Traducción al inglés de "¿Se ha encontrado ya el Gen del amor?"

Has the Love Gene already been Discovered?

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Introduction

For centuries, society, and in particular science, has ignored the striking emotional state that today we call 'falling in love.' While true that certain Greco-Roman authors (Lucretius, *On the Nature of Things*; Plutarch, *On Love*; Ovid, *Love's Remedy*) mentioned its existence, they limited themselves to warning humanity against the fits of love because of its tremendous potential to perturb normal behaviors. Love's effect was considered as fatal as an illness, very difficult to fend-off, and – as with all unexplainable phenomena of the time – attributed to a disease or divine interference. In fact, it was referred to by the nickname "Madness of the Gods."

Literature in its origins steered away from such topics, although a tragedy here or there would dare to mention its existence, for the most part the literary arts treaded very carefully around the subject of love. It was the marvelous art of poetry, which relieves our burden of excessive emotions through the gift of words, that found love to be an inexhaustible source of inspiration. Thus for centuries falling in love was suitable only for poets. Either poets were more aware of its influence, or perhaps this emotional state was capable of turning even the most ordinary, boring, and vulgar man into a poet. Things gradually changed and the importance of these emotions grew to the point of sustaining the plots of a great deal of fictional works. Although scholars continued to ignore it, the adventures and misfortunes of the love-stricken gained ground among audiences and readers alike to such an extent that a work of fiction without the lassos of love and sex, passion and indifference, lovers beaming with pleasure and agonizing in pain is almost unimaginable today. Love has had so much influence on literature that many authors try to explain not only its current popularity, but the very origins of the profusion of literature on the topic and the suggestive effects it has on the readers.

The First Explanations

Schopenhauer (1788-1860) was one of the first philosophers who attempted to break down the mysterious and perpetual aura surrounding love. He proposed that our very biology has something to do with its appearance and he strongly emphasized the difference between the unique, personalized, violent and almost irresistible passion of love and the more vulgar, promiscuous and generalized impulse of sex. *"mere sexual instinct is base, because, without individuation, it is directed to all, and strives to preserve the species merely as regards quantity with little regard for quality. Intense love concentrated on one individual may develop to such a degree, that unless it is gratified all the good things of this world, and even life itself, lose their importance. It then becomes a desire, the intensity of which is like none other; consequently it will make any kind of sacrifice, and should it happen that it cannot be gratified, it may lead to madness or even suicide.* (http://ebooks.adelaide.edu.au/s/schopenhauer/arthur/essays/chapter10.html, accessed April, 2013). And, perhaps due to the importance he placed on what he called *will*, which is nothing more than the combination of instinctive and innate impulses that make up part of our most intimate nature, he attributed love specifically to one of these instincts: *"The reason for this is that she is not influenced by intellectual considerations, but by something entirely different, namely, instinct [...] But as a matter of fact man has a very decided, clear, and yet complicated instinct — namely, for the selection, both earnest and capricious, of another individual, to satisfy his instinct of sex." (Ibid).* This thesis was not only completely ignored by his contemporaries, but did not enjoy even minimal support for more than a century.

Freud (1856-1939), an Austrian doctor and neuropathologist was also interested in the topic. As Schopenhauer before him, he realized that these emotions arise outside of the conscious mind where intelligence and will have the final say. He looked for the origins of these emotions in the unconscious world; a world that he was one of the first to highlight. An enigmatic world he imagined to be full of libido, sex, repressed impulses, frustrated desires and forgotten memories that, in one way or another, would influence our thoughts and decisions without us realizing it. Instead of attributing these emotions to a unique instinctive impulse, he considered them subsidiaries of the sexual instinct (and slightly subordinate) and attempted to find their origins in the fusion between an

infantile love towards one's progenitor of the opposite sex – appearing in early infancy and remaining in the repressed, subconscious, sublimated, and idealized realm – with some of the attractions that usually occur during the development of one's normal sexuality. This perspective formed part of the majority opinion on the topic for a long time, with slight variations added by various authors. Essentially, it explains the existence and appearance of falling in love in virtue of sexual instinct with a new twist and transformed by particular influences (first infant love, the example of maternal love, suggestive influence of fictional works and our cultural environment, the cumulative effects of sexual repression, etc.).

Sociological and Psychological Studies

Interest in the phenomena of falling in love increased markedly among psychologists, sociologists and anthropologists towards the end of the 19th Century; in part due to a growing interest in the topic among a broader spectrum of society. The first publications were of comparative studies on relationships in different societies and the presence or absence of the more noteworthy and emotional aspect of these relationships: "romantic love" (Finck, H-T., *Primitive Love and Love Stories*, 1899, access April, 2013, http://www.gutenberg.org/files/11934/11934.txt). Rougemont published his famous thesis on the origin and rise of "romantic love" in the Western World in 1939 (Rougemont, D., *Love in the Western World*, Princeton University Press, 1940). Researchers became ever more interested and began to read publications on the topic of love with greater interest and detail (for the sake of brevity we have mentioned only a few herein). Hobart published results from a survey of 923 men and women consisting of a dozen questions designed to measure the degree of romanticism in couples' relationships (Hobart, C. W., The Incident of Romanticism During Courtship, *Social Forces* 36, 1958, pp. 362-367). Kerphart, in 1967, published results of a survey of more than 1,000 people between the ages of 18 and 24 years of age about their romantic life (Kerphart, W. M., Some correlates of romantic love, *Journal of Marriage and the Family*, 29, 1967, pp. 470- 474). According to the results, the majority of the survey respondents believed they had been in love at least once (the average number of times subjects reported having fallen in love was 1.2 in men and 1.3 in women). Rubin then proposed a scale to measure the degree of romanticism in loving relationships in order to distinguish between truly "loving" a person vs. simply "liking" them (Rubin, Z.,

Measurement of romantic love, *Journal of Personality and Social Psychology* 16, 1970, pp. 265-273). Lee attempted to classify loving relationships in six distinct groups – eros, ludis, storge, pragma, altruist (agape), mania (obsessive), although he recognized that sometimes a relationship may have attributes and characteristics of more than one of these categories, making it difficult to categorize into a single one (Lee, J. A., The styles of living, *Psychology Today*, October 1974, pp. 43-51). Finally, Sternberg published his triangular theory of love, (Sternberg, R. J., A Triangular Theory of Love, *Psychological Review* 93, 1986, pp. 119-135) which defines our emotional relationships based on varying proportions of three ingredients: Passion (love), intimacy (affection), and commitment (willingness to do anything to maintain the relationship). The mix of these three ingredients evolves over time whereby, passion generally becomes less important in the relationship and, under favorable conditions, the other two take on greater importance. Besides a few minor adjustments suggested by particular authors, this theory has enjoyed near universal acceptance.

Biology

As the psychological and sociological studies on this topic increased, the value of "romantic love" as a justification for marriage also increased in Western Societies. For better or worse, this happened almost independently from the recommendations of psychologists, philosophers, and sociologists as documented in the publications of several authors (Averill, J.R. & Boothroyd, P., On falling in love in conformance with the romantic ideal, *Motivation and Emotion*, 1977, 1-3, pp. 235-247. Simpson J., Campbell, B. & Berscheid, E., The Association between Romantic Love and Marriage, *Personality and Social Psychology*, 1986, 12-3, pp. 363- 372).

Could it have been the tremendous triumph of the desire to live in a partnership, of romantic love – precisely at the time when free love began to challenge these ideals – that made us suspect (at least in our case) that something of such enormity could not simply be the expression of a secondary or accessory human characteristic, but a most intimate and authentic aspect of our being. Under such circumstances, this desire to love and live in a partnership would not be a simple passing fade or a superficial coating of our deepest nature; on the contrary, it would be part of the very essence of our inner

being. In other words, people would go to extremes to love and establish a partnership, because these feelings and actions would be programmed into our genetic makeup. Thus, it is not difficult to understand why, since the 1960s, certain authors suggest that underlying our romantic feelings exist biological impulses and therefore, these feelings are innate and rooted in our very essence. R. Alexander (Alexander, R., Darwinism and Human Affairs, University of Washington Press, 1979) when writing about the debate on the importance of biology and culture to explain human conduct, declares his open support of the latter, but leaves room for some doubt when he states, "there is much evidence in music, art and literature that few things so dramatically affect human socialization than falling in love." He even affirms that the dramatic nature of pair-bonding could be evidence and proof of the existence and importance of a genetic effect, which he proposed could be the basis of our social learning. He clearly states that "talking about falling in love" as something that happens to everyone, everywhere, is sometimes considered to be ethnocentric and there are anthropologists who affirm that people do not fall in love in societies where marriages are arranged.

Alexander doubts such affirmations by contending that in such societies falling in love is not approved of, and therefore, hidden. To support this point, he cites the works of several authors, such as J. Money (Money, J. J., E. Cawk, G.N. Niancki and B. Nuncombe, Sex training and traditions in Arnhem Land, Brit. J. Med. Psychol., 1970, 47, pp. 383-399), E.L. Posposil (Posposil, L., Kapauku Papuans and their law, Yale University Press, New Haven, 1958) and W. Irions (personal communication), that support this thesis. Eibl-Eibesfeldt describes falling in love as tying an exclusive knot with one person. He considers it to be such a necessary part of our innate being that one could say we are instinctively prepared to form lasting spousal relationships (I. Eibl-Eibesfeldt, Love and Hate, Aldine de Gruyter, New York, 1996). Ackerman staunchly defends the biological nature of love and its appearance through selective evolution affirming that by selecting for the aptitude to love, as a crucial part of our biology, evolution made us what we are. She affirms that contrary to what philosophers, moralists, theoreticians, shysters and advisors have defended; love is not an option, but a biological imperative. (D. Ackerman, A natural history of love, New York, Vintage Books, 1995). Peter Van Sommers asserts that, as there may be a biological basis for jealousy, we might also suspect that certain central aspects of love, the feelings of attraction and attachment, could be part of our emotional and motivational inheritance (P. Van Sommers, Jealousy, Penguin Books, London, 1988). Fisher explains that falling

in love and emotional attachment have physiological components and these emotions are common and universal in humans. Furthermore, if love is common to all people everywhere and is associated to small molecules residing on the nerve endings in the emotional centers of the brain, then love is primitive and we can suspect that the chemical systems that promote falling in love and emotional attachment (and perhaps indifference) had already appeared when Lucy and her companions walked the Savannahs of Eastern Africa three and a half million years ago. Therefore, even then those who succumbed to the passion of falling in love formed partnerships (H. Fisher, Anatomy of Love, Random House, New York, 1992). We are coauthors of a book that takes the debate one step further; hypothesizing the existence of a gene responsible for falling in love (a few chapters which summarize our hypotheses are available on this Internet portal – Homo sapiens. ¿una especie monógama?; La antropología de "Deus caritas est" [Homo sapiens. A Monogamous Species? The Anthropology of "God is love"]). "(our) monogamy, its instinctive nature in all other species, the irrationality and violence of falling in love, the multitude of people who fall in love in spite of their skepticism about love, suggests there might be something more to this: something as simple as the existence of a few specific genes in our genetic makeup. Thus this human behavior could be primarily due to the simple expression of genetic material. By adding "primarily due" we refer to the obvious influence of the human brain and culture. To begin, by discussing the possible presence of an innate love, we assume it is like all other instincts. Intellectuals have emphasized that we are the only species capable of easily overcoming our evolutionary constraints. Therefore, we are not requiring anything that has not been required in any other situation to date. Our instincts push us, but they do not oblige us to blindly follow them to completion." (Luis S. Lario, M. Lario and S. Lario, El gen del amor, Barcelona, Ediciones del Bronce, 1996, p. 99). It is very possible that the action of that gene, so essential in the initial phase of passion and falling in love, becomes less important during the course of the relationship, allowing for other factors that are perhaps not influenced by genetics, such as intimacy and commitment (of which Sternberg speaks), to become decisive for the continuation of a good relationship.

Recent Scientific Data

Results of scientific research in recent years support this hypothesis. As we've already mentioned in previously cited articles, research conducted by a group at Emory University in Georgia (Lim, M.M., et al. Enhanced Partner Preference in a Promiscuous Species by Manipulating the expression of a Single Gene, *Nature*, 429 (2004), pp. 754- 757) demonstrated the importance a single gene (ASVPR1A, which codes some of the AVP (Arginine-vasopressin) receptors) appears to play in the disposition towards monogamy in the prairie vole; to the extent that transferring this gene to the brain neurons of the promiscuous meadow vole was sufficient to convert it to a monogamous condition.

Even more recently, researchers at the Karolinska Institute in Sweden studied the effects of this gene's activity in humans (Walum, H., et al, Genetic variation in the vasopressin receptor 1ª gene (AVPR1A) associates with pair-bonding behavior in humans, *Proceedings of the National Academy of Sciences of the United States of America*, 105-37 (2008), pp. 14153-14156). Based on distinct variations in this gene within the study population, they found a modest correlation between the presence of these genetic variations and the aptitude among men to live in a relationship (it appears that this correlation does not exist in women). Carriers of allele 334 (present in 40% of the study subjects, which would make this gene "inefficient") were slightly more hesitant to marry, more likely to break off their marriage, more prone to infidelity and their relationships tended to be less satisfactory for their partners. Statistically these results were not very significant, but were much more obvious in the study subjects possessing two copies of this allele (which only occurred in 3.45% of their study population). In these cases the percent of subjects who cohabited with unmarried partners or had experienced problems in their marriage during the past year was double compared to the study subjects who did not possess allele 334. Based on these results, a few questions arise:

a) Could ASVPR1A be the gene whose existence we predicted in our book?

b) And in that case: Is everything we expect from this gene's activity, which perhaps we so pompously baptized with excessive pretension, so minimal as suggested by the results of this study?

Expectations

a) Regarding the first question, we have to recognize that "genetic determinism," in the sense that our genes alone can determine a particular aspect of our behavior, has very few proponents currently. Even if we suppose certain aspects of our lives are subject to particular biological impulses, we can never consider these stimuli to be as decisive in us as they are in other species or as they could have been in our ancestors millions of years ago. The presence of our brain development, social learning and cultural influences have – if not made us immune to their presence – reduced the importance of their effect to the extent that we are capable of ignoring, or acting in opposition to, these genetic influences. Thus, even if the ASVPR1A gene could have initiated monogamy millions of years ago in some of our ancestors, we cannot reason that its activity would continue to be as decisive today as it was at that time, and we would not expect the differences in behavior between people who possess this gene (people with a normally expressed ASVPR1A gene) and people who do not (people with allele 334, which has stopped the expression of this gene) to be enormously relevant. There are several arguments that support this perspective -

1) A large part of our behaviors (including things that affect the quality of life in a relationship) are passed down and controlled by the influences of social learning and a cultural imprint, which tend to standardize them.

2) For other facets of our lives determined at the individual level, we try to make sure our brain has the final word and thus, regardless of our genetic makeup, we should behave fairly similarly in most cases, because we should act not according to our instinctive impulses, but according to common norms dictated by reason.

3) In the absence of complimentary research, we cannot reject the possibility that circumstances exist which hinder the expression of this gene in its carriers. As we already presented in our articles published on this website, there is research documenting (in a monogamous species) the disappearance of the partnering tendency (a change towards promiscuity) with repetitive disappearance (by death) of serial partners (Alec Nisbett, *Lorenz*, Barcelona, Salvat, 1993, p. 45). Currently in humans changing partners is ever more frequent, for less tragic reasons than in Nisbett's research. Studies (Carter C. S. and Getz L. L., Monogamy and the Prairie Vole,

Scientific American, June, pp. 70-76, 1993. Winslow, J. T., et al., A Role for Central Vasopressin in Pair Bonding in Monogamous Prairie Voles, *Nature*, 365, pp. 545-548, 1993), suggest that to activate this gene (and create partnership ties), a certain continuity must exist in the relationships between two members of the population. Taking into account the extent of promiscuity among human youth today, we cannot reject the fact that Nisbett's results might be applicable to the human species. The doubt remains whether the formation of a pair-bond later in life would be capable of activating this gene, which had not been allowed to express itself, or if (at least in some cases) its activity becomes dormant forever. In such cases, the behavior of these carriers would become similar to individuals who do not possess the gene or have a defective copy.

In summary, we do not believe the modest results found in this research are sufficient to reject ASVPR1A as the hypothetical gene that at some point in the past encouraged monogamy in our ancestor species, especially when we take into account how decisive its activity is in other species and its apparent persistence in our own. This becomes more evident when we compare the behavior of the few subjects possessing two copies of allele 334 (which inactivates the gene) with the behavior of those who do not possess this allele. Thus, until otherwise proven, gene ASVPR1A could be the love gene whose existence we anticipated.

b) And so we come to the second question. If this gene is the love gene: What is the importance of its existence and its effectiveness at our current stage of evolution? It is very likely this gene exerts its effect by driving and channeling a special attraction towards a person, stimulating us to pair-bond: An experience that stimulates our awareness through a feeling, an affect and a special attachment (very similar to what we understand as falling in love). In fact, the majority of studies agree that the feeling of "being in love" abates after a maximum of three to four years. After that time it drops to negligible levels or completely disappears (which should lead us to believe that the activity of the responsible gene, if it exists, would similarly diminish). We must remember the Swedish research was conducted in couples who have lived together for at least five years (in our opinion, we should add the time from first attraction until the relationship is established). According to Sternberg's theory, with which we primarily agree, during this time the 'falling in love' or initial passion

factor, upon which the gene would preferentially act, would subside and be replaced by other factors such as intimacy and commitment. These latter factors would not be influenced by the gene's activities and we wouldn't expect to see major differences in the behaviors of study subjects who possess or lack specific alleles of this gene.

From our understanding, the study results would have been much more significant if instead of looking at the possible behavioral differences after a relationship of five or more years, the researchers had examined the quality of conjugal life during the first months of the relationship, especially related to feelings of love during the beginning of the pair-bonding experience (greater or lesser degrees of exclusivity, strength, urgency and the degree to which these were experienced as unavoidable, irreplaceable and indispensable), relationship qualities that should be potentiated by this gene's activity. That is where one would expect to find the greatest differences, because feelings are free from and unaffected by our brain's activity. In essence, you feel what you feel, although the brain may later reinterpret that feeling through ethical, esthetic or even practical lenses that help guide and channel it towards a particular outcome. For this reason we would expect greater contrast between the study groups, which would be much more clearly reflected in terms of feelings than in terms of what they were doing, because the other factors would not be influencing the relationships yet with their tendency to homogenize behavior. On the contrary, this study placed greater emphasis on the differences in behaviors than in sentiments.

While we are awaiting additional research to confirm or rebut the results of this study, we cannot ignore its relevance. For the first time in human history a study has attempted to establish a possible relationship between our genetic makeup and the quality of our pair-bonding relationships. Although the results were barely significant, they are sufficiently consistent to think that ASVPR1A might be the gene that led some of our ancestors towards a monogamous lifestyle hundreds of thousands of years ago and perhaps is responsible for those mysterious emotions that have perturbed and annoyed us for time immemorial. Thus a new path is forged. Considering the importance affection has in our lives, we expect other researchers will soon follow this path.