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Love: A Biological, Psychological and Philosophical Study

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Love: A biological, psychological and philosophical study.

Heather Chapman

University of Rhode Island

Dedication

This paper is dedicated to the love of my life

Jason Matthew Nye

October 4,1973 - January 26, 2011

Abstract

The concept of love has been an eternally elusive subject. It is a definition and meaning that philosophers, psychologists, and biologists have been seeking since the beginning of time. Wars have been waged and fought over it, while friendships have been initiated and have ended because of this idea. But what exactly *is* love, and why is it important to define this enigma?

In order to help define this idea of love, several books and numerous research articles were consulted, and interviews were conducted with faculty of The University of Rhode Island. Dr. Nasser Zawia was interviewed, in order to help understand the role of neurobiology in the process of falling in love. Dr. Zawia explained the importance of neurotransmitters and brain activity when a person is in love. Dr. Dianne Kinsey was consulted, in order to help clarify the importance of the psychology of love. Finally, an interview with Dr. William Krieger revealed the importance of the study of philosophy and how it relates to the concept of love.

Research has concluded that the disciplines of biology, psychology, and philosophy are all important in analyzing love; however, more research needs to be done in order to define what love actually is, and how we can apply this knowledge in our everyday lives. With the divorce rates increasing, and the idea of marriage changing in today's society, the importance of studying the concept of love cannot be overlooked. It is in this research that we, as a community, will be able to understand love, and its importance to the survival of the human race.

LOVE

Introduction: Why study love?

The concept of love has been studied throughout history. Philosophers have been asking such questions as “What is love?” and “Why do we love?” since the beginning of time. Today, these questions are still being asked, perhaps in a more desperate way. When children are very young, they are read fairy tales about Prince Charming rescuing a helpless princess, with the two of them riding off into the sunset to live the seemingly “happily ever after”. However, the “happily ever after” is never fully described. Do the prince and the princess get married, have children, and grow old together? Or do they in fact get married, have children, and then fall out of “love” and end up divorced within a few years? Do they stay happily and passionately in love, or do they stay together only out of the fear of loneliness? While the rates do seem to be leveling out, the trend remains that a high number of all marriages do ultimately end in divorce. The Americans for Divorce Reform currently estimates that "Probably, 40 or possibly even 50 percent of marriages will end in divorce if current trends continue." The question then becomes not only “What is love?”, but “What is love, and why are some people able to stay together, while other relationships fall apart?”

In order to answer these questions, the concept of love must be examined at different angles. Is it possible that love is just a biological response? Do people stay together because their brains have been conditioned to respond to the hormones released? Or could it possibly be a psychological need and desire to stay together? Perhaps, couples become “used to” each other, and, afraid of and unable to adapt to change and the uncertainty that comes with that change, they stay married? Finally, could it be the “essence” of love, the idea or concept of being in love that makes people want to try to work at staying together?

LOVE

This paper will examine the biological, psychological and philosophical aspects of love. For the purpose of this research, partners and couples will be heterosexual; however, homosexual love is equally valuable and important. The word "marriage" will refer to the union of a man and a woman, and the study of divorce will include couples comprised of a man and a woman. Research for this paper includes several books, articles and interviews with different members of the academic community at the University of Rhode Island.

Biology: Blame it on the Neurotransmitters

When a couple meets for the first time, the attraction can be instantaneous. They may describe the meeting as "a shock to the system", or "electric". When interviewed, the men may say "Everything else in the room faded, all I could see was her." The woman may say "I looked around the room, and when we locked eyes, I realized I couldn't take my eyes off of him." Could this be love at first sight? Or is this merely a biological response? In fact, research does find that a person's eyes do change when they see something they desire. "Looking into a lover's eyes is like looking into a fire…Thanks to a shot of adrenaline, your palms sweat, your breathing gets shallow, your skin feels hot, and your pupils dilate. Your amygdala, the center of the brain that processes emotion, blazes with activity. At the same time you produce dopamine, a 'feel good' neurotransmitter that is associated with passion and addiction, and oxytocin, a hormone related to bonding." (Pincott, 4). With all of these processes occurring at once, it's not surprising to learn that one's pupils actually dilate when focusing on an object of desire. In fact, a person's eyes dilate in order to grasp more of the image of the person. There may also be an evolutionary reason that men are attracted to women with larger pupils. "Men prefer big, gaping

pupils because they're a sign of arousal and receptivity…big pupils are cues of youth, fertility, and receptivity- in the subconscious male mind, a sight to behold." (Pincott, 8).

In order to understand the brain's response to love, one must examine the brain and fully comprehend the myriad array of structures involved. One of the main structures involved with falling in love is the limbic system. The particular system is well known as being the part of the brain involved in emotional response. The limbic system is actually several structures combined, including the basal nuclei, the thalamus, and the hypothalamus. While all of these structures are vital, the hypothalamus is directly involved in both behavioral and sexual function. Combining these two important functions, one can see how the limbic system is so crucial to falling in love.

Research has concluded, without a doubt that a person responds with their entire body when they feel desire. As stated earlier, when one is around an object of their desire, adrenaline is released, at least in the early stages. Adrenaline, also known as epinephrine, which is both a neurotransmitter and hormone, is released from the adrenal medulla during the "fight or flight response." (Sherwood, 188). This response, activated by the body's sympathetic nervous system, prepares the body for the decision to either fight the stressor, or "flight", to run away from the attack. During this reaction, the person's heart rate increases, the pupils dilate, the sweat glands are stimulated, and the brain becomes increasingly more alert. This reaction, the sweating, the dilated pupils, the increased heart rate, is exactly how people describe the feeling and energy of being "in love".

In addition to epinephrine, there are several other chemical responses released when a person experiences "love at first sight." Endorphins, oxytocin, dopamine, and vasopressin are also important to examine when looking at the brain's response to love. Endorphins are peptides that are manufactured in the pituitary gland and the hypothalamus. These "feel good chemicals"

act both as an analgesic and as a sedative. Endorphins are released during exercise, which is what many avid runners describe as a "runner's high". Eventually, the runner's body begins to crave the release of endorphins, which is why many exercise enthusiasts report the "need" to exercise. Endorphins are also released during sex; they provide the "feel-good, calming" effect that one feels immediately after orgasm. Finally, endorphins are released through touch, which is why a mother's touch can soothe a crying infant. "Endorphins, for instance, can create the sensation of euphoria and relief from pain." (Selhub, 33). It is that compelling euphoric feeling that couples describe when they say they have "fallen in love."

In her book, *A Natural History of Love*, author Diane Ackerman discusses the importance of the hormone oxytocin in a person's experience of love. Oxytocin, also known as the "cuddle chemical", "plays an important role in romantic love, as a hormone that encourages cuddling between lovers and increases pleasure during lovemaking…The hormone stimulates the smooth muscles and sensitizes the nerves, and snowballs during sexual arousal." (Ackerman, 163). Oxytocin is also linked to the feeling of "closeness" that one experiences after intercourse, which may explain why women are statistically more likely to "fall" for a man that they may know they have no future with, yet they mistakenly associate the feeling they experience after the release of oxytocin with love.

Since oxytocin is released through physical touch, including "stroking, cuddling, hugging, kissing, or having sex" (Pincott, 144), it can be concluded that it is also associated with the release of other distinct hormones in the body. In fact, "oxytocin works in tandem with other neurotransmitters such as testosterone…oxytocin may also influence how the feel-good neurotransmitters dopamine and norepinepherine hit the reward parts of the brain." (Pincott, 145). When this various cornucopia of hormones and neurotransmitters are released, the body

can associate this feeling with love. This is why one may become "attached" to a partner that is absolutely *not* a good match. Even if one consciously knows that the other person is a bad fit, this cascade of neurotransmitters may confuse the brain into believing the match is compatible. Unfortunately (or fortunately from an evolutionary standpoint), the relationship eventually ends. However, hormones are also extremely important in the feeling of addiction, dopamine especially. Perhaps it is this feeling of "addiction" that keeps couples together.

Women like to cuddle after intercourse, while men just want to sleep. This is a well-known "fact" that is commonly shared by society. But, interestingly, there is actually a biological reason for this desire. "Women experience stronger effects of oxytocin than men because women have more estrogen, and estrogen makes oxytocin receptors more sensitive." (Pincott, 146). At least now there is a biological explanation for that fact.

Dopamine, a monoamine neurotransmitter, plays an essential role in attraction. Dopamine plays several different roles in the body, including "being involved in fine muscle movement, integration of emotions and thoughts, involved in decision making, and stimulating the hypothalamus to release hormones (sex, thyroid, adrenal)." (Varcarolis & Halter, 50). One can see that, with both the involvement of emotion and thoughts, and stimulating the hypothalamus to release hormones, biologically speaking, dopamine is crucial to falling in love. Interestingly, a decrease in dopamine has been associated with both Parkinson's disease and depression, whereas an increase in dopamine is associated with schizophrenia and mania.

Considering the contrast in medical conditions that can be associated with dopamine (mania versus depression), it can be concluded that the release, or perhaps lack thereof, dopamine in a person's brain can be affiliated with how they act when they are either in love, or conversely, suffering from the loss of a love. Indeed, when one first "falls in love", as

mentioned earlier, their actions can become erratic. They want to spend every waking moment with the object of their affection; they pine for their presence when they are apart. Once one has experienced heartbreak, it can often be difficult to just get out of bed to face each day. Life can lose meaning, anhedonia (lack of finding pleasure in activities that one once enjoyed) is a symptom commonly described by those experiencing separation and divorce.

This contrast can easily be explained when one examines dopamine's other role in the brain, which is that of addiction. In the August, 2010 issue of the Harvard Mental Health Letter, researchers found that "All addictive substances (and many pleasurable activities) release the neurotransmitter dopamine in the nucleus accumbens, a cluster of nerve cells lying deep in the brain. Initially researchers thought that dopamine acted as a hedonic signal—one that registers pleasure in the brain—and that this signal prompted people to continue seeking the substance." In this way, combining biology with psychology for the moment, one can conclude that being with a partner whose actions are associated with the release of dopamine in one's brain, can actually lead to a physical "addiction" to the person.

Finally, vasopressin plays an important chemical role in one's ability to fall in love. Vasopressin, also known as antidiuretic hormone (ADH), is a hormone that serves many functions in the human body. It controls the reabsorption process in the kidneys, plays a role in maintaining homeostasis, and helps to restore blood pressure in cases such as hypovolemic shock. However, for the purpose of this study, it is important to note that when vasopressin is released, it can, in fact, help men bond with their mates. "One brain study found that people in relationships for more than two years show increased activity in the reward area of the ventral pallidum, which is rich with vasopressin receptors." (Pincott, 304)

In addition to the brain's response to the neurotransmitters and other "love" chemicals being released, there is also another very important aspect of chemistry that is responsible for the feeling of attraction. Pheromones are chemical signals that are released by the body that can serve to attract or repel potential mates. While there is currently some controversy pertaining to the determination of what pheromones actually do in the body, there is no controversy over the fact that they do exist. For years, researchers have been aware of the presence of a vomeronasal organ (VNO) in mammals, however "only recently have scientist discovered real evidence of a VNO in human adults." (Pincott, 28). It is also hypothesized that "Pheromones could trigger our sex drive by traveling the neural pathway that connects the nose to the hypothalamus, a region of the brain that initiates the release of sex hormones and fuels erotic feelings and sensations." (Pincott, 29) Knowing that pheromones do exist, and their purpose, it can be accurately concluded that people fall in love with the "scent" of a person.

There is a very distinct scent that each body gives off, however it is not necessarily consciously noted. Of course, as the human race has evolved, so have the litany of grooming habits. People now bathe frequently, use scented soaps, buy perfume or cologne, all in the hopes to make themselves more attractive to their potential mates. However, it is interesting to note that, while one may drench themselves with all of the cologne in the world, if a potential mate isn't attracted to the person's pheromones, there isn't much chance of love.

Interestingly, one's immune system plays a very important role in pheromones and their role in attraction. When one thinks of love, one doesn't often think of the immune system. The immune system is in place to protect the body from illness, to fight against foreign particle invaders, to help heal a cut, and to maintain homeostasis in the body. However, it does so much more than just those key actions. "Researchers believe that one major source of human

pheromones is the immune system's major histocompatibility complex (MHC). Whether you're attracted to or repulsed by a man's body odor may depend strongly on your respective immune systems." (Pincott, 29). It is in this way that, biologically speaking; one picks the "best" mate. One very important, albeit subconscious, way of making sure that one's offspring has the best chance of survival is by picking a partner whose MHC is dramatically different from one's own. "If you have children with a [partner] whose MHC variants are most unlike your own, your kids may inherit a more diverse MHC and stronger immune system that identify and destroy a greater range of bacteria and viruses. If your partner has MHC genes that are very similar to your own, your children might not be as healthy." (Pincott, 32). Biologically speaking, love seemingly depends on your MHC.

By choosing this variant MHC, it has been concluded that the offspring will be more advanced immunologically than if the MHC was similar. However, knowing what pheromones are, and knowing that they are detected on such an unconscious level, how does one actually detect this MHC? "Researchers speculate that MHC genes code for specific proteins that circulate in the bloodstream. These proteins bind to odorants in concentrations that depends on a person's MHC. These…ooze out of sweat glands in the armpits and the genital areas." (Pincott, 32). This leads one to conclude that cuddling allows not only oxytocin to be released, but the detection of pheromones as well.

Interestingly, women who are on hormonal contraceptives may actually choose partners whose MHC is actually similar to theirs. "Researchers are unsure why the Pill reverses women's usual preference for men with MHC-dissimilar genes, but it's evident that it has something to do with the lack of hormonal fluctuations." (Pincott, 34). This can end up being a problem, especially if the woman has been on a hormonal contraceptive throughout dating and,

subsequently, marriage. If the couple decides that they want to have children, and the woman stops taking the contraception, the couple may find that, unfortunately, they are not attracted to each other any longer.

While neurotransmitters do play an enormous part in the brain's role in falling in love, there are structures of the brain itself that change when a person is in love. A study done by Helen Fisher, Lucy Brown and Arthur Aron demonstrated this change. In this study, couples who described themselves as "intensely in love" were recruited, and while they were looking at a picture of their beloved, their brains were scanned by an fMRI. "The researchers saw a glow in several regions of the lovers' brains, representing blood flow. Among them were three important clusters of brain cells related to motivation and reward…the right ventral tegmental area (VTA), the medial caudate nucleus, and the nucleus accumbens." (Pincott, 283) These parts of the brain are known as the reward centers. When these areas are activated, the person "feels good", which is due to the fact that dopamine is being released by the VTA to the caudate nucleus and the nucleus accumbens. As previously discussed, dopamine is the "feel good" chemical. Being in love causes dopamine to be released and makes one feel good, which then causes the person to spend more time with their mate. The more time couples spend together in the early stages of the relationship, the more the neurotransmitters are subsequently released. The more neurotransmitters that are released, the more the couples want to spend time together. This is an ever-repeating cycle, which leads to an "addiction". And, as previously stated, dopamine plays a very important role in addiction. This idea of reward/punishment will be discussed further in the following section.

An interview with Dr. Nasser Zawia, explored the concept of biology and love. Dr. Zawia states that we "fall in love with the brain". This is contrary to the idea that the media

places on love, where men are shown commercials of scantily clad women, and women are shown commercials of shirtless, muscular construction workers. These media images are what we, as a society, are told we are supposed to find attractive. However, the previous research has proven Dr. Zawia is correct; humans do in fact fall in love with their brains.

Dr. Zawia also concluded that pheromones do play an important role in falling in love. He describes the VNO and its role in detecting pheromones. Dr. Zawia states "if you like someone's smell, you want to be with them." This is exactly what previous research has found, that a person's scent is staggeringly important in attraction.

In addition to the biology of love, Dr. Zawia discussed the importance of the role of psychology in relationships. He stated that "a person is like an addictive drug." While the importance of dopamine and addiction has already been discussed, Dr. Zawia explores this idea further, by stating "there is a reward/punishment area of the brain responsible for people staying together." The reward/punishment concept will be discussed later in the psychology section of this research paper.

When Dr. Zawia was asked which aspect of love played the greatest role in love, he stated "In the beginning, the most important part is biology, then, as love matures, psychology becomes the most important." He also stated that "love is the most important emotion for people."

Psychology: Love as a form of hysteria

While the biological components of love have been demonstrated as being extremely important, one must examine the psychology of love in order to get a full picture of this important human experience. While love can seem like an extremely abstract concept, it was

important and concrete enough for psychologists to study, and eventually, several theories on love have consequently evolved. One cannot discuss the psychology of love without discussing one of psychology's forefathers, Sigmund Freud.

Freud (May 6 1856 –September 23 1939) was an Austrian neurologist, and is considered the father of psychoanalysis. Freud had a great deal of theories for pretty much everything conceivable, from dreams and their meanings, to love and hysteria. "His many contributions to knowledge include his studies of the development of the sexual instinct in children, his descriptions of the workings of the unconscious mind and of the nature of repression, and his examinations and interpretations of dreams." (Drabble & Stringer, 2003). He was also an advocate for the use of cocaine, and even wrote a paper on the benefits of using the drug.

Freud believed that love and sexuality were extremely intertwined, and beginning at a very young age, one experiences these feelings, although they are often misguided. Freud believed in and coined the phrases "Oedipus complex" and "Electra complex". In Freud's scientific opinion, young boys are sexually attracted to their mothers, and want to kill their fathers in order to have their mothers all to themselves. Not to be outdone, young girls desire their fathers, and want to eliminate their mothers, in order to be with their fathers. These ideas (Oedipus and Electra respectively) provide motivation for the children, and when the children are spurned by their parents, they seek out others for their love and affection. Of course, this idea brought forth a great deal of controversy for Freud, as it is often disturbing to think of children as sexual creatures, and society's view of incest is that it is absolutely unnatural.

Taking the information we know from Freud, we can then conclude that we, as adults, are constantly searching for that partner that reminds us of our mother or father. "Women's tendency to marry men who resemble Dad, if Dad is loving, adds to the increasing evidence that

women lean toward the familiar and the positive for long-term relationships…We may be modeling our marriage on Mom's, or unconsciously deciding that since Dad is a good parent, than a man who looks like him will be too." (Pincott, 21). This idea may be disturbing for some people; however Pincott also concludes "the attraction is limited to general resemblances." (21).

Now that the relationship between childhood associations of love, and how we pick a mate (whether this belief is true or not is still up for debate), one can examine, from a Freudian perspective, how this love transfers to adult behavior. In order to further examine this theory, we must create a hypothetical situation to examine from a Freudian perspective. Imagine a couple, having been together for several years, having yet another fight over who's turn it is to take out the garbage. If this couple has not learned how to communicate effectively, there might be name calling, temper tantrums thrown, or the fight could escalate to encompass issues that have nothing to do with taking out the garbage. What would cause a pair of grown adults to act in such a childish way? "Freud concludes that when lovers act irrationally what they're really doing is regressing to the needs, insecurities, and obsessions of childhood." (Ackerman, 134). Everyone is guilty of behaving in an immature way, at one point or another, but it was Freud who realized the impetus for these actions. Of course, Freud did have a lot of people trying to disprove his theories (in fact, there are some that denounce his work altogether), however, one cannot disprove his enormous impact in the field of psychology.

Another important psychologist involved in the psychology of love was Abraham Maslow. Maslow (1908-1970) was considered the father of humanistic psychology. Humanistic theory is one that focuses on "human potential and free will to choose life patterns that are supportive of personal growth. Humanistic frameworks emphasize a person's capacity for self-actualization." (Varcarolis, 38). In fact, no psychology class is complete without studying

Maslow's hierarchy of needs. This theory includes the idea that "humans are active rather than passive participants in life, striving for self-actualization." (Varcarolis, 38). Contrary to Freud's theory, an adult can actively make choices in their lives, as opposed to most of their actions being mainly subconscious. Maslow's hierarchy is pyramid shaped, with the most fundamental needs at the bottom, and the "more distinctly human needs" placed on the top. The categories, from bottom to top, include physiological needs, safety needs, love and belonging needs, esteem, self-actualization, and self-transcendence. Physiological needs include food, water, and rest. Safety needs include security, protection, stability, and structure. Love and belonging needs include affectionate relationships and adoration. Esteem includes both self-esteem, and esteem from others. Self-actualization is defined as "becoming everything one is capable of." (Varcarolis, 39). Finally, self-transcendence is exceeding beyond one's own limitations.

When one views the hierarchy, it is not difficult to understand how his theory is so crucial to the idea of love. When one's physiological needs are covered, the next step is safety requirements. While this does include physical safety, it also includes stability, structure, and order. This is one reason that many couples do not want to divorce, mainly because this very idea will be shaken to the core. How often do women say "I'd love to leave him, but I have to take care of the children." Or, if the woman did not achieve adequate education and has no work experience, she may feel stuck in the relationship, as she cannot adequately provide stability and security for herself. Safety experts often tell women who live alone to have a male friend record the outgoing message on the answering machine, to place a pair of men's shoes by the door, and to hang a man's jacket on the coat rack, in case a burglar is casing the house. Unfortunately, in today's society, a woman alone is seen as helpless. In fact, to take it one step further, women are often told, when they go to a party, to say "we" often, in case a potential criminal is mingling

among the partygoers. These ideas, while definitely smart, just show how vulnerable a single woman can be in today's society.

On a brighter note, the security from being in a couple can reinforce the feeling of love, because it protects one from desolation and loneliness. There are so many articles that are published, especially around the holiday season, on how to survive being single. Since the security from being in a couple is there, those in love do not have to worry about how society will view them. They can often enjoy the holidays more, knowing they have someone to celebrate with, and in fact, commercials absolutely prey on this feeling. The psychology of commercials and the impact on the media is too complex to explain in this one paper, but there are a few points that are necessary to highlight. There is a certain jewelry company that has a particular commercial, which airs during each holiday season (especially Christmas and Valentine's Day.) In this commercial, a woman is sitting in a rocking chair with her child. The husband (presumably) comes up to her with a box in his hand, containing jewelry of some sort. The next shot is that of the woman accepting the jewelry, and gazing at her husband with love, while he looks at her in adoration.

Psychologically speaking, this commercial plays perfectly into Maslow's hierarchy of needs. The woman's physiological needs are being met (she is resting comfortably with her infant), she is feeling safe and secure, and her love and belonging needs are being met. She feels the love from her husband, and both her husband and her infant give her a sense of belonging in the family. This is not necessarily a bad commercial; it is just one example of Maslow's hierarchy being portrayed in the media.

Every human being wants to be loved. This is not a wholly incomprehensible statement. With the exception of some people with personality disorders, everyone wants to be loved. The

feeling that one experiences, especially when they know that they are loved, is indescribable. This is why love is a significant component in Maslow's hierarchy. "People have a need for intimate relationships, love, affection, and belonging and will seek to overcome feelings of aloneness and alienation. Maslow stresses the importance of having a family and a home and being part of identifiable groups." (Varcarolis, 39). It is this idea, this need for love that keeps us searching for, and then staying with, our partners. As stated earlier, 40-50% of marriages are ending in divorce; however, this statistic does not take into account the marriages that are staying together for "convenience". A marriage of convenience can include marriage for monetary gains, an exchange of services, or, heartbreakingly, a marriage that stays together because the people involved are afraid of being alone and the thought of unending loneliness.

Feeling alone can be one of the supremely devastating feelings in the world. Oftentimes, for couples who have been together for years, when one spouse dies, the remaining spouse often joins them in death. This may be because both partners were old, however, it can also be attributed to the feeling that one just cannot live without their love. It's almost a beautiful thing to think about, to love someone so strongly that you just cannot imagine one's existence or life without them.

Shakespeare touched on this subject when he wrote the play *Romeo and Juliet*. While the two lovers, Romeo and Juliet, definitely were not together for a long time, their love for each other was beyond measure. Through a number of misunderstandings, Romeo comes across Juliet's (supposedly) lifeless body, and declares himself unable to live without her. "For fear of that I still will stay with thee and never from this pallet of dim night depart again. Here, here I will remain with worms that are thy chambermaids, O, here will I set up my everlasting rest…O true apothecary! Thy drugs are quick. Thus, with a kiss I die." (152). Upon waking from her

slumber, Juliet finds Romeo dead next to her. Unable to live without him, she grabs Romeo's dagger and declares "O happy dagger! This is thy sheath; there rust, and let me die." (154). While this is, of course, a dramatization of the idea of not being able to live without your partner, it does show that this idea of belonging together has been together for generations.

In addition to Freud's view on love being developed during childhood and Maslow's idea that love is important enough to be included in the hierarchy of needs, there is another aspect of psychology that drives couples to stay together. B.F. Skinner (1904-1990) was a behavioral theorist who is perhaps best known for his theory of operant conditioning. "Operant conditioning, in which voluntary behaviors are learned through consequences, and behavioral responses are elicited through reinforcement, which causes a behavior to occur more frequently." (Varcarolis, 32). This idea of operant conditioning can accurately be applied to the idea of love.

Operant conditioning is most associated with the reward/punishment concept. The reward can come in the form of either positive reinforcement (such as receiving a trophy for finishing first in a marathon) or negative reinforcement (opening an umbrella on a rainy day, in order to not get wet). Contrary to popular belief, negative reinforcement is not a punishment; it is a removal of an unwanted stimulus. In contrast to reinforcement is that of punishment, such as being arrested after driving while intoxicated.

Love is the ultimate positive reinforcement. Historically, courting rituals, which are the path to love, are essentially working on the same idea as Skinner's positive reinforcement. For example, when a man is smitten with a woman, he will often send flowers, call often, write love letters, and take the woman out on elaborate dates. In return, the woman recognizes that he has potential as a provider, which in turn makes her more affectionate towards him. He recognizes this affection as being a positive reward, and in turn, will continue his pursuit and the behavior.

As mentioned earlier, the hormones and neurotransmitters involved in falling in love also play a role in the reward/punishment aspect of love. When one is in love, there is often an increase in the amount of touching involved, whether it be hugging, kissing or cuddling. This touch releases the endorphins, dopamine, oxytocin, etc., which produces a feeling of euphoria and contentment. One then desires this feeling, so they spend more time with their loved one, which releases more of the hormones/neurotransmitters. This is a consistent cycle of positive reinforcement.

In an interview with Dianne Kinsey, the concept of the psychology of love was discussed. When asked why people stay together, Ms. Kinsey stated that it was due to a "fear of loneliness." This fear of loneliness keeps couples together, even when it might be best for all parties to ultimately separate. In addition, Ms. Kinsey stated "there is a deep fear of growing old alone." This fear will keep couples together; in fact, it can even be the motivation to have children. While the desire to have children can absolutely be a biologically driven need, the truth is that some couples have children so there will be someone to take care of them when they get older.

When the idea of loneliness is discussed further, Ms. Kinsey stated that marriage can be a "convenience" and that "divorce takes too much effort." In order to combat this loneliness that couples feel when they are in a relationship without love, they often resort to extramarital affairs. These affairs can bring back the feelings of excitement and "newness" into a person's seemingly empty life. Unfortunately, the adulterer may not realize that these affairs will not fix the inherent problem, which is that the marriage is failing. Ultimately, the excitement of the affair will wear off, and the adulterer will have to either face the truth, or continue living with the denial.

Ms. Kinsey also discussed the fact that there are different types of love. She stated that the most important type of love in her opinion is "agape", which is a spiritual love. Ms. Kinsey

stated that this is when people place the "wellbeing of others above their own." This idea of love is different from the love that one thinks of normally; however it is equally beautiful and vitally important.

The concept of divorce was also discussed, and when Ms. Kinsey was asked why it seems that divorce is so prevalent in today's society, she stated "there is no longer a stigma around divorce…today's culture has supported children who come from divorced homes." This is certainly true, however women today who become divorced do not face the same stigma as they did in the 1950's. Since the women's liberation movement, women now have many more choices, and are able to sustain themselves and their children, if need be. Unfortunately, women still do not make a salary equal to a man's, yet this gap is closing.

When asked which personality aspects a person must have in order to make their relationship work, Ms. Kinsey stated they need to be "flexible to change, and they need to be resilient." These personality traits are especially important in making a marriage endure. For example, if a couple gets married at the age of twenty-five, they are not going to be the same people when they are thirty or even forty. Life will change them, they may go through career changes, have children, or take up new hobbies. In order for the relationship to survive, sustain and grow, the people involved need to be willing to evolve with it.

When asked which aspect of love, biology, psychology, or philosophy, is the most important in a successful relationship; Ms. Kinsey stated that it is "a combination of all three." She stated "love is the most powerful force in the entire world, but we have to start with ourselves."

Philosophy: The Essence of Love

LOVE

Throughout this paper, all the books read, all the interviews conducted, one concept continually emerged, and that is "loving is part of the human condition." We are inherently programmed to love, whether it's biologically, psychologically, or by some other mechanism we have yet to understand. "Contrary to what philosophers, moralists, theoreticians, in-laws, and counselors have always argued, love is not a choice. It is a biological imperative. And just as evolution favored human beings who were able to stand upright, it favored human beings who felt love. It favored them because love has great survival value." (Ackerman, 151). But what is this love, why are we driven to achieve it, and why are we so despondent when it's missing from our lives? In order to understand and answer these questions, it is imperative to travel through history, and to discuss how love was understood in the past.

In ancient Greece, Athens was considered the "birthplace of western philosophy." The family was not as we know it to be today. "…the family was not one household in Athens; it was the city itself, whose affairs all men knew and played a role in…Once legitimate heirs were born to a man, things loosened up slightly for the wives, who could then divorce to get out of a particularly nasty marriage." (Ackerman, 23). While there were, unquestionably, extramarital affairs, they were more well-known and accepted in that society. There is a similarity in one aspect, however. "It's not that Athenian women didn't sometimes have premarital or extramarital affairs, but those who did were thought shocking and immoral." (Ackerman, 23). This idea is still true in today's society, men's affairs are almost accepted, and at the very least, they aren't seen to be as much of a scandal of that of women's affairs.

With the knowledge of extramarital affairs and divorce, one may wonder if the ancient Greeks believed in love. In fact, the belief that society holds today, that there is one person out there for everyone, a "soul mate", actually originated with Plato. Plato (429–347 B.C.E.)

discussed the idea of the soul being separate from the body. “We must recognize that the soul is a different sort of object from the body — so much so that it does not depend on the existence of the body for its functioning, and can in fact grasp the nature of the forms far more easily when it is not encumbered by its attachment to anything corporea.” (Kraut, 2009). In addition, “the preconceived image of the person we are meant to love comes from Plato, who said that there are perfect universal forms, and humans are constantly searching for facsimiles of those forms.” (Ackerman, 126). Plato’s idea, that there is someone out there for everyone, is what keeps everyone searching for adoration and love. We, as a society, are taught, from the very beginning, that love is real, our soul mates are out there, and, ultimately, we will find the one who makes us complete and whole.

Perhaps couples stay together because of Plato’s idea of “soul mates”. When couples get married, those who are religious feel that they have found their soul mates, and they make a solemn promise to God to make the marriage work and flourish. In getting a divorce, the couple not only has to admit defeat to themselves, but also break a promise to God. They have to admit that the person they married may not be their “soul mate”, and that can be terrifying, because they need to go back out into the world of dating. Some of them may have the faith that they will find their love, others may meet and fall in love with someone else who may not be right for them. All of this work is done in search of a “soul mate”.

A more modern philosopher, Michael Boylan, discusses his idea of love in his book *The Good, The True and The Beautiful*. He states that love is an action, and the concept leads us to change and grow as human beings. “Love is a powerful motivator for being good. The affective part of the good will is no poor sister to the rational. It can be an effective guide to good action.”

(27). One can conclude, then, that the essence of love is not only to find your soul mate, but it also allows one to be "good".

Finally, one must philosophically compare love and sex, since these two ideas have a biological and psychological basis. Another modern philosopher, Robert Rowland Smith, does just that in his book *Breakfast with Socrates*. He concludes that "According to biblical tradition love can, in turn, be subdivided into friendship (philia) and spiritual or emotional love (agape), which complicates the relationship with sex, or eros, a bit further." (198). This theory, a complication of love and sex, is one that has been discussed for generations. Harlan Ellison once concluded that "Love ain't nothing but sex misspelled." While this quote is often laughed off, there is some truth to the saying. Love and sex are absolutely entangled; however it is possible to have one without the other. But that's a story, and a lesson, for another day.

In an interview with William Krieger, the philosophical aspect of love was discussed. Dr. Krieger stated that "psychology started from philosophy", and that both of these disciplines are entangled. Considering the research that was done based on Plato and Socrates' work, it's not difficult to see how these two disciplines play off and complement one another. When asked what he thought was the reason couples are able to stay together, Dr. Krieger stated it was due to "a person's ability to change." When asked to clarify on that idea, Dr. Krieger stated "people change radically over time; the couples have to be able to change as well." This idea is similar to Ms. Kinsey's, that in order for a marriage to survive, a person has to be able to change, to be flexible and resilient.

Dr. Krieger also agreed with Ms. Kinsey's idea that there is less of a stigma surrounding divorce in today's society. He stated that "years ago, women had no opportunities…even less if you had kids." In addition to the stigma surrounding divorce being lessened, Dr. Krieger also

stated that there is less stigma surrounding the concept of seeking therapy. Couples are now able to feel more free to visit a therapist in order to work through their difficulties, and in this way, they are able to potentially save some marriages that would have ended in divorce.

Dr. Krieger also concurs with Dr. Zawia and Ms. Kinsey, insofar as he believes that love and successful marriages are due to a combination of biology, psychology and philosophical aspects. He stated that "neurochemistry is definitely important, but it's not all of it." Dr. Krieger states that he absolutely believes in love and marriage, and that it is important to work together and change with the relationship in order to make it successful. He concludes that "Life is too short to be terribly miserable."

Biology, Psychology, Philosophy: Who wins?

After researching all three areas of love, it is difficult to say which of them is the most important when it comes to love, marriage, and success in a relationship. Biological factors, such as the release of the hormones and neurotransmitters, are absolutely important in falling in love, and staying in love. Evolutionarily speaking, pheromones are also extremely important in finding the best mate, especially if one wants to have children and give them the best chance of survival, thanks to the MHC.

Psychological aspects, such as Freud's ideas of the way one picks their mate based on their relationship with their parents, and also their regression into irrational behavior when in love, is also equally important. The fact that Maslow has both the ideas of "safety and security" and "love and belonging" in his hierarchy is important, because it allows one to recognize that love isn't just a random concept, it is necessary for good mental health. Skinner's explanation of

the positive reinforcement involved in operant conditioning allows us insight in how psychology explains and reinforces love.

Finally, Plato's discussion of the idea of a "soul mate" is crucial to today's idea of love. We spend a considerable amount of time searching for our soul mates; some of us spend our entire lives, just to feel the type of love that Plato described. Michael Boylan's idea that love is a means towards doing 'good' can be seen everywhere. A person may donate an organ or bone marrow to a loved one. We help our loved ones work through issues that would be ignored if they were a stranger. The idea that love is an impetus for good embodies the essence of the human spirit. Finally, Robert Rowland Smith's idea of love and sex being intertwined brings new meaning to sex, turning it from a biological drive to something beautiful shared by humans, in order to feel closer to one another.

In conclusion, more research needs to be done in order to discover what love truly is. While the previous research is extremely beneficial in helping to define love, case studies of couples who have been married for a substantial amount of time (greater than twenty-five years) would be helpful in order to come to a more definite conclusion. While no final definition of love has been concluded, a quote from Pascal comes the closest to gleaning a clue: "The heart has reasons that reason cannot know."

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