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The Psychology and Physiology of Love

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The Psychology and Physiology of Love

Throughout human history, the phenomenon called “love” has been studied and contemplated upon generally, as well as a philosophical and scientific study. The oldest surviving expressions of love are in the form of art – as cave paintings and sculptures, depicting sexual relations. Such depictions gradually fell in disfavor in the western world, as many theologians and religious philosophers of subsequent periods criticized sexual love. The phenomenon of love was taken away from its primal, animalistic sexual form – it was glorified as love for “God” – for a higher entity that was free of bodily passion. The conception of love emerges as a multifaceted one. Ordinary people recognize different types and forms of love. In recent decades, love has become of scientific interest and researchers from various areas of study have tried to understand its nature and expression using different methodologies of study. A fundamental question emerges here about the nature of love – is it a biological drive or need, as some researchers emphasize, or is it largely culturally constructed? Researchers from various fields are attempting to understand what biological and psychological bases it builds upon and what changes occur in an individual experiencing love.

A general definition of love, taken from the Oxford English Dictionary, defines love as “an emotion of strong affection and personal attachment.” The word love can be used as an emotion, a feeling, an experience or a behavioral expression. Scientific study of love has recognized the interplay of biological and

psychosocial factors in the experience of love – while these factors have been identified and studied in detail, a wide array of definitions of love have been offered by psychologists, with no clear consensus.

Erich Fromm (The Art of Loving, 1956) was one of the first psychologists to suggest a definition of love, as being “...possible only if a person achieves a secure sense of self-identity. When people are in love, they become one yet remain two individuals.” Another relatively recent definition of love defines it as being “...characterized by exclusiveness, fascination, and sexual desire.” (Davis, K. E.; Todd, M. J.; 1982)

While it is difficult to summarize love in a definition, some common elements in love and romantic relationships have been identified – love involves the *idealization* of another person (holding a largely positive attitude towards the partner) and *caring* for the partner along with trust, respect, commitment, companionship and sexual attraction (Fehr & Russell, 1991).

Some anthropologists and social psychologists maintain that love is a “cultural universal” – at least one variety of love, romantic love, is likely to have appeared in all human groups at all times in human history (Hatfield & Rapson 2002). In a survey of 166 varied cultures, anthropologists have found evidence of love in 147 (Fisher & Jankowiak, 1992). According to Fisher, in the remaining 19 societies scholars simply failed to identify and examine this phenomenon.

Despite the plethora of research on love, a comprehensive model accounting for its cognitive, affective, behavioral, neurological, physiological and evolutionary aspects is absent. Love has proven to be a complicated emotion, defying easy classification – it is virtually present in every culture and is a basic human emotion, and yet it varies enormously cross-culturally in its experience and expression, making it difficult to identify specific psychosocial aspects linked to it.

The Psychology of Love

All major theories of love in the field of psychology provide taxonomies of love. As early as 1886, the German physician and pioneering sexologist Richard von Krafft-Ebing (1886) identified five types of love, namely, true love, sentimental love, platonic love, friendship, and sensual love. The psychotherapist Albert Ellis in 1954 proposed additional love varieties: “Love itself . . . includes many different types and degrees of affection, such as conjugal love, parental love, familial love, religious love, love of humanity, love of animals, love of things, self-love, sexual love, obsessive-compulsive love, etc.”

Erich Fromm, in his book *The Art of Loving* (1956), stated that love is something that an individual *does* rather than a state the individual is in. His belief was that loving is an art than an individual must learn about and practice. He rejected the idea of love as magical or mysterious, an unexplained phenomenon that cannot be analyzed. The experience of “true love” (which is characterized by care, responsibility, respect and knowledge), according to Fromm, is only possible with the total development of an individual’s personality.

Several modern theorists have identified love as an emotion – either as a feeling resulting from several emotions or as an emotion in itself. Ortony and Turner (1990) collated the various types of “basic emotions” identified by several influential psychologists – of these at least three identified love as a basic human emotion (James, William, 1884; Watson, John B., 1930 and

Arnold, Magda B., 1960). These psychologists identify love as being a fundamental aspect of the human psyche or human behavior. Parrott (2001) has presented another categorization of emotions, in which he identifies love as a primary emotion associated with *affection*, *lust* and *longing* (secondary emotions) – therefore sexual arousal and internal disposition towards the loved one (affection and longing) are constituent secondary aspects of love. Affection is further associated with the tertiary emotions adoration, fondness, attraction, caring, tenderness, compassion, etc and lust with infatuation, arousal, desire, etc.

Robert Plutchik, in his book *Emotion: a Psychoevolutionary Synthesis* (1980), categorizes love as a feeling resulting from emotions. In his “Wheel of Emotions”, he identifies eight basic emotions (trust, fear, surprise, sadness, disgust, anger, anticipation and joy) and eight advanced emotions each composed of two basic ones. According to Plutchik, all emotions except for the basic or primary ones occur in combinations. Thus, love is a *feeling* consisting of the joy-trust dyad – it is a combination of two basic emotions, joy and trust. Plutchik further explains that joy serves the evolutionary function of seeking positive stimuli, and trust serves the evolutionary function of enabling sharing, cooperation and collaboration.

Other theorists have attempted to devise taxonomy of love. An attempt in this approach has been to identify the various categories people fit it, depending on how they love—this attempt has come up with love styles.

An influential theorist in this regard is the sociologist John Lee. In his book *The Colors of Love* (1973), he compared styles of love to the colour wheel. Based on the ancient Greek conceptualizations of love, John Lee identified six basic modes or styles (“colors”) of love used by people in interpersonal relationships—the first three being primary styles and the next three being secondary styles. Just as there are three primary colors, he suggested that there are three primary styles of love: Eros (physically and emotionally passionate love), Ludos (love that is perceived as a conquest and experienced as a game, often involving multiple partners) and

Storge (love that develops from friendship and involves feelings of fondness and affection for the partner).

The next three secondary styles of love are combinations of two primary styles. These are: Pragma, a combination of Ludos and Storge (practical, pragmatic and calculative love, involving practical considerations and not just purely emotional ones); Mania, a combination of Eros and Ludos (it is highly emotional, involving obsessive love, and jealousy and possessiveness for the partner); and Agape, a combination of Eros and Storge (defined as selfless love, which is altruistic in nature).

John Lee's love styles model was further expanded by Clyde and Susan Hendrick (1983), with six distinct varieties of love, namely: Passionate love (akin to Eros), Game-playing love (akin to Ludos), Friendship love (akin to Storge), Logical/Pragmatic love (akin to Pragma), Possessive love (akin to Mania, and Selfless/Altruistic love (akin to Agape). They further found gender differences in love styles—men tend to be driven more by Ludos (game-playing uncommitted love) whereas women tend to be driven more by Storge (friendship love) and Pragma (calculative love) styles.

Hendrick and Hendrick also attempted to identify unhealthy or neurotic types of love. Possessive love was identified as unhealthy as a co-dependent person cannot become part of a successful relationship. Altruistic love is another type of love identified as neurotic and unhealthy. Two problems were identified as inherent to altruistic love— in the first problem situation, only one partner possesses altruistic love – he or she gives and enjoys the giving while the other enjoys being given to – the giver would ultimately feel he or she is being taken advantage of, creating resentment for the partner. In the second situation, altruism is possibly a cover for a compulsive need to give—giving to be noticed, to be loved, to be appreciated rather than from a desire to help the other which may lead to maladaptive attention-seeking behavior.

Berscheid and Walster (1978) have proposed another classification of love, namely passionate love and companionate love. Passionate Love refers to a state of intense longing for union with another (reciprocated love), which is associated with fulfilment and ecstasy. It is also a state of intense physiological arousal. Passionate love has been shown to have elements of both pain and pleasure. Unrequited passionate love, or separation, is associated with emptiness, anxiety and despair. *Companionate Love* refers to a feeling of deep attachment and commitment to a person with whom one has an intimate relationship. It refers to affection felt for those individuals with whom one's life is deeply intertwined, such as love for one's significant others. It has been associated with "liking", which refers to feelings of affection for one's casual acquaintances.

Zick Rubin's contribution to the study of love is his distinction between *liking* and *loving* – according to him, these two feelings exist on a scale of love. His conclusion was that any scale of love must take into account certain elements of *passionate love*, namely idealization of the other, tenderness, responsibility, longing to serve and to be served by the loved one, the desire to share emotions and experiences, sexual attraction, the exclusive nature of the relationship and the couple's lack of concern with social norms and constraints. *Liking*, on the other hand, involved appreciation of the other person, respect and a feeling that one has similar social characteristics.

Cindy Hazan and Phillip Shaver (1987) have extended theories of early attachment of infants with their care-givers to adult romantic relationship styles. They identified three styles of romantic relationships, namely *secure lovers or secure attachment* (these individuals find it easy to get close to others and are comfortable having others feel close to them, they do not fear abandonment by the partner and find mutual dependency to be an inevitable aspect of close relationships), *fearful/avoidant lovers or insecure attachment* (these individuals are uncomfortable feeling close to another person or having the other person feel close to them and find it difficult to trust or depend on a partner), and

preoccupied/anxious-ambivalent lovers or insecure attachment (these individuals desperately want to get close to a partner but often find the partner does not reciprocate the feeling, they are insecure in the relationship, constantly worrying and fearing that the partner does not really love them).

Hazan and Shaver's research found that an individual's adult attachment style was predicted by the perception of the *quality* of the relationship with each parent in childhood. Thus the past life-experiences of an individual affect the quality of romantic relationships they will enjoy as adults and their style of attachment in these romantic relationships.

Another categorization of love comes from Robert Sternberg's Triangular Theory of Love (1986), one of the most influential approaches to love. Sternberg (1986, 1998) conceptualized love in terms of three basic components that form the vertices of a triangle: intimacy, passion, and decision/commitment. The triangle also indicates the various types of love that develop through combinations of the three components. These components are: *Intimacy* refers to a sense of emotional closeness between partners – the emotional bonding and attachment. It is primarily emotional or affective in nature and involves feelings of warmth, closeness, connection, and togetherness in the love relationship. *Commitment* refers to the extent to which a relationship is permanent and long-lasting, as perceived by the partners – also including shared achievement and plans in the long-term. It is largely a cognitive component, representing both the short-term and the longer term decisions of maintaining love. *Passion* refers to arousal, which may be sexual. It is primarily a motivational component consisting of the drives that are involved in romantic and physical attraction, sexual consummation, and related phenomena.

The intensity of love experienced depends on the strength of these three components and the type of love experienced depends on the relative strength of the three. They combine to form different types of love, of which Sternberg has

identified eight: Nonlove, Liking, Infatuation, Empty Love, Romantic Love, Companionate Love, Fatuous Love and Consummate Love.

Sternberg also proposes that romantic love develops over time and its different stages are determined by the change in emphasis on each component. A romantic relationship consisting of all three components is relatively more enduring than one consisting of only one. These three components of love differ from each other over three dimensions, namely *stability* (intimacy and commitment are relatively enduring and usually quite stable in close relationships while passion tends to be less stable and predictable), *conscious controllability* (there is a great deal of conscious controllability over commitment and some degree of controllability over feelings of emotional intimacy, whereas there is very little control over the passion experienced for partners), and *experiential salience* (individuals in close romantic relationships may not consciously realize the full extent of their commitment or experience feelings of intimacy without being able to consciously identify them, however there may be higher level of awareness of the passion component). Most love relationships do not fit clearly in any one category of love as the three components of love occur in varying degrees in a relationship.

The Socio-biology of Love: Sexual Strategies Theory

For many theorists, love has been closely linked to the sexuality of individuals, which in turn has been linked to reproduction. Reproduction is a major goal for most adults in every society. In such a situation, *successful reproduction* is viewed as a reinforcer. Socio-biologists have proposed that sexual strategies are inherited, due to their success in previous generations and following the sexual strategies that we have inherited is likely to lead to such reinforcement. Sexual behavior is viewed within an evolutionary perspective: the primary function of mating is reproduction. Successful reproduction requires not just mating but also pair-bonding to ensure parental care of offspring.

Due to the reinforcing capabilities of successful reproduction, the feelings associated with mating and mate-selection has been categorized as “love”. This perspective views attraction and mate-selection processes as being essentially *evolutionary advantageous* – and propose that the reinforcing value of the same lead to the development of feelings between partners which may be collectively known as love.

Men and women are likely to face different adaptive problems in the process of reproduction (Buss & Schmitt, 1993). Since women bear the offspring, men need to identify “reproductively valuable women” – younger women are more likely to be viewed as more fertile than older women, leading to a preference for youth, which results in young men choosing young women. A physically attractive person is more likely to be perceived as healthy and fertile than someone who isn’t, thus the preference for good-looking partners. Since women must make a much greater investment than men in order to reproduce, during pregnancy and nursing, researchers propose that women want to select those men as mates who are reproductively valuable, leading to the preference for good-looking mates. They also select mates who are able and willing to invest material, social and emotional resources in them and their children.

The criticism of this perspective has come from further research on romantic relationships. Sexual desire and romantic love may often be independent processes (Diamond, 2003). Diamond, in her bio-behavioral model of love, proposes that sexual desire and romantic love are functionally independent – romantic love is not intrinsically oriented to the mating process; and that the links between love and desire are bidirectional (not sexual desire eventually leading to love). Sexual desire is a motivational state initiating a search for opportunities for sexual activity, and responds to reproductive cues such as physical attractiveness – it may lead to passionate love. Romantic love is a motivational state leading to attachment, intimacy and commitment. Thus, viewing love as a concept that merely arises from the process of mating fails to explain companionate love.

Biological Basis of Love

The biological approach to love consists of various perspectives; it explores the physiology of love and its evolutionary function. The physiological perspective has attempted to monitor brain activity (in which the experience of love has been linked to the limbic system and right hemisphere of the brain, which are involved in the perception and expression of emotion) and hormonal activity (such as that of oxytocin) of people in love. Not only do brain processes influence love, love also has influences on the structure of the brain. The Limbic Resonance hypothesis suggests that our nervous systems are not self-contained, but attuned to those around us and those with whom we are most close. Thus love relationships may have an effect on the structural elements and functions of the human brain.

According to Arthur Aron, Helen Fisher and Lucy Brown, love is a *biological or motivational drive* in humans as opposed to love being an emotion. Aron contends that love is not an emotion; it is instead, a motivational state, perhaps one as fundamental as hunger and thirst. While the fulfilment of a love relationship leads to pleasure, rejection in love leads to a completely different set of feelings of pain. The wide variety of intense feelings experienced in love suggests that it's closer to being a drive than an emotion.

Research on the *neurochemical bases of love* suggests that bodily chemistry (physiological changes) and neural activity in the brain are the causes of the experience of love. Investigations into the neurochemical bases have yielded three main chemicals released by the brain that produce the feeling of love. These are dopamine, vasopressin and oxytocin.

The hormone *dopamine* is associated with the intense desire of early-stage love and with euphoria; craving has been shown to be released during mating process in both male and female members of various species of mammals including humans. Its release appears to enhance the likelihood of pair-bonding in the initial stages

of romantic relationships among humans. A surge of dopamine in the human body can produce increased energy, focused attention, and reduced need for food and sleep, which are also the common physical experiences of individuals in the early stages of love.

Research with humans using fMRI studied brain activity related to love on young men and women who were in love (Bartels & Zeki, 2004). While their brain activity was being measured, each participant was shown photos of the romantic partner and of a close friend. The picture of the partner activated specific areas of the brain which were rich in dopamine. Dopamine pathways were excited, lending weight to the neurochemical findings that suggest dopamine is important in the experience of love. These dopamine-rich regions have also been identified as brain areas responsible for motivation and reward-seeking behavior – lending weight to Aron's argument that love is not an emotion but a motivational state.

The hormone *oxytocin* is associated with long-term, monogamous love that may last beyond reproductive years. Thus, it may contribute to long-term relationships. It has been shown to play an important role in pair bonding in some animals, including humans (McEwen, 1997). In humans it is stimulated by touch, including sexual touching and orgasm, and it produces feelings of pleasure and satisfaction. Research indicates that levels of interpersonal trust correlate positively with oxytocin levels (Zak et al., 2003). Oxytocin is also released in mothers and infants during childbirth, and has been shown to create feelings of attachment. Studies have shown that oxytocin may help people be more comfortable socializing as it may potentially reduce anxiety – which seems to tone down the brain's fear response and increase a person's feelings of trust. Oxytocin, thus, plays an important role in various behaviors including orgasms, social recognition, bonding, and maternal behaviors.

The third major hormone involved in the experience of love is *vasopressin*. It is involved in love in long-term pair-bonding. It has been

found to foster visual recognition of others and feelings of attachment.

These three chemicals combined are believed to provide the neurochemical basis for intense attraction and lasting love in human beings.

Evolutionary Perspectives

The evolutionary perspectives on love have tried to understand why such a phenomenon would occur and how it evolved over time. Love has also been shown to have practical benefits to human beings which could possibly be of survival value. The cognitive evaluation of affectionate behavior is largely positive to an individual giving or receiving affection. Thus, affectionate and caring behavior has health benefits for both partners as it provides emotional support and optimism in dealing with life's challenges implying positive coping to stressful situations. These perspectives highlight the belief that love is a feeling that has essentially evolved from the process of reproduction, to solve the problems of reproduction and ensure the success of parenting.

Helen Fisher has studied the *Neural Mechanisms for Mate Selection* – since successful reproduction requires mating and the establishment of a pair-bond to ensure parental care of offspring, three internal inter-related motivational systems involved in the process of *successful reproduction* have been proposed (Fisher and colleagues; 2006). These three internal processes are: the desire to mate or the sex drive, pairing/mating or attraction (romantic love) and attachment or parenting. Each internal system involves reward pathways in the brain and is associated hormonal changes.

The sex drive (the desire to mate) motivates a person to seek a partner. It is associated with the desire to have sexual contact with others and may be directed towards a number of potential partners. The processes of attraction to pairing and a focus of energies on a specific partner – it may be labelled as passionate love in human societies. The focus on a particular

mate involves displaying one's affiliation towards him or her. The processes of attachment (which may be collated with "companionate love") lead to long-term relationships which facilitate parenting. It consists of feelings of security and comfort along with seeking proximity to the partner.

These three systems are correlated with neural mechanisms of the body. The sex drive involves the secretion of testosterone; attraction involves norepinephrine and serotonin and attachment involves the production of oxytocin and vasopressin. There may be a general arousal component underlying all three systems producing motivation. Activation of specific areas of the brain correlate with the thoughts, feelings and behaviors related to every biological need related to love. Thus romantic love is identified as a basic (biological) drive in humans that exists in the process of mating.

Another major evolutionary approach to love is the *Dynamical Evolutionary View of love*, proposed by psychologist Douglas Kenrick. Love is a set of cognitive decision biases that have evolved to serve the genetic interests of facilitating reproduction and passing on genes – these biases affect individuals' attention, memory and decision making, which go on to influence problem-solving behavior of individuals in social situations. The decision biases are involved in the attainment of each kind of problem encountered by an individual related to survival and reproduction – such as mate-seeking, mate-retention and parental care.

The "dynamic" aspect of love arises from bi-directional interactions between partners – these shape each person's actions and subsequent reactions. These interactions are also related to the different kinds of love experienced by an individual – such as the distinction between love felt for one's partner and love felt for one's offspring. While viewing romantic love to be an instinctive part of human nature, Kenrick also acknowledges the existence of cultural differences in love and related behaviors. He believes these differences arise out social variations (cultural environment) and variations in the physical ecology (physical environment) –

since behaviors that are adaptive in one environment may not be so in another. Therefore love is a basic universal experience, but is also monitored and influenced by individuals' social environment and ecology.

The psychologist David M. Buss attempts to explain the *evolution of love* in his studies. He proposes that love is an adaptation that evolved to solve problems of reproduction. Love provides sexual access, sexual fidelity and indicates commitment. While love is a universal phenomenon among human beings, its experience differs. Buss views love to be a mechanism for achieving commitment, appearing primarily in long-term mating. He also associates love with various developments in human evolution – males cannot detect female ovulation therefore they would tend to mate with one female throughout her menstrual cycle; this would eventually lead the males to intensely invest in their offspring and guard their partners from rivals. Females, on the other hand, would have to invest more resources in the process of reproduction and nurturing and therefore would concentrate their reproductive resources only on one male. This focusing on one mate, according to Buss, is perceived as "love".

Buss (1989) also studied the role of culture in love and attraction, by conducting a large-scale survey of 10,000 men and women from 37 societies (four cultures of Africa, eight cultures of Asia, four cultures of Eastern Europe, twelve cultures of Western Europe and four cultures of North America). Each respondent was given a list of 18 characteristics an individual may value in a potential mate (characteristics of *companionate love*) and was asked to rate how important each characteristic was to him or her personally. Regardless of which society they lived in or gender, most respondents rated intelligence, kindness and understanding with the highest priority value. Irrespective of the culture they belonged to, men placed more weight on cues of reproductive capacity, such as physical attractiveness while women rated cues of resources as more important. These findings support the sociobiological perspective of mate selection criteria in males and females and point

at similarities in the mate-selection process across cultures. While standards of beauty may vary across culture, physical attractiveness as defined by that particular culture holds as an important criterion in the process of mate-selection.

Cultural Values and the Meaning of Love

Cross-cultural psychologists have identified two dimensions on which cultures vary (Hatfield & Rapson, 1993). The first dimension is *individualism-collectivism*. This basic distinction is made between *collectivist cultures* (found in many Asian countries, an individual's identity is tied to his or her social group) and *individualistic cultures* (such as the cultures of United States and Canada and some European countries, the individual's independent identity is prioritized) in cross-cultural studies. Research has shown that individuals from collectivist cultures expect love to grow as the marriage unfolds over time. There is less emphasis on romance and infatuation, instead, practical concerns (such as income potential and compatibility with the extended family) may be emphasized more. In societies where marriages are arranged, the primary criterion for marriage is that the two families is the similarity in social status of the two families. The individual finds intimacy in relationships with other family members, not just the spouse.

In contrast, people from individualist countries emphasize the passionate side of love when looking for a long-term romantic relationship, focusing on feelings of passionate excitement and physical attraction (Dion & Dion, 1993). Individuals select mates on the basis of such characteristics as physical attractiveness, similarity (compatibility), and wealth or resources.

The second dimension on which cultures vary is *independence-interdependence*. Many Western cultures view each individual in society as independent, valuing individuality and uniqueness. Many other interdependent cultures view the person to be interdependent with those around him or her, in the social group. The self is

defined in relation to others, and harmony and conformity are valued in society.

The collectivist-interdependent orientation of many Asian and African cultures results in individuals from such cultures to view love as companionate-friendship love, in contrast to individuals from individualist-independent cultures.

Therefore love seems to have significant cross-cultural similarities, as well as differences, indicating its dynamic nature.

Conclusion

The various perspectives of love highlight the dynamic phenomenon that love is. Love consists of biological, psychosocial as well as cultural factors. The biological level can be considered the foundational basis of love – without inherited biological structures and functions of the human body, experiencing love would be impossible. Love emerges as a motivational drive which is closely linked to emotions and behaviors that accompany it. As a motivational drive, it is associated with certain internal structures and mechanisms and the behaviors they activate – including affective behaviors such as joy or trust that are associated with love. It is a complex motivational process that is accompanied by a dynamic interplay of activation of various regions of the brain and neurochemical secretion in the body. Love is a phenomenon in which no clear distinction can be made between external stimuli and internal behaviors – the external (social) and internal (biological) processes of an individual in love are bi-directional in nature. These bi-directional interactions of the body and the external/social environment give rise to psychological experiences or mental states in an individual – love is consciously experienced by an individual and categorized or labeled as such, depending on his or her past experiences in the context of his or her culture. The cultural context of an individual also defines complex behaviors expected from an individual in love, once the cognitive label of love has been established. Love emerges as a complex phenomenon which has cognitive,

affective and behavioral aspects, and arises from certain biological processes that are given meaning to in a cultural context.

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