give form to reality; then its aim became the production of possibilities; now it has become nothing but a risk manager. Once, we were producers; then we became consumers; now we are products. Once, the body's strength was exploited to produce goods; then the energy of desire was exploited to consume goods; now one's creativity is exploited to produce the self as a commodity. Once, we had children; then we desired children; now we have become children. Once, love was a pact of mutual support; then it was a desire; now it is the price at which we sell ourselves. Once, machines were a means to our ends; then they were the ends for which we were the means; now they are oracles that interpret signs and whose prophecies we interpret. Once, we were in a disciplinary society; then we were in a society of control; now we are in a risk society.[1]

Risk Control

Michel Foucault maintained that the analysis of discourses on sexuality could help us understand the structures informing historical societies. He observed that "the sexual conduct of the population was taken as both an object of analysis and a target of intervention"[2] from a perspective "at the boundary line of the biological and economic domains."[3] In this way, discourses on sexuality, love, and the life of the couple could disclose the evolution of the mechanisms by which social order was guaranteed. Foucault noted that a new mechanism was in the process of taking hold at the time of his writing (after the May '68 movements), which, instead of focusing on relationships (the family,

for example), took bodies and desires as its object. Medicine and psychoanalysis provided knowledge on sexuality that was functional for the exercise of biopower. In Foucault's words, "We … are in a society of 'sex,' or rather a society 'with a sexuality': the mechanisms of power are addressed to the body, to life, to what causes it to proliferate, to what reinforces the species, its stamina, its ability to dominate, or its capacity for being used."[4] We were thus urged to confess our practices and desires not only to doctors and psychoanalysts, but also publicly; and what could appear as an act of liberation[5] was in reality the mere effect of a mechanism of knowledge and control aimed at regulating and directing sexuality. According to Foucault's analyses, society was administered not so much by repression and inhibition as by a manipulation of desire that had us believing in its liberation—all of which served to produce consumers who invested for their own pleasure in a system ready to provide them the wherewithal for satisfaction in participating in the effectiveness of the mechanism.

Building on Michel Foucault's analyses, Gilles Deleuze announced in the 1990s "the progressive and dispersed installation of a new system of domination,"[6] and claimed that "societies of control … are in the process of replacing the disciplinary societies."[7] This control, he argued, is exercised by "machines of a third type, computers."[8] In fact:

> *If motorized machines constituted the second age of the technical machine, cybernetic and informational machines form a third age that reconstructs a generalized regime of subjection: recurrent and reversible 'humans-machines systems' replace the old nonrecurrent and nonreversible relations of subjection between the two elements."*[9]

Deleuze had already noted this transformation in the 1970s, when he and Félix Guattari wrote *Anti-Oedipus*, where they announced that, given that deterritorialization is rapidly being carried beyond any limit, "[W]e really haven't seen anything yet!"[10]

Indeed, at the time, fourth-generation machines and their learning algorithms had not yet invaded daily life; we had not yet seen the 2008 economic crisis, fiscal austerity measures, finance automation, and high-frequency trading; neither had we experienced the explosion of social networks and the proliferation of start-ups. In short, we had not yet seen all what has precipitated, it seems to me, the progressive installation of a new system characterized no longer by the cybernetic control of flows of desire fostering consumption, but rather by the calculation of a range of risks to incur in order to achieve one's goals. We are in the process of moving from a biopolitical society of control, where the goal was protecting and modulating the life of consumers, to a risk society.[11] Risk here is to be understood in the sense in which it is used in games of chance where the goal is to decide how much to invest in oneself today in order to sell oneself at the best

price tomorrow, all the while knowing that nothing is more volatile than value and that knowledge only expresses this degree of uncertainty with regard to the future, or, more precisely, to all calculable futures.[12] It is through an analysis of the way romantic, intimate, and sexual relationships are constructed today on dating sites and social networks that I will attempt to show, in what follows, how we have progressively moved from control to risk.

Matching Algorithms and Dating Sites

The first algorithm for matching couples based on affinity calculations was created in 1965, before the introduction of the Internet, by Jeff Tarr, then a student at Harvard University.[13] The use of computers to calculate romantic compatibility is an old process, and the systems we have today are the result of numerous efforts, studies, and experiments. Algorithms for creating romantic couples, such as the algorithm for the

so-called "stable marriage,"[14] provide solutions for other problems as well, such as, matching organ donors and patients, or determining the assignment of students in schools.

The introduction and spread of the Internet in the 1990s were crucial to the development of the many online dating sites that have since proliferated in countries around the world[15]—yet the beginnings were not plain sailing. For one thing, people found it hard to entrust the search for something as unique as love to a mathematical calculation, and, for another, these sites were seen as a last resort for the most desperate cases. This unfavorable opinion began shifting in the 2000s.[16] There were many reasons for this change in attitude, related chiefly to the popularization of the Internet and the expansion of its use for finding answers to all kinds of questions, but also for communication, self-expression, and dialog.

Obviously, love is an unpredictable feeling that cannot be calculated, but it is also evident that we each tend to appreciate, in the other, certain qualities more than others and that recurrent patterns are found in happy couples. So why not let algorithms propose an initial selection of profiles that correspond to our criteria and put us in touch with people we would not have the opportunity of meeting in the closed circle of our daily interactions. This is what Match.com, the first online site of its kind, set out to do when first launched in 1995. It worked quite simply at first: users created their own profiles (usually using a pseudonym) based on a limited number of characteristics; the algorithm then presented the user with a classification of more or less compatible people, and the user could then send messages to these potential matches to start getting better acquainted. The site worked by delivering a selection of new compatible profiles every day, which served both to increase the chances of individuals meeting their mate and to make the choice more difficult, with the effect of keeping subscriptions going longer.

In 2008, in response to the emergence of tough competition, Match.com developers reviewed data from more than a decade of interactions on the site. They observed that users often broke their own rules, choosing potential matches that did not entirely correspond to the preferences stated when they created their profile. Consequently, they decided they would need an algorithm that could incorporate additional information into the equation for sorting potential matches. The new system that was devised proposed not only the most compatible partners based on a user's stated preferences, but also those receiving messages from users with a number of common preferences. By this triangulation, the algorithm became capable of surprising, exactly as in life, and of figuring out what we like faster than we can. Similarly, the OkCupid.com algorithm,

acting as an oracle, began emphasizing the importance of knowing oneself before all else and offering new users guidance in discovering who they are and conveying it effectively. For this purpose, part of the site is dedicated to advice on creating a competitive profile,[17] and a blog[18] features statistics on dates and paired-off daters. Confessing, directly and indirectly, one's preferences, desires, sexual orientation, techniques of seduction, behaviors, and vices, is surely promoted, as Foucault suggests, for the sake of producing knowledge and, moreover, for commercial purposes (the data is used to sell advertising spots). However, it seems to me that something else is going on. Keep in mind that the data is published on a blog accessible to users of the site. This means that the same information exploited by businesses to develop their advertising strategies is available to individuals for their personal promotion. Users are thus urged to adopt a precise strategy and invest in creating a profile and in the activity on the site, not in order "to blend in" but, on the contrary, "to stand out" from the crowd and to reap the benefits of this exceptionality. In this sense, the process increasingly resembles decision-making in games of chance, that is, how much to put into the pot today—in terms of information retrieval, product development, and communication—in order to maximize profits in the future, which, at any rate, is not guaranteed.

We are urged to express ourselves, to be ourselves, that is to say, to display our singular patterns which, on the one hand, make us stand out from the crowd and, on the other, increase the degree of uncertainty since they constitute new information in relation to which other users must rethink their strategy of imitation or differentiation. The

diversification of dating site markets and the appearance, around 2011, of niche dating services is to be understood in this light.[19] Niche sites are dedicated to minority communities whose members feel disadvantaged or even discriminated against on general sites for reasons of origin, religion, sexual orientation, age, interests, tastes, and fantasies, etc. Choosing a niche is a specific strategy that involves bringing the competition into a field, or network, in which we think we have a better chance of achieving our goals.

Social Networks and Apps

Although this was not its primary purpose, Facebook has become the most popular dating site today, as many use it for flirting.[20] The development of social networks had the effect of reducing traffic on dating sites from 2010 on. Unlike on dedicated dating sites, Facebook users do not have pseudonyms and content is produced and shared spontaneously without the need for a questionnaire. Social media are not aimed at putting people in touch based on romantic compatibilities, but the algorithms they use to reward users for producing the most interesting content (according to the individual user's respective commitments) can prove very effective in this domain. Facebook, for example, applies a version of the Vickrey-Clarke-Groves (VCG) algorithm devised for auctions. Users propose their offer, which is validated by not only by "likes" but by time spent reading a user's post or page. The fact that Facebook's algorithm is a version of algorithms used for auctions, as are those used by other social networks, makes it clear that the point is not simply to match users and contents, but rather to stimulate the production of game strategies in order to receive, as a reward, the dissemination of one's content and access to one's favorites. It is not a coincidence that social networks are increasingly being used for commercial purposes and that there are more and more guides for developing social media advertising strategies.

On social networks, it could be said that the matching system has expanded to include all aspects of life and is no longer limited to romance. All relationships are increasingly mediated by algorithms which, on the one hand, learn from our preferences, tastes, and interests, and, on the other, suggest how to satisfy them knowing that satisfaction depends first and foremost on the quantity and quality of the information we share. In this way, strategies for finding love are not so different from those for finding good professional opportunities. The difference between life online and offline tends to fade as a result of miniaturized technological devices such as smartphones. Mobile apps, such as Tinder and Badoo, make it possible to integrate the search for love into daily activities,

many of which also rely on the help of technology. One might suppose this implies a trivialization of the search for love, which would be divested of its "authenticity," since it is put on the same level as other types of online searches. But the opposite is also true: all our daily activities, mediated by algorithms, increasingly resemble the search for love. Not only do these online services offer us personalized choices that depend, directly or indirectly, on stated preferences, but we are also invited to give our opinion and evaluate all transactions, interactions, and experiences as if, each time, it were a matter of finding the person we deserve. Algorithms learn to know our desires, our preferences, and our interests and try to figure out what we like even before we know it ourselves. Hence, we must admit that algorithms love us, and not only for what we are, but also for what we could become thanks to them.
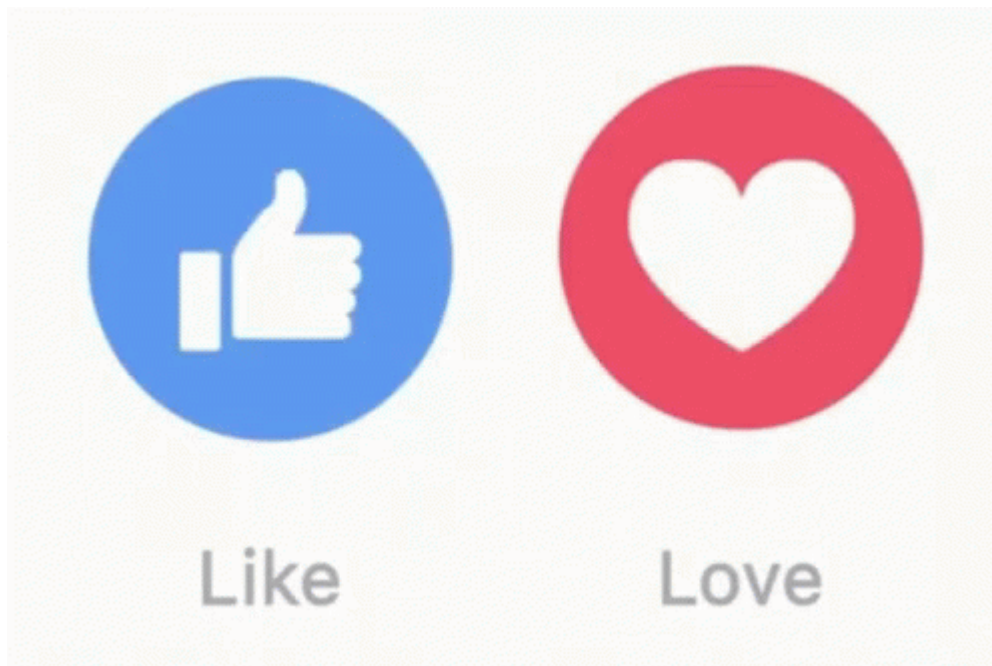
How do algorithms love us? Firstly, they do not love us in any exclusive way: they love everyone and do so according to the degree of commitment we demonstrate. Although anyone can, a priori, find favor with them, to earn their attention we must know how to be deserving. We are all competing in a universal game that involves knowing how to forge alliances (social networks) and devise strategies to earn points and a good position in the ranking. We are constantly being informed of the moves being played by others (what they like) and their ranking (how much they are liked), without however being given the means to understand exactly what their strategy is and what it will achieve. Is it a winning strategy? Should it be imitated? Should we join in? How much should we offer? How much should we bid? In short, do I "like"? The algorithm constantly updates the

ranking and lets us modify our expectations, assumptions, and strategies. We must constantly evaluate our chances of winning over the chances and desires of others. Furthermore, we must constantly reevaluate the margin of error of our predictions and the risk carried by any strategy, especially since we are acting in the absence of sufficient information, that is to say, on the basis of constantly changing information. Algorithms favor those who have the courage to expose themselves, who find ways to stand out, to surprise by being receptive to new competitions, and to those who produce new information, thereby compelling everyone to adjust their bid. If nothing is ever won forever, neither is anything definitively lost; when it comes to love, as everyone knows, nothing is to be taken for granted. What counts is not the definitive victory, but rather the fact of being able to continue to play, the fact of being able to not know what will happen tomorrow while still being able to hope that tomorrow will be happier than today. But, do we really like this game?

Towards a Risk Society

The term "risk society" was introduced by Ulrich Beck[21] to name the contemporary phase of modernity, in contradistinction to the "society of control."[22] In agreement with Anthony Giddens' analyses,[23] Beck maintains that the reflexive attitude that characterizes our lives throws us into a situation of uncertainty concerning, on the one hand, the effort to determine the risk involved in our social activities and, on the other, the impossibility of knowing with any certainty the effects of technological transformations and actions. Traditional modernity, and its production-based economy, feared exogenous threats that could affect resources, damage the means of production, and reduce the productivity of workers and the capacity of consumers to spend. The probability of these risks could be calculated,[24] and control of the social machine was aimed at averting them by way of exclusion and normalization. In contrast, in the second phase of modernity, the threats have become internal, determined by the very effects of the activity of production. The latter exposes us to new manufactured risks such as global warming due to pollution, more cancers caused by the use of chemicals, disasters connected with nuclear power, and worldwide economic crises brought on by speculation in finance. Uncertainty depends on the fact that only concurrent hypotheses are available to us about the probability of these risks and the potential success of the strategies to protect us from them. Furthermore, since the risk is initially dependent on the activity of knowledge and the technological applications thereof, operations aimed at reducing the probability of a future catastrophic event could generate a different one

that we would not be able to predict. According to Beck, the risk society is defined by this dynamic of continually updating potential risks that depend on the evolution of the conditions that carry these very risks, meaning the development of knowledge, which is not subject to scientific prediction. For this reason, reflexive modernity cannot endeavor to impose a normalizing control; this attitude is potentially dangerous and exposes to the risks evidenced by critics of authoritarian modernity, such as Foucault.[25] All it can do is recompense creative behaviors in order to limit the risks carried by the unpredictable evolution of knowledge. Consequently, all decisions are made in a regime of uncertainty, since we have to choose based on often discordant prognoses regarding the always new and endogenous future catastrophic scenarios we are trying to avert. This uncertainty depends at once on the ongoing evolution of conditions, that is the largely unpredictable future of the environment, and on the fact that every prediction can only be made on the basis of imperfect information. In this way, the risk society is thought to have replaced the society of control: the uncertainty is such that no control is possible and all efforts at gaining more control merely augment the risk.

To return to our matching algorithms, one could say that they function in accordance with this perspective since the information and data collected on an ongoing basis are used neither to determine behavioral deviations from an established norm for the purposes of imposing the latter (as in the society of control), nor to create a stable portrait of this or that user, but rather to produce probabilistic predictions as to the possible evolution of behaviors.[26] From this point of view, priority is given to information that is useful for understanding how the current dynamic could be modified or for evaluating the risks carried by future states of the environment (or of the network) based on unpredictable changes in existing conditions, that is to say, in available information. To what risk do we expose ourselves by betting on one scenario rather than another? What risk is involved in a profit strategy that relies on the actualization of a future event of which we have no experience?

Algorithms, as we have seen, work to identify patterns of behavior rather than to define what one person or another likes or dislikes, does or thinks, and to understand what actions and decisions this entails. Knowing who does what and with whom (so as to prevent deviant or unproductive behavior) is not what matters; what is important is that the algorithm, once a pattern of hypothetical correlations is detected, can launch a functional signal to action: propose a given product, or send a police patrol or an alert to find shelter in an underground bunker. For this reason, all behavior outside the supposed norm is precious because it makes it possible to update forecasts and to introduce new ones that can be exploited thereafter. Thus, it seems to me that the real question is always: what strategy can we adopt to make the most of this information, knowing that it is only 80% reliable and that this behavior carries risk X?
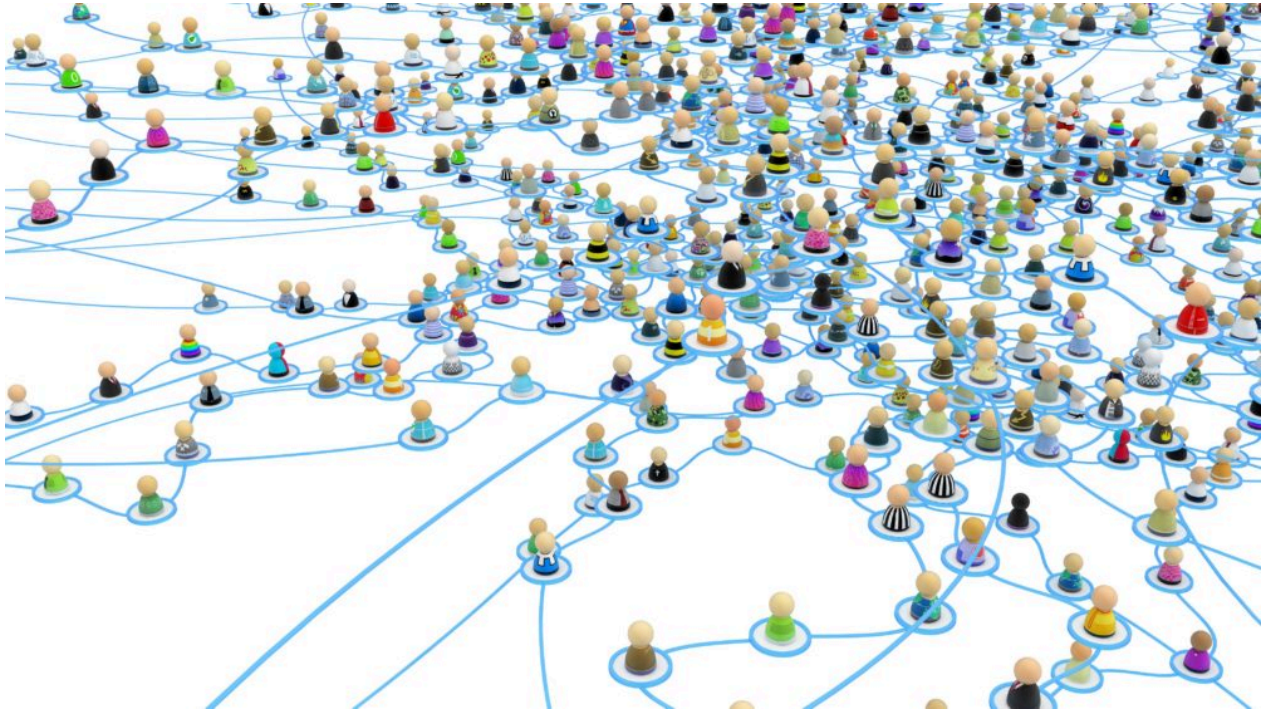
What interests me to not here is that we look at possible futures the same way that algorithms calculate them. According to Michel Callon[27] (among others),[28] the calculation of possible future states of the network/environment are performed continually by agents who themselves constitute this global hybrid system. These predictions are made from information available to agents according to their individual connections (the information is therefore always imperfect and dependent on one's position in the network), which reflects one's ability to collect new information in order to predict the future evolution of network configurations. Thus, not only do algorithms attempt to detect the behavioral patterns of human users, but humans, through developments in computational technology, are continually gathering information about the prediction strategies of algorithms in order to produce more powerful ones and more effective strategies than their opponents. This causes a change in conditions and forces everyone to adjust their behavior, modify beliefs and expectations, and expose themselves to different risks. How much should we bet on the probability of a future event that constitutes a possibility that has never been detected by any theory? What profit can be drawn from engaging with this risk?

In conclusion, I would like to note, without delving into the matter further here, that this type of computational reasoning is precisely what characterizes speculation in finance. Contemporary finance—introduced in the 1970s by computable formulas like the Black-Scholes formula[29]—is based on the sale of insurance against manufactured risks, that is to say the risk created by speculative transactions themselves.[30] So it is a matter,

on the one hand, of developing algorithms to detect the behavioral patterns of market agents in order to predict their effects on price variations and, on the other hand, of selling this information concerning arbitrage opportunities where the risk appears to have been correctly estimated and insured. However, this produces new behavior that changes the game, reintroducing uncertainty and, with it, the possibility of subsequent wagers, opportunities for profit and for ruin. The latter concerns especially those who did not engage enough with the algorithms, who have not taken care to surround themselves with efficient connections, who have calculated on the basis of restricted and obsolete information. No point then in looking for justice: what counts is love, and when it comes to the love of algorithms, we must be deserving, just as they deserve to be fed and cared for.

This planetary and hybrid network, where we are all calculating and clashing by exploiting alliances of information (of which we must be deserving) is a global casino where the one and only computational reasoning develops and realizes itself, like the

Hegelian spirit, in the coming to be of its states, through the development of contradictory strategies and hypotheses. However, this unpredictable becoming leads not to pure knowledge but to the endless reproduction of uncertainty and risks, to selling and buying: we trade in ignorance whose infinite becoming is the real stake. Possible futures are only offers of bets and manufactured risks between which we must choose, and innovation serves only to inject the needed measure of change so that nobody can be sure of winning every time, as this would lead to the bankruptcy of the global casino. The question, in this sense, is the following: do we really like this game, or have we just become collectively addicted?

Translated from French by Gila Walker.

Footnotes

1. See in particular Ulrich Beck. *Risk Society: Towards a New Modernity.* Sage, 1992. I will return to the question of risk below, reinterpreting it after an analysis of the functioning of matching algorithms.

2. Michel Foucault. *History of Sexuality, Volume I: An Introduction.* Translated by Robert Hurley, Random House, 1978, p. 26.

3. Foucault.

4. Foucault, p. 147.

5. "The irony of this deployment is in having us believe that our 'liberation' is in the balance." Foucault, p. 159.

6. Gilles Deleuze, "Postscript on the Societies of Control" (1990). Translated by Martin Joughin, *October,* Vol. 59 (1992): 3-7. An online version is available here. In his 1986 *Foucault* (University of Minnesota Press, 1988), Deleuze does not explicitly use the expression "society of control," but simply notes the shift from a more fluid and diffuse regime of power that takes control of life (biopolitics). The expression appears for the first time on the occasion of a talk he gave at Femis in 1987, translated into English as "What is the Creative Act?", and available online ⧉here.

7. Deleuze.

8. Deleuze.

9. Gilles Deleuze and Félix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia.* Translated by Brian Massumi, University of Minnesota Press, 1987, p. 458.

10. "This tendency is being carried further and further, to the point that capitalism with all its flows may dispatch itself straight to the moon: we really haven't seen anything yet!" Deleuze and Guattari. *Anti-Oedipus. Capitalism and Schizophrenia.* Translated by Robert Hurley, Mark Seem, and Helen R. Lane, University of Minnesota Press, 1983, p. 34.

11. Unlike Beck, I intend to give the notion of risk a sense closer to the one found in game theory, notably in non-cooperative strategic games with imperfect information.

12. Computation is a specific type of calculation performed by computers following programs. Human beings have always calculated, but computation, linked to automatic performance, is a more recent method.

13. Dan Slater. "Love in the Technology Era", Boston Globe Magazine, 13 January 2013. Available online here.

14. The "stable marriage" algorithm, created in 1962 by David Gale and Lloyd Shapley, is used by many hospitals and by the French national education system.

15. An exhaustive list can be found here.

16. See the 2016 survey by Pew Research Centre, available online here.

17. help.okcupid.com/

18. OkTrends.com was the blog on which Christian Rudder, one of the site's founders, published statistics on the data collected.

19. Dan Slater. "Diaper Daddies and Lonely Stoners." In *A Million First Dates.* Penguin, 2013, pp. 131–148.

20. In fact, the platform has launched an in-app dating service last month.

21. Beck, Op cit.

22. As Beck writes: "Many social theories (including those of Michel Foucault and those of the Frankfurt School of Max Horkheimer and Theodor Adorno) paint modem society as a technocratic prison of bureaucratic institutions and expert knowledge in which people are mere wheels in the giant machine of technocratic and bureaucratic rationality. The picture of modernity drawn by the theory of world risk society contrasts sharply with these images." Ulrich Beck. "Risk Society Revisited: Theory, Politics and Research Programmes." *The Risk Society and Beyond.* Edited by B. Adam, U. Beck, and J. Van Loon, Sage Publications, 2000, p. 222.

23. Anthony Giddens. *The Consequences of Modernity.* Polity, 1990.

24. According to the common definition, introduced by Frank Knight in *Risk, Uncertainty and Profit* (1921). New York: Signalman, 2009, risk is associated with the calculable probability of an event, even a random event (such as, the risk of betting on tails when flipping a coin), whereas uncertainty is the condition in which a decision cannot be made on the basis of a calculable probability (when you have to choose between alternative hypotheses concerning a particular random distribution, for instance, someone says that the coin is biased and someone else says it is not).

25. As Beck notes in "Risk Society Revisited," p. 218: "World risk society theory does not plead for or encourage (as some assume) a return to a logic of control in an age of risk and manufactured uncertainties—that was the solution of the first and simple modernity. On the contrary, in the world risk society the logic of control is questioned fundamentally, not only from a sociological point of view but by ongoing modernization itself. Here is one of the reasons why risk societies can become self-critical societies."

26. See the work of Louise Amoore on this subject, notably: *The Politics of Possibility: Risk and Security Beyond Probability.* Duke University Press. 2013.

27. See Michel Callon and Fabian Muniesa. "Economic Markets as Calculative Collective Devices."

Organization Studies, 2005, 26 (8), pp. 1229–1250; and Michel Callon (ed.). *The Laws of the Market.* Wiley-Blackwell, 1998.

28. See Callon and Muniesa, pp. 1229–1250; and Callon (ed.).

29. The Black-Scholes formula is used to calculate the price of an option based on expected volatility of a subjacent asset.

30. On this subject see Donald MacKenzie. "The Big, Bad Wolf and the Rational Market: Portfolio Insurance, the 1987 Crash and the Performativity of Economics." *Economy and Society* 33:3, August 2004, pp. 303–334; and Elena Esposito. "The Structures of Uncertainty: Performativity and Unpredictability in Economic Operations." *Economy and Society,* 42:1, 2013, pp. 102–129.

Anna Longo is a philosopher, adjunct at CalArts (Los Angeles), member of the Collège international de philosophie (Paris) and instructor at the New Centre for Research and Practice.