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The adventures of love in the social sciences : social representations, psychometric evaluations and cognitive influences of passionate love

Cyrille Feybesse

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THESE
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The adventures of love in the social sciences: social representations, psychometric evaluations and cognitive influences of passionate love.

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The adventures of love in the social sciences: social representations, psychometric evaluations and cognitive influences of passionate love.

Abstract

The main goal of this thesis is to explore the romantic feelings of passionate love widely defined as a “state of longing with another”. This construct is generally considered to be a universal experience strongly associated with sexual arousal and capable of having a strong effect in emotional, cognitive and behavioral dimensions. The main goal of this project is to provide further evidence about the contention that although subjective experiences of passionate love are culturally and contextually determinate, people all over the world present the same symptoms of passionate love with the same intensity when they consider being in love. Plus, the influences of passionate love on cognitive processes were tested in other studies. A total of 1000 college students participated in 4 different studies. The Passionate Love Scale (PLS) was administered on Brazilian and French subjects in order to explore their evaluation of passionate love through cognitive, emotional and behavioral components. The social representations of these same groups about passionate love were explored with a structural analysis of word associations. Cognitive processes were tested through one study about the relationship between passionate love and sensory experience and another one about the effect of passionate love in creative productions. The results found with the PLS indicated the same psychometric properties in France and in Brazil. In both cases, the factorial analysis indicated one stronger dimension with high internal consistencies. Subjects in love seemed to love with equal passion in both cultures but gender differences were found in Brazil. The analysis of the word association revealed contextual, cultural and gender differences. Passionate love had a positive effect in low cognitive processes (physical attraction and sensory experience) but no effect in high cognitive tasks (divergent and convergent thinking). The results of these different studies are presented and discussed in the light of cross-cultural, neuropsychological and evolutionary perspectives on romantic love. Passionate love might be experienced in a number of ways but its manifestation is universally the same. It is concluded that passionate love might be mainly a biological phenomenon with minor cultural variations directed to insure reproductive success in our species.

Keywords: Passionate Love, Romantic Relationships, Cross-Cultural Analysis, Creativity

Les aventures de l'amour dans les sciences sociales: représentations sociales, évaluations psychométriques et influences cognitives de l'amour passionnel

Résumé

Le but principal de cette thèse est d'explorer le sentiment d'amour passionnel dans les relations romantiques. L'amour passionnel est défini comme « un état de désir intense à d'union avec un autre ». Ce construit est généralement considéré comme une expérience universelle fortement associée à l'attraction sexuelle et possédant un impact considérable sur les dimensions émotionnelles, cognitives et comportementales. Le but principal de cette thèse était d'apporter de nouveaux éléments montrant que les expériences subjectives de l'amour passionnel sont culturellement et contextuellement déterminées et qu'il existe néanmoins une certaine universalité des cognitions et comportements lorsque les personnes déclarent être amoureuses. De plus, nous avons étudié l'effet de l'amour passionnel sur les processus cognitifs. Au total, 1000 étudiants ont participé à 4 études différentes. Des sujets français et brésiliens ont répondu à l'Echelle d'Amour Passionnel (PLS) dans le but d'étudier leurs sentiments d'amour passionnel sur la base des composantes cognitive, émotionnelle et comportementale. Les représentations sociales de l'amour passionnel de ces mêmes groupes ont été explorées à partir d'analyses structurelles d'associations de mots. Les processus cognitifs de l'amour passionnel ont été testés dans une étude sur la relation entre l'amour passionnel et les expériences sensorielles et une étude sur l'effet de l'amour passionnel sur les productions créatives. Les résultats obtenus avec la PLS ont montré les mêmes propriétés psychométriques en France et au Brésil. Dans les deux cas, l'analyse factorielle a révélé une composante principale avec des consistances internes élevées. Les sujets qui ont déclaré être amoureux ont semblé aimer avec le même niveau de passion dans les deux cultures mais des différences de genre ont été retrouvées au Brésil. L'analyse des associations de mots a indiqué des différences contextuelles, culturelles et de genre. En ce qui concerne les processus cognitifs, l'amour passionnel a un effet positif sur l'attraction physique et l'expérience sensorielle mais nous n'avons pas trouvé de relation entre l'amour passionnel et la créativité (pensées divergentes et convergentes). Les résultats de ces différentes études sont présentés et discutés en s'appuyant sur les perspectives interculturelle, neuropsychologique et évolutionniste de l'amour romantique. L'amour passionnel peut être vécu de plusieurs façons mais ses manifestations sont universelles. Nous concluons que l'amour passionnel est principalement un phénomène biologique qui peut être influencé par la culture, assurant des reproductions réussies de notre espèce.

Mos-clés : amour passionnel, relations romantiques, analyses interculturelles, créativité

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Introduction

Romantic love plays an important role in the life of all human beings. It can have a decisive impact on someone's choices, emotional states or the evaluation of happiness. The main focus of this thesis is the feeling of passionate love, which is usually considered to be a powerful side of romantic love. This topic was explored in several ways: psychometric studies, social representation theory or the relationship between passionate love and cognitive processes. Also, we were able to collect data in France and Brazil and collaborate with scholars from different parts of the globe. Through the different theoretical chapters of this project, we present different academic perspectives about passionate love from anthropology to the neurosciences.

This work was mainly undertaken through under the collaboration of two French laboratories of l'Université Paris Descartes: "Laboratoire de Psychologie Sociale: menaces et société" and "Laboratoire Adaption Travail Individu". This project was supervised by two professors that are respectively attached to this these labs: Geneviève Coudin and Todd Lubart.

The studies of this project addressed mainly the topic of romantic love throughout a social psychology perspective. The theories and methods employed in this project are mainly related to this field of research. Passionate love is considered to be a universal experience that can be understood in terms of several aspects:

First, passionate love may be seen as a psychological phenomenon with specific characteristics that are relatively general, not varying over time and are free from cultural influences. Some evidence suggests that people experience common "symptoms" when they are in love with someone. So far, several scientific studies have led to a consensual scientific definition and, the identification of some characteristics that seem to be present in people passionately in love from across time and place. These

common feelings and their levels of intensity can be measured with several psychometric scales. In this project, we focused on the Passionate Love Scale. This instrument has been proven to be a reliable measure in cross-cultural studies all.

Second, culture is considered to play a role in the way passionate love is represented. Scholars were successful in demonstrating that the interpretation one person has towards this feeling is influenced by culture to a great deal. The beliefs, judgments or representations of passionate love can be addressed with the use of social representation theory in order to determine if gender or culture influence how this concept is conceived or considered.

We suggest that people might differ in the way they conceive passionate love but when someone is in love, he or she will experience the same feelings with the same intensity.

Cross-cultural differences were addressed in one study in the thesis relating passionate love with sensory experiences one person can share with the beloved. We explored if culture could play a role on what are the sensorial features that can be more attractive and desired by lovers. This study can also be considered to address the effect of passionate love on basic cognitive processes. Finally, the thesis explored a very interesting relationship that has been almost totally neglected until very recently: the effect of passionate love on creativity. Love and creativity seem to have always been together in history but this still is a little-studied relationship for science. This topic can be considered to be very old in art but can be seen as something new and original in scientific studies today. This last study therefore examines the effect of passionate love on complex cognitive processes.

Before presenting the studies of this dissertation, we divided the theoretical presentation into four different chapters. Chapter one is dedicated in defining passionate love and presenting different scientific findings related to this topic. Chapter two deals with the

psychometric attempts trying to measure feelings on love in romantic relationships. In this case, we focused mainly on the different ways one can measure passionate love with the different love measures we used in our research. Chapter 3 addresses the cross-cultural perspective on romantic love. In this chapter, we present a brief historical perspective on passionate love and describe some cross-cultural similarities and differences on romantic love found in different academic research. Finally in Chapter four, we focus on the research theory and methodology we have chosen to explore our topic of research. This chapter deals with several topics: social representation theory, on the interaction passionate love has with creativity and a brief presentation of the evolutionary perspective on romantic love.

Chapter 1: Passionate love in the scientific literature

Il n'y a d'unions à jamais légitime que celles qui sont commandées par une vraie passion

Stendhal (1822)

Human beings have always questioned what love is. Love is present in almost all human and spiritual relationships. People sacrifice themselves, die and kill, create, and destroy for love. When the expression “I love you” is uttered it always represents an intense feeling, but this locus can have a myriad of meanings. This expression could be addressed to our beloved, our pets, family and friends, or even to our favorite brand. Love is expressed and experienced in multiple ways, may have several meanings, but it's also a concept that is always evolving, yet remains unique at the same time (Dewaele, 2008). In the same way, scholars are far behind in finding a conceptual definition of love. There are as many definitions for love as there are people trying to craft one. This was a major topic of discussion in the classical literature, where all sorts of visions were expressed. In order to keep it simple, here are few examples of different “love definitions” that have been proposed by different scientific scholars:

“A strong emotional attachment” (Goode, 1959 in Felmlee & Sprecher, 2006)

“A multidimensional construct that includes behavior as well as feelings and thoughts” (Sternberg & Barnes, 1988)

“An innate emotion raised by erogenous zone cutaneous stimulations” (Watson, 1924)

“Acts that achieve reproductive success” (Buss, 1988)

“The establishment of a relationship with a partner” (Hazan & Shaver, 1987)

So far, the definitions of love proffered by novelists, poets, or songwriters, are more compelling than those offered up by academics. One explanation of why it is so hard to scientifically define love is because the concept includes a vast territory of human behavioral events (Berscheid, 1988). In addition, love is dynamic and constantly

changing. In experimental studies, scientists need to control what they study, but loving relationships with their need for reciprocation, their hunger for intimacy, and their struggle to survive are constantly changing. The changes that occur in love over the course of a relationship can be translated or understood through the different types of love cited by different researches (see chapter 2 for a review). Scientific studies focused on love have used uncountable different terms to illustrate our personal relationships. The expression “romantic love” is widely used in recent scientific articles or textbooks but scholars lack a clear definition of what they mean by the term (Berscheid, 2006; Lamy, 2011). The common intention that we observe in exploring romantic relationships, is that they involve sexual attraction or a special affection for somebody with whom we are (or want to be) sexually active.

It might be hard to follow the multiple meanings of the different types of love provided by scholars who work on the topic of love. The main type of love explored in this thesis is also the one that was the most studied and understood: Passionate love. This is probably the most powerful type of love in the sense that is the one that provokes greater cognitive, emotional, or behavioral changes. Anyone knows and is aware when passionate love has struck and it is easy to notice it in people who are close to us.

1.1) Definition of passionate love

Passion is a term that is used to describe any strong emotional state (Baumeister & Bratslavsky, 1999). In the case of romantic relationships, passionate love translates to other terms such as “puppy love”, “infatuation”, “limerence”, “obsessive love”, “being in love” or “lovesickness”. Robert Sternberg (1988) assumed that passion leads to romance, physical attraction, and sexual activity. Passionate love can be viewed as that type of love where there are feelings of liking, combined with sexual desire (Berscheid,

2006). Scholars widely accept the following operational definition of passionate love provided by Elaine Hatfield and Susan Sprecher (in 1986 with some small changes since then), which is constantly used in scientific papers.

“A state of intense longing for union with another. A complex functional whole including appraisals or appreciations, subjective feelings, expressions, patterned physiological processes, action tendencies, and instrumental behaviors. Reciprocated love (union with the other) is associated with fulfillment and ecstasy; unrequited love (separation) is associated with emptiness, anxiety, or despair” (Hatfield & Sprecher, 1986, p. 383).

Baumeister & Bratlavsky (1999) tried to combine different academic approaches that attempted to define passionate love. They proposed that passionate love involves strong feelings of attraction for the other person. These feelings are typically followed by strong physiological arousal and the desire to be united with the beloved in a variety of ways. Passionate lovers surely want to be sexually united but they also desire a social, emotional, and even spiritual union in the sense of being in communion with the beloved. Ideally, this union is both constant and permanent.

Passionate lovers require exclusivity with the beloved. It is a mechanism that makes one focus on only one person, creating a sense of security (Marazziti & Baroni, 2012). We can be only passionately in love with one person at the time. This idea of exclusivity was also present in early psychoanalysts texts. Sigmund Freud (1914) considered that falling in love corresponds to investing our entire libido in a single object, elevating the beloved to the status of the ideal sexual object. In this sense, passionate love is the type of love that is most prone to lead a couple to get married (Neto, 1992). Gonzaga and colleagues (2008) were able to demonstrate that falling in love diminishes attraction to seductive alternatives and promotes commitment to a

single partner. They have found that love insures that a lover will have fewer thoughts of an attractive alternative.

As it is shown in the scientific definition, the relationship established with the beloved plays a crucial role in the way the lover will experience the feelings of passionate love. People passionately in love usually experience emotional turmoil, especially in the beginning of the romantic affair. They can jump from extreme joy to freezing disquiet and sorrow concerning the beloved or the relationship. What will determine the type of emotion experiences is whether one's feelings are reciprocated or not. These emotional feelings can oscillate very quickly in people experiencing high levels of passion. Passionate love translates the need of men and women to form and maintain interpersonal attachments. These feelings of connectedness are a powerful predictor of psychological and physical health (Hatfield, Feybesse, Narine & Rapson, (in press).

When the union between two lovers is achieved, the degree of happiness experienced by one of them is parallel to the other in positive reciprocity (Baumeister & Bratslavsky, 1999). College students, who are in stable romantic relationships, experience fewer mental health problems, have fewer overweight/obesity problems, and tend to drink less often than do single people. In the same way, married couples are less likely to suffer from long-term medical conditions and have higher life expectancy than do their single peers (Braithwaite, Delevi & Fincham, 2010).

Unrequited love is painful and stressful for everyone — be they lover or beloved. Roy Baumeister and colleagues (1993) investigated narrative accounts of people who have been rejected by the beloved or have rejected a lover's romantic advances. Participants could easily recount a story about this situation. In both cases, for lover and beloved, unrequited love was associated with negative feelings. The rejectors noted feelings of annoyance and anger. They also reported feeling considerable guilt in rejecting someone

and described this scenario as being a very unpleasant experience. Would-be-lovers felt humiliated and reported a considerable loss of self-esteem. They described feelings of longing, preoccupation, and fear. The rejectors rated the experience of rejecting somebody as even more painful than the discomfort of would-be lovers. For the beloved, there is no consoling advantage; would-be lovers have at least the consolation of having participated in a romantic and dramatic scenario, as they tried to win the heart of their beloved.

The principle of least interest is a well-known theory in social psychology, designed to predict who is most likely to avoid or terminate romantic involvement in the courtship, or premarital phase of a relationship. If one partner of the couple is more emotionally involved than the other, it seems reasonable to predict that it will be the person who is less involved, who will be most likely to terminate the relationship. Data from a longitudinal study of dating couples makes it clear that if romantic partners are unequal in their romantic involvement, the relationship will be a tenuous one. Less emotionally involved partners perceive themselves as having more control over the continuation of their relationships than do their peers (Sprecher, Schmeekle & Felmlee, 2006). This type of study underlies the importance of reciprocity in romantic relationships; it helps us understand the importance of correspondence when a couple is experiencing passionate love. These concepts help us to understand that the type of relationship one has with his or her object of passion (reciprocal/non-reciprocal; equitable/inequitable) will play a crucial role in the way passionate love will be experienced. Passionate love can be associated with very positive emotions when two lovers are closely united but this same feeling can be very negative when it is unrequited. Equity also plays an important role in romantic relationships. Couples in equitable relationships were more likely to become sexually involved and to fall in love.

Inequitable relationships tended to make the couple stop before going deeper in their romantic affair (Hatfield & Rapson, 1993).

The beloved can stay close even when he or she is not physically present. The presence of the loved one can be replaced by objects with which the beloved is associated. These objects can come from significant moments in the history of the relationship and therefore contain the essence of the lovers. The separation with beloveds can then be coped with by the presence of the object that symbolizes them. Aleksandra Niemyjska (2014) showed that the association one makes between an object and the loved one is possible through romantic magical thinking, which is described as an intuitive type of thought that can influence behavior in spite of countering cognitions. Magical thinking is linked with contagion in the sense of maintaining cognitive contact and with similarity because the image / object is equal to the person. Niemyjska demonstrated that magical thinking regulates the perceived distance from a loved one making one person have more feelings of safety and comfort. Magical thinking increases the feelings of the beloved's presence.

1.2) The symptoms of passionate love

Mesulam and Perry (1972) noticed that psychophysiological observations are ancient as man's ability to perceive cause and effect relationships within natural phenomena. They studied Greek and Latin medical texts to highlight how sophisticated and detailed were the observations of the physicians of the time. They transcribed a text about a physician of the third century B.C. called Erasistrato, who was treating Antiochus, the son of one of Alexander's general. The young man felt in love with his new stepmother called Stratonic. Recognizing that he would never have her, he decided not to show his

feelings. He felt sick and strived his hardest to die. Plutarch (from the first century A.D.) described Erasistrato's diagnosis (Mesulam & Perry, 1972, p. 547):

“Wishing to discover who was the object of his passion (a matter not so easy to decide), he would spend day after day in the young man's chamber, and if any of the beauties of the court came in, male or female, he would study the countenance of Antiochus, and watch those parts and movements of his person which nature has made to sympathize most with the inclinations of the soul. Accordingly, when anyone else came in, Antiochus showed no change, but whenever Stratonice came to see him, as she often did, either alone or with Seleucus, lo, those tell-tale signs of which Sappho sings were all there in him—stammering speech, fiery flashes, darkened vision, sudden sweats, irregular palpitations of the heart, and finally, as his soul was taken by storm, helplessness, stupor, and pallor.”

Modern day researchers confirm that there are a considerable number of “symptoms”—cognitive, emotional, physiological, and behavioral—that can be detected in a person who is experiencing passionate love. What is important to keep in mind is the idea that lover's strong attraction toward the beloved is generally considered uncontrollable. Perhaps, the strongest “tip off” that one is in love are the obsessive thoughts that passionate lovers have towards their object of their desire. Such thoughts might almost define this experience (Hill, Blakemore & Drumm, 1997). When asked about how much time one thinks about the beloved, passionate lovers will probably say that they spend 90%, or all the time, thinking about the loved one (Fisher, 2004). Scholars have been successful in ferreting out the common characteristics of passionate love. These “symptoms” seem to be universal and had been always reported across human history. Throughout history, it is possible to find “love stories,” where a young couple express romantic feelings that sound surprisingly similar to the feelings expressed by young lovers today (Hatfield & Rapson, 1993).

When someone is passionate in love it is common to observe these common traits (Feybesse & Hatfield, 2014):

- Intense sexual attraction to the beloved

- Strong desire to be with the beloved
- Intense thinking about the beloved
- Desire for exclusivity and closeness
- Idealization of the beloved and the relationship
- Powerful sense of empathy and concern with the beloved's well-being

Psychometric scales assessing passionate love always include these traits in their items (see chapter 2 for a review). Being in love has constantly been compared with drug addiction (Peele, 1988). The constant focus on the beloved reminds scholars of the total focus of drug addicts on their drug of choice. Passionate lovers are as blind to the realities of the outside world as are addicts, convincing themselves that their drug-induced state is superior to ordinary reality. Love possesses passionate lovers and propels lovers to action just as drugs do with dependent users. In both cases, there is an intense craving when lovers are separated from the object of desire and dependence.

This analogy between being in love and drug abuse has one limitation because, contrary to drug use, there aren't real, validated nosographical or epidemiological studies equating passionate love and lovesickness with the pangs of love addiction. It is certainly possible to find support groups that help one individual to deal with romantic relationships but group accounts indicate that men generally attend for sexual dependence rather than love addiction, while most women usually attend for relationship dependence rather than love dependence (Reynaud, Karila, Blecha & Benyamina, 2010).

Passionate love also influences our beliefs. Individuals in different types of relationships (in love and not in love) differ in their beliefs about how much they believe in the power of love. Romantic beliefs also are influenced by particular relationship schemas. Susan Sprecher and Sandra Metts (1999), for example, found that

various romantic beliefs are associated with love, liking, and passion. For example, people passionately in love tend to strongly believe that love at first sight is possible, that there can be only one true love, that true love last forever, and that love can overcome all obstacles (Sprecher & Metts, 1989). Sharing these beliefs can also play a beneficial role on the stability and quality of a romantic relationship (Sprecher & Metts, 1999).

1.3) The link between passionate love and sexual desire

Sexual desire has a powerful impact in our behavior. With puberty, it becomes an important factor in explaining our behavioral choices. Consider this clever observation from sex columnist Dan Savage (Degrasse, 2015):

“Sex is five hundred millions old; we are two hundred thousand years old. Sex built us, we inherited it. One of the lies we tell kids is “you are going to grow up one day and have sex”, no, “you are going to grow up one day and sex is going to have you””.

Passionate love is tightly linked with sexual attraction and sexual desire. For some scholars, love and sex are virtually identical constructs. As Ellen Berscheid noted in 1988:

“Love is about 90 percent sexual desire as yet not sated”

Berscheid and Hatfield have argued that love and sex are tightly linked. Longing for sex might not be identical to passionate love but they are “kissing cousins” (Hatfield & Rapson, 2009). One can be very sexually attracted for someone but not passionately in love but when one is passionate in love, he or she is generally extremely sexually attracted to the other. Religious groups often consider romantic love to be merely “sexual lust” disguised, and try to prevent its members from develop such feelings, because they lead to premarital and extramarital intercourse (Meston & Buss, 2009).

One must adopt a pragmatic and cautious attitude toward love and sex. Restraint and secrecy are the rule (Jankowiak, 1995)

Although sexual desire and romantic love are often experienced together, some theorists have suggested that they are governed by different social-behavioral systems that evolved to serve different goals. Helen Fisher (2004) explained that desire is governed by the sexual mating system, the goal of which is sexual union for the purpose of reproduction. Romantic love, however, is governed by the attachment or pair-bonding system (Diamond, 2003). The pair-bonding sought by passionate lovers goes beyond the desire for reproduction, as there are many reasons why humans have sex. Davis Buss and Cindy Meston (2007) have identified 237 different motivations for people to have sex in a survey. The reasons might be to simply alleviate stress but can it also be to get closer to God. Nevertheless, their survey indicated that the sex as an expression to love is a very important reason for people to have sex (see Hatfield, Luckhurst & Rapson (2012) for a complete review of all sexual motives that scholar have identified).

Susan and Clyde Hendrick (2002) explored the relationship between love and sex on college students. For this purpose, they created the Perception of Love and Sex Scale which taps the linkage between love and sex in five distinct dimensions: love is most important, sex demonstrates love, love comes before sex, sexless affection and sex is declining. They combined the results of the scale with different types of love attitudes with the Love Attitude Scale (see chapter 2 for a review) and other measures. They concluded that the intensity of the link between love and sex depends on one's love attitude. Ludic lovers related more with the idea that "sex demonstrates love". The "love is most important" subscale was more related to passionate, altruistic, friendship, and practical types of love, while it had a negative relationship with casual sexuality. The subscale "love comes before sex" was more related to passionate love. The idea of

“sexless affection” had a negative correlation with almost all love types—including the ones related to casual sex, indicating that there is always an emotional bond (not necessarily one that can be labeled “love”), in sexual activities. The “sex is declining” dimension had a negative correlation with the passionate, altruistic, and friendship types of love. This last dimension indicated that sexuality is an important aspect of passionate love but the relationship with the others dimensions also indicate that passionate lovers expect more than sex from their beloved. The Hendrick couple concluded that the lay people might link the two phenomenons tighter than the scientific scholars who tend to see love and sex in a continuum. The love phenomenon was given primacy over the sex theme. Sex tended to need love to emerge.

Félix Neto (2012) explored these same assumptions, taking into consideration the adult life span. Elderly respondents, average adults, and young adults appeared to possess structurally similar ideas about love and sex. His findings suggest that age is related to all perceptions of love proposed by the Hendrick couple. Older adults scored higher on “love comes before sex,” and assumed that sex is no longer as much a part of their relationships. This study demonstrated that the perception about how tightly linked love and sex is also influenced by age.

Gonzaga and colleagues (2006) found that momentary experiences of romantic love and sexual desire were distinct in their correlational study. In terms of experience, love and desire correlated with different emotional feelings. Love related more with happiness and approach-related states while desire was more strongly correlated with arousal and present states such as fear or concern. Unlike desire, love didn’t correlate with measures of sexual satisfaction or sexual behavior. Their sample explored love and sex in early stages of romantic relationships—showing that this relationship can be influenced by the context. One can predict a grater link between love and sex in more intimate

relationships. The same results were secured in a previous about sexual desire, where desire and love had a non-significant correlation for both males and females (Beck, Bosman, & Qualthough, 1991). On the other hand, a recent study provided compelling evidence that individuals with a stronger sex drive are more susceptible to falling in love. Sex drive positively predicted the frequency of falling in love, especially in women (Galperin & Haselton, 2009).

The relationship between love and sex might also be influenced by culture. In many cultures, men are taught to separate love from sex, while women are obliged to put both things together (Hatfield & Rapson, 2005). Societies in which “casual sex” is more allowed are probably more prone to accept the idea that love and sex are separated entities (Feybesse, Hatfield & Neto, 2013).

1.4) Passionate love: How long does it last and when does it begin?

Although the flame of passion is very strong, it is short lived. If a romantic relationship persists over time, passionate love will become a tenderer, less intense, and friendlier type of love. Scientific researchers are still debating about how long passionate love lasts. Scholars debate between two extremes of the range of passionate love length of time. In one extreme, some scholars stated that passionate love only last for about 12-16 months (Marazziti, Akiskal, Rossi & Cassano, 1999). Others would debate that passionate love survive longer, about 3-4 years on the other extreme (Jankowiak & Fischer,1992; Fisher, 2004). The same person can fall in love several times in his life. This is considered to happen 3-5 times in one lifetime (Reynaud et al., 2010).

Although it has been demonstrated that passionate love can be experienced in all ages, (Hatfield, Schmitz, Cornelius & Rapson, 1988), it is likely that this feeling might be most intensely experienced at puberty (Hatfield & Sprecher, 1986). The prevalence of

passionate love might be greater when people that are single and young. If we take into account studies on romantic love using college students, it is quite common to notice that 60% of the sample claims that they are in love, while half of the sample declares they to be engaged in romantic relationship. Hill, Owen, Blackmore and Drumm (1997) conducted a comparative study between subjects that were adolescence and subjects that were young adults. They concluded that passionate love is most frequent in subjects aged between 16-20 years old. Passionate love seems to become stronger and fully experienced when children enter puberty. This period of our development corresponds to the moment where children are less dependent to their parents and focusing more attention to their peers. Passion can be fueled by pubescent sexual and hormonal changes (Hatfield & Rapson, 1993). Although passionate love is generally attributed to adolescence or young adults, it can also be experienced in any other phases of the life-span. The elderly have been found to experience the same behavioral and emotional aspects of passionate love as adolescents do, but they present less obsessional aspects (Wang & Nguyen, 1995).

Although men and women are known to experience passionate love with the same frequency and intensity, they seem to experience it in a slight different ways. Studies indicate that men are more likely than women to believe in love at first sight. They fall in love more easily and they are more vulnerable in being rejected (Galperin & Haselton, 2010; Sprecher & Metts, 1989). Men report falling in love faster and express feeling of passionate love first. Later, women tend to tell their partners “I love you” more often than do men (Wilkins & Gareis, 2006). On the other hand, women are faster at perceiving other emotions and are more confident in expressing affection, liking, and love to the opposite sex (Harrison & Shotall, 2011). They are also more willing to sacrifice for the romantic relationship and fight for its survival but also fall out of love

quicker when they perceive that the relationship is ill fated (Rubin, Peplau & Hill, 1981). Men tend to see love as a game—that is, to jump from one relationship to another more often than do women (Hendrick & Hendrick, 1986; Meston & Buss, 2009). Men might fall in love more readily than do women because they experience sexual desire more often than do women (Beck, Bosman & Qualtrough, 1991).

1.5) The course of passionate love: From infatuation love to companionate love.

It is quite common to find classical novels describing a couple falling in love at first sight and immediately experiencing intense passionate love. Famous couples such as Romeo and Juliet (Shakespeare), Tristan and Isolde (Richard Wagner) or Anna Karenina and Alexis Vronski (Tolstoi) are very good examples of two persons falling deeply in love at very moment they first see each other. Even if almost everybody falls in love at least once in their life, “love at first sight” doesn’t seem to happen that often, however. In one study, which interviewed a hundred men and women, only 10% of them thought that they had experienced this phenomenon (Fisher, 2009). Generally, falling in love might require a period of self-discovery and some time in which attributes associated a particular other may take on an added salience (Aron, Paris & Aron, 1995). Passionate love certainly involves being very sexually attracted to someone in the beginning and during its course. One starts to be attached with emotional intensity by someone’s physical appearance (Hendrick & Hendrick, 2006) and to deeply enjoy all the moments spent as a couple.

Elaine Hatfield and Robert Sternberg are two very renowned scholars of love that disagree as to whether there is an early stage of passionate love, usually called *infatuation*, or both infatuation and passionate love feel just the same at the time. According to Sternberg (1988), infatuated love results from passionate arousal in the

absence of intimacy, and the decision/commitment components of love. Infatuation is defined here as a high degree of mental and physical arousal that can dissipate as quickly as it had emerged. Infatuation is situated in the period of time in which love has not yet been consummated and it is mostly idealized. Once love is consummated, infatuation becomes romantic love / passionate love as it has been defined in this chapter. Elaine Hatfield (Hatfield & Walster, 1978) considers passionate love and infatuation to spark the very same feelings. Ask anyone who is wildly in love and they will say they are feeling true and passionate love. Only when the relationship falls apart will they conclude it was just infatuation. The change of term is a way of rewriting history and discounting the seriousness of their feelings and their loss. Friends and family tend to argue “it’s just infatuation” when they disapprove of a relationship. But to the lover they feel the same.

Both scholars are probably right. In part, it is a matter of semantics. Some might experience passionate love feelings right away (like experiencing “love at first sight”) while others might meet someone who catches their attention (at first) and then fall in love a little while later. Falling in love can be a matter of attitude, in which someone recognizes having “special feelings for someone,” but will call these feelings love when something more concrete happens with this “special someone”. The emotional feeling gets more intense and can easily be called love. There is not enough evidence to sustain either contention but lay people probably resonate more on the Sternberg’s argument when they evaluate what happens in their romantic affairs.

Arthur Aron and colleagues (1989) have examined different accounts of falling-in-love from two different groups: undergraduate students and adult non-students. These accounts were compared to brief accounts of falling-in-friendship. These comparisons make it clear that passionate love flourishes when the beloved possesses desirable

characteristics such a physical attractiveness and an appealing personality. Falling-in-friendship is more related to similarities and propinquity. This research also showed that passionate love is maintained when the other appreciates the self and loves in return. These were described by the two falling-in-love groups as key elements for the foundation of the romantic attachment between themselves and their lovers.

Intimacy plays a very important role in the maintenance and crystallization of passionate love and romantic attachment. Commitment and decision making about what to do in relationships generally comes when passion and intimacy are cemented (Sternberg, 1986). For Roy Baumeister and Ellen Bratlavisky (1999) passion and intimacy are not related per se—passion and intimacy will change levels within a romantic relationship as time goes by. Passion will facilitate the development of intimacy. Changes in the level of intimacy will have an effect on passion as well. Early in the relationship, marked increases in intimacy will provoke high levels of passion. Stable levels of intimacy lead to declining feelings of passionate love, however. In time, as couples become increasingly intimate, it becomes increasingly difficult to maintain the high level of passion the couple felt in the early days of their relationship. Both authors searched the scientific literature for evidence supporting the idea that passion is a function of changes in intimacy, but were unable to find supportive evidence.

As it was stated earlier, theorists generally agree that passionate love decreases with time. Recently, scholars, who view passion as a multidisciplinary construct, have begun to investigate which aspect of passionate love deteriorates most rapidly. According to Bianca Azevedo, Arthur Aron (2009) and James Graham (2011), passionate love can be divided into two distinct components. One component would be classified as being “romantic obsession” that includes such elements as obsessive aspects of passionate

love (such as intrusive thinking, uncertainty, and mood swings: Acevedo & Aron, 2009). This component of love leads the individual to be dependent of the relationship, displaying an anxious attachment. Romantic obsession would be more frequently situated in the initial phases of romantic relationships and in insecure relationships (Graham, 2011) or in relationships where a couple is uncertain about the course of their present romantic relationship (Graham & Christiasen, 2009). The Mania love styles of Lee's theory (see chapter 2 for a review) would be the type of love that fits better what these authors are suggesting with their concept of romantic obsession. The Passionate Love Scale of Elaine Hatfield and Susan Sprecher (1986) also integrate this concept in their measure via some specific items of their scale (Items 1, 5 and 21).

The second component of passionate love suggested by these authors was called "romantic love" which corresponds to intense feelings of love, engagement, and strong sexual interest without having obsessive elements. Unlike the romantic obsessive subtype, romantic love can persist for a long period of time and can be found in new or older relationships. This type of love maintains energy, optimism, and friendship in older romantic couples (Acevedo & Aron, 2009). Both authors performed a meta-analysis, using data from several studies that included psychometric measures of love. They secured independent factors for these two elements. Romantic love was positively associated with satisfaction, well-being, high self-esteem, and relationship length (Acevedo & Aron, 2009). This didn't happen with the romantic obsession subtype. Both studies suggest that passionate love loses its obsessive elements with time, leaving a couple to experience a sort of "honeymoon" phase where attraction and desire are still very high, without having the complications and the turmoil of the obsessive aspect of passionate love. This phase is eventually replaced by a tenderer and more committed type of love, called companionate love, as the relationship continues.

No couple is an island. Baxter and Pittman (2001) interviewed heterosexual romantic couples, who were asked to try to recall the different factors that led them to commit themselves more fully to their relationship. The turning points that emerged were: spending time with the beloved and third-party storytelling to social network members. Spending time was associated with the feeling of passion, getting to know one-another, and exclusivity—which encouraged lovers to increasingly include the beloved in their social networks. These activities led couples to be even more committed to the relationship, for example, moving in together or getting engaged. Couple satisfaction correlated positively with the proportion of agreed-upon turning points that were communicatively remembered.

Classical authors such Freud (1912) and De Rougemont (1939) considered marriage as the social throttle of passionate love or erotic love. Scientific researches on the topic of love tend to agree with the idea that the romantic type of love experienced in a married couple is different from passionate love. Elaine Hatfield (1988) made the distinction between two types of love: one that is more related to romantic relationships between single people (passionate love) and another more related to conjugal love called companionate love. Companionate love is defined as “*the affection we feel for those with whom our lives are deeply entwined*” (p. 191). Companionate lovers share profound information about one another, since they share a deep intimate relationship. They share feelings of gentle affection, security, and attachment. In this phase of a romantic relationship, passion melts as physical attraction is waning and it is replaced by long-term and deeply felt commitment (Sternberg, 1988).

In a study about the endurance of love, researches (Hatfield, Pillemer, O’Brien & Le, 2008) have examined the effect of passage of time on both passionate and companionate love. Couples married for a varying length of time (median = 33 years) were asked to

evaluate their feelings about their beloved. Newlyweds presented high levels of passionate love. Men and women felt equal passion for their partners. Women scored higher on companionate love, however, than did their mates. Older couples presented the same levels of companionate love between men and women. Men were perceived to be more passionately in love than were their partner. In spite of the general assumption that passionate love is a delicate flower, fading with time, while companionate love is a hearty perennial, growing stronger with time, the authors found this was not so. Time had an equally corrosive impact on both passionate and companionate love. The authors also theorized that bursts of passion might occur in long-term marriages and that companionate love can benefit from such bursts of vigor.

1.6) The relationship of passionate love with emotions and other variables

Scientists diverge widely in their opinions as to whether love is an emotion or not. A number of contemporary emotion theorists don't include love as a *basic* emotion (Sprecher et al, 2006). Scholars, especially those from neuropsychology, consider love to be too complex to be considered as a basic emotion. Rather, they consider love to be a motivational state in which the goal is to preserve and promote mental and physical well-being (Fisher, 2004). Other authors don't consider love as an emotion because there is no universal facial expression for it (Sprecher et al, 2006). Psychologists tend to consider love as a basic emotion that occurs within relationships. Ferh and Russell (1991) also support this idea indicating that the lay people generally consider love to be an emotion.

Passionate love can be associated with several basic emotions and is highly related to several other emotions. The bitter-sweet emotional state can be viewed as the result of the sum of several emotional states. Falling in love can be viewed as a "strong emotional

switch” and an “emotional rush,” as passionate love is an “emotional storm” (Hendrick & Hendrick, 2006). Being in love can be seen as a condition of constant stress (Marazziti & Baroni, 2012). Passionate love is the expression of combining feelings such as ecstasy, insecurity, jealousy, impatience, joy, and/or hate (Hatfield & Rapson, 1996). Passionate lovers are constantly pulled in between several strong emotional states. Passionate love is currently being associated with more basic emotions than is any other emotion. Passionate love can be fueled by related emotions as well. Strong emotional states can help one person fall in love with another as Hatfield and Rapson (1996) noted:

“An array of theorists have proposed that it is precisely when people are not at their best--when their self-esteem has been shattered, when they are anxious and afraid, when their lives are turbulent and stressful--that they are especially vulnerable to falling head-over-heels in love.” (p. 9).

One basic emotion that had been proven to have an effect on passionate love is anxiety. Individual subject to stressful situations are more easily sexually aroused (Dutton & Aron, 1974). Hatfield and colleagues (1989) demonstrated that children and teenagers possessing higher levels of anxiety had more intense levels of passionate love. Unrequited passionate lovers proved to have higher states of obsession and anxiety than did requited lovers (Feybesse & Bungener, 2009).

Although passionate love is a very powerful emotion, it can easily be influenced by external and technically “unrelated” factors. These types of observations were well explored concerning sexual desire. Today, it is possible to find several studies demonstrating that external factors can increase sexual attraction. It is now possible to distinguish physical from non-physical factors that can make one person become more sexually aroused by someone else (Elliot & Niesta, 2008). Variables like the color red,

the physical environment, or the sound environment, and some well established social situations such as conditions of high anxiety have been found to spark sexual desire (Dutton & Aron (1974); Elliot & Niesta (2008); Griffitt (1970); Maslow & Mintz (1956); May & Hamilton (1980). All these articles documented that external factors can play a significant role on the level of one's sexual attraction to another. It's possible to theorize that passionate love can be sparked by such factors, just as sexual desire is, since those two phenomena are closely related. Research exploring these topics indicated that men seem to be more easily influenced by external factors than women. This idea can be illustrated with a study conducted by Brian Gladue and Jean Delaney (1990). They conducted a study designed to determine whether or not there are a gender differences how attractive potential dates are seen to be in bars as the hour grows late and one's opportunity to "score" diminishes. Men and women were asked to rate the attractiveness of a set of pictures of the opposite sex, in a so-called pick up bar from early in the evening until the bar closed. As the bar was about to close, women showed a sudden burst of generosity in their ratings. Men rated the photographs higher and higher as the evening went by. The authors concluded that in spite of these gender differences, as closing time approached, both men and women began to judge other patrons as more and more attractive. This effect was not due to the fact that patrons were looking at the others through "beer goggles"—i.e., the effect was not shaped by men's and women's level of alcohol consumption.

Love, and especially among those feeling passionate love, can be seen as a succession of certainties and doubts. Given some measure of attraction, people tend to be more attracted to others when they are uncertain about how much that person likes them than when they are certain of the other's regard (Whitchurch, Wilson & Gilbert, 2011).

Some theorists have speculated that the obstacles that couples encounter in pursuit of love actually contribute to passion. We love others not in spite of the difficulties we encounter in pursuit of them but because of those difficulties. Physical or social barriers, temporary separations or ruptures, are thought to turn up the flame of passion (Fisher, 2004). The classical literature and the scientific community seem to agree with this assumption (see Feybesse & Hatfield, in press, for a review of this argument). However, the existing scientific evidence indicates that this effect is not as clear or linear as some theorists have proposed. This idea can be exemplified by reviewing work on the two most studied obstacles until now: geographical distance and the Romeo and Juliet effect. The first one can be considered a physical obstacle that is often experienced by college students. According to Laura Stafford and colleagues (2006), 75% of college students are faced with a long-distance relationship at one point or another before their graduation. Parisian college students also consider “distance” as being one of the most important obstacles they face in their romantic relationships (Feybesse & Hatfield, in press). Stafford and her colleagues (1990) found that couples in long-distance relationship communicated more often and feel more love than did couples who live near each other. The long-distance group also tended to idealize their partner and to be more satisfied with the relationship than were their peers. Absence did seem to “make the heart grow fonder.” Things change once the couple moved back home and were once again in close proximity. Many relationships come to its end a few months after the couples’ reunion (Stafford, Merolla & Castle, 2006).

Social psychology has a very famous and debated theory about the effect of parental interference on romantic relationships: the Romeo and Juliet effect. This theory developed by Richard Discroll and colleagues (1972), contended that parental disapproval of their children’s romantic liaisons was counter-productive. Parental

disapproval ended up reinforcing love and commitment instead of breaking the romantic bonds. This is mainly due to the fact that lovers will tend to fight for their right to stay together. The data of the original study provided evidence in favor of the existence of effect the Romeo and Juliet effect but subsequent research has found no evidence for the purported phenomenon (Johnson & Milardo, 1984; Sprecher & Felmlee, 1992). Scholars have even found evidence that social network disapproval often leads to the end of romantic relationships (Felmlee, 2001). Recently, the Romeo and Juliet effect was put to the test in an elegant study. Sinclair and colleagues (2014) administered the same questionnaire used on the original study, added newer, more reliable measures of attraction, and combined their data with previous studies investigating the effect of peer and family networks on romantic relationship outcomes. Participants had to indicate the extent to which their networks approved of their romantic relationships, and romantic feelings on two separate occasions. This allowed researchers to evaluate the effect of interference on the relationship. The results suggested that network disapproval were damaging to romantic relationship. Love and commitment faded with the lack of support of others. There was no indication of the Romeo and Juliet phenomenon. Opposition may be powerful in romantic tales; less so in real life. Plus, it is important to take into account that formerly people did not to marry for love but to fulfill social obligations (see more details in chapter 3). In this context, it is to be expected that people would find love and sexual pleasure in affairs outside marriage making analysts think that love only happens when it is forbidden.

1.7) The biology of romantic love

The beginning of this century was marked by the emergence of neurophysiologic studies of people in love. These approaches tend to provide a further look and evidence

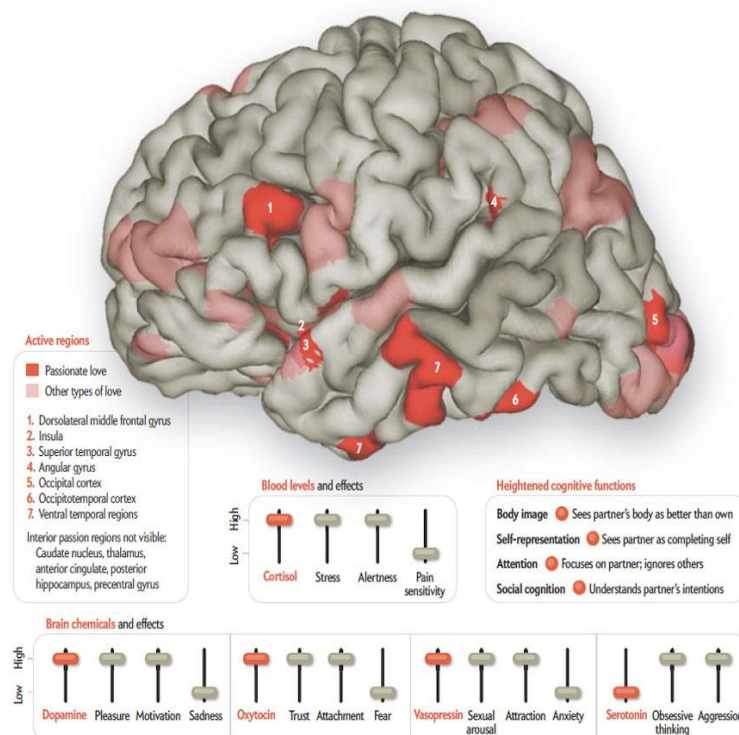
as to what was originally discovered by social psychologists as to the nature of love. Before the year 2000, scholars, such as Michael Lebowitz (1983), hypothesized that falling in love produces important changes in our brain chemistry. He argued that passionate love wired up specific brain networks between the limbic system and the cortex, leading to the experience of emotions and cognitions. Subsequent research has shown that there are indeed specific brain regions that “light up” when we are with our beloved (Fisher, 2004). The brain configurations of someone in love were often associated with the brain states under the influence of euphoria-inducing drugs (such as cocaine high; Hatfield & Rapson, 1993). Passionate lovers presented complex widespread brain activities, measured through an EEG analysis, which were considered “being a mental chaos” when compared with the state of subject that weren’t passionately in love (Birbaumer, Lutzenberger, Elbert, Flor & Rockstroh, 1993).

The first scholars to do an fMRI scan of “the brain in love” were the British neuroscientists Bartels and Zeki (2000). They asked “madly-in-love” individuals to look at a picture of their beloved while their brain activity was measured using the fMRI technique. The brain activity associated with passionate love was restricted to foci in the medial insula and the anterior cingulate cortex and, subcortically, in the caudate nucleus and the putamen, all bilaterally. Deactivations were observed in the posterior cingulate gyrus and in the amygdala and were right-lateralized in the prefrontal, parietal and middle temporal cortices. These are the brain areas associated with the reward system and sexual arousal. The deactivation of the prefrontal area indicated a decreased activation in the areas related to critical thinking, judgment, and decision making. Posterior studies using this same technique secured the same results (Fisher, 2004; Ortigue, Biachi-Demicheli, Patel, Frum & Lewis, 2010). Gay men and women presented these same patterns of activation and de-activation when they were madly in

love. Researchers didn't find any difference between the activation of gay and straight men and women (Zeki & Romaya, 2010). It is important to highlight this last point since at the present time gay people are fighting for the right to get married. Love wins when gay marriage is accepted.

The brain activations associated with passionate love differed from those activated in other ways of loving (like maternal love) and seemed to dissipate and change with the course of passion over time—activating brain systems implicated in attachment and pair-bonding instead (Acevedo, Fisher, Aron & Brown, 2011; Bartels & Zeki, 2004).

Figure 1: The brain in love (taking from Ortigue, 2011)



Helen Fisher (2004) theorized about the role of dopamine, norepinephrine, and serotonin in passionate love. According to her analysis, each chemical contributes to reproductive success in distinct ways. Dopamine is associated with sexual desire, leading to the need of sexual craving and gratification that might be directed toward many potential partners. Passionate lovers present higher levels of secretion of dopamine when they are with their beloved. The brain circuitry associated with sexual desire or sexual lust is close but somewhat different from that found with romantic love.

Men and women presented different (primarily) sexual chemicals. Male have testosterone as their main sexual mediator while women have estrogen and progesterone (Panksepp & Biven, 2012). The surplus of dopamine and norepinephine makes us to focus on one partner with euphoria and feelings of intense energy. Passionate lovers are ready to face adversity and spark their desire to belong with the beloved. Passionate lovers presented lower levels of serotonin in new romantic relationships (Marazziti, Akiskal, Rossi & Cassano, 1999). The serotonin levels matched those found in obsessive-compulsive patients, and might explain why passionate lovers experience intrusive and obsessive thinking about the beloved. These low levels of serotonin get back to normal levels between the 13-18 months of the romantic relationship.

Oxitocin plays a crucial role in the development of attachment in our species. Scientists have found a surplus of oxitocin with orgasms and in people engaged in serious romantic relationships. Oxitocin is thought to reduce separation anxiety and to promote confidence and positive social interactions. Oxitocin is now considered to be the “love hormone,” since it also has an important role in maternal love (Panksepp & Biven, 2012).

All these recent findings suggest that romantic love has a genetic base and was always present in our species (see chapter 4 for more details). Nature provided increasing complexity in the feelings of love as hominids have evolved (Marazziti & Baroni, 2012). These biological changes help us to understand why romantic love cause euphoria, excitement, and joy but also why this same yearning might lead someone to experience intense turmoil. These changes in our brain chemistry also provide more evidence that passionate love is powerful but short-lived emotion. Although these finding provide an important contribution to the understanding of the nature of love,

there is still a gap between the neuroscientific literature and the approach developed by social psychology (Clark-Polner & Clark, 2012).

1.8) Conclusion

The scientific understanding of love in romantic relationship has vastly improved in these last forty years. The new approach, provided especially by social psychology, brings new insight into the nature of love. It highlights the importance of sexual desire, intimacy, and even the role of social networks in the dynamics of romantic relationships. The science of love was able to overthrow several misconceptions about love — such as love is merely a social construction, it is only experienced among wealthy people, it can only occur outside marriage, and in forbidden relationships, or that it first emerged in the European middle ages era (see chapter 3 for more details for these last two points).

If romantic love still needs to be better conceptualized by academia as we speak, it is easy to notice that passionate love is very well conceptualized today, as it is the type of love that has received the most attention so far. This type of love seems to be central in human mating and romantic relationships. The passionate-companionate love taxonomy of Hatfield and her colleagues is the one that has more empirical evidence at the present time (Clark-Polner & Clark, 2012; Graham, 2011) but companionate love should receive more attention and investigation since that is critically important in relationships too. Romantic love might have more distinctive phases or sides than does companionate love, however.

Future research should focus more in how sexual desire turns into passionate love and we should also try to learn more about the dynamics of couples in love. There is surprisingly little research on these topics. The topic might still be considered to be

“frivolous” by some today but love implicates all human beings and is always a very important aspect of our lives. This is particularly important today since more and more people are freer to engage in romantic relationships and to marry for love.

All these research findings are due to the different efforts that were made in order to find the best ways to measure love. We will discuss this process in chapter 2.

Chapter 2: Measuring love and passionate love

One does not validate a test, but only a principle for making inferences

Lee Cronbach & Paul Meehl (1955)

Love researchers often hear that it is impossible to measure love. Many people say that love is too complex to be scientifically understood, therefore there is no possible way to find a measure to assess it. We can feel love in many different ways as we can also express it in infinite ways. Even if each romantic relationship is unique, scientific studies demonstrate similarities between them. We can find an unaccountable number of love stories but it is possible to craft common genres, we can sort stories in different categories and analyze what is commonly featured (Sternberg, Hojjat & Barnes, 2001). The same thing can be said regarding the feeling of love. Sternberg and Grajek (1984) argued that the differences we find within romantic relationships are concomitants of love and not in the core nature of love.

We are going to present several psychometric studies that provide strong evidence that it is possible to measure love in romantic relationships. It is interesting to notice how scholars that deal with this matter are particularly careful in testing and analyzing the different love scales that are more frequently used in scientific research. Today, there are a considerable number of studies available indicating unquestionably that love is a construct that can be tested with psychometric tools. Love can be assessed like many others complex psychological constructs such as anxiety, personality or intelligence. Like any other psychological phenomenon, love exists in varying degrees, therefore it is quantifiable. Love has been measured in several different ways. Some theorists argue for various typologies of love and attempt to measure those. Others focus on the components of love. These typologies and dimensions lead to the creation of different scales and sub-scales. One scale, such as the Passionate Love Scale, may conceive of

passion as a unity (possessing cognitive, affective, and behavioral indicants) and attempt to craft a single construct (Hatfield & Sprecher, 1986). Another scale, such as the Attitudes to Love Scale, may conceive of love as a multidimensional construct, thus is designed to measure various aspects of love (Hendrick & Hendrick, 1986). Still other scholars, interested in sympathizing various theories, tend to combine approaches (Hendrick & Hendrick, 1989).

It would be prohibitively long to present all the theories and measures in this document so we are going to focus on the theories that are still receiving attention today and/or were used in our studies. Passionate love can be assessed in numerous ways as we will show in this chapter. There are three popular theories about love that can be highlighted and are constantly used in scientific studies nowadays: The Love Attitude Theory of John Alan Lee, the Triangular Love Theory of Robert Sternberg, the Passionate Love and Companionate Love approach of Elaine Hatfield and her colleagues.

Passionate love is very often considered to be a strong manifestation of love, if not the strongest, usually situated in the beginning of a romantic relationship. Even if it is not directly measured by a giving instrument, passionate love is often take into account as an important aspect of love in which one person have to collect data. In this chapter, we will try to show how passionate love can be measured using different psychometric tools.

2.1) Measuring love in the scientific literature

Elaine Hatfield, Lisamarie Bensman and Richard Rapson (2012) conducted a historical review of social scientists' attempts to measure passionate love. They listed all of the scales they could find (published and unpublished); in the end, they provided 33 different measures. The first measures, created by sociologists in the 1940s, were

designed to explore romantic attitudes one person has towards another. Until the 1960s, those efforts seem to be isolated and a bit haphazard, failing to possess the theoretical focus and empirical consistency we can find today on operational measures of love and its correlates. Psychology, as a field, ignored the topic of love for a very long time, as Harry Harlow declared in 1958, in his APA presidential address. He pointed out that psychologists knew little about love and had so far failed in the mission to understand it (Rubin, 1988). With a few exceptions, love was an absent topic in journals and textbooks and there was not even an attempt at a true science about romantic relationships (Reis, Aron, Margaret, Clark & Finkel, 2013). At that time, love was basically considered to be an “intense liking” or a “strong sexual attraction” and was merely linked with affinity. The place of love on social psychology has changed in the 1960’s and this emergence is due extensively thanks to Elaine Hatfield and Ellen Berscheid’s contributions (Reis et al., 2013). Both scholars began to theorize about interpersonal attraction and close relationships, leading them to explore the nature of love. In the 1970’s, psychologists begun to develop assumptions about love; on how it should be defined and studied (Berscheid, 2010).

Zick Rubin (1970) was one the first social psychologists to conceptualize love as an independent entity and to conduct research demonstrating the difference between liking someone versus loving someone. He created the first modern scale of romantic feelings: the love scale. This early attempt considered love to include statements about speculations on the nature of love made by recognized authors such as Sigmund Freud or Eric Fromm. Another part of the items were based on the current theoretical and empirical literature about romantic relationships of the time. This pool of items was then judged by college students, who sorted the items into loving and liking categories. This separation allowed Zick Rubin to create two different scales: one measuring liking

and another measuring loving. Both scales were employed in a questionnaire format, addressed to students currently dating someone. Psychometric tests indicated that both scales were internally consistent. Rubin found Alphas that oscillated between .84 and .86 for the Loving Scale and .81 and .83 for the Liking Scale (Graham & Christiassen, 2009). Although the love scale was designed to assess one central dimension, the factorial analysis of the original study was better explained throughout three major components: affiliative and dependent need, predisposition to help, and dependent exclusiveness and absorption. The love scale had a moderate correlation with the liking scale, indicating that love and liking are close but separate entities. Rubin's love scale confirmed the prediction that subjects who love someone a great deal spend more time gazing into the beloved's eyes than those who love one another to a lesser intensity. Zick Rubin's Love scale was the first significant social psychology attempt to measure love, but it can be considered to be somewhat generic. Romantic love is considered in a broad light and the different item meanings of the "Love Scale" tend to focus on passionate love and commitment. Rubin's two scales can now be considered to be outdated, but his conception of love and platonic friendships has influenced other taxonomies of love (Masuda, 2003).

Scales measuring different types of romantic love blossomed in the 1980's. By this time, love had become a "hot" topic, being a constant theme in prestigious peer-review journals such as the *Journal of Personality and Social Psychology*. By this time, interpersonal relations had become an important field of study in scientific psychology and even started to gain exclusive journals such as *Journal of Social and Personal Relationships* or *Personal Relationships* a little later in the 1990's.

We can situate the 1980's as being the great decade for psychometric studies of love measures. At this time, a variety of different theories were empirically tested with self-

report measures, mostly in the United States. It is interesting to note that the most popular love measures were published at the same time—in 1986 and 1987. Those measures also motivated scholars to combine love with different topics of research. The feelings of love were linked with other psychological constructs such as sexual attraction, one's social network or emotional states. There were numerous of correlational studies being conducted at this point. Finally, as scholars could verify the validity of their measures, they could also test if other approaches of love could be combined with one another. Scholars on love tried to integrate different theories of love. When different love measures are used in a given study, respondents can rate their feelings and their romantic relationships on a variety of questions and aspects (Graham, 2011).

2.2) The Love Attitude Scale (LAS)

Canadian sociologist John Alan Lee (1977) developed a color of love analogy. His prime goal wasn't to define love itself but rather to make scholars and people in general aware that people possess different attitudes toward love. Lee (1988) developed his categories of love by reading classical novelists (though he does not say which novelists he really liked), nonfiction writers (such as Plato or Castiglioni), and the writings of popular psychologists of his time. He then tested his contention that people have very different attitudes toward love by interviewing hundreds of people in England and Canada. He asked people "from the street" to tell their stories about love. Those different stories were coded by selecting key points about them.

Lee concluded that we love different people in different ways and these variations can be seen as a combination of colors. One romantic couple can be experiencing a relationship centered on physical attraction and sexual intercourse. This type of

relationship can be associated with strong colors like a darker red color. As time goes by, this same couple starts to get to know one another and will progressively base their relationships on their intimacy and the affinity they share. By this point, their love can be illustrated with softer colors than red. Lee pointed out that there is not a real color for love just as there is not only one way to love someone (1988). There are different colors with different tones just as there are different types of love with different degrees of intensity. One color is the result of a combination of different colors like a romantic relationship is a combination of different styles of loving. Love styles are understood here like being in a color wheel: composed of primary and secondary colors. The secondary colors are a mix between two or more primary colors. Even if they are compounds of pairs of primary styles, they are quite different from their primary colors (Hendrick & Hendrick, 1986). The primary love styles are Eros, Ludus and Storge and the secondary love styles are Pragma (Storge with Ludus), Mania (Eros with Ludus) and Agape (Eros with Storge) (Lee, 1973). Finally, these love styles correspond to different attitudes toward love. These love styles are defined in the following ways (Lee, 1988; Hendrick & Hendrick, 1992; Neto, 1992):

Eros (romantic, passionate love): associated with infatuation and physical attraction, erotic lovers tend to believe in “love at first sight”. They pay close attention to the physical characteristics of their beloved and they get rapidly excited when they encounter someone that possesses the physical traits they are looking for. They know what they want.

Ludus (game-playing love): this type of lover considers love to be like a game. Ludus lovers don't give much importance to their romantic relationships and they can easily jump from one person to another because they are not looking for commitment in their relationships. They prefer to be collectors of conquests instead.

Storge (friendship love): Storgic lovers believe that love can only happen after friendship. Love is linked with affection and not with passion. They enjoy spending time and participating in activities with the beloved. For them, love is about knowing someone and not about idealizing someone.

Mania (possessive, dependent love): This love style is associated with anxiety, uncertainty, obsession and possession. They experience intense romantic feelings. Manic lovers can be very jealous of their beloved and are constantly seeking the attention of their beloved. Lee pointed out that they may not even like the loved one, because they would not choose him or her as a lasting friend. What they want from the relationship is being loved in return.

Pragma (logical, “shopping list” love): Pragmatic lovers long for useful and suitable romantic partners. They know what they want and they wait for the one that has all the qualities they are waiting for. These qualities don't necessarily have to be about physical characteristics, they can be a common social or religious background. They are expecting a friendship-based relationship and not an exciting affair.

Agape (all giving, selfless love): Agape corresponds to altruistic love. Agapic lovers think of love as duty. It is more related to an expression of will and devotion than feelings or emotions. This style of love is often associated with religious devotion in the Christian sense: we have the idea of self-sacrifice and love without being necessarily loved in return.

It is important to point out that one person's love attitude can rarely be defined by one specific color of love. According to Lee (1988), one person adopts several love-styles at the same time. These expressions change over time and will be shaped by his or her experiences as well.

A few years after the publication of this theory, some psychologists, intrigued by the theory, created scales designed to measure Lee's love attitudes. The first version was created by Thomas and Marcia Lasswell (1976). The six love types were assessed in a 50 items measure, in which subjects were asked to indicate their agreement with several items via a "true" or "false" answer choice. The authors tested the validity of the measurement by analyzing the clustering of the responses. The results indicated that the love styles were conceptually distinct. Their study provided scarce evidence about the reliability or the construct validity of their measure. The second attempt to create a scale using Lee's model was made by Clyde and Susan Hendrick (1984). Initially, the couple asked subjects to answer to the Lasswell's scale, using a Likert scale format. Alas, a confirmatory factor analysis failed to secure six independent dimensions. They considered their results to be promising, but concluded that some items should be revised, given the results of the factor analysis. It is obviously relatively hard to create one item that will only tap one love attitude without overlapping other love attitudes as well. In 1986, the Hendricks crafted a new scale after revising all the Lasswell's items. They reformulated some items, attempting to stick as possible with Lee's definitions for each love style. They came up with a 42 items scale (7 items per love style) and attempted to see if each style could be measured clearly, and provide more evidence that these six conceptions of love really exist. All the love styles had good alpha coefficients with the exception of the Storge love type that had relatively lower factor loadings for the subscale items. The love types were found to be reasonably independent from each other as well. In two correlational studies, the Hendrick couple found appropriate intercorrelations between the different scales. Eros had a positive correlation with Mania and Agape; this makes sense given that erotic love is associated with dependency, obsession and altruism at the same time. They found a negative correlation

between Eros and Ludus and this was also expected. Ludus corresponds to an unattached love, which is the opposite of what Eros corresponds to. Ludus also turned out to correlate positively with Pragma. Both love styles are associated with lesser intensity in attachment; it is a more selective way of choosing a romantic partner.

The Hendrick couple also noted that age had no significant effect for any love style. This might be mainly due to the fact that they tested the Attitude Love Scale on college students. They have found significant gender differences, males scored higher on Ludus while females were more Storgic, Pragmatic and Manic. There were no gender differences with Eros and Agape. Their sample possessed the same ethnic variation that is usually found in American universities (mainly composed by white European-American descendants with unrepresentative samples of other ethnicities that can be found in America). They concluded that there were merely ethnic differences on the love styles. These differences were seen as unimportant.

The results indicated that the love attitudes scale is a valid measure for scientific research on love styles using Lee's theory. The scale was successfully used in several subsequent researches and was endorsed by a great number of researchers in America and other countries. The continuous use of this instrument indicated strong psychometric properties. Two good examples of this can be observed in Portugal (Neto, 1992) or in Brazil (De Andrade & Garcia, 2014; Neto et al, 2000). The English version of the Love Attitudes Scale was explored a third time by the Hendricks in order to develop a shorter version, focused more on romantic relationship specifics rather than on love attitudes or general relationship questions (Hendrick & Hendrick, 1990). In this case, the authors came up with a 19 items version, in which some items were rewritten so that all items tapped relationship-specific questions. They compared their results with those they secured on the original scale. They also looked for gender differences. They

found that this shortened version possessed good psychometrics properties. They also provided more evidence of good construct validity evidence for the shortened scale. Gender did not interact with any of the differences they reported. They did, however, secure the same intercorrelations between the love styles reported previously. They concluded that both measures (the original Love Attitudes Scale and the shortened version) can be used in scientific research.

The Love Attitudes Scale is surely a fine instrument to use if someone is interested in exploring different aspects of love. In this sense, it might be the best multifactorial measure available. This scale has proved to be a discriminant tool when scholars want to compare different groups. All these psychometric studies provide considerable evidence for the colors of love theory. John Alan Lee (1988) followed these psychometric studies with encouragement but also with some regards. He never intended to create a scale out of The Colors of Love Theory as was done by psychologists. The analysis that we are able to make with the Attitude Love Scale distorts his original intention because we tend to classify people as being more of a particular color (males are ludic lovers for example) than considering someone or a particular group as possessing several love style preferences. Lee argued that scholars might restrict the colors of love theory in a black-and-white conceptualization of love. Thus, Lee believed that subjects participating in one study where the Attitudes Love Scale is used can often tell what the intention of a given item is. Someone can easily indicate the love style that he or she desires. Having awareness of an expected result is necessarily a bias.

2.3) The Triangular Love Scale (TLS)

Robert J. Sternberg is a psychologist who attempted to understand love because of his failed romantic relationships. His main concern was to understand what love is, how it develops, and why it succeeds or fails (Sternberg, 2013). He has developed the Triangular Theory of Love, which states that love can be understood in terms of three components. The three components can be viewed as forming the vertices of a triangle (Sternberg, 1986).

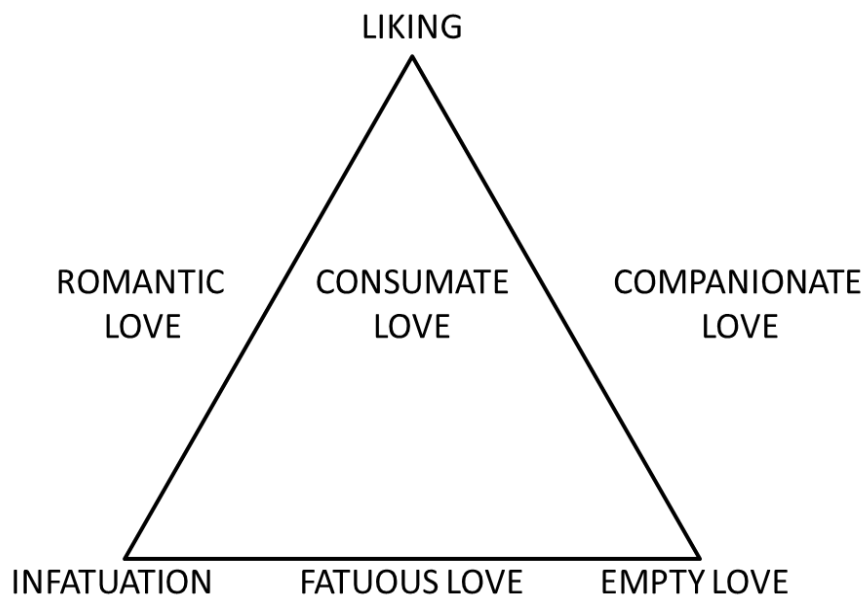


Figure 2.1: The Three Components of Love and Love Types

This triangle concept must be viewed as a metaphor and not a geometric model (Sternberg, 1997). This theory culminated after Sternberg and Grajek (1984) tried to determine which structural model would best fit the concept of love by asking laypeople to complete to a battery of psychometric instruments. Subjects had to answer personality assessments, love history questions, and items related to their love life with their family, friends or lovers. Factor analysis of the data indicated that the best explanatory model was the Thomsonian “bonds” model. The structure of love turned out to be similar across the different intimate relationships of a given person—such as

the relationship we may have with our parents, lovers, and friends. The Thomsonian model indicated 7 or 8 correlated aspects of love reflecting constructs like trust, caring, or affection. These factors would translate a primary experience of love. Robert Sternberg later considered that his basis for this first factorial exploration was too narrow in its assessment (Sternberg, 2013). After revising what he had found, he made the hypothesis that love is based on three main components capable of explaining the dynamics of loving relationships.

Here are the three components and their definition according to Robert Sternberg (1986; 1988):

The Intimacy component: Intimacy is linked to the bond we have with our beloved. It corresponds to the warmth we feel with the relationship. Intimacy can be viewed as the emotional investment one makes in the relationship. Sternberg and Grajek (1984 in Sternberg, 1988; p. 120) highlighted the different “signs” of intimacy: (1) desiring to promote the welfare of the loved one, (2) experiencing happiness with the loved one, (3) having high regard for the loved one, (4) being able to count on the loved one in times of need, (5) mutual understanding with the loved one, (6) sharing one’s self and one’s possessions with the loved one, (7) receiving emotional support from the loved one, (8) giving emotional support to the loved one, (9) having intimate communication with the loved one and (10) valuing the loved one in one’s life.

The Passion component: The passion component has sexual needs as its central aspect. It is related to arousal and motivation to love. Passion leads to romance, physical attraction, or the fact that we like the beloved. The passion component stimulates other needs such as self-esteem, affiliation with others, dominance over others, submission to others, and self-actualization. Passion can be seen as being the fuel of a relationship because it corresponds to its motivational source. When we think about our love

experiences, it is easier to be aware and conscious of our passion than it is to be with the next two other components: Intimacy and decision/commitment.

The decision/commitment component: This component consists of two aspects; one short-term (related to the decision to love someone or not) and another about making a long-term investment (which is the decision of maintaining love and keeping it alive.) Sternberg (1988) pointed out that these two points don't necessarily go together because one person can decide to love someone but not for the long run. Yet, commitment does not imply decision as well. A man finding himself in the "friend zone" with a woman usually is always around and committed to the relationship without saying the he is in love with his friend. This component has a more cognitive dimension since it involves decision making and awareness. People with high levels on the commitment/decision component are decided and well aware of their romantic feelings.

Interaction between the love components: According to Sternberg (1997), the three components of love are relatively independent of one another. The geometry of the triangle of love depends on two main factors: the amount of "love" and the balance of love, in which one can be experiencing a great deal of passion and commitment for someone, but little intimacy for example. The greater the amount of love, the greater the triangle area will be. The interaction between the components provides either possible types of love. The love triangle, then, takes different shapes with different lovers; it may also change its shape over time within one specific romantic relationship. This Triangle will rarely be equilateral, with high levels for all the components (what Sternberg calls "consummate love"). This mechanism resembles the Lee's colors theory. Sternberg (1988) points out that in romantic relationships, the general course of love can be usually described as starting with a high level of passion, combined with low intimacy and commitment. As the relationship progresses, intimacy reaches the

high level of passion, while the commitment component stays low (defined here as “romantic love”). Then, passion starts to fade away, while intimacy stays high and commitment increases. Finally, passion ends up being low, while intimacy and commitment maintain high levels. This last stage can be considered to be “companionate love” as it is described by Elaine Hatfield (1988). Nevertheless, passion needs to be sparked by intimacy if it is to develop. Sternberg (1986) states that passion alone is equivalent to infatuation. The interaction between passion and intimacy leads to passionate love. Passion plays a motivational role in this interaction as intimacy will cement commitment. A possible near-end love stage can be characterized by what Sternberg call “empty love”: passion and intimacy are gone and the person finds herself or himself in a stagnant relationship. Relationships high on commitment but low in passion and in intimacy can also translate what happens in arranged marriages. Marital partners are engaged in a relationship without sharing passion or commitment. Some relationships can have low levels of passion and commitment but possess high level of intimacy. Sternberg labelled this case as the “liking” type of love, which is defined as friendship. One feels closeness and warmth towards someone else without experiencing sexual excitement or making future plans about those feelings. Finally, the most common human personal relationships are usually casual and don’t raise the bar of any component. This type of relationship is considered to be “nonlove”.

In 1988, Robert Sternberg (in Lemieux & Hale, 1999) created the Triangular Love Scale in hopes of providing clear evidence in support of his theory. If he was right, the psychometric properties of the scale should indicate a three-factor solution (one for each component) and these dimensions should be relatively independent of each other. In his first attempt at scale construction, Sternberg secured problematic results. The Triangular Love Scale’s factor analysis indicated a three factor solution (as expected) but there was

high overlap among items. Some items loaded on more than a factor while others had high loadings in the wrong factor. This same scale was tested a second time by the Hendricks (1989). They encountered the same problems with their factorial analysis and again secured high correlations between the three components. The authors concluded that the scale measures one major construct or dimension of romantic relationships.

The Triangular Love Scale was re-tested by Acker and Davis (1992), but unlike previous studies, this study used a sample of participants more diverse than college students. College students are a homogenous group and are almost all situated in the same romantic phase. In this study, the sample consisted of adults, aged 18 to 68 years of age. The majority of participants were married at the time of the study. Another difference of this study from the others was that the authors attempted to evaluate whether participant's subjective romantic experiences could be characterized by the dimensions of passion, intimacy and commitment as was proposed by Sternberg. They also used behavioral measures tapping the occurrence of specific behaviors reflecting intimacy, passion and commitment. Thus, subjects had to answer to the Triangular Love Scale from three different perspectives: 1) taking into account the subject's own feelings, 2) taking into account the subject's partner's feelings and 3) considering what the subject would want an ideal partner to feel. The results had the same psychometric problems as did previous studies. The factorial analysis was best suited to a three-factor solution--just as had been previously found. The intimacy items were the more problematic in this case. They could be roughly split between the passion and commitment components or they could be interpreted as belonging in two distinct factors. They had the same problem of overlap encountered in previous research. The authors were able to reduce the item overlap by purging the items with the poorest loadings. The authors also found a strong intercorrelation between the three dimensions;

they could reduce the significance of these correlations with fewer items as well. The diverse sample allowed the authors to check if age had an effect on the various components of love. They have found the most compelling evidence of an age effect on the passion component. With age, passion ratings declined, especially in females. The length and the stage of the relationship also had an effect on both commitment and intimacy components, but to a lesser extent. Those in more serious relationships reported greater commitment than did their peers. Neither stage nor length of a relationship was correlated with a decline of intimacy. This finding is contrary to triangular theory predictions. Acker and Davis (1992) concluded that three components can be distinguished to a certain degree, given the items reductions. The authors found some support for the love triangular theory, thanks to their satisfaction and time course analyses, but they were far from validating the theory. This research showed the importance of having a heterogeneous sample when one is trying to assess different aspects of love. Soon after the Acker and Davis's study, Bernard Whitley (1993) conducted a psychometric study on Triangular Love Scale using female college students. Although he found that all three components were very reliable, regarding the factorial analysis, the same problematic results were found yet again: items overlapping and high correlations among the components. Test-retest correlations were high for the commitment component but low for the Passion and Intimacy components. Whitley suggested that it might be possible to find more appealing results with a sample of adults older than college students. Robert Sternberg (1997) tried to test the Triangular Love Scale yet again, in two subsequent studies. In the first study, he conducted a construct validation of his love scale. He distributed his questionnaire to adults, aged 19 to 62 years of age, who were either married or currently involved in a romantic relationship. Some relationships had existed for less than a year; others for as long as 22

years. The participants answered a questionnaire consisting of the Triangular Love Scale, The Rubin's Liking and Loving Scale, and questions about relationship satisfaction. Subjects completed the same questionnaire several times. On various versions of the questionnaire, they were asked to think about their mothers, fathers, siblings, lovers, closest friend of the same sex, and the ideal lover. It was hoped that the variation in age, length of the relationship, and type of person being discussed would allow the authors to do a better job of ferreting the different possible interactions between the three components of love. The results revealed different "size and shaped triangles" for different relationships. The data indicated consistency between "the type of triangle" and the type of relationship. Highest intimacy levels were found when subjects were thinking about their lovers and their closest friends. Passion was more poorly rated when subjects were thinking about their parents, siblings, and friends. Ratings on commitment were high for the ideal lovers and the actual lover and lower when it was rated for the closest friend, and so on.

Sternberg's internal validation was consistent with what scholars had found in the previous studies -- namely high reliability of the three subscales but with some items having high loadings in more than one component making the results being good in general but not totally satisfactory. Intimacy and commitment are more highly correlated than each one is with passion. Sternberg concluded that the results provided some evidence for the triangular love theory but was not fully supportive. Once again, the scale revealed great dependency between the different components and had items not measuring what they were supposed to measure. Sternberg decided to conduct a second study, with a similar but far larger sample. This time, subjects were simply asked to think about their beloved and the "bad items" of the Triangular Love Scale were replaced with new ones, in order to avoid item overlaps. These changes didn't alter

the overall results found in the first study, however. Sternberg found items loadings in unexpected factors and a high correlation between the components of love.

All this research provides some evidence for the Triangular Love Scale. The different dimensions are highly reliable and the scale can be a useful tool for someone who is seeking to link passion, intimacy, or commitment with others constructs. At the same time, the results tended to indicate that these components seem to be representing a more unidimensional factor of love than three independent ones. The main goal of all these psychometrics tests was to validate the Triangular Love Theory and not really trying to provide a new love measure. In this sense, the triangular love theory is partially confirmed with the use of questionnaire studies. This theory is still widely cited and used in scientific research and it is considered an important pillar of the actual science of love.

2.4) The Passionate Love Scale (PLS)

Elaine Hatfield started to work on love at a time in which the “prestigious” psychologists were interested in constructing mathematical models of rat learning (Hatfield, 1995). She and her colleagues, such as William Walster, Ellen Berscheid or Susan Sprecher started to study love by conducting research on interpersonal attraction. Their theory of passionate love was based on Schachter’s general theory of emotions. In order to someone experience the feeling of Passionate love, two conditions are needed (Hatfield & Berscheid, 1974):

- 1) One has to be physiologically aroused.
- 2) One has to perceive situational cues indicating that “passionate love” is the appropriate label for their intense feeling.

These two factors must coexist if a person is to experience emotion. With this paradigm, intense positive and negative emotional experiences can be conducive to love. One individual will experience several different feelings such as sexual attraction, gratitude or jealousy. These feelings, even if confusing, will be stimulated and stimulate physiological arousal sparking even more passionate feelings in the lover. According to Elaine Hatfield, add a dollop of behavior designed to get closer to the beloved and you have a heady brew. Schachter stated that individuals will label their emotional responses with the most plausible label available to them and this can lead to misattributions (Reisenstein, 1983). The person will label his or her feelings as “passionate love” when this label seems appropriate. Love feelings die when the person ceases to attribute his complex feelings to love and/or arousal dies. If we peek into the classical literature, movies, or popular music we may find that love is a complex and poorly articulated emotion. People receive no formal education on how to recognize the signs of love, which can be associated with a myriad of potential labels (Hatfield & Berscheid, 1974). Passionate love was always considered to be an important “love type” in the scientific literature but there was no scale available that could measure it directly. Aware that a reliable measure should be designed in order to explore the nature of passionate love in more depth. Hatfield and her colleagues started to work on their scale in the 70s.

Development of the Passionate Love Scale (PLS)

The main goal of the PLS is to measure passionate love in romantic relationships. As noted in chapter 1, although passionate love is a concept well established in the scientific literature today, this wasn't the case at the time of the development of the scale. The PLS had to reflect what was known about the literature on the nature of love. So Hatfield and Sprecher (1986) took into consideration several scholars accounts as to the nature of passionate love. They attempted to synthesize insights from primatologist,

neurophysiologists, and some psychologists. Before trying to formulate items for the PLS, the authors identified three components of passionate love and the “longing for union”—namely cognitive, emotional, and behavioral components (Feybesse, Neto & Hatfield, 2011; Hatfield & Sprecher, 1986):

The Cognitive components: One important characteristic of passionate love is the fact that lovers engage in intrusive thinking and preoccupation about the beloved. This constant thinking can be considered to be an obsession, in which the beloved is remembered with persistence (items 5, 9 and 21 of the PLS measure this aspect). The beloved is idealized and it is generally associated with positive attributes. The same thing happens regarding the relationship that can be even considered to be perfect (items 7, 9, and 15 of the PLS tap these aspects). Finally, passionate lovers want to know the beloved and be known as well. Item 10 evaluate the desire to know the beloved, while item 22 translate the desire of being known.

The Emotional component: Another major feature of being passionate in love in the attraction one feels towards the beloved. This attraction is irresistible and uncontrollable leading someone to experience a wide array of emotions. When things are going bad with the beloved, the emotions experienced are quite negative (items 1, 2, 8, 20, 28 and 30 of the PLS) but they tend to be positive when things go well (items 16, 18, and 29). This happens because there is a desire of total and permanent union with the beloved (items 11, 12, 23 and 27). Passionate lovers desire, want to love but wish to be loved in return (item 14). This high emotional state is backed up by a strong physiological awakening (items 3, 13, 17 and 26).

The Behavioral component: All these cognitive and emotional reactions will obviously influence ones behaviors. Passionate lovers are constantly seeking for cues

indicating how the beloved feels about them (item 24). He or she is delighted in studying the beloved (item 4), in serving or helping him or her (item 6 and 25).

In order to find the best items to assess these components, Elaine Hatfield and Susan Sprecher formulated a pool of 165 items. Items were written using positive direction formulations so they could be more meaningful. According to Elaine Hatfield, passionate love is such a powerful emotion, that items sometimes sound odd when converted to the negative. They conducted pre-test studies in order to determine how many points the Likert scale should have, and decided to choose for a nine-point level of agreement. The final goal was to come up with a 30 items version of scale and two shorter (and totally equivalent) forms with 15 items (one item for each passionate love aspect). This they thought would allow scholars to conduct before and after studies. In fact, in the years since the scale was developed, virtually all scholars have used Form A of the scale (the Passionate Love Scale is divided in 2 forms of 15 items).

The first study was designed to figure out which of the 165 items seemed to be the most reliable and valid indicators of passionate love. The items were randomly sorted into five different versions of the PLS, consisting of 33 items each. When answering questions, subjects were asked to think of the person whom they loved most passionately. Those who were not in love at the present time were asked to think about their last romantic relationship. All subjects were asked to try to describe their feelings when they were at their peak. After completing the selection of PLS questions, subjects were asked to complete a global measure of passionate love, a global measure of companionate love, and the Rubin's "Liking and Loving" scales. The items obtaining an average above five points on the nine point Likert scale and correlating above .50 with the other measures in that category were kept, leaving 76 of the 165 items to be eligible for the final PLS. A second study conducted with undergraduate students, had

the main goal to differentiate the items more linked with passionate love than with companionate love. Once again, subjects were asked to think about their beloved when their feelings were at their peak. The same criteria used in Study #1 were used in this second study; the items more statically associated with passionate love were retained, while the rest were discarded.

With these two studies, Hatfield and Sprecher arrived at the final 30 items version of PLS. They then conducted a third study in order to make one final psychometric analysis of the scale. In this last study, 120 Caucasian college students (60 males and 60 females), who varied in their romantic status, were recruited. The mean age was 20.11 (SD = 1.58) years. The average length of time the participants in relationships had been dating was 21 months. In addition to the PLS, respondents were asked to complete Rubin's "Liking" and "Loving" scales, to indicate their level of commitment to their partner, to evaluate how satisfied they were with their romantic relationship, and to rate their desire for physical interaction, and their level of trust on their close relationship. The authors also attempted to determine if the PLS was contaminated by social desirability.

The results demonstrated that the PLS possessed high reliability with a high internal consistency of .94 (Cronbach alpha) for the complete version of the scale and .91 for the two short versions. As hoped for, the scholars failed to find any correlation between the PLS and the social desirability scale. The factorial analysis indicated that the PLS consisted of one major component that explained 70% of the variance. Also, as expected, the PLS correlated with all the measures mentioned above: a strong correlation with the commitment scale and strong correlation with Rubin's "love" scale than with his "Liking" scale. No gender differences were found with the total PLS score. Even if females scored slightly higher (albeit not significantly higher) than males.

If we compare gender scores for each item of the PLS, females scored significantly higher on item 24 (“I eagerly look for signs indicating ___’s desire for me”) and on item 25 (“If ___ were going to through a difficult time, I would put away my own concerns to help him/her out”). The mean score found with the PLS in this last study was 206.93 points; this corresponds closely with scores usually found (in subsequent studies) among subjects who are in love when answering to the scale.

Despite these very promising results in initial studies of the PLS, Elaine Hatfield and Susan Sprecher were unaware in how their publication would be received. They were barely aware of other contributions appearing at the same time, like those of Sternberg or the Hendrick couple. It is easy to notice now that all these measures had a lot of success in academia. A quick search using “Google Scholar” in July of 2015 found 493 articles citing the original PLS article of 1986. The PLS was used in countless researches dealing with very different topics.

The PLS having been originally designed to tap passionate love in adults, Hatfield, Schmitz, Cornelius and Rapson (1988) created a “juvenile” passionate love scale in order to see if they could find evidence of passionate love feelings in children ranging in age from 4 to 18 years old. This version corresponds to the PLS 15 items (form A) in which the items were rewritten so they were suitable for children. The juvenile PLS was found to have a unidimensional solution as did the original PLS. Internal consistency varied between .94 and .98 with the different age group of the samples. The older groups of the sample had virtually the same scores on the PLS and the Juvenile version. The authors found that on the JLS there were some gender differences in the early ages (six years old), in which girls scored slightly higher than boys.

With the continued use of the PLS in American studies, there is strong evidence that this measure is very reliable, proving to be one of the best, if not the best, way to assess

passionate love in experimental studies. Scholars, who have used it, preferred the 15 items version of the scale, instead of the complete version (Graham, 2011). We can cite several studies that have re-tested the PLS and probably the most famous one was conducted by Susan and Clyde Hendrick in 1989. In this study, 391 unmarried American college students had to answer to five love measures at the same time and this included the PLS. The Hendrick couple found one strong and clean factor for the PLS with strong loadings except for item 1. They found an average interim correlation of .51 and an alpha of .97. The scale tended to be highly related to positive relationship characteristics.

Graham and Christiansen (2009) proceeded to a reliability generalization meta-analysis with the short and complete versions of the PLS. They used data of several studies conducted with the American version and found very high reliability with an average Cronbach alpha of .934 and a 9% confidence interval ranging from .90 to .96. Although the sample of studies used for this meta-analysis was relatively small to perform a multiple regression, bivariate correlation studies indicated that the PLS scores tended to be more reliable for men than for women. Relationships existing on a longer period of time had more reliable alphas than newer ones. The short version of the PLS (as compared to the 30-item one) had higher alpha's reliability among younger, homosexual and non-married participants. This study also found that the PLS items cluster in one factor.

The most impressive evidence for the PLS's construct validity are the neuroscientific studies of the brains of people being in romantic love. As we observed in chapter 1, scholars are well aware of the brain regions associated with passionate love. When one wants to identify the brain regions linked to passionate love, one must conduct the studies on men and women who are currently in love. The common procedure followed

in fMRI studies is to begin by interviewing potential participants about their love life and also by asking them to complete the PLS (Fisher, 2004). The PLS is almost always the assessment tool of choice by scholars interested in measuring the brain activity through fMRI scanning techniques (Collongues, Cretin, Seize & Blanc, 2011). Aron and colleagues (2005), for example, found a strong positive correlation between PLS scores and activation of the areas associated to passionate love (the right antero-medial caudate body ($r = 0.60$; $P < 0.012$) and the septum fornix region ($r = 0.54$; $P < 0.008$) in young adults that had recently felt passionately in love. More recently this same kind of correlations between the PLS and brain activation were found with a group of middle-aged individuals ($M = 52.85$ years) in happy, stable, long-term and heterosexual pair-bonds (Acevedo, Aron, Fisher & Brown, 2012). So when somebody is using the PLS in research, he or she is doing a bit of neuroscience as well because the scale is related to brain regions associated with romantic love. These results are particularly interesting because they link the PLS with a totally different type of data on romantic love. More evidence about the validity of the PLS can be found in chapter 3, in which we present data with the PLS on cross-cultural samples.

2.5) other important love measures

There are a number of scales measuring different aspects of romantic relationships. In this part of the chapter, we will describe some other measures that we chose not to use in our studies but are worth mentioning.

The Commitment Scale (Rusbult, 1983): The late Caryl Rusbult is still an important name in studies about commitment and satisfaction in romantic relationships. Her work

analyzed the effect of many variables on commitment: the effect of time, the cost of maintaining a relationship, the availability of romantic alternatives, etc.

The Adult Attachment Questionnaire (Hazan & Shaver, 1987): One of the most popular theories on romantic relationships today is Attachment Theory, which has generated a plethora of the studies of romantic love as an attachment process. Cindy Hazan and Philip Shaver developed a scale that measures three types of romantic attachment: secure attachment, anxious attachment and avoidant-ambivalent attachment. The scale items were created based on Bowlby and Ainsworth's research on mother-child attachment. This scale is a very useful tool for scholars wishing to explore the relationship between romantic attachment and other variables (Simpson, Rholes & Phillips, 1996). Romantic attachment styles, as they are proposed by Hazan and Shaver, can also be measured with the Adult Attachment Scale (Collins, 1996).

The Romantic Beliefs Scale (Sprecher & Metts, 1989): This scale measures ideologies of romanticism via 15 items on a 7 points scale, ranging from *strongly disagree* to *strongly agree*. The final score indicates the level of romantic ideology across a range of romantic beliefs. Sprecher and Metts (1989; 1999) found that passionate lovers tend to score higher on the Romantic Belief Scale and, as we notice with passionate love, this score decreases with time. Romantic beliefs have been found to be influenced by culture (see chapter 3).

The Relationship Closeness Inventory (Berscheid, Snyder & Omoto, 1989): This instrument evaluates the closeness of several types of relationships: family, friends or

romantic ones. The scale has proved to be both reliable and valid. The inventory can predict one's relationship longevity and future break ups.

2.6) Measuring passionate love with love scales

Several studies have tried to integrate the different typologies of love presented in this chapter. Each theory of love analyzes passion through a certain lens. The Passionate Love Scale and the Sternberg's Components of love measure the intensity of the traits proposed. The Love Attitude Scale is not really measuring the intensity of each love styles but rather evaluating the tendency one has towards each color of love. Passionate love, as conceptualized by Elaine Hatfield and Susan Sprecher, can be measured in different ways with these different scales.

If we consider the Love Attitude Scale, being passionately in love corresponds in having a certain attitude towards love, making one individual to prefer particular love styles over others (Hendrick & Hendrick, 2006). The love style that is more associated with passionate love is Eros but passionate love would be better explained if one combines Eros and Mania. Eros translates the experience of falling in love while Mania underlines the experience of having obsessive thoughts about the beloved alternating intense feelings between ecstasy and agony. Passionate love also makes one person to become more altruistic towards the loved one. Passionate lovers are willing to sacrifice for love so it is expected to have a positive correlation between the Agape love style and passionate love (Hendrick and Hendrick, 1989). The other three love styles, Storge, Pragma and Ludus, are indications of a more neutral kind of love that don't translate the apprehension and desire found among passionate lovers. Storge can be seen as an indication that the flame of passion has faded and can be considered to be closest to the feelings of companionate love. Pragma can be seen as someone choosing a mate basing

the decision using a “rational choice” and not an “emotional choice”. Ludus is the love style that is the more opposed to the concept of passionate love. Scoring high on Ludus corresponds to not being in love; it indicates that someone is not looking for something serious but rather is experiencing the desire to be free and have romantic experiences with several people. The PLS usually don’t correlate with Storge or Pragma love styles and correlates negatively with Ludus (Hendrick and Hendrick, 2006).

The Triangular Theory of Love integrates perfectly well the concept of passionate love and companionate love. If someone scores high on Passion but low in Intimacy and Commitment / Decision, he or she is experiencing infatuation (Sternberg, 1986). Passionate love needs intimacy as well, so it is better take into account the combination of the Passion and the Intimacy components. Companionate love can be measured with the Intimacy component and the Commitment / Decision component (Hatfield and Rapson, 2005). Overall, the Passionate Love Scale should correlate with all Sternberg’s sub-scales because passionate love necessarily stimulates all these dimensions. It is expected to correlate higher with the Passion component because Sternberg’s definition of passion is very close to what is measured by the PLS. This prediction corresponds to what was usually found in the scientific literature (Hendrick & Hendrick, 1989; Feybesse, Hatfield & Neto, 2011). Also, Sternberg (1997) found higher correlations between the TLS and Rubin’s Love Scale than between the TLS and Rubin’s Liking Scale.

Mashiro Masuda from Japan (2003) conducted a meta-analysis of 33 empirical studies conducted in America. His main goal was to verify if love scale measures could all be tapping two main psychological constructs: Erotic love and Companionate love. Erotic love was associated with sexual desire for the partner and Companionate love represented a “friendship-like platonic love towards the partner”. These two love types

seem to be present and illustrated in the main theories of love developed by social psychology. Masuda included studies that used the Rubin's scales, the PLS, the LAS and TLS. He also included studies in which global satisfaction was measured and correlated with love. The Meta-analysis took into account the means, standard deviations, and correlation values. All measures presented a similar psychological construct regarding Erotic love but different qualities were found regarding the different scales for Companionate Love. Masuda concluded that Erotic love is well-conceptualize among scholars but there are significant variations regarding their understandings of Companionate love. Thus, Satisfaction was highly correlated with Erotic love. The correlation between satisfaction and Companionate Love was unclear.

Before the Masuda study, the Hendrick couple (1989) performed an exploratory factor analysis with the same love measures and the Adult Attachment Questionnaire of Hazan and Shaver. Passionate love was the first of the five factors extracted and explained 32% of the variance. This indicates that passion is an important component of romantic love for all these measures.

Passionate love is well conceptualized by scientists today and it is probably the best "love type" to be used in experimental studies. This is an intense emotion, frequently present in college students, and easy to manipulate, thus providing one way of testing the effect of love on other constructs. Feybesse, Hatfield and Neto (2013) pointed out that passionate love can be a tricky variable at the same time. Passionate lovers may be experiencing high levels of passion but not in the same way. The emotional state provoked can lead one subject to emotional extremes such as extreme joy or intense despair and these differences must always be taken into account in any research paradigm. Passionate love may have diverse effects: it can broaden one's horizons but it can also cloud one's behaviors. The best way of controlling these aspects seem to be

evaluating the relationship the passionate lover has towards the beloved as we noticed in chapter 1.

2.7) Conclusion

Scholars dealing with the topic of love had to struggle for a long time before love became a respectable topic of research in the social sciences. Psychologists early were met with ridicule and disinterest; funding was often denied. Elaine Hatfield transcribed Wisconsin's Senator William Proxmire's press release in 1975, after his aide discovered that the National Science Foundation had granted money to investigate passionate love:

"I object to this not only because no one – not even the National Science Foundation – can argue that falling in love is a science; not only because I'm sure that even if they spent 84 million or 84 billion they wouldn't get an answer that anyone would believe. I'm also against it because I don't want to know the answer" (Hatfield, 1995; p. 28).

By the end of the 80's, it was already possible to conclude that "falling in love" could be studied like any other psychological phenomenon. The psychometric studies presented above certainly provide compelling evidence that this is so. The measures we have discussed are widely accepted in Academia today and really catch the attention of the public eye, so senator Proxmire couldn't be more wrong.

One critique can be made about all the measures presented in this chapter: in all cases, these are self-report measures. These questionnaire types of studies have limitations due to the fact that scholars are sometimes uncertain about the validity of these measured scores (Sternberg, 1997; Graham & Christiansen, 2009). We can stipulate that there is a variance between the score obtained with any of these measures and the "true score" one could get with a more direct method of observation. Then it would be ideal to

combine the love scales with other ways of collecting data such as the fMRI brain scanning for example.

A second critique about these psychometric studies is related to the fact that they were almost all conducted with samples of college students. This type of sample has its own characteristics and can be considered to be describing a very specific type of love. College students are usually single, young adults, generally casual dating or having recent romantic affairs. They can be a good sample when someone is looking for passionate lovers but wouldn't be ideal if someone is trying to explore different aspects of love. This problem can be addressed within all the social sciences since the vast majority of studies were conducted with samples of Western undergraduates (Henrich, Haine & Norenzayan, 2010).

The relationship found between all these love theories support the idea that scientific studies about love are fruitful and scholars were successful in quantifying this complex phenomenon. Yet, love is still a mystery to be solved, so it is better to combine several scales in one study. Other aspects of love should also be developed and measured (Graham, 2011). Like Cronbach and Meehl (1955) have said, scales should be considered to be just one way to make inferences.

Chapter 3: Cross-cultural perspectives on romantic love

“We are all connected; to each other, biologically. To the earth, chemically. To the rest of the universe atomically.”

Neil deGrasse Tyson

“Nature loves variety, unfortunately society hates it”

Elaine Hatfield

American scientific scholars of love, especially social psychologists, started to adopt a broader view of love and began to investigate this topic using a cross-cultural perspective. International scholars soon joined their ranks. These initiatives began at the end of the 80's and blossomed in the 90's. During this same period of time, important fields dealing with cross-cultural data, such as anthropology, started to use social psychology's theories of love in their studies (see Jankowiak, 1995, for a review of these efforts). The psychometric studies described in chapter 2 had an important impact on all the scientific fields that explored the topic of romantic love. The general inferences made by modern psychologists are constantly being taken into account in almost any contemporary scientific report, trying to explore the nature or the dynamics of romantic relationships. This represents an important switch in Western academia since once upon a time, before rise of social psychology perspectives, the psychoanalytical theories used to be the preeminent reference on love. The popular press seems to be following this trend as well, as it is more and more common to find publications or online articles presenting the Triangular Theory of Love, the Passionate-Companionate Love taxonomy, Hazer and Shaver's Attachment Theory, writings vulgarizing neuroscientific studies, and so on.

At one time, Western scholars neglected to take a cross-cultural perspective on romantic love, because they assumed that romantic passion only existed in European societies.

Romantic love was seen as a refined gift (or even a curse) the Europeans had given to the rest of the world. Non-Western societies were seen as cultures in which romantic love was virtually non-existent (Jankowiak, 1995).

Fortunately, present day scholars take a very different view, but the scholarly fascination with love can still be considered to be Eurocentric. Today, there are two main prevalent views in how different cultures experience and view love (Beall & Sternberg, 1995):

- 1) Love is a universal emotional experience that is defined similarly in all cultures. In this view, people in every culture experience love in the same way and all cultures share the same definition of love.
- 2) Love is a universal emotional experience that is defined differently across cultures. In this view, people in every culture experience love in the same way, but cultures interpret the experience in different ways. Some cultures might define love as infatuation whereas other cultures would view it as romance.

As this debate was presented earlier, the work of this thesis tends to adopt the second view: passionate love is experienced with the same symptoms and intensity in all cultures but these feelings are expressed in different cultural ways. Professor Viktor Karandashev (2014) illustrated very well this idea in a symposium about *romantic love and culture* in the 22th International Association for Cross-Cultural Psychology Congress. The idea is that we can caricature South American men serenading their feelings of passionate love to their beloveds for the whole village to see. They would be dancing while yelling “I love you” to their beloved, whereas Japanese men would discretely whisper a gentle “I love you” in the ears of their beloved. They would be considered cold and heartless by the South Americans. The Japanese would probably consider that South Americans are only interested in sexual pleasure. They are part of a

“hot” and sexual society. Yet, the current evidence indicates that if you ask these two groups of men to complete the PLS when they are in love, they will score the same and describe the same feelings.

With the concept of love being considered from both the evolutionary and cultural perspective, several publications shed light on our understanding of romantic love as a cultural phenomenon. Scholars from various countries have been involved in this kind of research. They test the degree of universality of romantic love, try to pinpoint the similarities and differences in attitudes towards love, and the nature of love experiences in different cultures. Such research makes it evident that there are both similarities and differences in people’s feelings when they are in love. Even if passionate love possesses important biological roots, human sexuality varies according to history and culture (Cour, 2013).

In this chapter, we will present a brief historical perspective on love, the cross-cultural similarities and differences found in scientific studies of love, and the use of psychometric scales measuring love in non-American samples. The methodological approach chosen to test our cross-cultural assumptions will be presented in chapter 4.

3.1) A brief historical perspective on love

Recent publications on the history of love tend to assume that the feelings of passionate / romantic love have always existed in humankind. Helen Fisher (2004) even made a bold statement that romantic love has always existed in all hominid evolution. If we focus on the brain regions associated with passionate love (see chapter 1), it is apparent that these are very primitive regions, that may not have changed much in millions of years. This would suggest that passionate love could have been experienced by inhabitants in the *Homo habilis* era. Unfortunately, it is impossible to test such

contentions because there is no possible way to travel back to the Pleistocene period and observe our remote ancestors.

The more scholars try to find the origins of love, the more they must go back in time. We can assume that sexuality always existed, although its meanings have varied with time. Human sexuality has been associated with a range of human activities and values (Hatfield & Rapson, 1993). On the other hand, the complexity of love found in our own species may be due in large measure because of the complexity of our societies.

Scholars have found evidence of expression of romantic love existing as long as 5000 years ago. One thing of which we can be sure is that love is as old as writing. One of the Sumerians first topics was about passionate love (Hatfield, Young, Bensman & Rapson, 2012). It is possible to find Sumerian poems about love and desire on tablets dating from about 4100 years ago (Young & Alexander, 2012). This is also true in the East, ancient Chinese civilization have left love poems dating from 2000 to 5000 years ago depicting the intensity and power of passionate love (Fletcher, Simpson, Campbell & Overall, 2015).

Ancient Greek society has passionate accounts of adult men longing for the affection of adolescent males. They might have praised other men, but were obviously sexually interested in women, too (Beall & Sternberg, 1995). Conjugal love between husbands and wives was considered impossible or ridiculous during the Roman Imperial Age. Romantic relationships were held outside marriage with a courtesan. This might be the period of time in which love and marriage started to be dissociated in Western societies. For a very long period of time, men and women married for political and economic purposes. Families married their children in order to cement unions with other families (Lindholm, 1995).

The Western historical view of love was obviously deeply marked by Christianity. The clergy was forbidden to marry, on the assumption that they would then be free of sexual lust, insuring that they could be closer to God (Beall & Sternberg, 1995). Even married people were advised to abstain from the physical pleasures of love. The husband, who had passionate sex with his wife, was adjudged to be an adulterer for pursuing lust (Gay, 1986). Today, most Christian church denominations still are a bit disapproving of sexuality.

Passionate love was little in sexual activity in the middle ages. The passion a knight felt for his lady was a chivalrous, non-intimate feeling, relying mostly on distant gazing (Beall & Sternberg, 1995). Women were assumed to be without demeaning sexual impulses. This courtly love is often considered to be a secularization of the Christian view about love and sex (Lindholm, 1995), in which sex was viewed as a sin (Hatfield & Rapson, 1993). In the 16th – 17th centuries, commentators viewed love as a consuming passion that is impossible to resist. Passion was also associated with illness. Love was associated with emotion and romantic imagination, not actual sexual activity (Karandashev, 2015).

Love and marriage started to be linked in the public imagination in the Victorian era. Peter Gay (1986) stated that the middle-class and bourgeois of the time had conflicting views about love because it could be viewed “*as a divine blessing, a potent energy, an infectious disease, a slow poison*” (p. 44). In this era, Christian values were still the dominant philosophy in the West and people were torn between following religious ideals and living their passions. Philosophers such as David Hume, Voltaire, and many others praised erotic passion and fought for human nature to be free from Christian doctrines. This contradiction was well explained by Elaine Hatfield and Richard Rapson (2005, p.108):

“The professional and bourgeois classes were the first to promote the ideal of married love. They were the last to be convinced that marriage should involve frank sexual passion”.

From the end of the 19th to the beginning of the 20th century, the marital ideal was considered to be an emotional, social relationship, linked with sexual intimacy. Western societies experienced demographic transformations, including declining fertility, a rise in infant mortality, and an increase in general life expectancy. Couples could spend more time together, without having young children. Urban migration and industrialization provoked marital changes and initiated modern views of sexuality. People started to become less dependent on their extended families and to focus more on their nuclear families (Wardlow & Hirsch, 2006). By the 1960s, the baby-boomer generation considered marriage to be characterized by happiness and love. Popular culture generally depicted marriage for love as the ideal and the search for one’s “soulmate” was not only encouraged but also commercialized. The sexual revolution that happened in the 60’s contributed to the collapse of Christians values in the West. Men, and especially women, were freer to love than in the past, with the emergence of convenient contraceptive methods (Cour, 2013). Today, western societies consider love to be the most important reason for marriage. According to Ellen Berscheid (2010) romantic love became *the sina qua non* for marriage.

It is only in this type of society that scholars could create studies and write about love in romantic relationships. People must be free to debate about love and sexuality, if they want to study it. This brief historical presentation indicates that passionate love has existed and has been experienced throughout the ages. We can notice that different times had different attitudes towards this experience. Love might be universal but it is culturally specific as well (Karandashev, 2015).

3.2) Cross-cultural differences in feelings of romantic love

Stendhal (1822) might have been the first writer to make a cross-cultural analysis of romantic love. In his book, *de l'amour*, he observed that the French are sanguine, the Spanish are bilious, the German are melancholic, and the Dutch are phlegmatic. He believed that one's temperament has a profound impact on the way one will love. There are cross-cultural variations on love, because culture lead people to have different types of temperaments.

Several cross-cultural studies of romantic love provide strong evidence that love is influenced by cultural factors (Dion & Dion, 1996; Neto et al., 2000; Karandashev, 2015). Cultures differ in how positively passionate love is viewed. Cultural factors may determine how frequently and how intensely men and women experience love (Jankowiak & Fischer, 1992). Passionate love may have existed throughout ages, but attitudes and behaviors associated with passion have varied dramatically from culture to culture (Karandashev, 2015).

One popular way of classifying cultural differences is by situating them in the spectrum of individualism – collectivism (Triandis et al., 1986). This technique has often been employed in cross-cultural studies of romantic relationships. Scholars have noticed that Western societies (usually labelled as individualistic societies) and Eastern societies (usually labelled as collectivistic societies) possess very different views of love. Individualistic societies consider love to be a critically important basis for marriage. Romantic love is highly valued and is considered to be an important aspect of personal fulfillment. In contrast, collectivistic societies are less likely to consider love as basis for marriage. Intimacy is more commonly expressed in the complex system of family relationships than in the nuclear family (Dion & Dion, 1996). Compatibility and emotional fulfillment are emphasized to a lesser extent (Wardlow & Hirsch, 2006).

These assumptions were empirically tested by Levine and colleagues (1995), who asked subjects from different countries around the globe to answer questions about their beliefs concerning the importance of love in marriage. Subjects had to rate the importance of love for both the establishment of, and the maintenance of, marriage. The results revealed that love received greatest importance in Western and Westernized nations and least importance in Eastern nations—especially in the undeveloped ones. The results were even more contrasting when subjects were asked to rate the importance of love on the decision to get married and its importance for the maintenance or dissolution of a current marriage. Levine and colleagues found few significant sex differences within or across countries. Participants assigning greater importance to love tended to come from nations with a high standard of living, where marriage rates and divorce rates are fairly high. These same results were observed by Susan Sprecher and her colleagues (1994) with American, Russian and Japanese students. The American and the Japanese were the most romantic; few of them would consider marrying someone without being in love. The Russian, especially the females, were more pragmatic. They were more ready to marry someone who possessed a host of desirable qualities, but who did not inspire the heat of passion. Oddly enough, the Russians seemed to fall in love much more quickly than did the Americans (Karandashev, 2015). Scholars agree widely that one's views about the experience of falling in love is deeply marked by his or her culture. The same emotional experience can be viewed very differently in different cultures. Some might consider love to be undesirable whereas others might be more open to accepting it (Beall & Sternberg, 1995). China can be considered to be an extremely traditional and collectivist society (Hatfield & Rapson, 2005), in which falling in love is viewed with negative connotations. The typical Chinese love story portrays a couple being faced with the dilemma of respecting their

filial duty or drifting into satisfying their romantic desires. Usually, in these stories, following personal desires leads to terrible consequences (Jankowiak, 1995). Love used to be a term usually employed when someone wanted to describe an illicit liaison that is not socially respectable (Beall & Sternberg, 1995). In China, contemporary research on romantic love assumes that searching for a mate requires one to take into account obligations to the parents and family as well as one's own preferences and personal feelings of love for the beloved. The experience of love is shared in a social context, because the major source of intimacy throughout life comes from individuals bound to their families. Feelings of commitment are perceived to be stronger in Chinese than in Western civilizations (Gao, 2001).

Cross-cultural scholars of love have observed that globalization is nudging Eastern societies to adopt a more "Western" view of romantic love (Hatfield & Rapson, 2011; Jankowiak, 1995). The West has a very positive view on love. Fehr (1988), for example, asked American college students to list the words they associated with love and commitment. Students provided a list of very positive adjectives for love. They linked it with expressions such as "caring", "happiness", "friendship" or "warm feelings". American students might agree that romantic love is a positive experience, but there the agreement ends. Young people possess somewhat different romantic beliefs. Weaver and Ganong (2004) tested the reliability and factorial structure of the Romantic Beliefs Scale (Sprecher & Metts, 1989), with a sample of African-American and European-American college students. Psychometric analyses with both groups were used to evaluate the generality of the model. The authors found that African-Americans and European-Americans didn't seem to share the same romantic beliefs. The Scale was not consistent for the Afro-Americans, but was adequate for the European-Americans. These results indicate that Afro-American differ in the way they conceptualize romantic

love. These results are very interesting because these two groups grow-up and live in the same country, the United States.

3.3) Views on the universality of romantic love

Only recently have scholars begun to investigate how universal love is. The idea of universality has been fiercely debated within Anthropology and Psychology. For now, there is a consensus that love is an universal phenomenon, but the evidence scholars have amassed thus far only allows romantic love to be classified as a “near-universal” construct. Passionate love seems to be a type of romantic love relatively free of cultural influences and it is now very well known that it is much more than a western, individualistic cultural construct (Hatfield & Rapson, 2005). A number of studies document that tribal and modern societies have surprisingly similar conceptions of passionate love (Neto et al., 2000).

One well-known attempt to prove the universality of romantic love was made by anthropologists Jankowiak and Fischer (1992). They examined ethnographical and folkloric accounts of romantic love in 166 widely distributed tribal cultures. They studied ethnographic accounts, searching for evidence of personal anguish and longing, the presence of love songs, tales of elopement due to mutual affection, native accounts of the existence of passionate love, or ethnographers’ descriptions of romantic love in the tribal societies under investigation. The authors found compelling evidence for the presence of romantic love in 88.5% of these cultures. They pointed out that monographs describing the remaining cultures simply lacked the information that would allow them to decide whether or not love existed in those cultures. They attributed this paucity of evidence to “ethnographic oversight,” meaning insufficient information existed about a given culture. They concluded that romantic love and passionate love are probably

universal. If passion is taboo, romantic love might be muted, but never entirely repressed.

As we noted in chapter 1, scholars have been interested in seeing if the experience of love is linked with gender and biological sex. Results from a wide array of studies (see Schmitt (2006) for a review) provide evidence that women are most likely to experience love and attraction for dominant men, whereas men tend to seek women who are physically attractive. Evolutionary psychologist David Buss (1989) has found evidence that human mate preferences display a striking level of cross-cultural universality. He asked people in 37 different cultures to indicate their most valued characteristics in potential mates. His sample was comprised of participants from all five continents and five islands. Subjects were asked to provide information about their biographical data, indicate at what age they desired to marry and have children, and to rate the level of desirability for 18 distinct characteristics (e.g. dependable character, chastity, intelligence and so on). The results revealed clear differences in men and women's mate preferences. In almost all samples, women tended to value financial capacity, ambition, industriousness (cues indicating high providing capacities) more than did men. To women, financial capacity was of primary importance. Men valued physical attractiveness and relative youth in potential mates. Women tended to be younger than men at the time of marriage. What is considered beautiful or an indication of the ability to provide resources will differ in different cultures, of course, but regardless of how they are defined, their importance is undiminished throughout the world. One can predict that men and women possessing the most sought after characteristics for human mate selection, will probably win more hearts, as well—indicating that love is a bit of a marriage market (Feybesse & Hatfield, in press).

Recently, Buss's data have been reanalyzed, using newer statistical techniques. Daniel Conroy-Beam and colleagues (2015) employed the Multivariate Distance and Logistic Regressions to quantify sexual dimorphism in the overall pattern of human mate preferences, both on average and across cultures. These techniques made it possible to consider mate preferences as a multidimensional process, in which age, sex, and cross-cultural differences were taken into account. The Mahalanobis Distances allow researchers to have a precise appraisal of the differences between groups in a multidimensional processes. Logistic regressions, in order to predict sex from mate preferences, indicate the accuracy with which mate preferences distinguish the sexes. The results indicated that sex differences play a fundamental role in mate preferences. The magnitude of the sex difference remained large regardless of its cross-cultural variability.

Around the world, people seem to love not only with the same frequency, but with the same intensity as well. One important study that documented that love feelings are universally strong, was conducted by Félix Neto and his colleagues (2000), in which the Love Attitudes Scale was administered in Africa, Asia, South America, and Europe. Authors expected to find cultural variations in the possession of those love styles that are not tightly linked to emotional factors (Pragma, Storge and Ludus) but more with personal attitudes. On the other hand, those love styles associated with high levels of emotion (Eros, Mania and Agape), would be relatively free of cultural influences. Participants were undergraduate students from Angola, Brazil, Cape Verde, France, Macao, Mozambique, Portugal and Switzerland. The authors' predictions were fairly well supported, because cross-cultural variations in Eros, Mania and Agape were very moderate. The Eros love style only varied with the Macao students; they tended to be less erotic than were young people in the other cultures. Differences in the interaction of

gender and culture were weak as well. Passionate love can be characterized by the possession of the Eros love style, but it is better portrayed as a combination of Eros and Mania. Both love styles were free of cultural effects. Similar results were found when Pinto and Neto (2008) compared the results of the Love Attitude Scales endorsed by Portuguese and Indian adolescents. The two groups turned out to be very similar.. As one might expect, the Indian subjects were a bit more pragmatic than were the Portuguese and in both samples, men were more Ludic and Agapic than were women. Elaine Hatfield and her colleagues have secured the same results, using the Passionate Love Scale (Hatfield & Rapson, 2005). They asked European American, Filipino American, and Japanese American, all enrolled in the University of Hawai'i, to complete a scale measuring the intensity of passionate love and another measuring the intensity of companionate love (they used Sternberg's intimacy and commitment / decision subscales). Regardless how long students had been in America, these various ethnic groups seemed to love with equal passion. No gender differences were secured in this sample. Men and women of all these ethnic groups scored alike on the companionate love scale as well. Kim and Hatfield (2004) found similar results when they compared the effect of passionate and companionate love on subjective well-being in Korean and American subjects. These societies were chosen for study because America represents an individualistic culture and Korea is typical of a collectivist culture. Multiple regression analyses indicated that in both cultures, passionate and companionate love are linked to happiness (as measured by the PANAS positive and negative affect scale) and satisfaction with life. Passionate love was strongest predictor of positive emotion while companionate love was the strongest predictor of life satisfaction.

Passionate love seems to fade away when its biological practical purposes have been achieved. Helen Fischer (1992) theorized that *Homo sapiens* and their ancestors experienced passionate love just long enough to ensure bi-parental care, which is necessary until the infant is old enough to survive on its own. This would suggest that passionate love must be alive for at least four years, if a child is to survive. Fisher examined the divorce rates in several societies, using the ethnographic records available from the United Nations Organization. She found that throughout the world, married couples commonly divorced in their fourth year of marriage. She concluded that modern men and women are driven by the same evolutionary forces that drove our ancestors—prompting modern man to marry, divorce and remarry with a variety of partners when this is socially and practically possible. This view is surely too simplistic, of course, because it doesn't take cultural aspects of romantic love into account. Many couples never divorce; their passionate love feelings can cement deep attachments, allowing companionate love to flourish and maintain a marriage for decades.

Xiameng Xu and colleagues (2011) attempted to determine cultural context that would affect the brain areas known to be activated when lovers are in early-romantic love and thinking about their beloved. They compared brain scans secured from Chinese participants, who were in love, with those previously secured from Americans in love. The brain regions associated with romantic love in this Chinese sample, presented highly similar patterns of the reward and motivational system activation in response to one's beloved, with those patterns previously found with the American sample. In both cases, romantic love was associated with the activation of the dopamine-rich regions. This team of researchers found small differences regarding the stimulation of the orbitofrontal systems; this brain region was not associated with romantic love in the Western samples. The authors suggested that this might indicate that the Chinese

participants engage in more critical thinking when they are in love than do their American peers. They weigh the pros and cons of their relationships more carefully, taking notes of negative aspects more readily, than do Western participants. This research also conducted an 18-month follow-up, in order to test the assumption that romantic love is associated with relationship happiness. This research was particularly interesting because it is known that the Chinese culture tends to associate passionate love with negative outcomes. The results indicated that the more intensely rewarding a relationship is in its early stages, the more likely it is to continue to be rewarding in the future.

Elaine Hatfield and Richard Rapson (2011, p. 5) commented on all these findings suggesting that passionate love is a cultural universal:

“We would argue that culture and historical pressures produce a vision of passionate love that are variations on a theme. Shading, melody, and tempo may vary with culture, but the underlying architecture of the mind may remain the same. Cultural traditions and values may affect romantic visions, how one describes one’s feeling when in love, and how demonstrative people are in displaying their love, but the fact of passionate love may indeed be a cultural universal based on similarities in the architecture of the mind and a common neural substrate”.

3.4) Romantic relationships in Brazil and in France

In this thesis we have tested some assumptions about romantic love by interviewing college students from two different cultures: Brazil and France. We have collected data about their social representations of passionate love (using a free association technique) and we have measured their feelings of love with the Passionate Love Scale, the Love Attitude Scale, and the Triangular Love Scale.

Scientific studies of love did not always receive positive attention in these countries. In the past, French social psychology almost completely ignored the subject of romantic relationships. If we consider most French social psychology texts, we will find that there is never a chapter dedicated to close relationships; this is in stark contrast to American texts which usually devote several chapters to the topic. The only exception is Serge Moscovici's manual, "psychologie sociale" (chapter 5: "les relations électives" written by Maisonneuve and Lamy (7th edition)). It is surprising that French scholars did not pay attention to love, because the French classical literature has always paid a great deal of attention to the topic. In 1864, Dumas stated that "French literature was the most immoral in the world" (Gay, 1986). According to Geneviève Coudin, the lack of studies on love in French social psychology is mainly due to the influence of psychoanalysis in French academia. French scholars usually explore this topic under the psychoanalytical perspective (e.g. Lacan seminars). Lubomir Lamy gave us another answer, he believes French social psychologists do not think that the topic of love can be taken seriously. It is important to point out that in spite of this neglect, two French social psychologists have worked on the topic of love: Nicolas Guéguen and Lubomir Lamy. Both scholars conducted several experimental studies investigating the impact of physical appearance, sexual offers, seduction, and the like on courtship behavior, dating or mate choice. As far as we know, they are the only ones focusing on love in France.

Brazilian social psychologists have been working on this topic, with some consistency, since the year 2000. The topic of love has been present in MD and PHD thesis and several psychometric studies have been conducted on the topic (De Andrade & Cassepp-Borges, 2013). Brazilian scholars have also published several studies exploring mate selection in that country (see Feybesse & Hatfield (in press) for a review). These efforts seem to be growing in Brazil, but the debate they stimulate is still restricted to

the academic domain. Scholars have also been more concerned with documenting similarities in love with what has been found in the rest of the world, than exploring particular aspects that romantic love may have in Brazil.

Today it is possible to find some cross-cultural studies, highlighting some particularities of French culture concerning romantic love. The studies that we will present were conducted primarily by American scholars interested in studying love in France, focusing particularly on its historical and literary contributions to worldwide conceptions of love. Simmons, Wehner, and Kay (1989) asked French and American participants to complete a questionnaire about attitudes concerning romantic love. These questions asked such things as: Do you believe that we can only love one person? That love overcomes all? Or do you think love is irrational? The results indicated that the French participants were more traditional than were Americans when it comes to romantic love. The French were more likely to associate love with marriage than were Americans, even though they also tended to be more likely to believe that love is irrational. The French considered that jealousy is an indicator of romantic attachment that is fueled by the feelings of love. Finally, the French sample considered love to be “too emotional to be observed scientifically” because it is a “head over heels” phenomenon. This might explain why studies of love are so rare in France. The American and French were in accord on some beliefs about love because there was no difference in their level of agreement that lovers should confess everything to the beloved, that love transcends social position or standards of morality, and these factors should not influence the choice of a love partner.

Studies classifying cultures on the individualism-collectivism dimension described the French culture as being a curious blending of individualism and collectivism, being autonomous, but group and family-oriented at the same time (Hall & Hall, 1990). Stella

Ting-Toomey (1991) tested the cultural variability of French, American, and Japanese college students on their expressions of love, intimacy, commitment, disclosure, attempts at relationship maintenance, relational ambivalence, and relational conflict. The French and American participants had higher levels of love, commitment, and disclosure maintenance than did the Japanese participants. The American sample showed higher levels of relational ambivalence than did those in the other groups. The American and Japanese samples had significantly higher degrees of relational conflicts than did the French. French male and female participants had similar results on the various dimensions, even if the women reported a slightly higher degree of love commitment.

Murstein and colleagues (1991) compared American and French cultures using the Love Attitude Scale. American and French students scored the same on Eros and Ludus. Being in love had a positive effect on the Eros scores. Americans were found to be more Storgic and Maniac whereas the French scored higher on Agape. This last result is interesting because it suggests that the French are more willing to sacrifice themselves for their lover than are the Americans.

Brazilians have a particular take on passion and love. They generally consider love and passion to be separate entities. One person can feel extremely passionate (sexual) about Person X, yet not be at all “in love” with this person. Passion is fleeting and purely sexual whereas love is something more serious and committed. The carnival is an important event all over Brazil and Brazilians seem to become more ludic in their romantic attitudes during the festivities. The Carnival provides a context in which the everyday life is suspended and everybody can live in excess (Damatta, 1986). During the festivities, some Brazilians will succumb to “carnival love” which can be characterized by an intense feeling of passionate love that will completely vanish when

the carnival is over (Feybesse, Hatfield & Neto, 2013). Carnival love is not viewed as real love but as pure passion and lust. The anthropologist Linda-Anne Rebhun (1995) noticed that Northeastern Brazilians, from the state of Pernambuco, often made this distinction between passion and love. Lower-class people emulate upper-class white families in this aspect of their unions. Passion was considered to be an idealization, that will necessarily fade away as reality beckons. Passion was considered to be imaginary; it is fantasized that the loved one possesses qualities that are not really there. Rebhun noticed that the subjective experience of love and passion are very similar, even if Brazilians made a clear distinction between the two. When she asked her informants to describe these feelings, they ended up saying very similar things.

Deschamps, Camino & Neto (1997) have also investigated Northeast Brazilians in a study in which he compared love style preferences in Brazil and Switzerland. In both cultures, people scored the same on Eros, Ludus and Agape. Brazilian participants seemed to be cautious about their answers. For them, love was associated with marriage, so they tended to be somewhat more choosy and pragmatic in their choices, compared to participants from Switzerland. The results seem at odds with the stereotype of Brazilians as hot Latin lovers and the Swiss are cold and emotionless. The Swiss were more prone to value emotionally intense relationships like passionate love. They were less practical and less concerned about whether or not their relationships would lead to marriage.

Brazilian males and females value much the same characteristics that men and women in the rest of the world value, with one exception: they were especially eager to find mates with a good sense of humor (Castro & Lopes, 2011).

Scientific studies focusing on passionate love are sparse in Brazil and ever more rare in France. We hope that this project will foster the development of research on romantic

love in both cultures. French psychology has an unquestionable tradition, quality, and usually possesses an original view on what is known about a given topic. The French perspective on this thing called “love” can surely contribute to the science of love.

3.5) Measuring love around the world

The psychometric scales presented in chapter 2 (The Passionate Love Scale, the Love Attitudes Scale and the Triangular Love Scale) were administered in several countries around the world. The number of studies using these scales is quite impressive. When scholars tried using these scales, they focused generally on analyzing their psychometric properties and attempt to determine if there was gender or cultural differences in these countries. Usually, non-American scholars preferred to translate one existing measure (usually crafted by an American researcher) into their native language, rather than trying to construct a new one. Overall, scholars tended to secure positive results, in the sense that the three love measures appeared to be reliable and valid in different cultures. In most cases, scholars found similar structures to those observed in the American studies. These attempts are isolated, and it is impossible to gain a complete knowledge about where the scales have been tested and the results they obtained. There are a many translated versions available online, for example, with no information about the psychometric properties of these scales. Plus, no one has as yet published a compendium of the published studies.

If we take the PLS as an example, we were able to find a considerable number of studies that have used the scale, in several countries (see table 1). However, most of the time, the authors did not include any information about the psychometric properties of these translations and the extent to which they correlate with the original version of the PLS. For those in which we have information about it, the PLS proved to be a reliable

measure and have reproduced the results found in the original study (Hatfield & Sprecher, 1986).

Table 1: List of countries that have used the Passionate Love Scale.

Holland	Peru	Denmark
India	Poland	England
Indonesia	Russia	Israel
Iran	Spain	Germany
Iran	Turkey	Pakistan
Italy	Slovenia	Canada
Japan	Sweden	China
Korea	USA	
Portugal	Korea	Switzerland

The PLS has proven to be a reliable measure in very different cultures such as China (Xu, Wang, Aron, Lei, Westmaas & Weng, 2012), Turkey (Yildirim, Hablemitoglu & Barnett, 2014) and Portugal (Feybesse, Neto & Hatfield, 2011; Sim-sim & Pulido, 2013). In all these cases, the factorial solution of passionate love had strong loadings and high reliability. Subjects in love scored higher than students who were not in love, and the results seemed to indicate equal levels of passion for both male and female participants in love. We noticed small differences—such as many Turkish students declaring they had never been in love, if their results are compared with those found in Portugal (Feybesse et al., 2011), or with the results secured in study 1 and 2 of this thesis. This may be due to cultural differences between Western and Eastern societies, such as comparing cultures that tend to forbid teenagers and young adults to have romantic partners before marriage, with cultures that tend to allow such associations (Yildirim et al., 2014).

Landis and O'Shea (2000) used the Passionate Love Scale to verify if passionate love could be better explained through a multicultural construct. They hypothesized that different cultures have different multifactorial structures with the PLS. They asked participants from North America, the Middle-East, and Asia to complete a questionnaire about love attitudes, in which the PLS was included. They combined all the samples and performed a principal components analysis, which indicated six distinct factors. These factors highlighted some variability in continuous positive and negative aspects of passionate love: Commitment-affection (factor 1); insecurity-security (factor 2); other centered-self-centered (factor 3); instability-stability (factor 4); affective passion-physical passion (factor 5) and physical affection-cognitive affection (factor 6). The structure of these factors varied as a function of culture. Some of these factors might be absent in one culture and present in another. The sex of respondents had no effect on these variations. The authors considered this study to be exploratory and not a theory-confirming study, so the relationship between culture, gender and passionate love should be explored with further research. Their data suggested that passionate love, as it is measured by the PLS, could be generalized with one main dimension as had been done in previous research.

The Love Attitude Scale has proven to be a reliable measure in several cultures. Félix Neto (2000) concluded that the study he conducted showed that the Love Attitudes Scale has relatively good factorial solutions across different cultures. The Ludus love style was the most problematic factor across cultures. The cross-cultural differences found with the scale are as big as the similarities and it is still hard to truly grasp those distinctions. Some love styles did not have cultural effects whereas other had. Nevertheless, the Love Attitudes Scale is a valuable measure for scholars wishing to make cross-cultural analysis of romantic love. Other studies have confirmed Neto's

factorial results in very different cultures, from a Western point of view, such as Taiwan (Huang, 1999) or Japan (Tagawa, 2014).

The Triangular Love Scale was also tested in several countries and the theory underlying it is still very popular in international academia. Scholars from different countries were faced with the same psychometric problems that were found in the US: one important interdependence between the three Sternberg's dimensions and several items having strong loadings on more than one of these same components (see chapter 2 for a more extended review). Subsequent international research tried to overcome these psychometric problems by reducing the number of items in each subscale (Cassepp-Borges, 2010). This procedure is quite common in studies that try to validate an English version of a given scale in psychometricians' native language. We can cite a French-Canadian study (Lamieux & Hale, 1999), a Dutch study (Overbeek, Ha, Scholte, De Kemp, & Engels, 2007), or Brazilian studies in which Sternberg's scale was tested several times (Cassepp-Borges & Teodoro, 2007; Gouveia, Fonseca, Cavalcanti, Diniz & Dória, 2009; Cassepp-Borges, 2010); the results were obtained the number of items in the TLS was reduced. As we saw earlier in chapter 3, Sternberg (1997) has predicted that the levels of passion, intimacy, and commitment would follow different courses as a romantic relationships progress. These "foreign" studies have found more compelling evidence that this is the case in their analysis than did Sternberg (see Cassepp-Borges (2010) for a review).

Only few scholars have tried to combine these three scales using correlation analysis. This type of study has often been done in America. We found two important exceptions: Brazil and Japan. This research is interesting because these are two very different cultures, even though Brazil has the largest number of Japanese immigrants in the world. Brazilian scholars were interested in conducting research, which required

participants to indicate their attitudes and feelings on several scales measuring love; scales which had been successfully adapted to their own cultures. Vicente Cassepp-Borges (2010), for example, found correlations between the components of the Triangular Love Scale and the love styles of the Love Attitudes Scale that were similar to those often found in the United States (Hendrick & Hendrick, 1989). Feybesse, Neto & Hatfield (2011) found almost identical results for America and Portugal when they combined the three scales in Portugal.

Noriko Tagawa (2014) compared the studies on love that were conducted in Japan (using several love scales such as the TLS, the LAS or the Relationship Closeness Inventory) with previous studies. Japanese participants scored high on Sternberg's Passion, Intimacy, and Commitment components when they were thinking of someone with whom they were in love. Gender differences were found with the Eros love style of the Attitude Love Scale, contradicting what is usually found in similar studies. Marriage for love became popular only very recently in Japan, so young lovers tend to fight against these new feelings of passion, and build their romantic relationships with caution, but love measures presented successful comparative results in this culture as well.

3.6) Conclusion

Cross-cultural studies on romantic love have proven to be an important and fertile aspect to be taken into account for the development of the science of love. Lovers do not exist in a bubble far from everybody else but in a historical and cultural context. Love is probably as old as the humankind and it was probably a crucial element in insuring our species' survival. The differences and similarities found across cultures provide unquestioned insights about the nature of love.

Cross-cultural studies provide strong evidence in support of the psychometric measures of love that we will employ in this thesis. One thing that is clear, is that it is extremely important to encourage scholars from a variety of cultures to engage in more communication. Cross-cultural studies—exploring cross-cultural similarities and differences on the Big Three love measures—using meta-analytic methods, could provide a better understanding of cross-cultural differences in the nature of love, societal variations in scores, and the psychometric properties of different scales in different countries.

This assemblage of data could prove that love is a universal phenomena, at least in modern times. The data are already available in many cultures, so there are countless possibilities to conduct such studies at present.

One place in which we have almost no information on romantic relationships is Africa. Psychometric research on love in this large continent would be valuable to all academia. These types of studies could contribute to engaging locals in the scientific process. Such research would also have practical implications. Having a better scientific understanding in how romantic relationships work and develop could help to better fight the AIDS epidemic for example.

Even if people are different in many ways, the studies we have reviewed tended to show that they love in very similar ways. Passionate love seemed to be felt everywhere, even if it is subjectively experienced in very different ways. An American, a Brazilian, and a Japanese person can easily understand one another when they are sharing what they feel when they are in love. They might have different attitudes about the nature of love, but they can surely understand one another and recognize the joy and anguish of love. The basis of romantic relationships also appears to be the same, in the sense that commitment and intimacy play an important role everywhere. After reviewing all these

cross-cultural studies, one can hypothesize that commitment is more important in traditional societies, whereas intimacy is extremely important in the individualistic societies, especially at the beginning of romantic relationships.

Chapter 4: Concepts and methods to explore passionate love

I'll be able to say to myself of the love (I had):

Be not immortal, since it is flame

But be infinite while it lasts.

Vinícius De Moraes

This project has explored the topic of passionate love in several ways, allowing us to test a number of distinct assumptions. The exploration of these assumptions, with the studies that are about to be presented, will provide answers that are far from being conclusive, but will at least enrich our knowledge. The main goal of this chapter is to provide an overview of the empirical work that it is related to the studies of this thesis.

In this chapter, we will begin by presenting research that is closely related to the research we conducted in this project. There are previous studies that tested hypotheses using protocols or research methods similar to those we chose in our different studies.

We will not present here a discussion of conducting a psychometric evaluation of the Passionate Love Scale in Brazil and in France, because the theoretical background related to this topic was extensively addressed in Chapter 2 and Chapter 3 (study 1).

The aspects of our research related to social representation analyses can be considered to be the study that deals with the cultural aspects of passionate love (study 2). We have included representations of passionate love and love types that were investigated with particular groups. Also, we are going to present one research method that can be related to our studies about social representation and that explored the topic of romantic love in a great deal: the prototype analysis studies. As we are going to present, several studies on “love types” were conducted providing evidence that “lay people” think about love types that are similar from the ones that are measured by with our psychometric scales

and from what one study can find with the word association task we used on our social representation study.

The use of the Passionate Love Scale can be seen as an investigation of how intensely different symptoms of passionate love are experienced in a given culture. The factorial analyses and reliability studies indicate if the items proposed by the scale are adequate in a given group or culture. The studies related to sensory experience and creativity can be seen as studies about the effect that passionate love can have on cognitive processes. Sensory experience demand “lower level” basic cognitive processes whereas creativity requires thinking and actions (Lubart, 2003), which are “higher level” and complex cognitive processes. Today, it is possible to find different studies linking all these topics and research methods with love.

The studies that we presented in chapter 3 provide evidence that love can be influenced by cultural factors. There are cultural variations in the way that love is perceived. On the other hand, psychometric and neuropsychological studies on passionate love tend to suggest that there are no cultural effects regarding the symptoms associated with this feeling and that people all over the world seem to experience passion in romantic relationships with equal intensity. The biology of passionate love is universally the same as well. The study related to passionate love and the cognitive processes (study 3 and 4) could be considered to be more exploratory. Overall, previous studies have demonstrated that passionate love has a negative effect on cognitive control processes. Passionate love deactivates the brain areas associated with critical thinking or decision making. The serotonin imbalance found in passionate lovers makes them being extremely focused on their beloved and on the romantic relationship (Marazziti, Akiskal, Rossi & Cassano, 1999). Although it is widely accepted that passionate love has an important impact on our cognitions, there are few studies on this topic

(Steenberger, Langeslag, Band & Hommel, 2013). Research linking love with creativity is in its infancy, but it is possible to notice an increasing interest in academia about this topic. Today, it is hard to be certain about how scholars influence one another or in what direction a given influence goes.

4.1) Social representations

One way to understand what people experience when they are in passionate love is to refer to social representation theory (some research about romantic love using this theory can be found in study 2). This theory was originally developed by French sociologist Durkheim under the term “collective representations” and was revisited by Moscovici in the sixties as a way to explore how people represent ideas in a social context. It is hard to define what social representations are but they can be summarized as a set of knowledge and attitudes about a given object shared by a social group. In this sense, any given representation is organized around a nucleus and peripheral systems. This nucleus is seen as a stable entity that will determine the meaning and the organization of the object. The peripheral elements ensure the stability of the nucleus and its adaptation to environmental factors (Galand & Salès-Wuillemin, 2009). Claude Flament and Michel-Louis Rouquette (2003) have pointed out what can be grasped about a given topic when someone uses the social representation techniques is an understanding of how the person perceives that construct. Social representations correspond to one’s way of perceiving a given aspect of the world. They argue that social representations are linked to specific social contexts conditions surrounding the person who makes them. One person belongs to several groups such as social class or status, profession, nationality and so on... The social nature of the individual carries meanings and symbols of the groups to which this same person belongs. Social

representations are an organized set of cognitions related to an object (Negura, 2006). Social representations are constructions developed in the dynamics of social domains. Social groups contribute and fight each other for the constitution of social representations (Doise, Clémence & Cioldi, 1992).

The social representation one person has towards a given object will necessarily be linked to his or her social context as well. The social representation corresponds to a body of knowledge, attitudes, and beliefs about a particular object. Different techniques exist for assessing representations; they allow the understanding of how one group of persons apprehends abstract concepts, such as passionate love, for example. Different social groups can have different social constructions about a given object and such asymmetries between groups can be more (or less) important (Deschamps & Moliner, 2008). According to Jodelet (1984), social representations are constituted to three main elements: opinions, attitudes and stereotypes. These elements are always related to each other and can be organized in many different ways. In a way, when we asked participants to represent an object, we are also asking them to be creative because we are exploring how they are imagining reality. Exploring social representations correspond to explore ideas. Two distinct groups can have different representations of a single object because each group might generate different clusters of ideas about this same object (Flament & Rouquette, 2003).

It is possible to collect data on social presentations in different ways. What is always at the center of any data collection is idea communication. On one hand, subjects of a group give meaning to an object. This meaning can be considered to be in the realm of someone's subjectivity about a given topic. On the other hand, there is the receptor (or the researcher) who will try to arrange and analyze this meaning using an objective approach (Negura, 2006). Social representation theory transforms abstract ideas into

concrete conceptions of a given object (Jodelet, 1984). Data gathered in a social representation perspective can be the transcription of interviews, semi-structured accounts and even the analysis of words provided by free-association tasks. In this thesis, we used the free-association method by asking our participants to provide the first words that come to their mind when they read the word “passionate love”. This method allows exploring how passionate love is defined and what are the main topics associated with this central word. Different groups can form different nuclei indicating that a same word can have a myriad of meanings. There are two main methods that can be taken into account when someone is analyzing the words provided by the free-association task: the rank of the word and the frequency of the word. With these elements, one can determine what are the central words (the nucleus), the peripheral words and how these words vary. One word can be associated with different words so it can be represented with different meanings. The free-association method can be manipulated in several ways. Researchers can be more directive when asking participants to provide a list of words: they can ask participants to only provide adjectives or ask to provide words according to a given social group (e.g. according to you how Hollywood movies perceive love?).

The data can also be analyzed in many different ways. Doise, Clemence and Cioldi (1992) provided a list of methods available when someone wishes to explore a set of data in a social representation perspective. These analyses lead to complex statistical models such as correlational studies or factor analysis. According to these same authors, the association task can be analyzed with at least dozen of statistical methods going from a simple analysis of frequencies to multidimensional analysis of group differences. The goal of such methods is generally determine how different thoughts and ideas can be integrated in a coherent ensemble. They are based on the assumption that common

representations can be found through inter-individual variations. In this thesis, we analyzed gender and cultural expressions associated with passionate love by conducting correspondence analysis of words and using the method of similarity analysis (more details are available in study 2). These methods are ideal when someone wishes to compare results of independent groups. In any case, the clusters or the links one person gets with the data must be interpreted as it is usually done in any classical psychometric study. Dimensions and assemblies are formed so the researcher can find out their meanings.

Finally, the word association task that we have employed in this project can be seen in terms of prototypical accessibility providing what are the main prototypes. The word association task employed in social representation theory gives us access to what are the “consensual prototypes” (Galand and Selès-Wuillemin, 2009) because we set out which words are more associated with our inductive word. There are a lot of research available in cognitive psychology about the prototype analysis of romantic love and they can give us hints on what we can find with our social representation study.

4.2) Prototype analysis of love

Eleanor Rosch (1973), a cognitive psychologist, developed the concept of natural categories. Rosch pointed out that it is sometimes difficult to come up with a precise definition of things like dogs. Dogs can be little or big, hairy or slick, affectionate or killers, etc. But we know a dog when we see one. Poodles are dogs, so are German shepherds. In our minds, she argues we have a prototype of a dog. Many examples come to mind when we think of dogs. Sometimes, we are not quite sure. Is a coyote a dog? A wolf? People may disagree.

Many objects named in natural language can be seen as having a prototype, or internal structure. These prototypes are internally structured concepts that are generally shared by all members of a given group. Rosch demonstrated that subjects could provide prototypically ratings for types of fruit, for example, a fruit like a tomato was judged to be less typically “fruity” than, say, an apple. Prototypes possess also a vertical organization. Fruit has subordinate categories, like “apple”, “orange”, or “banana”, for example. Fruit also has superordinate levels as well, such as “food”, for example. It was verified that generally all members of a given group tend to cite the same items at the subordinate level (Fehr, 1991). Prototype analysis is useful for exploring how one idea or object is organized and defined by a group. In this it has some similarity to the social representation model. It might be that, in a prototype analysis, subjects are more focused on finding the best way to define a given object, by providing the best matching prototypes of that given idea or object. Rosch defended the idea that a hierarchy of prototypes exists. There are some prototypes that will more linked to general prototypes than others, so certain prototypes can provide very good examples of how an object or idea is represented (Aron & Westbay, 2006). Scholars take the prototypes that are more frequently cited as indicator of “typical” prototypes. For example, a pigeon is more easily remembered as a type of bird than a penguin is.

Prototypes analyses have been widely used in studies related to love. This type of research, which was begun in the 80’s, was developed by Beverley Fehr. Today it is possible to find several prototype analysis studies related to romantic love. Scholars have focused most on analyzing prototypes of love itself, but there are a wide variety of studies looking at aspects of love, such as passionate love or romantic jealousy, in existence. Fehr (1988) began her research on love prototypes in the hope that this method could contribute to the development of a scientific definition of love. Her

earliest studies tried to analyze the prototypes of love and commitment, because, she thought, both terms were closely related, but both were also lacking a clear definition. College students were asked to provide prototypes for love or commitment, rate the level of kinship between some proposed subtypes of love, and commitment, and list these different subtypes. College students were considered to be the ideal participants, since she was interested in finding out what “lay people,” meant by these terms. The results indicated that to some extent love and commitment are interdependent concepts, because they shared common features, but they also possessed some independent features as well. In this sense, these results provide some tangential support for Rusbult’s model of commitment (i.e., love is a dimension of commitment) and Sternberg’s Triangular model (commitment is a component of love) were the theories that better translated the relationship found between love and commitment of this study: commitment is necessarily related to love and vice versa. Fehr’s prototypes for love also illustrated and matched Hatfield’s and colleagues’ model of love. The “types” of love provided in this research can easily be divided into passionate and companionate love. The main difference between Fehr’s and Hatfield’s research is that participants thought that other types of love, that are not related to romantic love or companionate love -- like maternal love or love for our siblings and family should also be included in the category love. Fehr concluded that for ordinary people, love and commitment possess important characteristics that are often overlooked by the explicit theories of love. There is a gap between the scientific view and the lay person’s view of love. Research on love tends to take a somewhat reductionist point of view. Scholars usually provide taxonomies with few subtypes.

Fehr and Russell (1991) conducted a second wave of studies on the prototypes of love. Once again, college students had to think of different “types” of love. A second group

of participants were shown a series of words potentially related to love, and asked to evaluate how good or bad an example of love that construct was. Love types provided in experiment 1 such as “maternal love”, “parental love”, “friendship”, “romantic love” or “passionate love” were considered to be very good examples of love types. The researchers also tried to determine if it was possible to delineate the borders of love and/or rate students’ agreement about statements related to love. If this was possible, it was expected that students would mention some subtypes of love very frequently, indicating that they are good prototypes of love, whereas poor examples of love would be mentioned only infrequently. Students were able to provide a large list of love types. They tended to perceive love in all its variations as a positive emotion (see study 2 for more details). Fehr concluded that love has fuzzy borders, because it is hard to find the cut between good prototypes of love and bad ones. Nevertheless, love was considered to be better understood from a prototype perspective than a classical perspective. The love types that seemed to fit better the concept of love were maternal love, romantic love, affection, love of work, self-love, and infatuation. This type of research led Fehr to create a measure of “love prototypes,” in which participants are asked to rate the extent to which a given type of love presented captures his or her concept of love. This allowed researchers to assess the importance of different types of love. The primacy of Hatfield’s companionate love can be measured via this technique by summing the scores of love types associated with it—types such as friendship love, familial love, maternal love, and so on. The same procedure can be used in assessing the primacy of passionate love, Ludus love, and the like, for example (Fehr, 2006).

A few years later, Arthur Aron and Lori Westbay (1996) analyzed the structures of the prototypes of love that were previously identified by Fehr in 1988. They concluded that love could be divided into three general components—labeled as passion, intimacy, and

commitment. Two supplementary studies cross-validated these three component solutions with independent samples. The love features provided by the participants fit well with the triangular model of Robert Sternberg and the love styles model of John Alan Lee. These authors conclusion is consistent with the model proposed by Fehr in research we discussed earlier. In conclusion: Prototype analysis allows a better understanding of how love is structured and can surely help scholars to define what the idea of love is. Prototype theory is linked to concepts and not events (Fehr, 1991) so it might help scientists to define a concept, although not to understand its dynamics.

There has been some attempt to investigate love prototypes cross-culturally (see Fehr (2006) for a complete review). The results indicate that people's conceptions of love vary according to cultural context. Overall, Western societies consider love to be a positive emotion, because they associate love with positive attributes, such as those presented when describing the American sample (e.g. affection, puppy love or love for humanity). Chinese participants were less enthusiastic. For them love was a bitter sweet emotion. They provided love categories that could be split into two subcategories, one positive and another negative. Cross cultural analysis of love prototypes can help scholars in identifying which aspects of love are universal and which are cultural specific. In this project, we have asked to French college students to provide love types, with the goal of comparing their lists, with what was found in Fehr's study of 1991. There is also a temporal gap of more than 20 years between Fehr's study and ours, so differences we discover may be due to culture or to the passage of time: participants of different generations might provide different lists of love subtypes.

4.3) Relationship between love and creativity

Love and Creativity are topics of research in psychology that were neglected by scholars for a long period of time. These topics were once viewed as mystical experiences and seemed almost impossible to investigate using scientific methodologies.

Elaine Hatfield and Ellen Berscheid noticed almost no scientific studies on love, when they started to conduct research on love (Hatfield & Walster, 1978). Only at the end the 80's, did love come to be considered a respectable topic of research; even then it was a topic mostly explored by social psychologists (Hendrick & Hendrick, 1989). The same thing can be said about creativity. According to Todd Lubart and Robert Sternberg (1999), for a very long period of time, there were no scientific journals dedicated to creativity or departments of psychology studying it in a cognitive, social, or clinical way. The scientific recognition of this topic of research seems to have appeared even later than studies devoted to love. Today, both topics are focus of a great deal of theorizing and research, which is providing an array of empirical evidence. We can suppose that love in romantic relationships may have an influence on creativity, given that emotion and cognition are supposed to be related to cognitive abilities, and therefore creativity. Emotion can elicit specific concepts such as passionate love and lead to creative thinking, especially if there is a need for it (like when we are longing to be united with our beloved). Lubart, Mouchirioud, Tordjman & Zenasni (2003) indicate that it is still hard to determine how emotions influence creative productions. Some scholars have found that positive emotion enhances creativity more than do negative emotion. Other scholars have secured the opposite result.

Love and creativity have been linked together very recently in scientific studies. These two phenomena seem to be universal and are qualities that can be used to define our

species because they are mostly human abilities. Maybe nothing defines humankind better than love and creativity. Both are surely key elements in the development and survival of our species, as we will try to show at the end of this chapter. Kaarina Määta (2011) noticed many features that are common to the essence of love and creativity, making them interconnected concepts. She believes that linking both concepts is important; both are currently important topics of research now. Both can affect human well-being in a profound way, both require compromises, and tolerance of conflicts, as well as flexibility and bargaining. Imagination is always present in love, as in creativity, and imaginative ability has always been present throughout the human span. Both love and creativity can also be manifested in (or can even be sparked by) psychopathological or deviant cases (Hatfield & Rapson, 2005; Lubart, 2003). As Kaarina Määta suggested, there are some scientific indications of the possible relationship between love and creativity. Passionate love seems to be the best type of love to be used in correlational or experimental studies of creativity and the link between the two, because this type of love has a strong effect on people's cognitions and emotions.

Robert Sternberg and Todd Lubart (1995, p. 677) defined creativity as “the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)”. According to these authors, creative people buy low and sell high in the world of ideas. Intelligence, knowledge, thinking styles, personality, motivation, and environmental context are six personal resources that help our creative potential and allow us to be creative. Scholars have sought to understand how creativity and innovation are influenced by environmental factors and concluded that people evidencing the individual attributes related to creative achievements are reactive to climate variables (Hunter, Bedell & Mumford, 2007). In this way, passionate love can play a significant role “as a climate variable” because falling in love enhances

perceived self-efficacy, because it expands the self (Aron, Paris & Aron, 1995). Collins and Amabile (1985), noticed that creative productions require high levels of motivation. Passion and commitment are important elements to creativity. So, according to this project, people who are passionate in love (context) should be more creative, in order to overcome obstacles (motivation) that get in the way of their romantic relationships. They will probably provide the motivation to find more alternatives, in order to deal with any type of obstacle that presents itself. One of the basic romantic beliefs, found by Susan Sprecher and Sandra Metts (1989) in college students, is that love can overcome any obstacle. Linking passionate love with creativity can be seen as an investigation as to the interaction between motivational context and creative behavior. Passionate love is also a powerful emotional state and investigating the creative aspects of that can be a good way to test the effect of emotion in creative productions.

One of the first bits of evidence for the notion that love can trigger creativity is provided by Griskevicius, Cialdini & Kenrick (2006), through an evolutionary perspective. These authors tested the idea that motivation for mating may spark creative processes, in order to facilitate mating success. Thus, they tried to determine if both short-term and long-term mating goal behaviors activated creativity. The authors asked participants to either look at a picture of a desirable person of the opposite sex (enhancing short-term mating) or to imagine being in a particular romantic scenario (enhancing long-term mating). They found that male participants displayed creativity in short-term or long-term scenarios whereas women only displayed creativity in the context of attracting a high-quality, long-term mate. The authors argue that creativity is a tool which allows one to receive attention from romantic partners. The gender difference the authors secured is probably due to the fact that males adopt courtship behaviors more often than do females. Along the same lines, Förster, Epstude & Özelsel (2009), suggested that people

in love focus typically on a long-term perspective, enhancing holistic thinking, and thereby sparking creative thoughts. These authors believe that love and sex lead to different ways of perceiving the world. They proposed that subjects induced to imagine sex without being in love will use detail-oriented processing, eliciting analytic thinking and not creative thoughts. On the other hand, subjects induced to imagine love without sex will use creative thinking and not analytic thinking, because such circumstances will elicit global thinking. After conducting two experiments, the authors concluded that love enhances global processing and creative thinking whereas sex enhances local processing and analytic thinking.

Love is surely a very important topic among artists. In a very interesting study, Martins (2007) checked which rhymes are most common in Brazilian popular music. He analyzed 3073 rhymes, comprising the 100 most aired songs in Brazilian radio stations between 2001 and 2005. One of the most commonly employed pairs of words used by songwriters during this period of time were the combinations of the words “coração / solidão” (heart / solitude) and “amor / Dor” (love / pain). This finding makes one wonder if songwriters are especially creative when experiencing unrequited love. On the other hand, perhaps these results are due merely to the fact that songs on the theme of unrequited love might be especially appealing to the public, providing a guarantee of commercial success.

Poerio and colleagues (2015) have investigated whether social daydreams could have an impact on momentary feelings. They sought to find out if emotional well-being could emerge from imagination as well as from real events. Previous research suggested that daydream activity is commonly concerned with the mental pursuit of social goals. College students were recruited to evaluate their feelings before and after they have experienced their most recent social daydreams (centered on social goals and needs) and

non-social daydreams. In the context of this study, daydreams were associated with imagination, whereas emotional feelings and well-being were evaluated with measures tapping happiness, love, and the impression of connection. The authors found that everyday daydreams, filled with social content, were associated with increased feelings of love and connection. Feelings of happiness increased too and were linked with the idea that daydream content is related to social interaction. If imagination can have a positive effect on love, one can certainly wonder whether there might indeed be a positive relationship between passionate love and creativity.

The research closest to that conducted in this project (and conducted at the same time as our own) was conducted by Kelly Campbell and James Kaufman (2015). They conducted a correlational study between love, personality, and creativity. Love was assessed with the Triangular Love Scale, so the authors had data on the subjects' passion, intimacy, and commitment components. Personality was assessed via the Big Five. Creativity was measured in two different ways: participants were asked to report their artistic creative behavior and by answering questions related to everyday creativity. The questionnaire was a self-report document, allowing the researchers to put it online, and secure a large sample of 1529 participants. Campbell and Kaufman found a positive correlation between the love components and everyday creativity. Artistic creativity had a negative correlation with each love component. This study indicates that passionate love can have a variety of effects on creativity, depending on the type of creativity involved. Passion was positively associated with agreeableness and openness.

4.4) Evolutionary psychology and sensory experience

The last study in this project corresponds to a cross-cultural collaboration, lead by Professor Viktor Karandashev, from the University of Michigan, in which we were able

to explore the relationship between physical attraction, sensory experience, and passionate love with a French sample of college students. This type of study is very common in the field of evolutionary psychology, which deals with mate selection and romantic love. In the case of our study, we sought to explore cultural variations towards sensory experience in romantic attraction in five cultures: Georgia, Russia, France, Portugal, and the United States. We assumed that physical attraction would play a key role in sparking passionate love in all five societies, but in different cultures, different features of attraction might appear more (or less) important. Some cultures might value visual aspects of a potential mate's appearance, others might value tactile-kinesthetic or olfactory factors. The authors were unable to find any hallmarks of what is sexually attractive in all cultures; most scientists believe that cultural standards of appeal are so diverse that it is futile to search for universal standards of appeal (Hatfield & Rapson, 1993). Men and women differ also greatly in what they find sexually arousing, so it seems likely to propose that the genders will differ on which sensory experiences they consider important.

As we discovered in chapter 3, men and women all over the world tend to search for mates that possess certain constellations of traits. Mate selection is complex in humans. One person can employ different mate strategies at different times and oscillate between short-term and long-term romantic relationship strategies. Like in several other species, those who possess desirable characteristics are seen to be carrying "good genes" and have a higher date status. They will search for the best partners and will have higher rates of mating success. Males tend to prefer short-term relationships, and are motivated by the guarantee of sexual relations in long-term relationships. They are also more inclined to participate in extra-pair sexual relations. Women prefer long-term relationships and are more motivated by the guarantee of emotional commitment in

long-term relationships (Landolt, Lalumière & Quinsey, 1994). Short-term mating is more costly and less beneficial for women than it for men (Buss, 2006), because they have biological constraints and a limited period of fecundity (Gouillou, 2014).

Romantic love facilitates pair-bonding, long-term relationships, and increased reproductive success (Buss, 1988). When someone is looking for love in a relationship, he or she will take into account the bonding acts that are displayed by the beloved. In general, one is going to be looking for signs of commitment; commitment can be identified in several ways. One basic and initial sign of men's commitment will be the voluntary provision of resources, such as food, shelter, or protection. Providing sexual access and remaining sexually faithful is another sign of commitment. Finally, lovers tend to commit reproductive resources to their beloved, which indicates a willingness to provide parental investment and self-sacrifice (Buss, 2006). The origin of love in humankind is linked to development of a need for bi-parental care. The development a large brains during hominid evolution requires high energetic demands. Offspring survival relies on bi-parental care and parenting efforts. Love provides the pair-bonding and attachment needed to guarantee this bi-parental care (Jankowiak, 1995). Modern anthropology and evolutionary psychology scholars have concluded that love is a commitment device developed throughout the hominid evolution. Love is an adaptation designed to solve problems of reproduction (Buss, 2006).

The best bet for an ancestor who might have experienced feelings similar to passionate love is the one from whom we have descended: *Homo erectus*. Researchers investigating the brain fossils of this species concluded that their brain was so large it would demand the constant high-energy intake—the same high energy intake required by *Homo sapiens*. *Homo Erectus* infants' would then also need a cooperative nurse and perhaps bi-parental care for quite a while in order to survive (Cofran & Desilva, 2015),

opening the possibility that *Homo erectus* mothers, fathers, and children would develop deep attachments. The circumstantial evidence indicates that *Homo erectus* lived in small hunter-gathering bands, centered on monogamous pair bonding. It is difficult to know the degree to which pair bonding or cooperative breeding were adopted prior to *Homo erectus*, because the evidence is sparse (Fletcher, Simpson, Campbell & Overall, 2015). Other species that require bi-parental care, such as some bird types or the prairie vole, display the same neurochemical reactions that humans do when they are reproducing (Fisher, 2004). The human abilities for language, introspection, and higher cognition, mean that love will be more complex in humans, than in other mammals. Some theorists argue that once reproduction is successful, and the offspring are old enough to be independent, feelings of love will fade and a couple will be free to bond with others. Such sequential mating with provide genetic diversity in a tribe (Fisher, 1992). Societies that allow divorce show high rates of divorce after the fifth year of marriage. In Western countries, current divorce rates hover around 50% and rates tend to be lower in the West. Therefore this suggest that one problem of reducing love to its evolutionary reason for existence is that the evolutionary approach doesn't explain why so many couples manage to stay together for their entire lives (Fletcher et al., 2015).

Some characteristics (such as the smell or the hair for example) are probably valued in mating and be good indicators of one person's qualities. If we go back to our study exploring romantic love and sensory experience, we can include this final study as one related to the evolutionary perspective and also to cognitive processes. As was stated earlier, interpersonal perception and sensory experience require fairly low cognitive processing, which can be influenced by feelings of passionate love. Previous researchers have shown that some physical characteristics are more appealing than others. Males prefer facial symmetry, a low hip-to-waist ratio, long hair, clear skin, and average

weight (Nevid & Rathus, 2009). Women look for tall men, muscular builds, and tend to give more emphasis to bodily scent (Furlow, 1996; Stulp, Buunk & Pollet, 2013). In our study, we will investigate the role of various senses in physical attraction (see study 4 for more details).

4.5) Conclusion: what was expected in our different research studies

This project dealt with several topics related to passionate love and used very distinctive methods of research in the different studies. It provided also an attempt to test the Passionate love Scale in two cultures where there was no official data available thus far. The PLS can be a very useful tool for many studies exploring the nature of romantic love. In this aspect, this project seems to be particularly valuable because there is almost nothing in France about psychometric properties of French love scales. As it was shown previously, although there is a lot of psychometric work being done in Brazil, the PLS is the one “big” love scale that has not yet been tested on the continent. Our contribution, of matching the PLS with some other love measures, helped to provide information about the construct validity of these same measures. The cross-cultural research with the PLS presented in chapter 3 led us to conclude that the PLS was going to be a valid measure both in France and in Brazil. It was also expected that we would replicate previous results with the PLS because culture seems to have a minor impact on passion: we expected to find no gender differences and equivalent scores when subjects have declared that they are in love.

The social representation method has given us a glance into how passionate love is represented in Brazil and in France. We believed that we would find gender differences in the way this concept was viewed: men would tend to link passionate love with sex whereas women would associate it more with romantic attachment. As we saw in

chapter 3 and in this chapter, we expected Brazilians to separate passion and love whereas the French would consider these concepts to be closely linked because they would associate passionate love with romantic attachment and romantic relationships. These are two Western societies and love is seen as positive emotion in both societies, so French students, like the Americans, should provide positive attributes and be more focused on ideas that are related to romantic relationships (e.g; attachment, sexuality, emotional states and son on).

It is relatively well established that passionate love has an effect on cognitive processes. People that have been in love for at least six months displayed significant impairments in cognitive functioning (Steenbergen et al., 2013). In the research linking love with creativity, we tested the effect of passionate love on divergent thinking and convergent thinking tasks. Previous research suggests that passionate love might have a negative effect on convergent thinking because subject in love, especially when love is evoked, might keep their beloved in mind and have a harder time focusing on completing convergent tasks. On the other hand, love seem to expand the self or just “take one out of focus” so subjects in love might have an advantage in finding alternatives (especially if they are linked to love) and therefore to perform better on the divergent thinking task. If we take an evolutionary perspective on this matter, love and creativity probably played a very important role in hominid evolution. Our ancestors (like ourselves) needed to be inventive in order to adapt and survive. We have been able to migrate to every corner of the planet, travel to the deepest depths of the ocean, and even reach space. All of these achievements require innovation. As we have seen, love surely provides the attachments needed for a couple to be successful in reproduction. We are definitely a pair-bonding, social species, but not really a monogamous one, so love has insured bi-parental care long enough for our offspring to survive. Love and creativity

are then key elements in our existence on this planet and should go together. Those who are more creative and more able to secure deep relationship attachments, should be the ones with the greatest chance to pass on their genes; thus one could expect that love and creativity go hand-in-hand together.

Regarding the research about sensory experience, sexual attraction, and passionate love, we expected that this research would provide interesting cross-cultural information. If we think about the studies conducted by David Buss concerning mate selection around the world, it is interesting to notice that gender differences proved to be more important than cross-cultural differences in shaping mate preferences. Men tended to be more consistent in their desires for various traits than were women. Women were more likely to desire different things. These same type of results might be expected when exploring gender differences in sensory experience characteristics: we might expect men to agree more cross-culturally about what physical characteristics they find appealing than do women; i.e., women should present more discrepancy cross-culturally. In the same way, gender differences should be more important than cross-cultural differences in our cross-cultural samples.

The main claim of this project is that passionate love is universally the same with regard to its symptoms and intensity, but the way that it is characterized is subject to cultural influences. This is translated into the expectation that we will find no cultural differences with the PLS results but some with our social representation study. Also passionate love has some repercussion on creative productions and sensory experience. This is not something we can test in this project but the relationship between love and creativity should be the same all over the world.

Study 1: Psychometric analyses of the Passionate Love Scale in Brazil and in France

1) Introduction

In this study, we explored the psychometric properties of the Passionate Love Scale (PLS) in France and in Brazil. This measure, as far as we can tell, was never tested in these cultures before so this study has tested it for the first time. The evidence suggests that the PLS should work well in both cases. As we have presented in chapter 3 and will address later in this chapter, several love scales were successfully adapted in Brazil. Measures like the Triangular Love Scale and the Love Attitude Scale have proven to be reliable in Brazil reproducing what was found in the original studies (Cassepp-Borges, 2010; Neto et al, 2000). The PLS was found to be closely linked with different aspects of these two measures (Hendrick & Hendrick, 2006) so it should be adaptable to the Brazilian culture as well. French researcher have not explored much those types of measures so it was harder to determine if the French version of the PLS could match with what was found in previous studies about this topic. We believed that it would for two main reasons: 1) Félix Neto and colleagues (2000) found good psychometric properties for Lee's six-factor model of the Love Attitude Scale in France. The dimensions of this measure related to passionate love (Eros and Mania) were found to be reliable in France and in several other cultures. 2) The PLS has proven to be reliable in several European countries such as Portugal, Holland or England so there was no reason to believe that this shouldn't be the case of France. As we have stated earlier (chapter 3), we are aware that the PLS was used in several cultures and languages but it was hard to find psychometric information about these attempts. Nevertheless, we did not find any study stating that this scale did not work in a particular culture. Also, the scale was reliable in cultures that can be considered to be very different from the United States such as Japan or Turkey (see chapter 3 for a review).

This study provided the possibility of exploring the main contention of this project: passionate love is free from cultural influences regarding the nature of the experience and its intensity when someone is in love. If the PLS turns out to be reliable in different cultures, this means that people from different places of the world tend to agree with the different aspects that are explored in the scale (see chapter 2 for a complete review). They would tend to agree that, when we are in love, we are dominated by intrusive thinking about the beloved or that we consider the beloved to be the perfect romantic partner for example. The intensity, the passion of the feelings can be evaluated with PLS scores obtained with different groups.

The presentation of this study was divided in two parts. First, we will start showing the results we obtained in Brazil. In this case, the results are presented in English and may later be published in Portuguese. This study will probably be more interesting to Brazilian scholars because it can help them to integrate the concept of romantic love or feelings of love in their research.

The study related to the translation and application of the PLS in France will to be presented in French, as Cyrille Feybesse and Geneviève Coudin have prepared the paper to be published. In this case, we provided a bigger abstract written in English so non-French speakers could be informed in more detail about the results.

The French version of the Passionate Love Scale was used in other research of this thesis (Study 3 and Study 4) so we were able to “test” it several times in this project and see if we tended to reproduce the general results. This is not the case for the Brazilian study but this Portuguese version was tested in Portugal and we were able to correlate the PLS score with several other love measured that were made or translated into Portuguese. If we are able to find the same types of correlations again, we have will a good indicator of concurrent validity for this version of the instrument.

Measuring love in Brazil: Validation and adaptation of the Passionate Love Scale (PLS) in Brazil

Résumé en Français

Cette étude a exploré les propriétés psychométriques de la traduction en portugais de la Passionate Love Scale (PLS) de Elaine Hatfield et Susan Sprecher au Brésil. Il s'agit d'une mesure d'auto-évaluation de 30 ou 15 items qui explore les aspects cognitifs, émotionnels et comportementaux de l'amour passionnel. Dans cette étude, 371 participants (239 femmes et 132 hommes) âgés de 23,42 ans (ET = 5,97) ont répondu à un questionnaire en ligne. Les participants ont été demandés de compléter des questions démographiques, de répondre à l'Echelle d'Amour Passionnel (PLS), à l'Echelle Triangulaire de l'Amour, à l'Echelle d'Attitudes sur l'Amour et à une dernière échelle qui mesure la satisfaction vis-à-vis de l'amour. Des analyses factorielles confirmatoires ont démontré des résultats satisfaisants pour l'Echelle d'Amour Passionnel et l'Echelle de Satisfaction sur l'Amour. En ce qui concerne la PLS, la consistance interne retrouvée (Alpha de Cronbach) a été de .95 pour la version de 30 items et de .91 pour la version de 15 items. Cette étude fournit une échelle supplémentaire mesurant l'amour romantique aux chercheurs brésiliens.

Mots-clés : Amour passionnel, relation romantiques, échelles psychométrique.

Abstract

This research explores the psychometric properties of the Passionate Love Scale (PLS) of Elaine Hatfield and Susan Sprecher translated into Portuguese. This scale is a 30 or 15 item self-reported questionnaire that taps the cognitive, emotional and behavioral aspects of passionate love. In this study, 371 participants (239 females and 132 males) aged 23,42 (SD = 5,97 years) on average participated in an online survey. Subjects had to complete demographic questions, the Passionate Love Scale, the Triangular Love Scale, The Attitude Love Scale and the Satisfaction with Love Scale. Confirmatory factorial analysis demonstrated that both the PLS and the Satisfaction with Love Scales have consistent results. The Cronbach Alphas found were .95 for the 30 item version and .91 for the 15 item version of the scale. This study provides a supplementary measure about romantic relationships for Brazilian researchers.

Keywords: Passionate Love, romantic relationships, psychometric scales.

2.1) Introduction

Psychometric studies on love in Brazil are a reality today. It is possible to find several studies on this topic presenting very interesting results. Vicente Cassepp-Borges and Alessandro De Andrade (2013) investigated which instruments measuring something related to romantic relationships were available in the Portuguese language. They found 17 different translated scales, concerning satisfaction or attitudes on romantic

relationships, love, love styles, jealousy, etc. This great Academic interest about love can be found among the laypeople as well; Brazilian citizens assign a great deal of importance to love. In a cross-cultural study testing the importance of love and marriage in 11 cultures (e.g. Thailand, Japan, India, Mexico, Australia...), the Brazilian and the American samples were the two cultures least willing to marry without love. The Brazilian sample was, by far, the readiest to agree in making a clean break if love has completely disappeared in one's marriage (Levine, Sato, Hashimoto & Verba, 1995). These results can be corroborated with the high rate of divorce and remarriage found in Brazil (Cano et al, 2009).

The main purpose of this study was to validate the Passionate Love Scale (PLS) of Elaine Hatfield and Susan Sprecher (1986) in Brazil. This instrument is an important missing love measure that wasn't tested in the country¹. The PLS measures the intensity of a given passionate love feeling that can be defined as being "the longing for union with another..." (Hatfield & Sprecher, 2009). This measure taps emotional, cognitive, and behavioral aspects of passionate love and has proven to be a very reliable measure (see chapter 2) tested in several cultures (see chapter 3). The PLS version used in the current study corresponds to the same version that was previously tested in Portugal (Feybesse, Neto & Hatfield, 2011). This version showed almost the exact same results found in the United States and it also proved to be a very reliable measure on Portuguese teenagers (Sim-sim & Pulido, 2013). With the Portuguese sample, item 1 of the PLS had a weaker loading (.29) in the original study made in Portugal (Feybesse, Neto & Hatfield, 2011) but was found to be a good predictor in another study (Sim-sim & Pulido, 2013). We have offered the hypothesis that this oscillation in the results might be due to some subjects, difficulties in understanding the item's meaning; item 1

¹ Elaine Hatfield has record of one attempt made by Jean Natividade but no results or publication accounting this essay could be found.

corresponds to the following affirmation: “since I’ve been involved with ____, my emotions have been on a rollercoaster”. The term rollercoaster term used to describe an emotional state might be confusing for the Portuguese so we conducted a second formulation of this study. We used our original formulation for item 1 in the questionnaire, but after subjects had answered all the original 30 items of the PLS, they had to answer to an alternative formulation for item 1: “Since I’ve been involved with ____, my emotions have had ups and downs”. This instrument is an important missing love measure that wasn’t tested in the country previously.

Before testing the Portuguese PLS in Brazil, we asked to 25 Brazilian exchange students, living for less than 6 months in Portugal, to evaluate their level of comprehension of the item meanings of the scale. They all declared they had perfectly understood the instructions and the item sentences (Feybesse, Neto & Hatfield, 2011).

Several studies have indicated that passionate love is probably a universal phenomenon, experienced with the same intensity all over the world (see chapter 3). The data from this study provide an opportunity to test this assumption because we have answers from all the Brazilian regions. Brazil is a large country with perhaps the most ethnic diversity in the world, as Castro and Araujo Lopes (2011, p.480) noted: “*The Brazilian population is mainly composed of descendents of Indigenous peoples, Portuguese settlers; African slaves, and different groups of European and Asian immigrants. In addition, its ethnic composition is not uniformly distributed throughout the country, increasing its diversity even more*”. Comparing the results found with the PLS between the different Brazilians regions provides the opportunity to test both the ethnic and cultural universality of passionate love feelings. We hypothesized that we would not find differences between the different regions with the PLS among subjects who declared being in love at the time their participated in this study. We believe that it is

possible to find differences regarding some love styles of the Love Attitude Scale. Felix Neto and colleagues (2000) have found cultural effects on Pragma, Storge and Ludus love styles.

2.2) Methods

Participants: In this study, 371 Brazilian subjects (239 females and 132 males) answered the online survey. Their mean age was 23,42 years ($SD = 5,97$, range = 17-58). The majority of the sample was enrolled in college (88,1%) coming from a vast diversity of course majors, but mainly from Psychology followed by Medicine and Engineering schools.

We have some information about the love life of this sample: 74,9% were single, 8,4% declared they were in in a stable union, 3,8% were married and 1,8% were widowers. The majority of the sample declared they had been in love (63,2%) for 29,16 ($SD = 42,78$) months but fewer were currently involved in a romantic relationship (58,4%), with the relationship length averaging 38,28 ($SD = 54,07$) months. Subjects who were not currently in love were asked to answer the questionnaire, thinking of someone they'd loved in the past; they constituted 16,2% of the sample. Only 3,3% declared they were not now and never had been in love.

Sexual orientation: In this sample, 79,4% of the sample declared themselves to be heterosexual, 7,1% said they were bisexual, and 5,1% stated that they were homosexual. The rest of the sample (8,4%) left this question blank.

Geographical distribution: We secured responses from 14 of the 27 Brazilian States and this includes all 5 Brazilian regions: 7,4% were from the North region, 11,9% were from the Northeast region, 15% were from the Midwest region, 46,4% were from the

Southeast (which is the most populated area of Brazil) and finally 11,9% were from the South region.

Instruments: After answering demographic and romantic relationship questions, the questionnaire included four self-report scales assessing romantic relationships. Two measures had been tested in previous research on the same sample used in this study. At the end of the questionnaire, subjects were invited to provide a comment about the survey if they wanted to.

Passionate Love Scale (PLS): This instrument measures the intensity of passionate love (see chapter 2). Higher scores on the PLS correspond to a greater feeling of passionate love. The complete version of the scale has 30 items but a shorter version of 15 items is also available. Higher scores indicate a greater level of passionate love. Before starting to answer the PLS, subjects had to indicate if they were in love “right now”, were thinking in someone they “loved in the past”, or “have never been in love”. Participants had to indicate their agreement with each item with a 9 point Likert scale.

Triangular Love Scale (TLS): This scale, originally developed by Robert Sternberg, measures the intensity of three aspects of love: Intimacy, Passion, and Decision/Commitment (Sternberg, 1997). Sternberg’s measure has been tested several times in Brazil (see chapter 3 or Cassepp-Borges & De Andrade (2013) for a review). Overall, Brazilian scholars have found the same psychometric problems found in the United States and several shorter versions of the scale found to suit better the Triangular Love Theory (Gouveia, Fonseca, Cavalcanti, Diniz & Doria, 2009; Cassepp-Borges, 2010). In this study, we used 7 items of the Intimacy subscale, 6 items of the Passion subscale, and 6 items of the Decision/Commitment subscale, with a sample comprised of Brazilian students from all regions of Brazil.

Love Attitude Scale (LAS): The Love Attitude Scale was originally developed by Susan and Clyde Hendrick (1986) and measures 6 distinct love styles, as they were proposed by Lee (see chapter 2 for a review). In this study, we used the translated version of Félix Neto (1992), that proven to be a reliable measure both in Portugal and in Brazil (see chapter 3).

The Satisfaction with Love Life Scale: This scale was developed by Félix Neto (2005) and previously tested on Portuguese college students. Satisfaction with love life can be defined “*as a global evaluation by the person of his or her love life*” (Neto, 2005; p. 4). This is a brief 5 items scale in which subjects have to indicate their level of agreement on a 7 point likert response, the scale’s CFA with this Brazilian sample confirmed one strong factor with an eigenvalue of 3,78 and no other factors approaching an eigenvalue of 1. This first factor accounted for 43,93% of the variance in the items. The item intercorrelations were high, varying between .80 and .93. Cronbach’s alpha was .92 indicating an excellent internal consistency. These results reproduce what Felix Neto found with his Portuguese sample.

Procedure: We contacted several college professors from all over Brazil to indicate to their college students and colleagues the link of the online questionnaire during the European academic year of 2014-2015. This helped to better target and control who was participating in the study. The web link provided sent the participant automatically to the questionnaire (annexed in this thesis). Subject’s had information about the different universities collaborating in the study, the name and contact of the main researcher and the assurance that anonymity was guaranteed. Aside from some demographic questions, all questions were facultative. After answering all the questions, participants could leave a comment if they wanted to.

2.3) Results

Descriptive statistics: Only 61,67% of the participants completed all the measures we used in this research. Some subjects left the questionnaire website at one point, leaving the rest of the questions blank.

The PLS scores can vary between 30 and 270 points with the complete version of the scale and 15 to 135 points with the shorter version. The average for the complete scale with the whole sample was 194,67 (45,40) points. Subjects who had declared themselves to be in love scored on average of 202,24 (SD = 36,70) points on the PLS, the group that declared they were thinking of someone they loved in the past scored 185,90 (SD = 45,81) on average, and we found 92,92 (SD = 63,24) points on average, with the group that declared they had never been in love. A one way ANOVA between these three groups indicated that there was a statistically significant difference at $p < .05$ level between these different PLS scores. Among those who declared themselves to be in love, we found gender differences with the Passionate Love Scale. Males had a mean of 193,82 (SD = 41,76) points whereas females had a mean score of 206,07 (SD = 33,59) points. A t-test revealed a significant difference [$t(244) = 2,45$ $p = .015$]. The magnitude of the differences in means was small (eta square = .024—that is, only 2,4% of the variance in passionate love is accounted for by sex).

Passionate lovers had also higher scores on the Satisfaction with Love Scale, if we compare their results (M = 25,30; SD = 8,29) with the group of subjects thinking of someone they had loved in the past (M = 18,00; SD = 8,22) or those who have never been in love (M = 16,09 SD = 10,11). A one-way ANOVA revealed statistical differences between the passionate lovers in these two groups at $p = .001$ but not between the last two groups.

Table 1 : Means, standart deviations and items factorial contributions of the PLS in Brazil

Item	M	SD	Factorial contribution
1-Desde que me envolvi com a (o) _____, as minhas emoções estiveram numa montanha russa.	6.08	2.57	.31
2- Eu sentiria um desespero profundo se a (o) _____ me deixasse.*	5.92	2.57	.66
3- As vezes o meu corpo treme de excitação quando eu avisto a (o) _____.	6.08	2.48	.60
4- Eu sinto muito prazer ao estudar os movimentos e os ângulos do corpo da (o) _____.	6.43	2.59	.59
5- As vezes sinto que eu não posso controlar os meus pensamentos; eles são obsessivos em relação a (ao) ____.*	4.49	2.51	.51
6- Eu sinto-me feliz quando faço alguma coisa para tornar a (o) _____ feliz.*	8.06	1.75	.63
7- Eu prefiro estar com a (o) _____ do que com qualquer outra pessoa.*	6.78	2.38	.72
8- Eu ficaria com ciúmes se pensasse que a (o) _____ estivesse apaixonando-se por outra pessoa.*	7.74	2.24	.57
9- Ninguém poderia amar a (o) _____ como eu.	4.75	2.93	.61
10- Eu anseio saber tudo sobre a (o) ____.*	6.20	2.40	.68
11- Eu quero a (o) _____ física, emocional e mentalmente.*	7.01	2.36	.70
12- Eu vou amar a (o) _____ para sempre.	5.73	2.74	.63
13- Eu fico derretido (a) quando olho profundamente nos olhos da (o) _____.	7.01	2.38	.76
14- Eu tenho um apetite infinito de afeição com a (o) ____.*	6.65	2.33	.80
15- Para mim, a (o) _____ é a (o) minha (meu) parceira (o) romântica (o) perfeita (o).*	6.36	2.53	.72
16- _____ é a pessoa que me pode fazer o mais feliz possível.	6.15	2.54	.76
17- Eu sinto que meu corpo responde quando a (o) _____ me toca.*	7.55	2.12	.68
18- Eu sinto carinho em relação a (ao) _____.	8.46	1.49	.56
19- A (O) _____ parece estar sempre na minha mente.*	6.61	2.18	.73
20- Se eu fosse separado da (o) _____ por um longo período, eu sentiria uma solidão intensa.	6.02	2.54	.68
21-As vezes sinto que é difícil concentrar-me no trabalho porque os meus pensamentos em relação a (o) _____ ocupam a minha mente.	4.33	2.52	.56
22- Eu quero que a (o) _____ me conheça – os meus pensamentos, os meus medos e as minhas esperanças.*	6.50	2.42	.60
23- Saber que a (o) _____ se importa comigo, faz-me sentir completo (a).	7.38	2.00	.73
24- Eu procuro encontrar avidamente sinais a indicar que a (o) _____ me deseja.*	6.65	2.27	.60
25- Se a (o) _____ estivesse a passar por um período difícil, eu poria de lado as minhas próprias preocupações para ajudá-la (o).	7.48	1.90	.65
26- A (O) _____ pode me deixar efervescente e atordoado.	6.48	2.37	.64
27- Na presença da (o) _____ eu anseio tocar e ser tocado.	7.19	2.25	.59
28- Uma existência sem a (o) _____ seria escura e triste.	4.54	2.74	.65
29- Eu tenho uma poderosa atracção pela (o) ____.*	7.49	1.97	.72
30- Eu fico extremamente deprimido (a) quando as coisas não vão bem no meu relacionamento com a (o) ____.*	6.49	2.44	.64

Note: * indicates the item selected for the 15 items version of the PLS.

Psychometric properties of the Passionate Love Scale in Brazil

All the 30 items of the Passionate Love Scale were subjected to a principal component analysis. Prior to performing PCA the suitability of the data for the factor analysis was tested. Verification of the correlation matrix revealed that all items had a coefficient of .30 and above (see table 1). In the case of item 1, we found coefficients above .30 in both cases: .31 with the original item formulation and .36 with the new item formulation. These results correspond to the weaker loadings found with the PLS. The internal consistency of the scale is exactly the same with both versions of the item. The mean score obtained with the original item is somewhat more homogenous with the results found with the other items of the scale. This last result lead us to continue using the original version of the PLS that we had used in Portugal. The Kaiser-Meyer-Okin value was .94, exceeding the recommended value and the Barlett's Test of Sphericity reached statistical significance (sig. = .000), supporting the factorability of the correlation matrix.

Principal component analysis revealed the presence of one stronger component exceeding an eigenvalue above 1. The Varimax rotation was performed and explained 37,87% of the variance. The internal consistency found in this study corresponds perfectly with what it was

found by Elaine Hatfield and Susan Sprecher (1986). The Cronbach alpha reported with the complete version of the scale was .95 and .91 for the 15-items version.

Group comparisons

Sex and regional differences on passionate love

We checked to determine if there was a gender difference on the PLS among subjects who were in love. Overall, females from all over Brazil scored higher on the PLS than

did males: $M = 206,07$, $SD = 33.59$ vs $M = 193,82$, $SD = 41,76$). A t-test indicated that this difference was statistically significant ($t(244) = 2,45$, $p = .15$). We found this same result with the shorter version of the PLS but a t-test revealed that the difference we found was less important ($t(245) = 2,20$, $p = .30$).

We performed a two-way between-groups analysis of variance to explore the impact of sex and region on level of passionate love with the complete version of the Passionate Love Scale. Once again, we conducted this analysis of variance only with the subjects who had declared they were currently in love. Subject's geographical location was grouped according to his or hers geographical region as we mentioned above. There was no significant main effect for the geographical region [$F(4, 233) = 1.73$, $p = .144$]. There was a statistically significant main effect for sex [$F(1, 233) = 9.93$, $p = .002$] and the interaction effect [$F(2, 233) = 1.44$, $p = .256$] did not reach statistical difference. Female subjects scored higher in every Brazilian region. Although this sex differences was significant (see table 2), the actual difference in the

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Sex and regional differences in love styles

We did not find any regional differences with any of the love styles. Subjects from all the regions of Brazil presented the same levels of the different love attitudes.

If we take the whole sample of this study, there were no significant sex differences with any love styles. If we conduct this same analysis, only taking into account subjects who declared they were in love at the time they have answered the survey, male ($M = 17,24, SD = 4,80$) subjects scored higher on Ludus than did females [$(M = 15,80, SD = 4,25; t(192) = -2,07, p = .40$]. Also, males ($M = 25,24, SD = 5,69$) scored higher than females on the Agape love style [$(M = 22,85, SD = 5,69; t(191) = -2,75, p = .007$]. We did not find any other gender differences on the love styles

Table 2: Regional mean scores on the PLS among subjects that declared themselves “to be in love” when they participated in the study.

Region	Gender	N	PLS score
North	Male	3	162 (SD = 44,03)
	Female	17	207,59 (SD = 36,23)
Northeast	Male	3	160,67 (SD = 14,22)
	Female	31	208,74 (SD = 34,63)
Midwest	Male	12	191,25 (SD = 41,22)
	Female	26	198,88 (SD = 32,02)
Southeast	Male	46	198,48 (SD = 44,37)
	Female	71	210,56 (SD = 32,65)
South	Male	12	192 (SD = 33,59)
	Female	22	195,32 (SD = 34,40)

Sex and regional differences on the Triangular Love Scale and Satisfaction with love life.

There were no gender differences with any of the three components of the Triangular Love Scale or the total score of the Satisfaction with Love Scale among subjects who declared themselves to be in love. The same result was found regarding regional differences. Subjects from all regions of Brazil showed similar scores on the Intimacy, Passion, or Commitment subscales of the TLS. The results are the same regarding the level of satisfaction with love life.

Correlations among the scales

The correlations found among the different scales used in this research are similar with to those found in previous studies (see chapter 2). We observed most of the expected

correlations (see table 2). The PLS had strong and positive correlations with the Eros and the

Table 3: Correlations among all measures

	1	2	3	4	5	6	7	8	9	10	11
1. PLS	1	.51**	-.09	.19**	.09	.38**	.52**	.77**	.45**	.68**	.28**
2. EROS		1	-.01	.03	.05	.12	.34**	.56**	.57**	.52**	.54**
3. LUDUS			1	-.01	.12	.06	-.18**	-.08	-.13*	-.23**	-.06
4. STORGE				1	.18**	.21**	.22**	.14*	.03	.07	-.05
5. PRAGMA					1	.04	-.02	.08	.01	-.02	.01
6. MANIA						1	.26**	.19**	-.11	-.02	.01
7. AGAPE							1	.44**	.36**	.52**	.28**
8. Passion - TLS								1	.53**	.60**	.36**
9. Intimacy - TLS									1	.68**	.70**
10. Commitment - TLS										1	.54**
11. SWLLS											1

Note: N = between 322 and 243. Significant intrascale correlations are given in boldface.
 ** Correlation is significant at the 0.01 level (2-tailed)
 * Correlation is significant at the 0.05 level (2-tailed)

Agape love styles of the LAS. The correlations found between the PLS and the three subscales of TLS were also expected. Also, The PLS correlated positively with Mania and did not correlate negatively with Ludus as it usually does. These same correlations were found

with the Passion subscale of TLS. Only, Ludus correlated negatively with Agape of the LAS and with the Intimacy and Commitment subscales of the TLS.

The SWLLS had mild positive correlations with the PLS, the passion subscale of the LAS and with the Eros love style. Nevertheless, it had strong positive correlations with the Intimacy and Commitment components of the TLS.

2.4) Discussion

The results for the PLS confirmed that this measure showed adequate psychometric properties. The scale reproduced the properties found in the original study (Hatfield & Sprecher, 1986) and matched those found in Portugal (Feybesse, Neto & Hatfield, 2011). The mean scores and group differences found in this study indicate adequate ability to measure passionate love in Brazil. Item 1 had, once again, less satisfying results, being the poorest item in predicting the level of passionate love even if the factorial contribution was satisfactory. This item probably works better when assessing newer passionate love states because it translates constant mixed feelings about the relationship one has with the beloved. This is probably truer in new affairs than in older ones where intimacy and commitment are more present. New and older strong passionate love cases will technically have high evaluations on all the PLS items but subjects in well-established romantic relationships must experience less emotional turmoil about the beloved and the relationship and thus they will tend to disagree with the item 1 statement to a greater extent.

The main issue for discussion concerning the PLS results in this study concerns the gender differences among participants “in love now”. The data indicated this difference in all Brazilian regions, contradicting what was found in the USA, Portugal and France. This indicates that one must be careful when analyzing gender difference with the PLS in Brazil. It is relevant to note that no gender difference was found with the Eros love style or the Passion component of the TLS. According to Elaine Hatfield, this is the first time that gender differences were found with the PLS. Brazilian males in love behaved differently when answering the PLS and it is hard to understand why. Their mean score of was lower than the one that has traditionally been found. Young Brazilian males might have wanted to be more “discrete” when evaluating their passion for the beloved

with PLS. Elaine Hatfield argued that gender differences in non-sex questions are carrying the effect whereas sexual items are gender neutral. Passionate love and sex are strongly related but not identical so maybe that is why we found gender differences with the PLS and not with Eros. We can speculate the reasons why but subsequent research will have to examine it further. The correlations we have found between the PLS and the other love measures provide strong evidence for construct validity of this scale in the Brazilian culture.

We did not find the regional differences in passionate lovers' scores on the PLS of the type we had expected. This result provides more evidence that erotic / passionate love is free of cultural influence (Hatfield & Rapson, 2005; Neto, Mullet, Deschamps, Barros, Benvindo, Calmino, Falconi, Kagibanga & Machado, 2000). Scientific studies on romantic relationships are gradually gathering evidence that human beings from different cultures present the same signs of passionate love with the same intensity. Romantic love might be primarily a "commitment device," motivating a couple to stay together and have success in reproduction (Fletcher, Simpson, Campbell & Overall, 2015). The brain regions associated with romantic / passionate love correspond to primitive areas of the brain associated with reward, leading scientists to suggest that this phenomenon always existed within *Homo sapiens* (Fisher, 2004).

We have found very homogenous results regarding the different love styles with the LAS. We did not find any regional differences and few sex differences on the love styles. This might be due to the fact that we used a sample of young adults, mostly college students, probably experiencing similar romantic scenarios. According to Felix Neto (1992), our romantic involvement will highlight some love attitudes (being passionately in love corresponds to being more erotic and maniac, for example) and it will darken some other love attitudes (subjects tend to be less ludic or pragmatic when

they are in love, for example). Cultural differences might be found if we have a broader sample regarding the age range of the participants.

Ludus love style did not correlate negatively with Eros, the passion component of the TLS, or with the PLS like it usually does. In addition, we didn't find gender differences, when subjects are in love. According to Vicente Cassepp-Borges, scholars in Brazil usually have psychometrics problems with this love style. Recently, De Andrade and Garcia (2009) found correlations between the different LAS love styles with a sample similar to our own. Nevertheless, those correlations remained quite low in both studies (below .30) but matched with what was found in the United States (Hendrick and Hendrick, 1986) and in France (Feybesse, Coudin & Hatfield, submitted).

The results we have found with the LAS items reproduced what Cassep-Borges (2010) observed regarding regional differences with the subscales. As in the case of this study, Cassep-Borges did not find regional differences at all. Also, he did not find major gender differences with the TLS or the LAS. The correlational results between the LAS and the TLS in the current study matched his study as well. Finally, regarding the relationship with the PLS and TLS, we found strong correlations in Portugal (Feybesse, Neto & Hatfield, 2011). The PLS correlated more strongly with the Passion component of the TLS, as we expected. Sternberg's (1986) definition for his passion component is very similar with what the PLS is intended to measure.

The results we have found with the Satisfaction with Love Scale reproduced very similarly the original study made in Portugal (Neto, 2005). The psychometric properties and the results found in Brazil matched those found in Portugal. This study provides evidence of the possibility of using this scale with a Brazilian sample. Is it interesting to note that the SWLLS had a stronger positive correlation with the Eros love style and weaker ones with the PLS or the Passion component of the LAS. Being passionately in

love does not necessarily mean that one is satisfied with his or her love life. One can be unrequited by the beloved and be extremely unsatisfied about the romantic course of a given relationship. In the case of this study, the majority of the sample that has declared to be in love also stated to be involved in a romantic relationship making them probably very satisfied with their love life. This probably explains why we were able to find a mild positive correlation between these three scales.

This study is one of the first attempts to link different measures of love that were created or translated into the Portuguese language. Several successful attempts were made with the English versions of these scales (see chapter 2). The correlational study conducted here with the PLS, the LAS, and the TLS matched almost perfectly with what was found by Hendrick and Hendrick (1989). On one hand, this provide evidence for the validity of the Brazilian versions of these scales and additional evidence as to the universality of these love theories. The ethnical and cultural variations found in Brazil make these findings particularly relevant and can be an indication that these results may be reproduced in other cultures.

2.5) Conclusion

This study examined Hatfield and Sprecher's PLS in Brazil. The scale was found to be a reliable measure discriminating well different passionate love states. The external validity indicates that this translated version kept the original construct characteristics. Several scholars recommend the use of several love measures in studies dealing with romantic relationships (Graham, 2011) and the PLS provides an important addition in any research.

We hope that this study will stimulate new Brazilian scholars to adopt these instruments and the theories underlying them. We believe that the Brazilian culture provides a fertile

environment to explore the topic of romantic love in social psychology (Feybesse, Hatfield & Neto, 2013). All these different scales can help researchers to create and test new measures as well. The results of this study reinforce the idea that romantic love is a universal concept and that the theories and conclusions about love developed in the US can be reproduced in Brazil.

3) Evaluation de l'amour passionnel: adaptation et validation en version française de Passionate Love Scale (PLS) - Passionate love evaluation: French adaptation and validation of the Passionate Love Scale

Résumé en français

Dans quasiment toutes les taxonomies de l'amour romantique produites par la littérature scientifique, le type « amour passionnel » est pris en compte. A notre connaissance, il n'existe pas d'instrument adapté permettant d'évaluer ce construit en France. Le but de cette recherche est de proposer une validation française de l'outil Passionate Love Scale (PLS) d'Elaine Hatfield et Susan Sprecher (1986) qui mesure l'intensité de l'amour passionnel. Cent quatre-vingt-dix participants ont répondu à un questionnaire d'auto-évaluation qui contenait la Passionate Love Scale et la version française de la Love Attitude Scale. Les résultats indiquent que la version française de l'Echelle d'Amour Passionnel est fortement unifactorielle avec une excellente structure et consistance interne. Les moyennes des scores obtenus et les propriétés psychométriques retrouvées coïncident avec celles constatées aux Etats-Unis. Les corrélations entre les deux échelles utilisées dans cette étude correspondent à celles présentées dans les études antérieures. La Passionate Love Scale peut être un très bon outil pour tout chercheur désirant intégrer le concept d'amour romantique dans ses recherches.

Mots clés : Amour ; Amour passionnel ; Attitudes d'amour ; Sexualité

Abstract

Background. – Passionate love is a type of love taken into account in almost all taxonomies of romantic love that have been developed by scientific researchers (Hatfield, Bensman, & Rapson, 2012). This type of love is commonly defined as being “a state of intense longing for union with another” (Hatfield & Sprecher, 1986). These two authors designed the Passionate Love Scale (1986), which measures the intensity of a given passionate love state by assessing cognitive, emotional, and behavioral components of this emotion. The PLS is a self-report questionnaire of 15 or 30 items that possesses a unidimensional structure with an excellent internal structure and reliability (Hatfield & Sprecher, 1986). Several meta-analytical psychometric studies have confirmed the reliability of the Passionate Love Scale. This scale has been translated into several languages and used in a countless number of studies.

Method. – Population. The sample is composed of 190 undergraduate students of Paris Descartes University (France): 101 female (53,2%) and 89 males (46,8%). The mean age is 21,58 (S.D. = 2,99). In this same sample, 53,7% of respondents said that they were in love, 35,8% answered the Passionate Love Scale thinking of someone they loved in the past and 3,2% declared that they have never been in love. Thus, 50% said that he or she was currently involved in a romantic relationship. Material. The questionnaire used in this research was comprised of initial general demographic questions and other questions related to subject's romantic life. Subjects who stated that they were engaged in a romantic relationship, were asked to indicate if they were faced by social (e.g. parental disapproval) or physical obstacles (e.g. a long-distance relationship) that were getting in the way of their relationships. All subjects answered the French version of Passionate Love Scale and the French version of the Love Attitudes Scale (Hendrick & Hendrick, 1986). Procedure. Students were asked to answer to the questionnaire while studying in different libraries of Paris Descartes University during the 2012-2013 academic year. Anonymity was guaranteed.

Results. – The results of the factorial analysis (component analysis and varimax rotation) revealed the existence of one strong dimension which explained 47,74% of the variance. All items of the scale had loadings above .30 on the first factor. There were no gender differences in the PLS scores when subjects stated that they were in love at the time they answered the questionnaire. The Cronbach alphas were .94 for the 30 items version and .91 for the reduced 15 items version of the scale. The Passionate Love Scale had strong positive correlations with *Eros*, *Mania* and *Agape* love styles and a weaker negative correlation with the *Ludus* love style of the Love Attitudes Scale. Besides *Ludus* scores, we didn't find any gender differences between the different love styles measured by the Love Attitudes Scale. Obstacles didn't have an effect on the intensity of passionate love among participants that were currently in a romantic relationship.

Discussion. – This study allowed us to validate in France a scale that measures the intensity of passionate love. The scale has very good psychometric properties as was found in several studies in the USA. Thus, French students in love seem to possess equal levels of passion as students from others parts of the world. This study provides more evidence that passionate love might be a universal experience. We also offer up a brief discussion about the lack of effect of obstacles on the level of passionate love. This instrument can be very useful for French scholars that want to assess love in romantic relationships in their studies. The scale can also be used in clinical settings.

Keywords: Love; Passionate love; Love attitudes; Sexuality

3.1) Introduction

Les recherches de psychologie sociale sur l'amour dans les relations romantiques existent depuis plus de 40 ans dans les pays anglo-saxons et sont devenues une composante importante de ce domaine d'étude à un niveau international. La recherche sur l'amour est bien intégrée dans de nombreux pays européens comme les Pays-Bas, la Pologne et le Portugal mais nous remarquons que ce thème est très peu, mises à part

quelques exceptions comme Guéguen (2011) ou Lamy (2012), étudié par la psychologie sociale française. Aujourd'hui, les théories sur l'amour romantique issues de la psychologie sociale connaissent un succès mondial et influencent une large gamme de disciplines allant de l'anthropologie (Jankowiak, 1995) aux neurosciences (Ortigue, Bianchi-Demicheli & Patel, 2010). Ces différents domaines contribuent à apporter de nouvelles preuves empiriques aux théories et méthodes d'évaluation utilisées traditionnellement par la psychologie sociale.

Le concept d'amour reste, néanmoins, extrêmement difficile à définir. Il existe pratiquement autant de définitions que d'auteurs qui s'y essaient. Dans ce sens, les chercheurs ont eu plutôt tendance à catégoriser l'amour en plusieurs types. Différentes théories présentent différentes définitions qui possèdent des typologies d'envergures différentes. L'amour a été distingué de l'amitié (Rubin, 1970) ; il comprend 3 composantes essentielles (passion, intimité et engagement) qui aboutissent à 8 types différents (Sternberg, 1988) où il est exploré à partir de 6 attitudes différentes par exemple (Hendrick et Hendrick, 1986). Un type d'amour est présent dans toutes ces catégories : c'est la passion amoureuse ou l'amour passionnel. Ce type d'amour se retrouve à toutes les époques et dans toutes les cultures (Jankowiak, 1995) et c'est celui qui a le plus focalisé les recherches scientifiques. De nombreux chercheurs ont essayé de mesurer ce construit (Graham et Christiansen, 2009).

La typologie utilisée ici est celle d'Elaine Hatfield et collaborateurs (Hatfield, 1988) qui distinguent deux types d'amour au sein de l'amour romantique : l'amour passionnel et l'amour-compagnonnage. Dans les relations romantiques, l'amour est généralement vécu de façon très intense avec de forts sentiments d'attraction physique et sexuelle. L'amour passionnel se caractérise par les fortes émotions et d'importantes activations physiologiques vécues par le sujet. Cet amour se transforme progressivement avec le

temps en quelque chose de plus tendre et intime. Ce dernier type d'amour motive l'individu à prendre soin de l'autre, à lui accorder de la confiance et du respect. On le retrouve facilement chez les personnes mariées. La définition de l'amour passionnel la plus acceptée aujourd'hui est la suivante :

Un état de désir intense à s'unir avec un autre. L'amour passionnel peut être vécu de deux manières distinctes. Quand il est réciproque, il est associé à une sensation d'extase, de bien-être intérieur et à une sensation de soulagement mais quand celle-ci n'est pas réciproque (ou en cas de séparation), elle est associée à un vide intérieur, à de l'anxiété et à du désespoir (Hatfield et Sprecher, 1986; p. 383).

De nombreuses recherches scientifiques sur l'amour passionnel en ont éclairé plusieurs caractéristiques. Il semble être plus fréquent chez les célibataires, les adolescents ou les jeunes adultes (Hatfield et Rapson, 2005). Ce sentiment éveille des sentiments fortement positifs sur l'objet de passion, favorise les comportements d'amour, le développement de l'intimité et de l'acte sexuel (Sternberg, 1988; P.120-121).

Développement de l'Echelle d'Amour Passionnel aux Etats-Unis

Elaine Hatfield et Susan Sprecher (1986) ont construit la PLS en passant, comme il est d'usage, par plusieurs étapes. Dans un premier temps, les auteures se sont référées à divers travaux sur les relations romantiques pour déterminer les composantes de l'amour passionnel que l'échelle devrait considérer. Elles sont arrivées à la conclusion que les items de la PLS devraient prendre en compte trois aspects principaux :

La composante cognitive : Une des caractéristiques des plus classiques du sentiment amoureux est de penser constamment à la personne aimée. L'amoureux a des difficultés de concentration car il pense constamment à son objet de passion. Ces pensées sont intrusives et difficiles à contrôler. Ces pensées obsessionnelles sont comparables à

celles de patients souffrant de troubles obsessionnel-compulsifs. Elles surviennent surtout au début des relations romantiques (Marazziti, Akiskal, Rossi et Cassano, 1999). Une étude récente montre que les personnes amoureuses ont plus de difficultés à maintenir un contrôle cognitif lors de tâches habituelles comme étudier ou travailler (Steebergen, Langeslag, Band et Hommel, 2014).

L'amoureux a une forte tendance à idéaliser la relation et la personne aimée. L'objet de passion est toujours évalué positivement. Les sujets qui sont amoureux et engagés dans une relation romantique avec leur objet de passion ont une tendance à croire au coup de foudre, à penser qu'il n'existe qu'un seul vrai amour ou que l'amour peut vaincre n'importe quel obstacle (Sprecher et Metts, 1989). Ces idéalizations ont pu être observées dans plusieurs cultures (Sprecher et Toro-Morn, 2002).

La composante émotionnelle : L'amour passionnel sous-entend toujours une forte attraction physique qui peut arriver à être incontrôlable. La passion est considérée comme étant un mélange d'émotions différentes avec des hauts et des bas qui font ressentir des émotions intenses au sujet (Hatfield et Rapson, 2005). Être amoureux correspond à vouloir aimer et être aimé en retour. Les chercheurs en neurosciences considèrent l'amour romantique comme étant un phénomène plutôt biologique ayant comme fonction de maintenir une relation durable avec un partenaire afin d'augmenter les chances d'une reproduction réussie (Aron, Fisher, Mashek et Brown, 2005).

La composante comportementale : l'amour passionnel peut amener une personne à mettre en place un certain répertoire de comportements. L'amoureux cherche à comprendre les sentiments de son objet d'amour, il l'étudie, essaye de l'aider et désire constamment une proximité physique avec lui (Lee, 1988).

Les chercheurs ont créé plusieurs items pour mesurer ces différents aspects de l'amour passionnel. Cette étape a généré 165 items différents, testés dans trois études sur des

étudiants de Licence de l'université du Wisconsin aux Etats-Unis. La première étude a exploré cinq versions différentes de la PLS pour conserver les items qui obtenaient des scores élevés. Deux échelles évaluant l'amour ont été utilisées : l'une mesurait l'amour compagnonnage et l'autre était « the Liking and Loving Scale » de Zick Rubin (1970). Les items candidats à figurer dans la PLS étaient ceux qui étaient peu associés à l'échelle « Liking » de Rubin ou à l'échelle d'amour compagnonnage. La dernière étude avait pour but de mener une analyse psychométrique des 30 items qui composaient l'Echelle d'Amour Passionnel sur un échantillon de 120 étudiants engagés dans une relation romantique. Les résultats ont indiqué que l'échelle possédait un facteur principal avec une excellente consistance interne. Les auteures n'ont pas retrouvé de corrélation avec la désirabilité sociale. Les filles et les garçons ont obtenu le même score et il a été remarqué que l'intensité de l'amour passionnel décroissait avec le temps.

Depuis sa parution, l'Echelle d'Amour Passionnel a connu un grand succès dans la communauté scientifique et a été utilisée dans d'innombrables recherches explorant la relation que l'amour passionnel pourrait avoir avec toutes sortes de variables différentes (Hendrick et Hendrick, 1989). Plusieurs méta-analyses, des études portant sur la version américaine, ont confirmé qu'il s'agit d'un instrument qui possède une validité et consistance interne très élevée et qui semble être relativement libre d'influence des caractéristiques de l'échantillon testé (Graham et Christiansen, 2009). La PLS a été utilisée dans 22 pays différents comme le Brésil, la Chine, la Pologne ou l'Iran.

Depuis les années 2000, un nombre considérable d'études en neuropsychologie s'attèlent à comprendre les aspects biologiques de l'amour romantique. La PLS est l'instrument de mesure privilégié par ces recherches. Des études employant la technique de lecture cérébrale par résonance magnétique (fMRI) ont montré un lien entre l'amour

romantique et les régions du cerveau associées au centre de récompenses et sur les effets hormonaux liés aux pensées obsessionnelles sur les relations romantiques (Fisher, 2004). Des chercheurs américains ont trouvé une forte corrélation positive entre l'activation des régions du cerveau associées à l'amour romantique et le score à la PLS chez des sujets qui déclaraient être intensément amoureux (Aron, Fisher, Mashek et Brown, 2005).

Il existe en France une carence d'outils psychométriques capables de mesurer l'amour dans les relations romantiques. De fait cet instrument n'y a jamais été testé. Les objectifs principaux de cette recherche sont de :

- 1) Valider en français la Passionate Love Scale (Hatfield et Sprecher, 1986) qui mesure l'intensité de l'amour passionnel.
- 2) Explorer les corrélations entre la PLS et l'Echelle d'Attitudes sur l'Amour (Neto, Mullet, Deschamps, Barros, Benvindo, Camino et Falconi, 2000) dans la culture française.

3.2) Méthode

Participants : Cent quatre-vingt-dix sujets ont répondu à un questionnaire d'auto-évaluation destiné à tester les propriétés psychométriques de la PLS en France. Il s'agit d'étudiants inscrits dans une université parisienne en 2012–2013 : il s'agit donc d'une population de jeunes adultes (entre 18 et 34 ans) ayant en moyenne 21,58 ans (ET = 2,99). Le questionnaire a été complété par 101 femmes (53,2%) et 89 hommes (46,8%). Notre échantillon possède les mêmes caractéristiques que celles de l'échantillon américain (Hatfield et Sprecher, 1986). Les études scientifiques sur l'amour sont menées très généralement auprès d'étudiants universitaires (Graham et Christiansen, 2009). La majorité des participants à ces études sont célibataires (93,6%), les autres

sujets (3,2%) ayant déclaré être mariés ou pacsés. En ce qui concerne leur vie amoureuse, 53,7% déclaraient qu'ils pensaient à quelqu'un dont ils étaient actuellement amoureux, 35,8% pensant à quelqu'un qu'ils avaient aimé dans le passé et 8,4% considérant qu'ils n'avaient jamais été amoureux au cours de leur vie. Les sujets qui sont amoureux ou qui l'ont été ont déclaré avoir vécu ce sentiment 1,92 fois. Dans ce cas, la médiane de la distribution est de 2.

En ce qui concerne la vie amoureuse de nos participants, 50% ont déclaré avoir un(e) petit(e) copain (copine) avec qui la durée de relation variait de 1 à 96 mois. Dans ce cas, la moyenne est de 23,74 mois (ET=19,55). Dans cet échantillon, seul 1 sujet a déclaré maintenir une relation avec quelqu'un du même sexe

Matériel : Cette recherche a utilisé 2 mesures de l'amour ainsi que des questions plus générales sur la vie amoureuse. De plus et nous avons examiné si de potentiels obstacles à l'amour du couple impacteraient l'intensité de l'amour passionnel. Pour cela, nous avons proposé quelques obstacles physiques et sociaux référencés dans la littérature scientifique sur les relations romantiques. Les sujets qui « vivaient une relation romantique avec la personne aimée » devaient nous indiquer s'il y avait une distance géographique importante entre les membres du couple, s'ils appréhendaient une séparation géographique dans le futur ou s'il existait des différences culturelles, ethniques, religieuses ou socio-économiques au sein du couple. Nous avons aussi demandé si la relation était désapprouvée par les amis ou les parents. Finalement, nous avons demandé si leurs différentes activités professionnelles ou leurs études les empêchaient de passer du temps avec l'être aimé. Nous avons émis l'hypothèse que les sujets amoureux confrontés à des obstacles présenteraient des niveaux d'amour passionnel plus élevés que ceux qui n'étaient pas confrontés à ces obstacles.

Les deux mesures de l'amour que nous avons utilisé sont les suivantes :

Echelle d'Amour Passionnel ou Passionate Love Scale (Hatfield et Sprecher, 1986) :

Nous avons utilisé la méthode de back-translation pour traduire l'instrument. L'auteur principal de cet article a traduit l'instrument en Français et ensuite puis cette traduction a été discutée avec un autre des auteurs. Les items de l'échelle ont ensuite été retraduits en anglais par une enseignante d'anglais de l'Université Paris Descartes. Cette traduction a été envoyée à Elaine Hatfield qui a examiné si les items retraduits gardaient le sens original.

Nous avons demandé à 16 étudiants de licence de psychologie (6 filles et 10 garçons) de répondre à l'échelle et de signaler les items qu'ils ne comprenaient pas. Tous les sujets ont déclaré avoir parfaitement compris les 30 items de l'échelle.

Les items de la PLS sont proposés sur une échelle de type Lickert en 9 points de « pas du tout d'accord » à « tout à fait d'accord » (voir tableau 1). Plus le score à l'échelle est élevé, plus le sentiment d'amour passionnel est intense. Avant de répondre aux différents items de l'échelle, les participants ont lu la consigne suivante :

Dans ce questionnaire on vous demande de décrire ce que vous ressentez quand vous êtes passionnément amoureux. Le sentiment amoureux est décrit habituellement dans des termes tels que l'amour-passion, la maladie d'amour, l'amour obsessionnel...

- Pensez à la personne que vous aimez le plus passionnément actuellement.

- Si vous n'êtes pas amoureux, pensez à la dernière personne que vous avez aimée passionnément.

- Si vous n'avez jamais été amoureux, pensez à la personne dont vous vous êtes senti(e) le plus proche, de cette façon.

Essayez de répondre en considérant le moment où vos sentiments étaient les plus intenses. Dans tous les cas ayez cette même personne en tête quand vous répondez.

L'échelle d'Attitude sur l'Amour ou Love Attitude Scale (Hendrick et Hendrick, 1986) : Cet instrument a été conçu à partir de la « Théorie des couleurs de l'amour » développée par le sociologue John Alan Lee (Lee, 1988). L'échelle évalue des attitudes amoureuses dans 3 types d'amour principaux *Eros* (amour érotique), *Ludus* (amour jeu) et *Storge* (amour fraternel) et 3 types secondaires *Pragma* (amour pratique), *Mania* (amour obsessionnel et dépendant) et *Agape* (amour altruiste)]. Une version française a abouti à des résultats satisfaisants chez des étudiants français tourangeaux : les mêmes solutions factorielles et indépendances entre les différents styles d'amour ont été retrouvées (Neto et al, 2000). Cette échelle contient 42 items donc 7 items pour chaque style d'amour.

Procédure : Nous avons demandé à des étudiants à répondre au questionnaire dans différentes bibliothèques de l'Université Paris Descartes au cours de l'année universitaire 2011-2012. Quand les sujets avaient répondu au questionnaire, l'expérimentateur leur expliquait les buts de la recherche et indiquait que les réponses resteraient anonymes et seraient utilisées seulement à des fins scientifiques.

3.3) Résultats

Statistiques descriptives : Dans le cas de la PLS, plus le score du sujet est élevé, plus le niveau d'amour passionnel ressenti est intense. Les notes peuvent varier de 30 à 270 points dans la version complète de l'échelle et de 15 à 135 points dans sa version abrégée. Avant de répondre à la PLS, les sujets indiquaient s'ils étaient amoureux au moment où ils répondaient au questionnaire, s'ils pensaient à quelqu'un qu'ils avaient aimé dans le passé ou s'ils considéraient qu'ils n'avaient jamais été amoureux (3 groupes de sujets). La moyenne totale obtenue avec cet échantillon français est 192,77 points (ET = 39,08). Une ANOVA intergroupe à un facteur indique une différence significative entre les 3 groupes, $F(2, 173) = 24,09$ $p < .001$. Les sujets qui ont indiqué

qu'ils étaient amoureux au moment où ils ont répondu au questionnaire ont obtenu un score de 207,30 points (ET = 31,48). Bien que filles aient un score plus élevé que les

Tableau 4 : Moyennes, écart-types et contributions factorielles des items de l'Echelle d'Amour Passionnel (PLS).

Item	Moyenne	Ecart-type	Contribution factorielle
1. Depuis que j'ai une liaison avec _____, mes émotions sont comme des montagnes russes.	5,54	2,21	0,32
2. Je ressentirais un profond désespoir si _____ me quittait.*	6,82	2,07	0,64
3. Parfois, mon corps tremble d'excitation à la vue de _____.	5,91	2,25	0,53
4. Je me délecte en étudiant les mouvements et les angles du corps de _____.	5,76	2,26	0,38
5. Parfois, je sens que je ne peux pas contrôler mes pensées ; elles se portent de manière obsessionnelle sur _____.*	5,76	2,37	0,52
6. Je me sens heureux(se) lorsque je fais quelque chose pour rendre _____ heureux(se).*	7,74	1,43	0,59
7. J'aimerais mieux être avec _____ qu'avec n'importe qui d'autre.*	6,68	2,04	0,62
8. Je deviendrais jaloux(se) si je pensais que _____ était en train de tomber amoureux de quelqu'un d'autre.*	7,70	1,98	0,51
9. Personne d'autre ne pourrait aimer _____ comme moi.	5,01	2,55	0,56
10. J'ai envie de tout savoir sur _____.*	6,64	2,07	0,54
11. Je désire _____ physiquement, émotionnellement et intellectuellement.*	7,50	1,75	0,69
12. J'aimerai _____ pour toujours.	5,21	2,55	0,59
13. Je fonds lorsque je regarde _____ profondément dans les yeux.	6,50	2,16	0,62
14. J'ai un besoin infini d'affection de la part de _____.*	6,47	2,40	0,75
15. Pour moi, _____ est le (la) partenaire romantique parfait(e).*	5,65	2,17	0,57
16. _____ est la personne qui peut me rendre le (la) plus heureux(se).	5,93	2,36	0,66
17. Je sens mon corps répondre lorsque _____ me touche.*	7,06	1,87	0,58
18. Je sens de la tendresse pour _____.	7,64	1,63	0,55
19. _____ semble toujours être dans mes pensées.*	6,44	2,11	0,65
20. Si j'étais séparé(e) de _____ pendant longtemps, je me sentirais intensément seul(e).	6,07	2,49	0,68
21. Parfois, je trouve qu'il est difficile de me concentrer sur le travail parce que des pensées concernant _____ occupent mon esprit.	5,79	2,33	0,58
22. Je veux que _____ me connaisse (mes pensées, mes peurs, et mes espoirs).*	6,12	2,30	0,45
23. Je me sens complet sachant que _____ se soucie de moi.	6,19	2,28	0,57
24. Je cherche avidement des signes indiquant le désir de _____ pour moi.*	6,37	2,22	0,45
25. Si _____ se retrouvait dans une période difficile, je mettrais de côté mes propres soucis pour l'aider à s'en sortir.	7,46	1,69	0,51
26. _____ peut me faire me sentir effervescent(e) et débordant(e) de vitalité.	6,99	1,93	0,68
27. En présence de _____, j'ai très envie de le (la) toucher et d'être touché(e) par lui (elle).	7,25	1,83	0,64
28. Une existence sans _____ serait sombre et lamentable.	4,76	2,42	0,63
29. Je ressens une puissante attirance pour _____.*	7,27	1,76	0,61
30. Je suis extrêmement déprimé(e) lorsque les choses ne vont pas bien dans ma relation avec _____.*	6,54	2,29	0,66

* Correspond aux items de la version réduite de la PLS

Tableau 5 : Corrélations entre l'Echelle d'Amour Passionnel et les différentes attitudes d'aimer de l'Echelle d'Attitude sur L'amour.

	PLS	EROS	LUDUS	STORGE	PRAGMA	MANIA	AGAPE
PLS	1	.55**	-.20**	.01	.09	.59**	.56**
EROS		1	-.08	-.11	.06	.16*	.40**
LUDUS			1	.09	.21**	.06	-.17*
STORGE				1	.20**	.04	.11
PRAGMA					1	.16*	.16*
MANIA						1	.35**
AGAPE							1

** La corrélation est significative à $p < .01$

* La corrélation est significative à $p < .05$

garçons ($M=212,02$ et $M=200,82$ respectivement), cette différence n'est pas significative. Les sujets ayant déclaré avoir répondu en pensant à quelqu'un qu'ils ont aimé autrefois, ont obtenu 183,64 points ($ET = 36,81$). Les sujets ayant déclaré n'avoir jamais été amoureux ont obtenu un score moyen de 147 points ($ET = 46,12$). Si nous revenons aux sujets qui sont amoureux, Hatfield et Sprecher signalent que les sujets américains, amoureux à l'instant présent, ont tendance à répondre « 7 » (position extrême) aux différents items de la PLS. Nous observons le même phénomène avec notre échantillon français (moyenne avec tous les items = 6,91).

En ce qui concerne les résultats obtenus avec l'Echelle d'Attitudes sur L'amour, Susan et Clyde Hendrick (1986) ont observé des différences de genre aux différentes dimensions (styles d'aimer). Les garçons ont des scores plus élevés dans le style *Ludus* tandis que les filles ont tendance à avoir des scores plus élevés sur les styles *Eros*, *Storage*, *Pragma* et *Mania*. Les garçons de cet échantillon ont obtenus un score plus élevé en *Ludus* mais nous n'avons pas trouvé de différences avec les filles sur les cinq autres styles d'amour.

Analyse factorielle : L'analyse factorielle en composantes principales indique une solution avec une composante plus forte. Ce premier facteur explique 47,74% de la variance (rotation varimax). Tous les items saturent dans cette dimension au-dessus de .30. Les saturations factorielles oscillent entre .32 (item 1) et .75 (item 14) dans cette dimension principale. L'indice Kaiser-Meir-Olkin de .901 et le test de Bartlett de sphéricité de .000 atteignent des seuils statistiquement significatifs; les résultats sont très satisfaisants et avoisinent ceux obtenus avec la version américaine.

La consistance interne retrouvée entre les 2 versions de la PLS est très élevée car l'alpha de Cronbach est de .94 pour la version à 30 items de l'échelle et de .91 pour la version réduite à 15 items. Nous n'avons pas souhaité de tester la stabilité temporelle car il a été bien démontré que l'amour passionnel décroît avec le temps (Acevedo et Aron, 2009).

Validité de construction : Les corrélations entre la PLS et l'Echelle d'Attitude sur l'Amour que nous avons retrouvées avec les étudiants français vont dans le sens de ce qui a été observé ultérieurement (Hendrick et Henrick, 1986 ; Feybesse, Neto et Hatfield, 2011). Nous retrouvons une forte corrélation entre la PLS et Eros ainsi qu'avec Mania. Comme nous l'attendions, il existe une corrélation négative entre PLS et *Ludus*. De fait, les étudiants ayant obtenu un score élevé à la PLS ont aussi indiqué une forte tendance à avoir une attitude Agapé c'est à dire à être altruiste envers l'objet d'amour. Susan et Clyde Hendrick ont trouvé ces mêmes corrélations avec les étudiants américains (1989). Plus récemment, nous avons obtenu ces mêmes résultats avec des étudiants portugais (Feybesse, Neto et Hatfield, 2011). Les résultats sont présentés dans le tableau 2.

Parmi les sujets ayant déclaré avoir un copain ou une copine, plusieurs sujets ont considéré être confrontés à un ou plusieurs des obstacles proposés par le questionnaire.

La présence d'obstacles dans la vie amoureuse des sujets en couple n'a pas eu d'effet sur l'intensité de l'amour passionnel.

3.4) Discussion

L'objectif de cette étude était d'adapter l'Echelle d'Amour Passionnel en France.

Les analyses psychométriques présentent des résultats satisfaisants et reproduit les résultats obtenus avec la version américaine (Hatfield et Sprecher, 1986). Les sujets amoureux ont obtenu un score moyen semblable à celui trouvé aux Etats-Unis. En France, à l'instar des recherches utilisant la PLS dans différentes cultures, on retrouve un même niveau d'amour passionnel (Hatfield et Rapson, 2005). Cependant il existe des différences culturelles importantes dans l'attitude vis-à-vis de ce phénomène. Certaines cultures ont un regard très négatif sur l'amour passionnel tandis que d'autres le valorisent. Ces différences ne semblent pas influencer l'expérience qu'en font les sujets. La raison tient sans doute aux fondements biologiques de l'amour passionnel qui est partagé par tous les individus (Fisher, 2004; Ortigue et al, 2010).

Les corrélations retrouvées avec la version française de l'Echelle d'Attitude sur l'Amour confirment la validité de la PLS française. Ces corrélations correspondent à nos hypothèses et corroborent les résultats antérieurs (Hendrick et Hendrick, 1989; Feybesse, Neto et Hatfield, 2011).

Certains styles d'amour de l'échelle d'Attitude sur l'Amour mesurent un construit analogue à celui de l'Echelle d'Amour Passionnel (Hendrick et Hendrick, 2006). Si nous considérons les différents types d'amour de façon isolée, le type *Eros* est celui qui correspond le plus à l'amour passionnel mesuré par la PLS. Dans l'attitude *Eros* la composante sexuelle joue un rôle fondamental. On y trouve le désir d'une relation intense (Neto, 1992). L'amour mesuré par la PLS est mieux défini par la théorie des

attitudes sur l'amour si nous combinons l'attitude *Eros* avec l'attitude *Mania*. La combinaison de ces deux types d'amour traduit le fait de tomber amoureux : un réveil physiologique et émotionnel (Hendrick et Hendrick, 2006). Avec *Mania*, le sujet ressent une grande intensité émotionnelle, de la jalousie ainsi qu'un besoin constant d'être rassuré par l'objet de sa passion (Hendrick et Hendrick, 1986). Les attitudes *Storge*, *Pragma* ou *Ludus* sont des façons d'aimer plus tièdes que l'amour passionnel. Le type *Ludus* étant celui qui s'oppose le plus à l'idée d'être amoureux car il correspond à un amour détaché (Lee, 1988).

Nous ne trouvons pas de différences de genre avec la PLS ou avec le style *Eros* d'aimer et cela correspond à ce que nous nous attendions. Après avoir testé l'Echelle d'Attitudes sur l'Amour en Europe, Asie, Afrique et Amérique de sud, Felix Neto et ses collaborateurs (2000) soulignent que le style *Eros* d'aimer n'est pas influencé par le genre ni même par la culture. Dans notre cas, les garçons se sont montrés comme plus ludiques que les filles et cela correspond à ce qui est généralement retrouvé. En ce qui concerne les différences de genre vis-à-vis l'Echelle d'Attitudes sur l'Amour pour les styles *Storge*, *Pragma* et *Mania* nous n'avons pas trouvé de différences. Cela peut s'expliquer par le fait qu'au moins la moitié de nos sujets étaient amoureux au moment où ils ont répondu au questionnaire et se trouvaient engagés dans une relation romantique. Etre amoureux et en couple correspond à une attitude d'aimer plutôt érotique.

Dans cette étude, la présence d'obstacles physiques ou sociaux au sein d'une relation romantique n'a pas influencé l'intensité du sentiment amoureux. L'influence d'obstacles qui empêchent l'union d'un couple romantique a été relativement bien étudiée. Certaines recherches retrouvent une augmentation du sentiment amoureux (Driscoll, Keith et Milton, 1972 ; Stafford et Riske, 1990) tandis que d'autres ne montrent pas de

changements significatifs (Johnson et Milardo, 1984 ; Sinclair, Hood et Wright, 2014). La littérature scientifique a tendance à considérer que les obstacles enflamment toujours la passion mais les obstacles peuvent aussi être une raison ou une excuse pour sortir d'une relation romantique. Il serait intéressant de vérifier si l'engagement du couple pour maintenir la relation ne joue pas un rôle important dans la volonté qu'un couple peut avoir à essayer de surmonter un obstacle. Les couples qui ne se sont pas engagés dans une relation romantique peuvent avoir tendance à se dissoudre quand ils font face à un obstacle difficile à surmonter.

3.5) Conclusions

L'Echelle d'Amour Passionnel peut être un instrument très efficace pour mener des recherches sur les relations romantiques ou si on souhaite avoir des données sur la vie amoureuse de variable. La version réduite de cet instrument est largement utilisée de nos jours dans des recherches qui ont des thèmes et protocoles très variés. L'amour joue un rôle important dans la qualité de vie de n'importe quelle personne. C'est une variable importante à prendre en compte car c'est un prédicteur de satisfaction, de bonheur, d'émotions positives et de bien-être.

L'Echelle d'Amour Passionnel peut être aussi très utile dans un contexte clinique. Son application peut indiquer la manière qu'on est en train d'aimer ou comprendre nos relations romantiques (Favez, 2013). Son application peut aider un sujet ou un couple à discuter de ses émotions, de son intimité ou de sa sexualité.

4) Main conclusion

The psychometric results with the Passionate Love Scale obtained with the Brazilian and French samples indicated that this measure is consistent and reliable in these

cultures. In both cases, participants who were passionate in love scored higher in the PLS than the others and they tended to score between 200 and 210 points in average. These results corroborated very well with what was found in previous studies. The results indicate that Hatfield and Sprecher's conception of passionate love are applicable in these two cultures and provide further evidence that passionate love is a universal experience. We were able to test the PLS only one time in this project but we do further to test the French version in study 3 and study 4 and the scale yields a similar results (more information about this are available in the chapters dedicated to these studies). The social representation study also indicated that our French participants share Hatfield and Sprecher's definition of passionate love (see study 2 for a review).

Brazilian and French participants tended to agree with the same conviction on the items of the PLS. This indicated that they tended to experience similar "symptoms" when they were hit by cupid's arrow because the PLS addresses specific points about passionate love. As we have seen before (chapter 3), research from different fields pointed out that different cultures describe romantic love with similar characteristics as neuroscientists found that passionate love activates the same brain areas in subjects from different cultures or between people with different sexual orientations. The results of this study provide evidence supporting that French and Brazilians share common feelings when they are passionate in love. The main concern we had on this topic was with the male Brazilian sample which scored lower on the PLS when they were in love in all Brazilian regions. Apart from the southeast region, we only had very small samples of male participants and this might explain why we found gender differences in Brazil. The representative nature of the male sample in Brazil can therefore be questioned. Nevertheless, the PLS is a reliable measure in assessing the feelings of passionate love in France and in Brazil.

Study 2: French and in Brazilian students' social representation of passionate Love

Résumé en Français

L'objectif de cette étude était d'explorer les représentations sociales de l'amour passionnel d'étudiants français et brésiliens. Nous avons émis l'hypothèse que ces représentations seraient influencées par la culture mais aussi par le genre. Nous avons employé la technique d'association de mots insérée dans un questionnaire sur les relations romantiques. Les participants français étaient 202 (101 filles et 101 garçons) et les participants brésiliens 371 (239 filles et 132 garçons). L'âge de nos participants était en moyenne de 21,70 (ET = 3,05) ans (français) et de 23,42 (ET = 5,97) ans (Brésiliens). Les participants français ont fourni une liste de 1104 mots tandis que les participants brésiliens ont fourni une liste de 2015 mots. Ces deux listes de mots ont été soumises à une analyse factorielle des correspondances et à une analyse de similitudes. Les résultats ont été obtenus avec le logiciel statistique IRAMUTEQ. L'interprétation de nos résultats suggère que les Français ont associé la « passion amoureuse » à des sentiments de forte intensité émotionnelle qui peuvent avoir des aspects négatifs et positifs. Ce sentiment a aussi été associé au désir et à l'attraction sexuelle. Les Brésiliens ont plutôt considéré que l'amour passionnel est une émotion intense et tendre à la fois, fondamentalement positive, qui est vécue à l'intérieur du couple. Les différences de genre étaient plus marquées chez les sujets brésiliens que chez les sujets français. Nous avons conclu que les représentations sociales de la passion amoureuse sont influencées par la culture et le genre.

Mots-clés : Passion amoureuse, relation romantiques, représentations sociales.

Abstract

The goal of this research was to explore French and Brazilian participants' social representation of passionate love. We have made the hypothesis that social representations would be influenced by gender and culture. Data was collected throughout the word association technique. We asked to 202 (101 females and 101 males) French participants and to 371 (239 females and 132 males) participants to complete a questionnaire about romantic relationships. The mean age of our participants were 21,70 years (SD = 3,05) and 23,42 (SD = 5,97) years (Brazilians). French participants provided a list of 1104 words whereas Brazilian participants provided a list of 2015 words. Both word lists were submitted to a factorial analysis of correspondence and a similitude analyses. Results plots were provided with IRAMUTEQ statistical software. The interpretation of the results suggested that the French participants associated passionate love with intense emotional feelings that could have positive and negative attributes. Also, this feeling was associated with sexual desire and sexual attraction. The Brazilian participant considered that passionate love was a tender and intense feeling at the same time. This feeling was mostly associated as a positive emotion that is experienced inside romantic couples. Gender differences were more

evident with the Brazilian sample than with the French one. We concluded that social representations on passionate love are influenced by gender and culture.

Keywords: Passionate love, romantic relationship, social representation.

1) Introduction

Some studies have explored young adults' representation in the domains of sexuality and love. Studies using the social representation theory in Brazil and in France had investigated the topic of love and sexuality in several studies and the results suggest that these cultures have different ideas about love and sexuality.

Apostolidis (2009) and Jodelet interviewed young adults from France and Greece about their representations of intimate sexual relations. The authors investigated representations of several themes: the body and its needs, sexuality, and interpersonal attraction, and the link between sexuality and the feelings of love. When they were analyzing what their respondents said regarding sexuality, they noticed that discussions of this topic led to a spontaneous discussion of themes related to love. Both French and Greek women tended to associate their sexuality with romantic love or romantic attachment. Men considered sexuality and love to be two distinct ways of thinking about sexual relations. Having sex with love was seen as having sex with feelings. Sex without love was considered to be casual, ephemeral, focused on physical pleasure, superficial, individualistic and related to the risk of catching sexual diseases. On the other hand, sex with love was associated with romantic relationships that last for a fairly long period of time. Relationships that are prone to build something fairly permanent with someone, are related to attachment / union with another, and reciprocity, and are seen to be less risky than other forms of sexuality (the mentioned the idea of getting sexually transmitted diseases such as AIDS for example).

Love was associated with the idea of knowing the other. The authors tested the assumptions of this first study with a second study, in which young adults from France and Greece were presented with one of two scenarios: the first scenario described a man meeting a woman during their holidays and having sex on that same day. The second scenario described the same man, meeting the same woman, in the same context, but waiting one day before engaging in sexual relations. The authors proposed that the representations of this romantic relationship would be different, depending on whether the couple had sex right away or waited one day to engage in this activity. A factorial analysis of the answers revealed that the condition in which the characters had sex right away was associated with the act being ephemeral and hedonistic and was less likely to be associated with feelings of love. The condition in which sex was delayed was associated with positive attributes, such as feelings, communication, and construction (giving the impression of something closer to the idea of love). The authors observed the same distinctions with the French and Greek participants. They concluded that sexual relations are organized around two basic principles: one related to the domain of feelings and another related to the hedonistic domain.

Social representation analysis is also widely used by Brazilian scholars. This method has been employed to study several topics, including romantic relationships, and it is impossible to present all of them in this chapter. Some examples: Bertoldo and Barbara (2006) used the social representation analysis to explore the topic of dating in romantic relationships among Brazilian students from the south of Brazil. Students were asked to write down the first words or expressions that came to their minds after reading the word “dating.” (They’ve used the Portuguese word “namoro,” which represents the idea of having a steady and exclusive relationship with someone). Students’ associations highlighted ideas of commitment, stability, trust, intimacy, love and friendship. Women

more frequently mentioned tender words like caring, companionship, complicity or sincerity, even if they were thinking about a relationship that was relatively new. Men mentioned the word “sex” more frequently. The authors noticed that “friendship” had a central role in students’ social representations of dating. This word had a more central place than the word “love”. Students who were not dating when they participated in the study highlighted more negative aspects of committed relationships. The scholars concluded that there is a consensus as to what dating is, indicating that the idea of a boyfriend or girlfriend corresponds to social roles that are well established and commonly shared by the college students.

Costa and Fernandes (2012) secured similar results when they asked Brazilian teenagers from the Northeast of Brazil to participate in a free-association test concerning two incentive words: love and sex. The word love was associated with expressions such as companionship, respect, friendship, and trust, followed by representations associated with physical intimacy with words such as hugs, kissing or petting, and finally with emotional attributes such as affection, heart, and passion. Love was also linked to the idea of dating, getting engaged, or married. Sex was linked with words related to the idea of pleasure, such as happiness, orgasm, and ecstasy. Sex was also associated with feelings such as love, passion, liking, and loving. Women linked love with terms related to long-term romantic relationships and caring whereas men tended to link love with the idea of desire, without attaching it to long-term romantic relationships. Women represented sex with acts associated with feelings, complicity, and affection, but men were more focused on the sexual act and the satisfaction provided by it. The authors concluded that these Brazilian teenagers represented love and sex as something related to mutual pleasure, based on commitment, reciprocity, and satisfaction.

The methods offered by the social representation theory can be a useful tool in exploring gender or cultural differences about the ideas of love and passionate love. Social representations are not an independent way to think, they are socially imposed to a certain degree (Costa & Fernandes, 2012). In this sense, Brazilian and French students should possess different representations about passionate love because they have different views about the topic of romantic love. The studies presented in chapter 3 indicated that Brazilian men and women should consider love somewhat less linked to feelings of romantic love but being more related to feelings of infatuation and sexual desire. French students might associate love more with an intense feelings or a strong emotional experience. It is expected that gender differences will be found too because almost all studies about romantic love have found gender differences to a certain extent. Another condition that might be interesting to take in to account is to verify if the fact of being in a romantic relationship (or not) can have an influence on how passionate love is represented. As we showed previously, subjects who are passionately in love, when that love is requited, tended to have a very positive view of love. They idealized romantic love, the beloved, and their relationships. Subjects thinking of someone who they have once loved might have a darker social representation about passionate love, because they might well associate this feeling with an important relationship that ended badly. They are likely to focus on the negative aspects of passionate relationships, whereas those in a reciprocated romantic relationship are likely to focus more on the positive aspects.

2) French and Brazilian students' social representation of Passionate Love

In this thesis, we were interested in exploring French and Brazilian participants' social representation of passionate love using the word-association method. In both cases, participants had to write the first six words that came to their mind with the word

“passionate love”. The data were later analyzed with the French software IRAMUTEQ that is often used in qualitative studies. This software provided the possibility of exploring the social representation of participants in two different ways:

- **Factorial analysis of correspondence (Reinert method):** This method explored common factors between the different words associated to “Passionate Love”. This method allowed us to have a look at the ideas generated by an inductive word. The different words provided by the participants are gathered into clusters (or classes) that indicate which words varied in the same way. The interpretation of the results was done with graphics, which took into account two dimensions. These factors are obtained by checking the association between different words: if one person said “sex” when she was thinking about the word “passionate love”, she can have associated passionate love with other similar words of someone else who also said the word “sex” as well. Searching for “common factors” lead to the separation of the word into different classes that have only a descriptive value (Doise, Clemence & Lorenzi-Cioldi, 1992). These classes will contain different set of words in which one person can find different central themes.
- **Analysis of similarities:** the analysis of similarities helped us to see if we could find different associations between male and female participants from the same culture (correlations between nominal values). This method allowed us to associate words between themselves in different groups. This method doesn’t have a causal value but indicates the words that go together (Bouriche, 2003). In this case, the words provided by our male and female participants were separated in two different data sets so we could see if they would provide different matrix of similarities. The results provide a representational graphic

indicating a central theme and the expressions associated. Also, it is possible to distinguish secondary themes and the words associated with them. The results are usually interpreted as if the similarities and the clusters represent a tree: the central theme is the trunk and the secondary themes are the branches. These trees are organized according to their correlational levels but IRAMUTEQ does not provide an output of the correlation values. Once again, the results provided have a descriptive meaning.

The samples of these two studies are the same ones we used in study 1 when we explored the psychometric properties of the PLS in Brazil and in France. In both cases, we asked participants to complete this word-association task after answering the demographic questions and before completing the different love measures used in the different questionnaires.

Before performing the different analysis, the French and Portuguese words were separately transformed: the verbs were put into their infinitive; nouns and adjectives into the singular and similar expressions such as “passion”, “passionate” or “passionately” were considered to be one same word that was considered to be “passion” for example. IRAMUTEQ executed these modifications using French and Portuguese dictionaries.

3) French students’ social representation of Passionate Love

3.1) Method

Participants: This sample is composed by the same 190 French participants of study 1. We asked to another 12 male participants to answer our questionnaire so we could have the exact same number of male and female subjects in this study. By the end, the sample is composed of 101 male and 101 female participants. The mean age is 21,70 (S.D. =

3,05) ; 54% of respondents said that they were in love, 36,1% answered the Passionate Love Scale thinking of someone they loved in the past and 7,9% declared that they had never been in love. Thus, 50% said that they were currently involved in a romantic relationship (more information about the characteristics of this sample is available in study 1).

Material: Before answering the French versions of the Passionate Love Scale and the Love Attitude Scale, subjects were invited to provide the first six words that came to their mind with the word “Passionate Love”. We used the usual French formulation for this type of free-association task: « Si on vous dit "**PASSION AMOUREUSE**", à quoi pensez-vous ? (*Donnez 6 mots qui vous viennent spontanément à l'esprit*) ».

3.2) Results

Analysis of the word-association data

The French sample provided 1104 words. Each participant provided 5,46 words on average. Female participants provided 577 words while the male participants provided 527 words; 427 words were cited at least two times (after regrouping). As it can be seen in table 1, French participants tended to make numerous associations with the word Passionate Love providing a heterogeneous pool of words: 50% of the words were cited by only one subject whereas 42% were cited by two subjects. Our analysis could only take into account the words that were cited at least 3 times; this represents 88 words (7,92%) of the 1104 words provided by the participants. Only few words were cited more than 3 times and only 3 words were cited more than 30 times (“love”, “sex” and “happiness”), another three words were cited more than 20 times (“feelings”, “desire” and “sharing”) and 14 words were cited more than 10 times (see table 1).

Figure 1: word cloud provided by the French participants (N = 202)



Table 1: list of words and frequencies provided by the French sample

Amour	84	Coup	7	baiser	4
Sexe	39	Séduction	6	unique	3
Bonheur	30	Lien	6	union	3
Folie	25	Film	6	torride	3
sentiment	24	Ephémère	6	sincérité	3
Désir	24	Beauté	6	réciprocité	3
Partager	23	Attachement	6	romance	3
Joie	19	Aimer	6	raison	3
Couple	19	Sauvage	5	physique	3
Relation	18	Respect	5	heureux	3
Intensité	14	Peur	5	fusionnel	3
confiance	14	Perte	5	flamme	3
tendresse	12	Feu	5	euphorie	3
Intense	12	Douceur	5	esprit	3
Fusion	12	Besoin	5	entente	3
complicité	12	attrance	5	emotion	3
Cœur	12	temps	4	déchirement	3
souffrance	11	rose	4	douloureux	3
Rouge	11	romantisme	4	danger	3

Factor analysis

Once again, the factorial analysis of the results only took into account words that were cited by 3 different subjects. Therefore many words cited by the participants are “lost”.

If we take a general look at the words that were taken into account it is easy to notice that participants also mentioned words associated to “union” and “sharing”.

Passionate love was also often associated with words related to sexual desire and sexuality. The factorial solution indicated that the words could be classified in 6 different classes that can be interpreted as covering two main topics (see figure 2). This solution explained 49,55 % of the variance of the words association (see figure 3).

Table 2: Profiles of classes 2, 3 and 4 (French sample)

Class 2 (grey)	P	Class 3 (green)	p	Class 4 (blue)	p
Film (film)	.001	Rêve (dream)	.001	Confiance (trust)	.001
Tendresse (tenderness)	.002	Rare (rare)	.001	Entente (understanding)	.002
Rouge (red)	.004	Sexualité (sexuality)	.01	Temps (time)	.01
Homme (man)	.013	Passion (passion)	.01	Fille (girl)	.01
Destruction (destruction)	.013	Obsession (obsession)	NS	Relation (relation)	NS
Emotion (emotion)	.013	Beauté (beauty)	NS	Plaisir (pleasure)	NS
Rose (pink)	NS	Douceur (sweetness)	NS	Envie (wish)	NS
Bonheur (happiness)	NS	Temps (time)	NS		
Partager (sharing)	NS	Pensée (thinking)	NS		
Relation (relation)	NS	Fille (girl)	NS		
Désir (desire)	NS	Désir (desire)	NS		
Besoin (need)	NS	Séduction (seduction)	NS		

Note: P indicates the significance level of association between the word and the class (Chi-Square). NS indicates a non-significant level of association between the word and the class (Chi-Square).

Table 3: Profiles of classes 1, 5 and 6 (French Sample)

Class 1 (light blue)	p	Class 5 (dark blue)	p	Class 6 (pink)	p
Intense (intense)	.001	Fougue (ardor)	.001	Sauvage (wild)	.01
Aimer (to love)	.01	Intensité (intensity)	.002	Romantisme (romanticism)	.01
Perte (lost)	.01	Excitation (excitement)	.003	Fusionnel (fusional)	.01
Extrême (extreme)	.01	Heureux (happy)	.04	Sentiment (feeling)	.01
Dispute (dispute)	NS	Flamme (flame)	.04	Foudre (lightning)	.03
Couple (couple)	NS	Bien-être (well being)	.04	Coup (blow)	.03
Dépendance (dependence)	NS	Folie (madness)	NS	Beau (beautiful)	NS
Jalousie (jealousy)	NS	Foudre (lightning)	NS	Souffrance (suffering)	NS
Relation (relation)	NS	Coup (blow)	NS	Complicité (complicity)	NS
Vie (life)	NS	Jalousie (jealousy)	NS		
Intensité (Intensity)	NS		NS		
Fort (strong)	NS		NS		

Note: P indicates the significance level of association between the word and the class (Chi-Square). NS indicates a non-significant level of association between the word and the class (Chi-Square).

Figure 2: Classification of the words in classes according to the Reinert method (France)

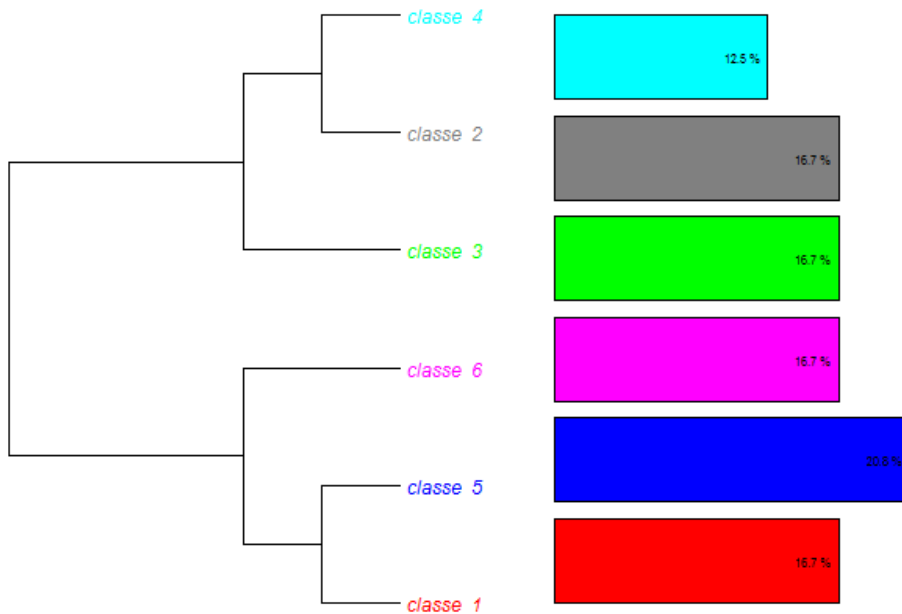
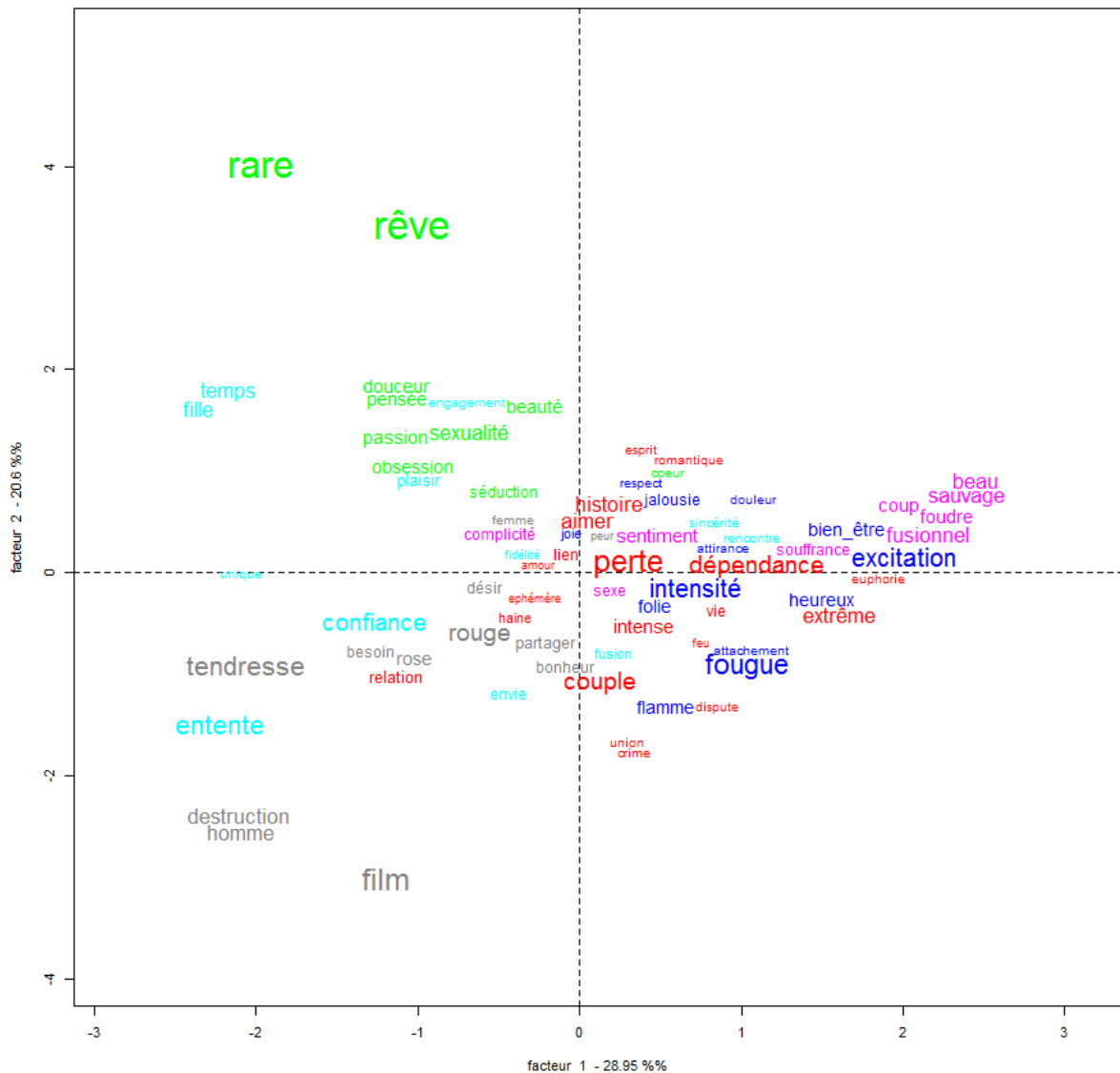


Figure 3: factor analysis plot for the words associated with passionate love in France (axes 1-2)



The first topic was created by the combination of class 2, 3 and 4 and seems to be more related to cognitive and emotional aspects of passionate love in which the different classes are relatively independent (the words belonging to these 3 classes are different). These three classes accounted for 45,9% of all classified words associated with passionate love. Class 2 contained words related to feelings (e.g. tenderness, happiness) and relation (e.g. sharing, film, relation). In Class 3 appear mainly the words “passion”, “sexuality”, “dream” and “rare” underlying somewhat cognitive aspects of passionate love. Finally, class 4 contains words that can be related to characteristics of romantic

relationships (e.g. trust, time, agreement, relation). The factor analysis plot indicates a clear distinction between class 2 and 3 (see figure 3).

The second main topic seems to be addressing the idea of intensity and pathology. The topic is organized around the remaining three classes: 1, 5 and 6. These three classes account for 52,2% of all classified words associated with passionate love. These three classes overlap one another and seem to be addressing the same topics (some words could be found in more than one class: e.g. intense, lightning, jalousie). These classes seem to be underlying the idea that passionate love is associated with powerful, intense and extreme emotions. The word “intensity” is present in classes 1 and 5 and both classes contain words that can be associated with a darker side of passionate love (e.g. dependence, extreme, jalousie, lost or madness). Classes 5 and 6 have words than can be associated with positive and negative emotions such as happiness or suffering. The factor analysis forms classes that are filled with contradictory terms. One thing that is common about these terms is that they usually carry a lot of intensity in their meanings.

Analysis of similarities

As it can be seen in images 1 and 2, “love” is the central word for male and female participants as well. This word is attached with all the other associations found in both cases. Love is attached with intense feelings as well as with words with contradictory meanings that were mainly related to romantic attachment and sexuality. Nevertheless, male and female participants did not present the same clusters of words suggesting that they associated passionate love with a broad range of ideas as they wanted to emphasize different topics. The clusters that are peripheral from the central one suggest that male and female did make different associations even if they go around the same topics.

Figure 4: analysis of similarities among French males

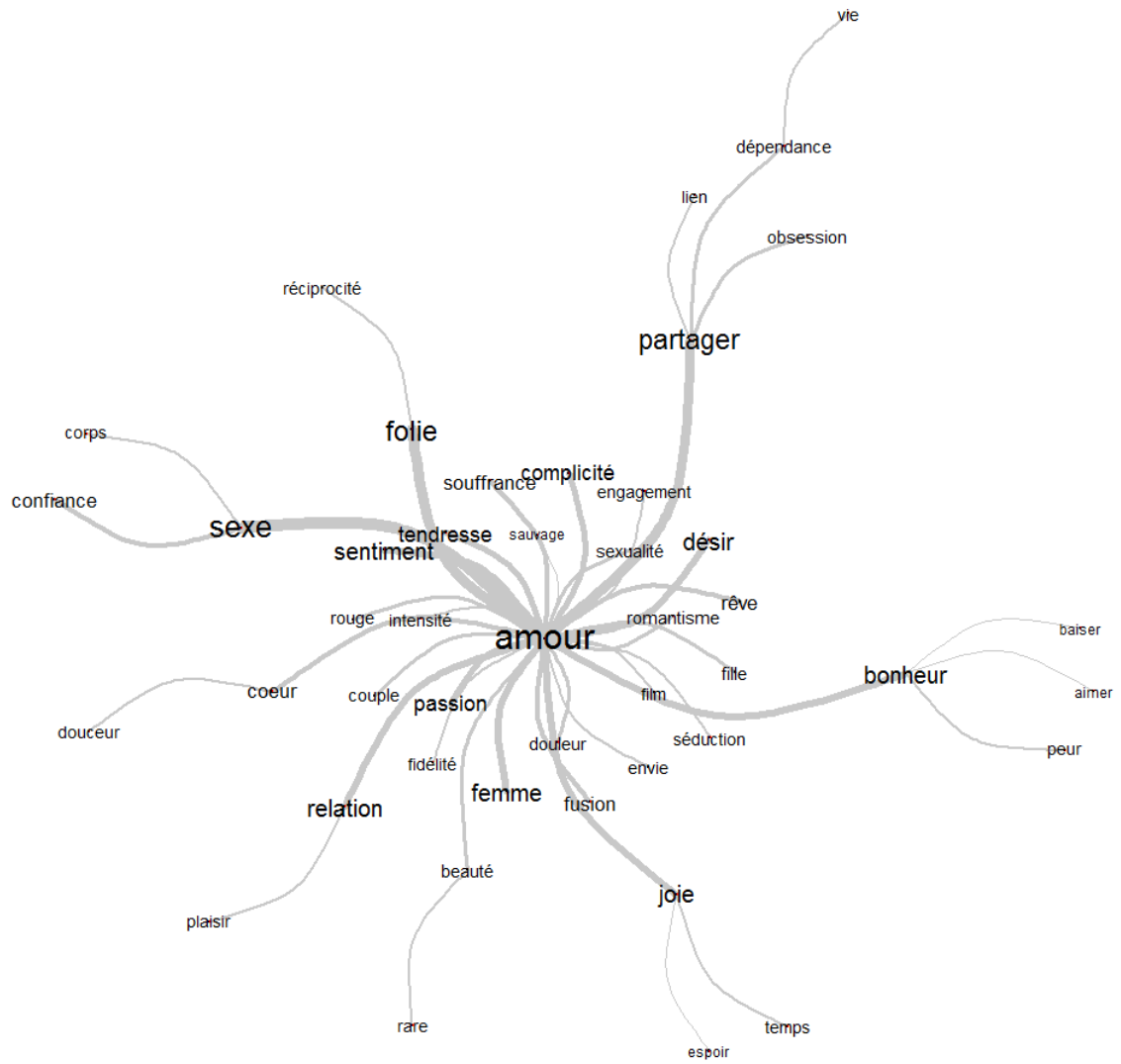
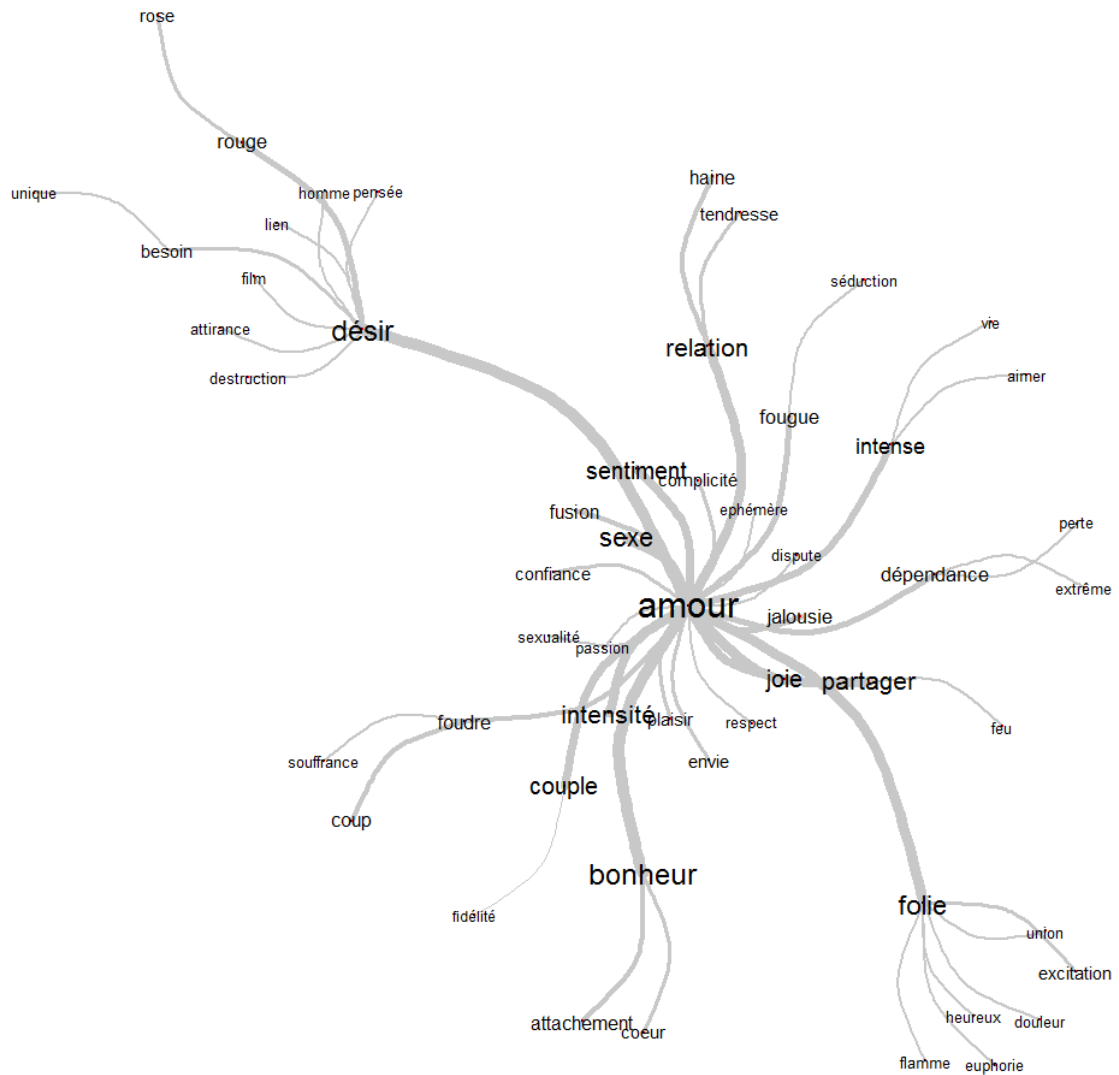


Figure 5: Analysis of similarities among French females



Female associations: The central theme “love” is surrounded by different words suggesting different topics such as sex, jealousy, passion, trust or dispute. This suggests that passionate love is a type of love that can lead to contradictory feelings.

From Female participants’ associations, we find clusters in which “desire”, “happiness” and “madness” have distinctive branches: “desire” is associated with the idea of thinking and the idea of possibly imagining a scenario (film). Also, “Desire” is linked with the words destruction in one side and the colors red & rose on the other side that can be associated to the idea of negative and positive outcomes. Also, “desire” is

attached with “attraction”, “link”, “need” and “unique”. This suggests the idea of attraction and desiring exclusivity with the beloved. Happiness is linked to heart and attachment. Madness is associated with words with intense meanings (flame, euphoria and excitation), positive and negative feelings (pain and happy). They got fuzzier branches in which “relation”, “intense” and the verb “to share” are central. The words associated with these different branches present secondary words with positive and negative meanings (“desire” is associated with destruction and attraction while “madness” is associated with pain and union for example).

Male associations: The words provided by male participants seem to “gravitate” quite closely the central word (love) and it has been difficult to find isolated branches. Love is associated with a myriad of ideas related to feelings, intensity, romantic attachment and sexuality. If we compare with the female sample’s results, those are harder to describe. Male participants have clusters in which “sex”, “madness”, “happiness”, “joy” and “sharing” have distinctive branches. “Sex” is linked with body and trust; “madness” is associated mainly with the reciprocity, which is hard to interpret. “Happiness” is associated to the verbs “love” and “make love” and fear suggesting somewhat an idea of action. “Joy” is related to hope and time and seem to be distinct from the words associated with “happiness” even if these are similar emotions.

3.3) Discussion

The results of this study suggest that passionate love is associated with a vast number of words and ideas. We were not able to include the vast majority of the words that was provided by our sample. There are only few words that could be employed in our analysis. This indicated that the social representation of passionate love among French participants can be very different from one person to another and they probably define

passionate love in different ways. The sample was composed by college students living in the same place and half of the sample told us that they were in love and were currently dating their beloved so one could expect that they would share common idea about what passionate love is but this did not seem to be the case because the number of common words were low and the frequencies dropped quickly.

The interpretation of our results indicates that participants have a conception of passionate love similar to that presented in chapter 1 of this thesis. The factor analysis indicates that passionate love is represented by a type of love in which one experiences intense feeling and emotions that can be both positive and negative. Also, passionate love is often associated with sexuality and sexual desire. The factor analysis plot suggests that the social representation of passionate love contains two main topics. The first one is related to cognitive and emotional aspects of passionate love. The second one is more focused on intensity and pathology / negative aspects. Passionate love has a bright side when associated with positive feelings such as joy and happiness but it is also frequently associated with the idea of madness for example. Participants probably see passionate love as being a dangerous emotion because it can take someone to extreme positive and negative emotional states as it can have positive and negative outcomes. We suggest that their social representation relates passionate love to something that it is mainly linked with emotions and romantic attachment that are intense in nature.

The relationship with the beloved is an important aspect of this social representation as well. Passionate love is frequently associated with ideas of sharing, reciprocity and fusion. One can consider that it is associated with the idea of “doing something with someone” so passionate love is seen as something one person experiences with someone else even if this feeling is not necessarily reciprocate. Our participants seem to be

constantly addressing an idea of interaction / exchange and not the idea of being in love with someone with whom there have no contact at all. This intense relationship between the two lovers can be “happy”, “sexual” and even a “dream”, but it can also be a “jealous”, “mad” and “dependent” one.

The analysis of similarities indicates that both male and female participants have the word “love” as being the central word associated with passionate love and this is not surprising since this word is one of the two inductive words (passion amoureuse). Overall, they tend to associate passionate love with slight different ideas. We noticed the same thing regarding the Love Attitude Scale. We only found gender differences with the Ludus subscale while it is common to find differences with Storge, Pragma and Mania as well. Both genders have equally associated passionate love with the words “madness” and “happiness” even if these same words were associated with different words. Female participants associated “happiness” with attachment whereas male participants associated it more with physical acts. The female participants emphasized the idea of desire and romantic relationship while the male participants associated passionate love with sex and physical pleasure more often. These results confirmed the results obtained with the Love Attitude Scale. Male participants scored higher on Ludus, confirming they were more focused on physical pleasure than on commitment.

3.4) Conclusion

This study indicated that the social representation of passionate love among college students require a vast amount of answers to be seized accurately. The data analysis we conducted would have provided more conclusive results if we had a larger sample. One important limitation of this study is that only few words could be associated with one another. This sample size was satisfying for the psychometric analysis of the French

version of The Passionate Love Scale but was insufficient regarding the social representation study. With more subjects, we would have been able to examine more word associations and probably better factorial solutions (the classes would have contained more distinctive themes). We are faced with the same limitation concerning the similarities analysis results: more data would have provided clearer clusters among male and female participants' answers. Here, the words tended to be more related to the main cluster ("love") forming secondary clusters that looked blurry.

Yet, passionate love is portrayed as an intense emotion in which the interaction with the beloved plays an important role. We consider that our results corroborate with Hatfield and Sprecher's definition of passionate love (1986): an intense romantic state in which one is *longing for the union with another*. French participants associated this feeling as something loaded with mixed emotions that can lead one person to ecstasy or to a deep despair. This scientific definition makes us believe that participants kept in mind, regardless of how their romantic relationship was actually going, that passionate love can be unrequited or requited so it should be represented with positive and negative attributes.

4) Social representation of passionate love in a Brazilian sample of youngster

4.1) Method

Participants: This sample is the same one who filled out the online questionnaire used to explore the psychometric properties of the Passionate Love Scale in Brazil. Subjects completed the social representation task before answering the psychometrics scales. We were unable to control the number of male and female participants and ended up having 239 female participants for 132 males from all the regions of Brazil. The mean age was 23,42 years (SD = 5,97); subjects in love represented 63,2% of the sample / those

thinking of someone they had loved in the past were 16,2% / finally, those who had never been in love constituted 3,3% of the sample (more information about this sample characteristics are provided in study 1).

Material: subjects were invited to provide the first six words that came to their mind with the word “passionate love”. In this case, we used the Portuguese term that is usually employed to describe Hatfield’s theory about passionate love. Also, we used the usual Brazilian sentence formula for this type of free-association task (Lins, 2013): “Quando VOCÊ pensa na palavra “AMOR APAIXONADO”, por favor, quais são as 6 palavras e expressões que lhe vêm à mente?”

4.2) Results

This sample gave 2015 words, which corresponds to an average of 5,43 words per subject. This provided a list of 576 words that were associated with passionate love. Female participants provided 1316 words whereas male participants provided 699 words (64,42 % of our sample were female participants). Female participants gave 5,5 words on average for 5,29 words for the male sample. As indicated in table 4,141 words were cited at least three times. The most cited word, “carinho”, was mentioned 107 times (28,84% of the participants). “Carinho” is a difficult word to translate: if it means endearment, it also carries the idea of taking care of someone. Three words were cited more than 80 times (passion, love and happiness); 3 words were cited more than 40 times (sex, companionate ship, complicity). The frequency of the most evoked words that were mentioned more than 50 times dropped quickly but this drop slowed down with the list of words that were mentioned less than 30 times. In this case, 7 words were cited between 20 and 30 times, 26 words were cited between 10 and 20 times. We found 83 words that were cited at least 2 times and 351 words were cited only once. Finally our analysis took into account 24,65% of the words cited by the Brazilian participants.

Table 6: list of words and frequencies provided by the Brazilian sample

carinho	107	Sinceridade	10	passageiro	5	proteção	3
paixão	86	Frio	10	parceria	5	possível	3
amor	82	Feliz	10	mulher	5	peito	3
felicidade	81	Emoção	10	irracional	5	olho	3
sexo	63	Atenção	10	filme	5	olhar	3
companheirismo	44	Admiração	10	eterno	5	necessidade	3
cumplicidade	43	Vontade	9	compromisso	5	mão	3
respeito	38	Reciprocidade	9	apego	5	momento	3
beijo	34	Euforia	9	vista	4	mentira	3
amizade	34	Companheirismo	9	vermelho	4	homem	3
confiança	31	Calor	9	ternura	4	final	3
alegria	28	Atração	9	sempre	4	filho	3
romance	27	Amar	9	satisfação	4	expectativa	3
desejo	26	Sofrimento	8	riso	4	esperança	3
coração	25	Relacionamento	8	relação	4	encantamento	3
abraço	25	Medo	8	problema	4	corresponder	3
fidelidade	24	Liberdade	8	poesia	4	constante	3
loucura	20	Ilusão	8	paixao	4	completude	3
vida	18	Ficar	8	obsessão	4	compartilhar	3
tesão	18	Dor	8	lindo	4	ciumes	3
namorado	18	Compreensão	8	leveza	4	borboleta	3
saudade	17	Cego	8	lealdade	4	bobagem	3
sorriso	16	Segurança	7	incondicional	4	beleza	3
cuidado	16	Plenitude	7	idealização	4	apaixonado	3
casamento	16	Não	7	futuro	4	angustiar	3
sentimento	15	Ansiedade	7	forte	4	amigo	3
junto	14	Sonho	6	fantasia	4	aconchego	3
intensidade	14	Querer	6	família	4	aceitação	3
namoro	13	Prazer	6	familiar	4		
afeto	13	Paz	6	encontro	4		
intenso	12	Intimidade	6	encanto	4		
companhia	12	Fogo	6	conquista	4		
união	11	Deus	6	bobo	4		
romantismo	11	Ciúme	6	acelerado	4		
entrega	11	Casal	6	sentir	3		
dedicação	11	Tristeza	5	sedução	3		
bem	11	Tranquilidade	5	risco	3		
barriga	11	Romântico	5	quente	3		

Factor analysis

The factor analysis of this pool of words indicates a solution with six different classes. The factorial plot indicates that these classes can be divided into two main groups. One group is composed of classes 1 and 5, while the second one is composed of classes 2, 3, 4 and 6. This solution explained 49,55% of the variance of the words associations.

Classes of the second group are the factor that weights the most and can be considered as addressing similar topics (see table 8). This group contains 64,4% of all the words included in the factor analysis. Classes 2 and 4 are tightly linked together and seem to address topics related to symptoms associated to love such as “heat”, “belly”, “laugh” or “will”. Class 3 suggests characteristics of a boyfriend/girlfriend romantic relationship: two persons in couple who miss each other, who are “happy”, “trust” each other and so on. The factor analysis plot indicates that class 6 is quite independent from classes 2 and 4. The words associated with class 6 translate a passionate romantic relationship of one couple living a steady relationship. This class is composed of the words “boyfriend”, “always”, “friendship”, “complicity” and so on. The presence of the word “obsession” suggests an idea of passion or intensity

The first group (Class 1 and 5) forms 35,6% of the words considered in the analysis (see table 7). These two classes are relatively independent from each other. Class 1 contains words related to commitment such as “marriage”, “God” (probably suggesting the idea of a union under God). This class also gathers words related to intensity such as “passion”, “irrational” or “madness”. Class 5 contains words suggesting the idea of something unreal (“fantasy”, “silliness”, “idealization”) that makes one person feels positive things (“accelerated”, “affection”, “heath, “joy”). The words that were taken into account in the plot of this analysis have explored topics related to commitment, intimacy and passion.

Table 4: Profiles of classes 1 and 5 (Brazilian Sample)

Class 1 (red)	p	Class 5 (dark blue)	p
Casamento (marriage)	.001	Acelerado (accelerated)	.001
Paixão (passion)	.001	Romantismo (romanticism)	.001
Deus (God)	.001	Fantasia (fantasy)	.001
Afeto (affection)	.003	Afeto (affection)	.001
Atenção (attention)	.003	Reciprocidade (reciprocity)	.007
Desejo (desire)	.003	Idealização (idealization)	.01
Problema (problem)	.004	Bobagem (silliness)	.01
Irracional (irrational)	.04	União (union)	.01
Lealdade (loyalty)	.04	Companheirismo (companionship)	.01
Sentimento (feeling)	.04	Coração (heart)	.02
Emoção (emotion)	.04	Alegria (joy)	.05
Loucura (madness)	.05	Liberdade (freedom)	.05
Confiança (trust)	NS	Fogo (fire)	.05
Entrega (delivery)	NS	Conquista (conquest)	.05
Sinceridade (sincerity)	NS	Atração (attraction)	NS
Dor (pain)	NS	Apego (attachment)	NS
Intimidade (intimacy)	NS	Respeito (respect)	NS
Futuro (future)	NS	Abraço (hug)	NS
Carinho (endearment)	NS	Sorriso (smile)	NS

Note: P indicates the significance level of association between the word and the class (Chi-Square). NS indicates a non-significant level of association between the word and the class (Chi-Square).

Table 5: Profiles of classes 2, 3, 4 and 6 (Brazilian Sample)

Class 3 (green)	p	Class 2 (grey)	P	Class 4 (light blue)	p	Class 6 (pink)	p
Saudade (missing)	.001	Casal (couple)	.001	Frio (cold)	.001	Namorado (boyfriend)	.001
Feliz (happy)	.001	Intenso (intense)	.003	Barriga (belly)	.001	Sempre (always)	.001
Parceria (partnership)	.001	Vontade (will)	.003	Não (no)	.004	Amizade (friendship)	.002
Confiança (trust)	.02	Eterno (eternal)	.004	Riso (laugh)	.01	Obsessão (obsession)	.004
Intenso (intense)	.03	Companhia (company)	.007	Sonho (dream)	.01	Cumplicidade (complicity)	.01
Companheirismo (companionship)	.03	Romance (romance)	.01	Sorriso (smile)	.02	Beijo (kiss)	.01
Vida (life)	.03	Mulher (woman)	.01	Ficar (casual date)	.05	Abraço (hug)	.02
Amar (to love)	NS	Lindo (beautiful)	.01	Paz (peace)	.05	Bobo (fool)	.04
Plenitude (fullness)	NS	Calor (heat)	.03	Tranquilidade (tranquility)	.05	Aconchego (cosiness)	.04
		Querer (to want)	.05	Intensidade (intensity)	NS	Euforia (euphoria)	NS
		Poesia (poetry)	.05	Emoção (emotion)	NS	Admiração (admiration)	NS
		Sexo (sex)	NS	Sufrimento (suffering)	NS	Ciume (jealousy)	NS
		Namorado (boyfriend)	NS	Ilusão (illusion)	NS	Futuro (future)	NS
		Dedicação (dedication)	NS			Encontro (meeting)	NS
		Sufrimento (suffering)	NS			Encanto (enchantment)	NS
		Relacionamento (relationship)	NS				
		Cego (blind)	NS				
		Paixão (passion)	NS				
		Namoro (dating)	NS				

Note: P indicates the significance level of association between the word and the class (Chi-Square). NS indicates a non-significant level of association between the word and the class (Chi-Square).

These words bring the idea of an attached relationship. Brazilian participants mostly employed positive emotional adjectives underlying that passionate love is basically a positive experience. It is also interesting to notice that words directly related to sexuality were not considered in the plot analysis.

Similarities Analysis

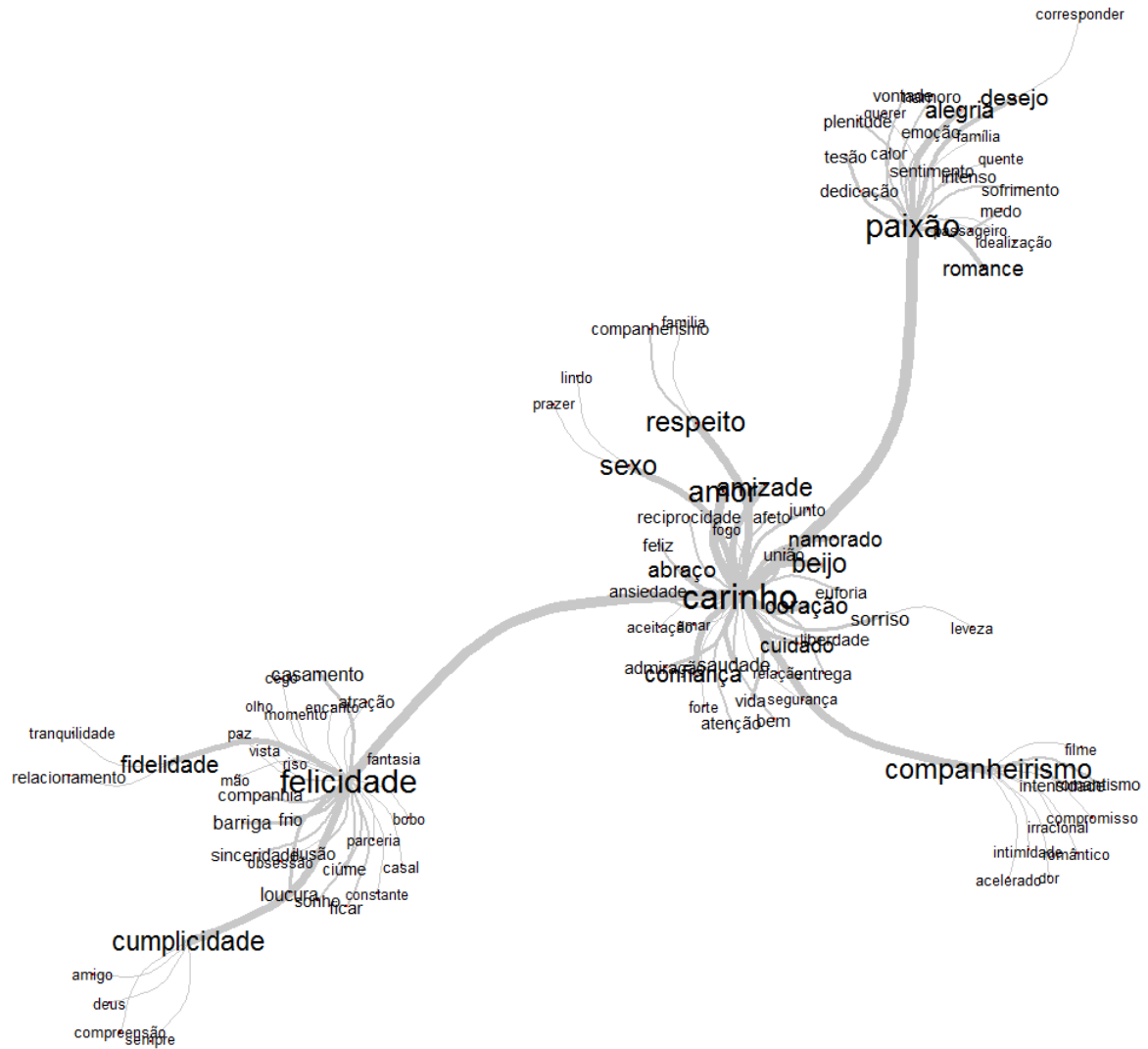
We conducted similarities analysis with the pool of words provided by the Brazilian Female and Male participants. Gender provided different central and peripheral clusters. It is interesting to point out that the central words of the different clusters are vastly surrounded by positive attributes highlighting the idea that passionate love is considered to be a positive feeling by “nature”. The word associations and the clusters found with these two groups can be seen in image 7 (female word associations) and in image 8 (male association).

Female word associations: the central word found in this sample is “carinho” (endearment) suggesting that passionate love is markedly centered with a tender feeling instead of an intense one. The word is surrounded by positive attributes: “happy”, “freedom”, “affection” and “admiration”. “Carinho” is greatly associated with the idea of engagement in a romantic relationship: “boyfriend”, “safety”, “reciprocity”, “together” or “friendship” testify the meaning of their representations into this direction. The words “sex” and “respect” form peripheral branches around the central word and are linked with positive attributes as well (sex linked to “beautiful” and “pleasure” whereas “respect” is linked to “partnership” and “family”).

The results indicate three very distinctive clusters formed around the central word. The first one is composed of words situated near the word “happiness”: “marriage”, “fantasy”, “company”, “sincerity” or “couple” indicate that “happiness” is associated

with a successful romantic relationship. Two words, evoked with a higher frequency, are linked with the word “happiness”: “fidelity” and “complicity”.

Figure 9: word association between Brazilian females



The second cluster has the word “companionship” and is surrounded with words considered as having contradictory meanings. This central word is associated with “film”, “commitment”, “irrational”, “acceleration”, “pain” or “romanticism”. The last cluster has the word “passion” as central. Passion is associated with sexual connotation words like “horny”, “heat”, “desire” or “hot”. Passion is associated with both negative

(“fear”, “suffering” or “idealization”) and positive attributes (“plenitude”, “family”, “dedication” or “romance”).

Figure 8: word association among Brazilian male



Male word associations: The output regarding the associations made by Brazilian males to “passionate love” suggests a different structure. The central word turns to be “sex” which is surrounded only by positive attributes such as “happy”, “kiss”, “romantism”, “intensity” or “heart”. Four distinctive clusters surround this central word. The first one has the word “companionateship” at its center with “couple”,

“understanding”, “attraction”, “dating” and “attention” around it. The second cluster has “carinho” at its center and is only related with positive attributes such as “romance”, “friendship”, “marriage”, “feelings”, “emotion” or “care”. The third cluster is composed by the word “passion” which is linked with “woman”, “to love”, “smile” and “God”. The last cluster has “happiness” at its center and is associated with negative attributes (e.g. “blind”, “pain”, “madness”, “lie”), yet also with positive ones (e.g. “life”, “respect”, “joy”, “trust”). Happiness is also associated with “love” which is itself associated with “missing”, “boyfriend” and “unconditional”.

4.3) Discussion

The three most frequently cited words given by Brazilian participants illustrate well the general idea that the data suggest (carinho (endearment) + paixão (passion) + amor (love)). Brazilian participants associated our inductive word with the idea of a steady relationship in its early stage. They have associated “passionate love” with a romantic relationship that is committed, intimate in which the flame of passion is very much alive. In the one hand, participants mentioned words related to commitment such as “marriage”, “trust”, “partnership” but they also expressed words related to intense feelings such as “obsession”, “passion” or “idealization”. This describes a steady romantic relationship that is intense and passionate. Brazilian sample gave positive attributes most of the time and considered passionate love to be a positive emotion; they were addressing a serious romantic relationship between two single people. Our demographic data about this sample support this idea because 83,3% of the participants declared to be single. Also, 63,2% of the sample was in love for about two years and 58% were engaged in a romantic relationship (see study 1). These data help us understand that “passionate love” corresponds to feelings that are deeply shared

between two single people who are dating. The words that were central in the factorial analysis of correspondence tapped very often a relationship status (e.g. “marriage”, “couple”, “boyfriend”). Emotional aspects played a secondary role. It is interesting to notice that words related to sexuality were almost inexistent in the factorial plot.

It’s worth noticing that words with negative connotations are associated with clusters in which the central word has a very positive connotation. The similarities analysis shows, for example, that “madness” is associated with “complicity” (female group) and with “happiness” (male group). Therefore, “passionate love” is considered to have a “mad”, “irrational” side but this is connoted in a good and positive way. Passionate love leads to an uncontrollable state that is nice because it is experienced in a safe context in which the boyfriend or girlfriend can be trusted and is sharing the same feelings. They refer to a romantic relationship that leads a couple to get married. Even if the relationship between the two lovers is strong, it is founded on passionate feelings that are intense, irrational, and strong but they are good at the same time.

The analysis of similarities provides very interesting results. They suggest that male and female participants have different representations on “passionate love”. Female participants associate it with a tender emotion experienced in romantic couples whereas male participants associate it mainly with sex that is experienced in the same type of context. Sex can be considered to play a secondary role within the female representation in the sense that it is one way to express feelings of endearment even if sex was associated with “hot” attributes. Sex has a central role within male representations. These results corroborate what researchers usually say on romantic love: men tend to consider sex as a central aspect of romantic love while women tend to emphasize attachment (see chapter 1 for a more complete review of this topic). Also it is interesting to notice that the clusters found with the male participants separate love from sex. Sex is

directly related to passion whereas love is linked with happiness. One can interpret these results considering passion as a component of sex. Passion relies on sexuality in a positive way. Love, on the other hand, is related to the relational aspects one have with the beloved. Love rises in “happy” relationships for men.

4.4) Conclusion

In this study, we asked Brazilian participants to provide the first words they associate with “passionate love”. Our results suggest that this kind of love is close to endearment and passion. Male and Female participants mention similar words but these same words tend to have different meanings.

In Brazil, the Love Attitude Scale did not reveal any gender difference on the love styles when we considered the entire sample. The same thing happened in other Brazilian studies using this same measure (Cassepp-Borges, 2010). In contrast, our social representation study reveals sparkling gender differences and is probably a better tool to find gender nuances on feelings of romantic love. Assuming that our assumptions are correct, if we combine the data obtained with both approaches, we have the indication that male and female participants tend to have the same attitudes towards love but define “passionate love” in different ways. For both genders, passionate love is found in steady and committed romantic relationships. Passionate love takes time; it needs intimacy and engagement to develop. This feeling is considered to be very positive with almost no downside when embraced by couples that experienced it. If we take the theoretical background on love types that we used in this thesis, what we found with the Brazilian subjects in this study did not translate Hatfield’s conception of passionate love. One can consider that the Brazilians portray passionate love as an emotion in which tenderness and passion are mixed. Somehow this feeling can be situated in

between Hatfield's passionate love and companionate love conceptions. If we consider the Sternberg's typology, passionate love is understood as the "romantic love" type in which passion and intimacy are high and commitment is low. As we have seen before, the majority of Brazilian participants were single dating people who were not really committed in the sense that they are not married but they "talked" about deep and passionate attachments. These results corroborate what we have illustrated earlier about the Brazilian culture in chapter 3 and in the introduction of this study. Costa and Fernandes (2012) noticed that love was associated with the idea of commitment and their Brazilians participants tended to separate passion from love. Passion was more related to sex. In our case, Passionate Love is considered to be in the realm of love but love is probably placed after lust or infatuated states. Passionate love is considered to be more of a combination of a passionate state with intimacy, like Sternberg suggested, because intimacy takes time to grow so it takes time for romantic love to be in the boundaries of reality. Our conclusions about the Brazilian data allow an interpretation in this direction. Amusing enough, one of the biggest Brazilian poet and songwriter who was one of the founders of the Bossa Nova movement, Vinícius de Moraes, had a view about love that goes totally on Hatfield's conception of passionate love. Love does not need time, intimacy or commitment to exist. It just needs to be experienced. It is better to live something that might be fleeting and turns out to be wrong than live nothing at all.

5) Main conclusions on the social representations of "passionate love"

The results we obtained through free-association tasks by these two samples (Brazilian and French) indicate gender and cultural differences in the social representation of passionate love. Cultural differences are easy to spot; French participants consider

passionate love as an extreme emotion that can be positive and negative. It is also greatly linked to sexual desire. Brazilian participants tend to associate Passionate Love with a sweeter emotion mainly experienced inside well-established romantic couples.

Our interpretations of the results suggest that gender differences are very distinctive in the Brazilian study but not so much in the French one. Brazilian males indicate that “sex” is central to passionate love whereas female focus on the idea of endearment. French male and female’s representations of passionate love are more similar. Overall, both genders mention the same words and consider that “love” is central to passionate love. Yet, women link passionate love with desire and madness while men favor sex and the idea of sharing.

We noticed that French participants oscillate between negative and positive aspects considering passionate love as an intense emotion with contradictory meanings. The Brazilians were less contradictory; they basically associate it with positive emotions and outcomes. We consider that the Brazilians are more focused on a romantic attachment whereas the French underline emotional states. The Brazilians seem to have assumed that passionate love represents something concrete, real while the French consider it as something more abstract and more mental / psychological in a way. There is this idea of something that is unreal, “a film”.

All these results indicate that the one person’s representation of passionate love is influenced by its gender and culture. The social representation theory and the free association method used to study it have been fruitful at corroborating literature on cultural and gender dimensions of romantic love (see chapter 1).

One significant limitation of this representational study is related to the size of the French sample. It was too small to allow a more detailed interpretation of the results. Only a few words have been taken into account in the analysis. Passionate love is an

abstract term that generates a lot of distinctive associations; therefore we should have doubled the number of participants. The results we obtained with this small sample have been awkward to interpret. The analysis of similarities plots provided by IRAMUTEQ showed it well. The words that could be linked with one another tended to gravitate around a central cluster. Secondary clusters were not formed in a distinctive and clear way and were made with an insufficient number of words. The results we got with the Brazilian sample, for example, were easier to interpret because we he found very distinctive clusters. The factor analysis is probably more representative of female associations since male participants were outnumbered. We do not think that culture played a role in these limitations. One could consider that passionate love is perceived with more “complexity” among French students for example so the results are going to be harder to interpret because they will provide complex plots and outputs. It does not seem to be the case because both French and Brazilian participants wrote very common and banal words in general.

Finally, it is hard to be sure if the Brazilian and the French participants understood the same idea when they read the inductive word. Cyrille Feybesse and Geneviève Coudin were careful in choosing the right French expression to be used in the French study. They thought of several possibilities and made a pre-test with two possibilities (“passion amoureuse” and “amour-passion”) before engaging the French study. Cyrille Feybesse was not so careful when he decided to use the Portuguese term “amor apaixonado”. This term was chosen because it is the expression used by Brazilian and Portuguese scholars when they translate Hatfield’s “passionate love” expression. The problem is that common Brazilians do not use necessarily this term when they want to express that they are passionately in love. It is possible that this expression lead our participants to consider that we were asking them to find words related to the type of

love “*one person feels towards his or her girlfriend or boyfriend*”. If this was the case, it is not surprising that participants would associate the inductive word with a more committed and intimate type of love. It is hard to determine if this was the case and if it had an effect. Cross-cultural studies using this free-association technique should test their inductive words first in order to be sure that the two inductive words have the exact same meanings in their respective cultures. This is especially true when someone is dealing with the topic of love because there are always several ways to express one same romantic feeling. Our results suggest that the French participants understood our French formulation in the same way we defined passionate love in this thesis but we are not sure when we consider the results we got with the Brazilian sample. We tend to believe that this might have biased our data to a certain extent but, as presented earlier, previous studies demonstrated that Brazilian separate passion from love and consider these terms to be at different levels of attachment. Passion is considered to be infatuation; a fleeting feeling while love denotes something that is accomplished when a romantic affair gets more serious. Our results suggest that passionate love is only considered to be “real love” when there exist some commitment and intimacy within a couple.

Study 3: The effect of passionate love on creativity

Abstract

This study was an exploratory attempt to test the effect of passionate love on creativity. Creativity was assessed through divergent and convergent thinking tasks; passionate love was measured with the Passionate Love Scale. The Positive Affect and The Negative Affect Scales were included in order to determine if participants in love were feeling positive or negative emotions. Participants were assigned to one of our two experimental conditions: in one condition, love was evoked in the beginning of the experiment and in the other condition; love was never evoked during the session. The results indicated that passionate love tended to have a negative effect on the creativity tasks. Evoking love had more effect on creativity than the fact of being in love or not at the time of the experiment. Love feelings were more detrimental on the convergent task than on the divergent task. Implications of our results on the effect of passionate love on creativity are discussed.

Résumé en Français

Cette étude a exploré l'effet de l'amour passionnel sur la créativité. Le processus créatif a été mesuré à partir de tâches sur la pensée divergente et convergente. Les données sur l'amour passionnel ont été obtenues à partir de l'Echelle d'Amour Passionnel. Nous avons inclus l'Echelle d'Emotion positive et Négative dans le but de déterminer si les participants amoureux ressentait des émotions plutôt positives ou négatives. Les participants de cette étude ont été placés dans une des de nos deux conditions expérimentales : dans une condition le sentiment amoureux a été évoqué au début de l'expérience tandis que dans l'autre condition l'amour n'était jamais évoqué pendant la séance. Les résultats ont montré que l'amour passionnel a eu une tendance à avoir un effet négatif sur les tâches de créativité. Evoquer l'amour a eu plus d'effet sur la créativité que le fait d'être amoureux ou pas amoureux. Le sentiment amoureux a semblé être plus préjudiciable à la tâche de pensée convergente qu'à la tâche de pensée divergente. Les implications de nos résultats sur les effets de l'amour passionnel sur la créativité sont discutées.

1) Introduction

Creativity is a powerful tool in a large range of domains. It can be fundamental in problem-solving situations, in teaching, business management, or even in findings new ways to conduct scientific research designed to test its effects. In this study, creativity is considered to be a complex cognitive phenomenon that involves divergent thinking and convergent thinking tasks. This cognitive approach explores the mental representation and processes underlying creative thought (Sternberg & Lubart, 1999). Linking passionate love with creativity is an effort to explore the effect of emotion

(both positive and negative) in complex cognitive processes. One can consider that love and creativity are tightly linked because in humans cognitive abilities are complex. Our cognitive complexity allows us to create elaborate machinery or to invent beautiful and meaningful stories that never happened in reality. As we saw in chapter 4, love seems to be a trait present in other species but, as far as we can tell, no other species seem to be able to love in so many different ways and with such complexity. Factors such as intelligence, knowledge, cognitive styles, or motivation will play an important role in determining how creative a person can be (Lubart, Mouchiroud, Tordjman & Zenasni, 2015). Creative productions require one to fully engage his or her cognitive resources. Passionate love extracts a great deal of our cognitive resources as well. Steenbergen, Langeslag, Band, and Hommel (2013) provided empirical evidence that passionate love, when experienced in early romantic relationships, can have a very important effect on emotion and attention. These authors conducted an experiment in which they tested the effect of passionate love on cognitive control. They asked college students to complete the Passionate Love Scale (PLS) and evaluated participants' performance on both the Stroop and Flanker tasks, which are designed to assess variants of a cognitive control paradigm. The results indicated that the PLS correlated with decreased individual efficiency in cognitive control. This study suggested that being passionately in love interferes with the execution of daily tasks, such as study or work, because passionate lovers are plagued by intrusive thoughts about the beloved and their romantic relationships. The authors concluded that the effect of passionate love on cognitive control was not mediated by affective changes. Passionate love should have lesser impact on cognitive processes over time because its effects decrease over time. The authors concluded that although passionate love generally impairs cognitive

performance, it might also facilitate some tasks that are not related to analytic thinking, such as divergent thinking.

Researchers are still debating the relationship between mood, emotions, and creativity. Initially, scholars began by assuming that positive mood or positive emotional states benefit creative thinking or finding problem-solving alternatives. Empirical evidence on this topic, however, produced mixed results. Geir Kaufmann (2003) indicated that while scholars were successful in demonstrating that creativity is affected by emotional states, the relationship between the two remains a complex equation. He pointed out those different studies secured different results: sometimes neutral emotional states facilitated creativity more than did positive ones. Other findings suggested that positive or neutral mood states were more detrimental to creativity than was negative mood (Kaufmann, 2003). Franck Zenasni and Todd Lubart (2002) demonstrated that the effects of emotions on creativity depend on numerous conditions. They conducted an experiment in which mood was induced through recall of life events before participants started to perform creativity-related tasks. Mood was induced by asking participants to recall life event in which they had been either happy, sad or neutral. Creativity was measured with the use of the Torrance Tests Creative Thinking instrument. The results indicated that the mood inductions were effective in shaping both mood and emotional intensity. Emotional intensity was linked to higher ideational fluency. Intensity of negative emotional states benefited creativity while intensity of positive emotional states inhibited it. Negative moods were more useful for facilitating performance on divergent tasks and help participants to regain emotional neutrality. The tasks help participants regain a more balanced mood. Positive mood contributed to the generation of higher number of ideas. This research showed that emotion can contribute to creative production in several ways.

As we observed in chapter 4, few studies have been conducted exploring possible links between love and creativity, using experimental approaches. So far, love has generally been assumed to be positively linked with creativity (Griskevicius, Cialdini & Kenrick, 2006; Förster, Epstude & Özsel, 2009), although one correlational study found mixed results (Campbell & Kaufman, 2015). This research explores the effect of one particular type of love on creativity: passionate love. As we stated in chapter 4, Passionate love is probably the best type of love to be tested for its effects on creative processes because it has a powerful impact on cognition and is a generator of strong emotional states. As it was presented earlier in chapter 1, passionate love can be seen as an intense mix of emotions that will have a direct impact on emotional and cognitive behaviors. Passionate love may be a potent motivational tool for creative production but it might also be perceived as a barrier, which allow one come up with novel or original ideas because it interferes with normal task activities. In this study, creativity was explored in two different ways: with one convergent thinking task and one divergent thinking task, because we hypothesized that passionate love might have different effects on these two types of creative tasks. Divergent thinking consist in finding several ideas or answers from the same starting point (Lubart et al., 2003); convergent thinking is oriented “*toward deriving the single best (or correct) answer*” to a clearly defined problem or question (Cropley, 2006; p. 391). Our participants were asked to complete these two tasks related to creativity in all our experimental conditions. Also, passionate love can lead to the experience of both negative and positive emotions so we thought that it was important to include one measure that could determine which emotional state participants were in at the time of testing. Plus, love might have an effect on creativity only when it is evoked. Passionate lovers might put their romantic feelings aside when they are focused on other cognitive tasks so this study was designed with two

experimental conditions: in one condition love was evoked (experimental condition), in the other condition love was not evoked (control condition).

We considered that this to be an exploratory study on the topic of love and creativity even if we tended to think that passionate love, especially when it is induced, would benefit both divergent and convergent thinking creative productions.

2) Method

The sample of this study is composed of 89 college students of psychology from the Université Paris Descartes. A full 68 participants (76,4%) were female. The mean age was 19,98 (SD = 1,92) years of age. Among the participants, 55,1% (N = 49) participated in the control group and the rest of the sample, 44,9% (N = 40) were assigned to the experimental condition. In this sample, 63,6% (N = 56) declared themselves to be in love and 42,2% (N = 42) of those currently in love were in a relationship with the beloved (requited love). The remaining 15,7% (N = 14) were thinking of someone with whom they were in love but assumed that their feelings were not reciprocated (unrequited love). Among those that said that were not in love (36%; N = 32), the vast majority declared that they had been in love in the past (32,6%; N = 29); only three subjects said they had never been in love.

• Instruments

Induction of Passionate love and the control condition: The participants of this study were randomly assigned to one of two different conditions: the control group, in which love was not evoked, or and the experimental group, in which love was evoked.

In order to induce feelings of passionate love, we used the methodology of Fisher, Aron, Strong, Mashek, Li and Brown (2005). These authors tested several ways to induce feelings of love in experimental conditions and concluded that showing a picture of the

beloved, listening to a song that related to the beloved, or asking the subject to write about the beloved, were the best ways to evoke feelings of intense romantic love. In our study, we did not ask participants to bring a picture of the beloved to the experiment because we thought that this would be too intrusive. Instead, participants were asked to write about an important moment they had shared with their beloved. They were given five minutes to complete this task. Also, they had to bring a song to the experiment that reminded them of their beloved (if they were in love) or of someone they had loved in the past (if they were not in love) or a song that made them feel something related to romantic love (if they had never been in love). After writing about an important moment they had shared with their beloved, they were asked to listen to the song they have brought to the experiment, using their MP3 player device. Luckily, everyone had one. Participants in the control condition were asked to think about an academic achievement they had experienced. They had to write about a memorable moment related to their studies (passing their “baccalauréat” or being admitted to the university, for example). They had to bring a song that made them think about their current or past studies to the experiment.

Creative tasks: We used tasks similar to those that can be found in the EPoC test designed to assess potential creativity in children (Lubart, Besançon & Barbot, 2011). In this study, we selected tests 2 and 4 of EPOC’s test (literary creativity), in which the stories and characters presented were adapted to suit young adults. Subjects received the same instructions in the beginning of the two creative tasks; they were asked to create a story or to think about story endings that were original and different from those other college students might invent. They had 30 minutes to complete both tasks (15 minutes for each task). Creativity was evaluated in two different ways:

Divergent thinking task: participants had to create several story endings after being presented with the same beginning of a story (a college student that stays home alone after the departure of the roommate). We counted the number of story endings provided by participants in order to have a fluency score for this task. More story endings indicated more potential to provide divergent thinking.

Convergent thinking task: participants had to create a story with three characters (two male college students and one female college student meeting at a coffee shop). These stories were then evaluated by three judges who were not aware of our study purposes and did not have any information about the creator of the story (subject's gender or condition for example). They had to evaluate the level of creativity of each story on a 7 point Likert scale. Participant's stories were given in different random orders. The interjudge agreement was satisfactory (Cronbach Alpha = .65).

The Positive and Negative Affect Scale (PANAS): The PANAS is a brief measure designed to measure positive and negative affect (Watson, Clark & Tellegen, 1988). Positive affect (PA) is understood as being positive feelings of enthusiasm and high energy or sensation of pleasure whereas negative affect (NA) is associated with subjective distress and aversive mood states such as anger, nervousness, or fear. The PANAS is a self-report measure in which subjects have to evaluate the extent in which they are feeling 10 positive and 10 negative emotions. The original study of Watson et al. (1988) indicated that the Positive Affect Scale and the Negative Affect Scale are independent measures and that each scale had high internal consistency regardless of whether subjects were evaluating the feelings they were having at the present times or in different time frames during the past (the past few days or past few weeks, for

example). The French version of the PANAS has proven to be as reliable as the original English version (Gaudreau, Sanchez & Blondin, 2006).

Passionate Love Scale (PLS): We used the same French version of the PLS that we administered in the study testing the psychometric properties of the scale in France (see study 1). We made one small change regarding the question in which the subject had to indicate whom he or she is thinking of. When the subject considered being in love, he or she had to indicate if this love was reciprocated or unrequited. We made this change so we could separate subjects that are in love and this love is required from subjects that are experiencing unrequited love. The scientific literature considers that required passionate love is associated with positive emotions while unrequited passionate love is associated with negative emotions (see chapter 1). We checked the internal consistency of the French version of the Passionate Love Scale with this sample and we found a Cronbach alpha of .92 for the complete version of the scale.

- **Procedure**

College students from L1 and L2 of psychology were invited to enroll in this study during their classes. They were told that the study was about problem solving. The experimenter contacted those who agreed to participate by telephone to remind them that they were scheduled to participate in the study and to bring one music device with a song of their choice about their beloved or about their studies. Subjects participated in a session in which everyone else was in the same experimental condition (the control or the experimental condition). Participants were received in small groups which ranged between 2 to 10 people. They were instructed to complete the first part of our questionnaire, in which they were required to answer demographic questions, write

about their beloved or their studies, and listen to the song they had chosen. When every subject had completed this first part of the study, they were asked to perform the divergent and convergent thinking tasks. Finally, participants were asked to complete the PANAS and the PLS. The study took one hour on average to be completed.

3) Results

We separated this sample in two main groups: one in which subjects were in love (students in love that is reciprocated or not) and another group in which subjects are not currently in love (students who were thinking of someone they loved in the past and students that declared they had never have been in love). We had only a few subjects declaring that were experiencing an unrequited love affair (N = 14) or that they had never been in love (N = 3).

Passionate love: Subject in love scored higher on the PLS than subjects who declared not being in love. Subject in love scored 212,92 points (SD = 28,49) and the ones not in love had an average score of 195,71 (SD = 29,15) points. These scores are a little higher than those we have found in our previous studies with the French PLS and this is probably due to the fact that passionate love was induced in almost half of the sample. Also, there were no gender differences between subjects who were in love (unrequited and requited passionate lovers). Evoking love had a small effect on passionate love feelings in the experimental condition. When subjects were in love, they scored higher (214,55; SD = 30,52) when love was evoked than when love was not evoked (211,59; SD = 27,37). Among those who were in love, 47,2% of the sample declared they were in a requited love affair, whereas 15,7% declared they were involved in an unrequited love relationship. The requited love group scored 212,92 (SD = 28,49) points with the PLS and the unrequited love group scored 195,71 (SD = 29,15) points; this difference

was not statistically significant. The same thing happened with the group of subjects that was not in love or who had never been in love, when they were asked to think about an important moment about their romantic love and listened to a song about a former lover, they scored higher on the PLS (194,00; SD = 38,13) than those who were asked to think about their studies (178,71; SD = 36,86). These results are presented in table 1.

Table 1: Mean and standard-deviation values obtained with the PLS in different groups

Love evoked (experimental condition) (N = 39)	204,59 (35,18)	In love (N = 23)	214,55 (30,32)
		Not in love (N = 16)	194,00 (38,13)
Love not evoked (control condition) (N = 49)	196,54 (33,16)	In love (N = 33)	204,34 (28,64)
		Not in love (N = 16)	178,71 (36,86)

A two-way analysis of variance was conducted to explore these results. We attempted to determine if the experimental condition (evoking love or not) and subject's love state (currently in love or not) had an effect on passionate love, as measured with the PLS scores. One two-way ANOVA indicated that there was a significant main effect of the love state on passionate love feelings [$F(1, 80) = 9,61, p = .003$], the effect size was moderate in this case (eta square = .11). The experimental condition (evoking love or not) did not reach statistical significance although PLS scores were higher in all the groups when love was evoked [$F(1, 80) = 2,92, p = .091$], the effect size was small with this dependent variable.

Positive and negative affect: the college students of our sample scored higher on the Positive Affect Scale (M = 30,16, SD = 5,88) than on the Negative Affect Scale (M = 16,02, SD = 5,77). On this last scale, male participants scored 14,74 (SD = 3,56) points

whereas female participants scored 16,40 (SD = 6,27) points. We secured significant gender differences on the positive affect measure but not on the negative affect measure. Male participants scored 34,00 (SD = 5,29) points on the positive affect scale and female participants scored 28,88 (SD = 5,51) points. This difference was statistically significant ($t(84) = 3,67, p = .001$). Also, subjects in love did not differ from those who were not in love on the two dimensions of the PANAS scale. Subjects in love scored higher on the positive affect dimension (M = 30,58; SD = 5,24 against M = 29,19; SD = 6,84). They had lower scores than those who were not in love on the negative affect dimension (M = 15,37; SD = 4,87 against M = 17,30; SD = 7,16).

We had similar results when comparing the group of participants who were in the experimental condition with the group of participants who were in the control condition. Subjects who were asked to think about love scored slightly higher on the Positive Affect Scale than those who were asked to think about their studies (M = 30,53; SD = 6,29 against M = 29,72; SD = 5,41). They secured lower scores on the Negative Affect Scale (M = 15,81; SD = 5,80 against M = 16,27; SD = 5,80). In both cases, the differences were not significant.

Divergent thinking task: students were able to create an average of 7,26 (SD = 3,53) story endings. The scores of this divergent thinking task varied between 2 and 21 endings. Students who were in love were not able to create more endings than were students who were not in love. They created an average of 7,23(SD = 3,75) against 7,43 (SD = 3,12) story endings. Requited passionate lovers found an average of 7,21 (SD = 3,22) story endings whereas the unrequited passionate lovers found 7,29 (SD = 5,18) story endings. If we take into consideration the two experimental conditions, students in the condition in which love was evoked scored lower than the group of students in

which an important academic achievement was evoked. Students in the love condition came up with an average of 6,45 (SD = 2,62) story endings against 7,92 (4,03) story endings in the control group. A t-test indicated that this difference was statistically significant ($t(87) = 1,99, p = .04$). If we only consider the group of subjects who declared themselves to be in love, those in the condition in which love was evoked came up with slightly fewer endings than did those who were asked to think about their studies: the ones in the love condition provided an average of 6,56 (SD = 2,66) story endings against 7,70 (SD = 4,33) in the study group. The scores of the divergent thinking task can be observed in table 2.

Table 2: Means and standard-deviations values obtained with the divergent thinking task in different groups

Love evoked (experimental condition) (N = 39)	6,45 (2,62)	In love (N = 23)	6,56 (2,66)
		Not in love (N = 16)	6,50 (2,58)
Love not evoked (control condition) (N = 49)	7,92 (4,03)	In love (N = 33)	7,70 (4,33)
		Not in love (N = 16)	8,37 (3,40)

A two-way ANOVA explored the impact of experimental condition and love state on divergent thinking performance. In this case, the experimental condition had more effect on divergent thinking performance than on the initial love state [$F(1, 84) = 3,71, p = .058$]. Nevertheless, this effect was not statistically significant. The effect size can be considered to be small. The love state had a very small effect on the divergent thinking scores. The effect was far from being significant [$F(1, 84) = 0,15 p = .70$].

Convergent thinking task: Potentially, creativity scores on the convergent thinking task could vary between 3 and 21 points. The external judges assigned an average of 11,58 (SD = 3,56) points for the student's stories. As presented in table 3, subjects in love secured an average score of 11,69 (SD = 3,71) points against an average of 11,44

(SD = 3,39) points for those who were not in love. On the other hand, students who were invited to think about their academic achievements scored significantly higher on the convergent thinking task (M = 12,90, SD = 3,74) than did the students who were invited to think about romantic love (M = 9,95, SD = 2,98; $t(87) = 4,26$, $p = .001$). The t-test indicated a significant difference among these two groups. Also, we found a significant difference with the group of subjects who declared themselves to be in love at the time of the experiment. Subjects who were asked to think about their beloved were judged to write less creative stories than were those who were asked to think about their studies. When love was evoked, this group secured an average score of 9,39 (SD = 2,81) points against 13,29 (SD = 3,43) points for the control group. This difference was found to be significant ($t(54) = 4,49$, $p = .001$).

A two-way ANOVA explored the impact of experimental condition and initial love state on convergent thinking performance. The results indicated an interaction between the experimental condition (evoking love or not) and the love state on the convergent thinking task. Students in love had a slightly better performance when they were in the condition in which love was evoked than when they were in the condition in which love was not evoked.

Table 3: Mean and standard-deviation values obtained with the convergent thinking task in different groups

Love evoked (experimental condition) (N = 39)	9,95 (2,98)	In love (N = 23)	9,39 (2,81)
		Not in love (N = 16)	10,75 (3,21)
Love not evoked (control condition) (N = 49)	12,91 (3,47)	In love (N = 33)	12,12 (3,43)
		Not in love (N = 16)	13,29 (3,52)

The opposite happened with the students who were not in love at the time of the experiment. In their case, they scored slightly higher on the convergent thinking task when love was not evoked. We found a statistical main effect for the experimental condition [$F(1, 84) = 13,17, p < .001$] on the convergent thinking scores; the effect size was moderate (eta square = .14). The fact of being in love or not did not have an effect on the convergent thinking performances [$F(1, 84) = 0,89, p = .893$]. The effect size in this case was almost inexistent.

Correlations among the scales: We performed several types of correlational analyses with the different measures in this study. We calculated correlations taking into account the whole sample, with the condition in which love was evoked (the experimental condition), and, finally with the condition in which love was not evoked (the control condition). In all cases, the PLS did not correlate with any other scales except with the negative affect of the PANAS in the condition in which love was not evoked. This negative correlation seems logical because most of the subjects that were in love were in a relationship with the beloved, so one would expect that they would associate this feeling with positive emotions. The correlation between passionate love and the creative tasks were near zero so no relationship between love and creativity was found.

As it is indicated in table 4 and in table 6, it is interesting to note that there was a positive correlation between the divergent thinking task and the convergent thinking task. The more creative the subject was at the divergent thinking task, the more creative he or she was on the convergent thinking task. This correlation did not occur in the condition in which love was evoked. It is also interesting to notice that the convergent thinking task had a positive correlation with the Positive Affect Scale of the PANAS. It is important to point out that these correlations were more meaningful when we

excluded the group of subjects that were in love but were unrequited and the group of subjects of subjects that have declared that they have never been in love. There were no significant correlations between our different measures when we only took the unrequited love group into account but the results indicated a negative relationship between passionate love and the divergent and the convergent thinking tasks. The Negative Affect Scale of the PANAS tended to have a positive relationship with the PLS in this case. Having more subjects in this case might have indicated significant correlations among these measures.

Table 4: Correlation among the different measures with all the sample (N = between 85 and 89)

	Passionate Love Scale	Divergent Thinking task	Convergent Thinking task	Positive Affect (PANAS)	Negative Affect (PANAS)
Passionate Love Scale	1	-.05	-.04	.04	-.01
Divergent Thinking Task		1	.34**	.09	-.14
Convergent Thinking Task			1	.22*	-.19
Positive Affect (PANAS)				1	.08
Negative Affect (PANAS)					1

** Correlation is significant at the .01 level

Table 5: Correlation among the different measures with subjects in the condition in which love was evoked (N = between 39 and 40)

	Passionate Love Scale	Divergent Thinking task	Convergent Thinking task	Positive Affect (PANAS)	Negative Affect (PANAS)
Passionate Love Scale	1	-.01	-.14	.06	.30
Divergent Thinking Task		1	.16	-.01	-.09
Convergent Thinking Task			1	.22	-.19
Positive Affect (PANAS)				1	-.03
Negative Affect (PANAS)					1

Table 6: Correlation among the different measures with subjects in the condition in which love was not evoked (N = 46 and 49)

	Passionate Love Scale	Divergent Thinking task	Convergent Thinking task	Positive Affect (PANAS)	Negative Affect (PANAS)
Passionate Love Scale	1	-.03	.12	.03	-.33*
Divergent Thinking Task		1	.35*	.11	-.16
Convergent Thinking Task			1	.20	-.19
Positive Affect (PANAS)				1	.19
Negative Affect (PANAS)					1

** Correlation is significant at the .01 level

* Correlation is significant at the .05 level

4) Discussion

The main goal of this research was to explore the effect of passionate love on creativity. Creativity was measured with one divergent thinking task and one convergent thinking task. Passionate love tended to have a negative effect on creativity. Although we did not find a relationship between passionate love and creativity in our correlational analysis, evoking love before asking subjects to undertake the creativity tasks had a negative effect on the creative performance whether subjects were in love or not. Subjects in love in the condition in which love was evoked had the worst performances on the convergent thinking and divergent thinking tasks. These results suggest that evoking love has more effect on creative production than does the fact of being in love. Making subjects think about their romantic relationships or about a past romantic affair might have led subjects in the experimental condition to maintain thoughts of their beloved in their mind while they were doing the creative tasks. This might have limited the cognitive resources available to them in attempting to provide several story endings or crafting a creative story. Passionate love involves a craving for emotional union and facilitates obsessional thoughts about the beloved or the romantic relationship, so asking people to think about their romantic stories might have created an obstacle in performing other cognitive tasks because they have ruminations about their love life stuck in their minds. Our results are consistent, in part, with the conclusions of Steenbergen et al. (2013). These authors concluded that passionate love is associated with reduced cognitive control in multiple ways. In general, research tended to conclude that passionate love reduces analytic thinking, obfuscating convergent thinking, but facilitating divergent thinking (Foster et al. 2009; Steenbergen et al. 2013). The results of our own study suggest that both convergent thinking and divergent thinking are impaired by passionate love.

In Campbell and Kaufman's (2015) study, artistic creativity was negatively associated with Sternberg's love components (Passion, Intimacy and Commitment/Decision) but everyday creativity was positively associated with these same love components. In the case of our study, passionate love tended to have a negative effect on "potential creativity" but no direct relationship between love and creativity was found. Campbell and Kaufman (2015) did find significant negative and positive correlations between love and creativity but generally these correlations tended to be small. In Campbell and Kaufman's (2015) study, data on creativity was collected through self-report answers. People in love, living in healthy relationships, tend to have higher levels of self-esteem (Hatfield, 1970) so they are more prone to consider themselves more creative as well. Nevertheless, Campbell and Kaufman's (2015) findings on the relationships between the various love components and everyday creativity make sense. One would expect that people in love might exercise their "creative skills" in order to keep the flame of passion alive or further intimacy and commitment in their romantic relationships. Creative acts probably attract the attention of a romantic partner facilitating the development of romantic relationships (Miller (2000) in Steenbergen et al. 2013).

If we take into account the results observed with our analysis of variance, evoking love had more effect on the convergent task than on the divergent task. We can be more conclusive about our findings on the convergent thinking task than on the divergent thinking task, but a bigger sample would probably provide clearer results for both variables.

Evoking love had an effect on passionate love feelings whether subjects were in love or not. All subjects had higher scores with the PLS when they were in the experimental condition of this study. Even if this effect did not reach significance, it is interesting to note that passionate love feelings can be manipulated in experimental conditions.

Asking participants to talk or write about their beloved (Fisher, 2004), or listening to a song that reminded them of the beloved sparked feelings of romantic love. It has been demonstrated that music and song lyrics can have an effect in people's behavior. Guéguen, Jacob & Lamy (2010) conducted an experiment in which female participants were exposed to a romantic and a neutral song before being "asked out" by a male confederate. Women in the experimental condition gave out their phone numbers more often than did those in the control condition. According to these authors, romantic songs activate positive affect making a person being more prone to accept courtship requests. One stimulus that could increase even more feelings of passionate love would be asking subjects to bring a picture of the current or past romantic partner to the experimental session (Fisher et al. 2005). This stimulus has proven to be a very reliable way to induce romantic love in fMRI research. If we had asked subjects to bring a picture of their beloved, they might have experienced even more intense feelings of romantic love, perhaps producing more conclusive results because they would experience even more feelings of passionate love.

Finally, Steenbergen et al. (2013) concluded that passionate love is associated with reduced cognitive control in multiple ways. These authors speculated that passionate love could enhance divergent thinking since passionate love could benefit impulsive thinking. Our results suggested the opposite effect, even if those results are not conclusive.

5) Conclusion

The results of our study combined with what was found with previous studies secured thus far about the effect of love on creativity seem to indicate that the relationship between love and creativity might be a multidimensional relationship. Love might have

the same effect on creativity than emotions do. As we have seen earlier, emotions can have opposite effect on creativity (Zenasni & Lubart, 2002). Kaufmann (2003) observed: *“the extant evidence on the effect of mood on creative thinking forms a crooked and not a straight line and is full of perplexities and seeming paradoxes”* (p. 132). He pointed out that creativity is a multifaceted construct, which is mood sensitive. Different types of mood will relate differently to different components of creativity. The same thing probably happens between love and creativity. Unrequited passionate love might relate differently to creativity than does requited love affairs. Subjects in the early stages of a romantic relationship might be more “inspired” to perform creative acts than are well-established romantic couples and so on.

Plus, equating the relationship between passionate love and creativity might involve more than simply checking the effect of emotional states (both negative and positive ones) on creative productions. Passionate love provokes specific cognitive schemas, such as focusing our attention on our love object or having intrusive thoughts about the beloved and the relationship. This surpasses the idea of simply inducing emotional states because it enables a specific pattern of brain functioning that will lead someone to be more focused on love than with any other tasks.

Thus, various types of romantic love might produce different outcomes on creativity. Companionate love, for example, should enhance positive feelings without stealing cognitive resources that would prejudice performances on convergent or divergent tasks.

Thus, subjects in our experimental condition may have been more creative if they were oriented to use their romantic feelings as basis for finding solutions in problem-solving situations related to romantic relationships. Even if this study leads to the conclusion that passionate love has a negative effect on creativity, further research should be

conducted — especially about the effect of passionate love on the divergent thinking task. Our results indicated that future research on this topic should separate “requited” passionate lovers from the “unrequited” ones because they somehow behave differently on the different creative tasks. The fact of finding a negative effect on creativity in this research and on Campbell and Kaufman’s research (there, artistic creativity had a negative correlation with love) can be considered to be somewhat strange. Love seem to be an important topic of artistic productions; it is a main topic in songs, movies or novels, so it is natural to assume that love is a powerful source of inspiration for artists. Maybe professional artists are more skilled in using their romantic feelings as a tool for creative productions than regular people are. We might find opposite results if we remake this same study on students of arts and the like. They might be more aware on how one can canalize their romantic feelings when he or she is performing artistically. It hard to be conclusive about the effect of love on creativity on the basis of this or previous research on the topic so far, but we can at least suggest that love and creativity probably have a complex and multisided relationship. This mirrors the complex relationship previous scholars have postulated regarding the effect of emotions on creativity. One thing is sure; more research needs to be done in this topic so scholars can start to truly understand the relationship between these powerful phenomena.

Study 4: Sensory experience in interpersonal physical attraction: Cross-cultural comparisons*

Résumé en Français

Cette étude apporte un regard plus approfondi sur la relation que l'amour passionnel possède avec l'attraction physique et certaines expériences sensorielles liées à l'amour romantique. Des participants Français, portugais, Géorgiens et Russes ont remplis un questionnaire qui a inclus l'Echelle d'Attraction Physique, l'Echelle d'Expérience Sensorielle et l'Echelle d'Amour Passionnel. Les résultats ont montré que l'Echelle d'Amour Passionnel a corrélé positivement avec l'Echelle d'Attraction Physique et la majorité des caractéristiques proposées par l'Echelle d'Expérience Sensorielle. L'analyse interculturelle a indiqué plus de différences de genre que culturelle en ce qui concerne les différentes préférences vis-à-vis l'expérience sensorielle.

Mot-clés : Attraction physique, amour romantique, perception interpersonnelle, expérience sensorielle, culture

Abstract

This study provided a further look in the relationship that passionate love has with physical attraction and some sensory experience features related to romantic love. French, Portuguese, Georgian, and Russian participants were asked to complete a questionnaire in which the Physical Attraction Scale, the Sensory Experience Scale, and the Passionate Love Scale were included. The result showed that scores on the Passionate Love Scale correlated positively with scores on the physical Attraction Scale and with most of the items of the Sensory Experience Scale. Cross-cultural analysis indicated that gender was somewhat more powerful than culture in predicting differences on these three scales.

Key words: physical attraction, romantic love, interpersonal perception, sensory experience, culture

* This part of the thesis was written with the collaboration of Victor Karandashev, Aquinas College, USA, Elena Zarubko, Tyumen State University, Russia, Veronika Artemeva, Saint-Petersburg State University of Architecture & Civil Engineering, Russia, Félix Neto, Universidade do Porto, Portugal, Lali Surmanidze, Tbilisi State University, Georgia.

1) Introduction

Attraction can be defined as a positive attitude evinced by the desire to approach and be closer to another person. Physical attraction is based on the potential partner's physical characteristics. Physical attraction plays a key role in a passionate love. What is the

subjective experience of attraction? And does it differ cross-culturally? In the case of this presentation, due to the complexity of the original study, involving so many nations, we will focus primarily on the results we secured with the French sample. The French data was collected by the author of this thesis during the academic year of 2014-2015.

The purpose of the study was to explore the role of visual, auditory, tactile-kinesthetic, and olfactory factors which determining physical attraction to another person in romantic relationships. The visual factor of attraction is based on the physical characteristics of a partner that are visually appealing. These include, but are not limited to the partner's body type, shape, face, how appealing the eyes are, and the shape of the partner's lips. The auditory factor of attraction, then, is the attraction to a partner experienced most prominently through the sense of audition. The contributing characteristics would be the tone of the partner's voice, the pitch in which they speak, the sound of their laugh, and the voice in which they sing. The tactile-kinesthetic factor of attraction would include the way in which a person feels their partner's body moves, the way their hands feel and touch, or the pleasure of performing physical activities with the partner. The olfactory factor of attraction would consist of the smell of the partner's breath, the taste of their lips, the smell of their perfume or cologne, and the scent of their skin.

Visual senses yield research data about various aspects of the body which people find attractive as humans. Many studies have revealed the value of facial symmetry, a low hip-to-waist ratio (for women), long hair, clear skin, and muscular builds for both sexes (Miller & Perlman, 2009). Other investigations document that the visual sense is the most important to males when assessing physical attractiveness. Males place a greater emphasis (than do women) on the physical characteristics of prospective female

partners, traits such as body shape, weight, and hair length (Nevid, 1984). Hönekopp, Rudolph, Beier, Liebert, and Müller (2007), found that physical fitness also determined perceptions of physical attractiveness for men and woman. Patzer (1985) explains that people are predisposed to be attracted to people with facial symmetry and certain body types even before an initial meeting takes place. Body and facial symmetry are considered to be universal standards of beauty (Gouillou, 2014).

As for the role of olfaction in physical attraction, the studies demonstrated the effect of biological factors that influence our olfaction, thus affecting our attraction toward others. Furlow (1996) showed that women use olfaction to choose mates whose genes, combined with theirs, will provide more variety in their offspring. Another study (Pierce, Cohen, & Ulrich, 2004) used two kinds of chemicals on two separate subject groups, one being pleasant and one being noxious. Results showed that people generally judge others to be more attractive when they get in the presence of a pleasant scent than when in the presence of a noxious one. The study of Thornhill and Gangestad (1999) found that facial attractiveness correlates with body scent attractiveness to the opposite sex for both men and women.

We further reviewed the role of gustation, audition, and tactile senses in physical attraction. In the study, conducted by Saegert, Swap, and Zajonc (1973), subjects were given a pleasant or noxious taste just before having an encounter with a person of the opposite sex. Results showed that there was a positive correlation between attraction and pleasant taste. Furthermore, a study done by Gallup and Frederick (2010) showed the relationship between having an attractive voice and number of sexual encounters. Another study performed by Roberts, Kravovich, Ferdenzi, Saxton, and Jones (2011) demonstrated the correlation between nonverbal kinesic cues and mate quality.

The purpose of our study was to investigate the role of various senses in physical attraction to a potential or current romantic partner in a variety of cultural contexts. We performed cross-cultural comparisons based on the assumption that some sensory factors of attraction may be universal, while others are culturally specific. We expected that the role of the various senses may differ among cultures because of their cultural traditions.

2) Methods

Participants: The participants were from four regions: Portugal (N = 89), Georgia (N = 181), Russia (N = 169) and France (N = 214). Participants completed the survey either online or in paper-pencil format. Regarding the French sample, all questionnaires were filled using the paper-pencil format during classes or in University libraries. Several participants tended to leave some questions blank; participants that did not indicate their gender or left more than one question incomplete were excluded in this study. Thus, our sample is comprised of 95 males (44,40 %) and 108 females (50,50 %), a full 78,5 % of the total sample were enrolled in college. The mean age was 22,70 years (SD = 4,54). Participants were required to answer to several questions regarding their romantic life. They were asked to think of a person whom they love “right now” or of the last person they loved (if they were not experiencing romantic love) when ~~they were~~ answering the questionnaire. Several subjects (24,3%) did not indicate what were their love feelings. Among those who did provide this information, 52,8% considered themselves to be “in love” right now, 36,2% were thinking in someone they loved in the past, and 11% declared that they had never been in love. Subjects were also asked to indicate in which stage of the romantic relationships they are or had been; the possible responses could range from “no relationship yet” (indicating that he or she had not yet committed themselves to something concrete with the beloved) to “sexual relationship with faded

passion” (indicating somewhat that he or she was in a long-term relationship, less passionate now than it had been in the beginning). The majority of the sample (44,9%) situated themselves as having or have reached a “passionate sexual relationships” with the beloved followed by “growing passionate feelings” (12,10%), or “no relationship yet” (12,10%). More than half of the sample (67,80%) declared themselves to be or have been in a relationship between six months and three years in length.

Regarding the French sample, we were able to collect data of 214 participants in which 50,5% were female. The mean age of this group was 22,70 (SD = 4,54) years old. Participants could indicate how long the past or current romantic relationship lasted or is going on. The median of the length of the relationship found was romantic relationships that lasted or has been going on for 6 months to one year. Almost half of our French sample (44%) has always lived in the Parisian region and 17,8% have lived abroad in the past.

Instruments: A quantitative survey design was utilized in this research. The questionnaire contained three different scales: the Physical Attraction Scale, the Sensory Experience Scale and the Passionate Love Scale. Data collected on Portugal used the Satisfaction with Love Life Scale (the same scale we used in the psychometric study of the PLS in Brazil). The French version of this questionnaire was translated into French by two different researchers, who speak fluent English and French. Then the two versions of the scale were sent to Todd Lubart, who is also fluent in both English and French, and he statistically analyzed the two French versions, in order to come up with a final version of the items. The final version of this French version is annexed in this thesis.

The Physical Attraction Scale (PAS): this is an eight item scale designed to assess the subjective level of physical attraction one person feels toward the beloved. The items focused on physical (kissing, hugging or cuddling, for example) and emotional characteristics of attraction. CFA with the translated French version indicated a two-factor solution with one cluster composed of items 12, 14, 16 and 17 and a second cluster composed of items 11, 10, 13 and 15. This result indicated that there is one dimension related to activities one desires to do with the beloved (hug, be with, cuddle the beloved, and experience strong emotions) and a second dimension related to feelings related to the beloved (desire to kiss, admire, and get excited by the physical appearance of the beloved). The internal consistency was also adequate; Cronbach alpha was .86.

Sensory Experience Scale (SES): This questionnaire presented 53 questions pertaining to the role that various visual, auditory, tactile-kinesthetic, and olfactory factors play in romantic attraction to a partner. These questions concerned expressive behavior, smile, a partner's dancing and singing abilities, his/her voice, facial structure, hair, body, way of dressing, eyes, skin, smell of a partner, and lips. These questions asked about how important each of these factors were in sparking one's physical attraction to a potential partner. The variables of interest were related to visual, auditory, tactile, and olfactory impressions from a partner, as well as specific sensory characteristics within these modalities, e.g. body, sound of voice, touch, and so on. The question was "Which impressions of the physical appearance of your romantic partner are important to you, and which impressions are less important? Your task is to rate how important each listed impression is for your physical attraction to your romantic partner from not important (1) to most important (5)."

Examples of items for rating are:

- This person has animated facial expression;

- This person speaks emotionally;
- This person has gratifying laughter;
- This person's breath smells good;
- The dancing with this person is comfortable;
- This person's shape of nose;
- This person's hairstyle;
- This person's tone of voice;
- How this person sings;
- This person's body is in shape;
- This person's lips look nice.

The main results secured by Viktor Karandashev are presented in the results section. We, however, were only interested in a portion to this data. We wished to compare the French sample data with that of participants from Georgia, Russia, and Portugal. The Sensory experience scale was previously tested with a sample of American, Russian and Caribbean subjects (Zarubko, Karandashev, Jameson-Charles & Hutcheson, in preparation). Their principal component analysis (with varimax rotation) and scale analysis allowed them to identify 13 major dimensions with good and excellent reliability ($0.7 \leq \alpha < 0.9$). These 13 dimensions in combination explained 68 % variance. The factors brought together various sensory experiences: expressive behavior, dancing, singing, facial structure, body characteristics, hair and eyes features, voice, expressive manner of speaking, skin, dressing, lips are among those. Analysis of variance revealed cultural similarities and differences across the dimensions of sensory factors.

The Passionate Love Scale (PLS): Finally, the French participants were asked to complete the French PLS. In this case, we used the abbreviated and most commonly

used version of the scale (with 15 items) instead of the complete version of the scale. Information about this scale can be found in chapter 2 and in study 1 of this thesis.

3) Results

Let's consider some results of the results we found with our French sample before starting to compare them with the samples from the other cultures. For the most part, these data were collected at the faculty of psychology of the "Université Paris Descartes" and in other Parisian faculties to secure an even number of male and female participants.

Correlation among the different measures with the French sample

Regarding the French PLS, the results found with this sample were consistent with those we have secured in our validation and adaptation of the PLS in France (see study 1). Once again, the PLS was found to be highly reliable (Cronbach alpha = .92); again, there are no gender differences among those who were in love. This group of participants tended to evaluate their feelings of passionate love at around 7 on the Likert scale and to score significantly higher than did those who were thinking of someone they had loved in the past. All these results corroborated, once again, those found in our previous research (study 1). The Passionate Love Scale correlated positively with scores on the Physical Attraction Scale. If we take our entire French sample into account, the PLS and the PAS had a Pearson product moment correlation of .47 ($p = .01$). The correlation between these two scales with the female sample was a little higher than with the male sample (.47 against .49, $sig. = .01$). We tested the statistical significance of the difference between these correlation coefficients. The Z_{obs} value calculated for male and females indicated that there was not a statistically significant difference in the strength of the correlation between physical attraction and passionate love.

As it can be seen in table 1, passionate love correlated positively with almost all the sensory experience features suggested by the Sensory Experience Scale. It is interesting to notice that smell, skin and voice features did not correlate with the PLS, however.

Table 1: Correlations between the Passionate Love Scale and the sensory experience features taken into account by the Sensory Experience Scale found in France

	Expressive face and Speaking	Smile and Laughter	Smell	Dancing	Facial structure	Hair	Eyes	Voice	Skin	Body	Dress	Singing	Lips
PLS	.19**	.18*	.12	.20*	.17*	.23**	.24**	.15*	.13	.19**	.19**	.09	.22**
N	199	197	193	201	189	195	199	194	197	190	198	198	200

** Correlation is significant at the .01 level

* Correlation is significant at the .05 level

Cross-cultural analyses with the Sensory Experience Scale and the Sexual Attraction Scale

The Sensory Experience Scale was submitted to a principal component analysis (with Varimax rotation) and scale analysis, which allowed us to identify 13 major dimensions with good and excellent reliability ($0.7 \leq \alpha < 0.9$). The factors brought together various sensory experiences: expressive behavior, dancing, singing, facial structure, body characteristics, hair and eyes features, voice, expressive manner of speaking, skin, dressing, and lips are among those.

Then, we ran a MANOVA to see the main effects of country and if “you love someone right now”, as well as an interaction effect for those variables, on 13 sensory preferences dependent variables. We ran these analyses separately for men and women since we did not want to average possible gender differences. For men, there was a significant main effect of country, $F(39,1241) = 3.765$, $p = .000$; Wilks' $\Delta = .718$ and no main effect of “if you love right now”/“loved once”/“an expected romantic partner”,

$F(26,838) = 1.060, p = .382$; Wilks' $\Delta = .937$. There was no statistically significant interaction effect between variables of country and if "you love right now", $F(78,3216) = .866, p = .792$; Wilks' $\Delta = .853$. For women, there was a significant main effect of both country, $F(39,1904) = 7.136, p = .000$; Wilks' $\Delta = .668$ and "if you love right now"/"loved once"/"an expected romantic partner", $F(26,1286) = 2.559, p = .000$; Wilks' $\Delta = .904$. There was no statistically significant interaction effect between variables of country and if "you love right now", $F(78,3551) = .986, p = .513$; Wilks' $\Delta = .889$. These findings mean that culture (country) has a significant effect on sensory preferences in romantic attraction in both men and women, while the variable "if you love right now"/"loved once"/"an expected romantic partner" has a significant effect only in women (they have higher sensory preferences when they are in love now), but not in men. Since no significant interaction effect between variables of country and "if you love right now"/"loved once"/"an expected romantic partner" was found, therefore we ran the further analysis using one-way ANOVA of 13 sensory factors in romantic attraction depending on countries and aggregated the data for those participants who love someone right now, loved someone before, and rated their preferences for a prospective romantic partner. The results are presented separately for men and women in tables 1 and 2 and reveal cultural similarities and differences across the dimensions of sensory factors. Women tended to have more cross-cultural variations in their sensory preferences than men.

The Tukey HSD post hoc tests were used for multiple comparisons among four countries. Tables 1 and 2 presents more details on the significant cultural differences based on Post Hoc results.

In the cases of no significant differences among all four countries, we omit the subscripts; the results look like this:

2.71	2.99	2.76	2.81
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In the case of statistically significant differences among all four countries, the results look like this:

3.99	3.37	3.12	3.65
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In the case when the second and third columns are not statistically different, they have subscripts *bc* and *bc* in both columns. But if they are statistically different from the first and fourth columns, then, they do not have the subscripts *a* and *d*. The scores in the first and fourth columns are statistically different from all others; therefore they do not have any other subscripts. The results in the table look like this:

3.96	3.23	3.15	3.54
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Generally, cultures with different subscripts in their columns differ significantly from one another; those cultures, which have the same subscripts, do not differ statistically from each other.

First, we analyzed the tables 1 and 2 vertically comparing the importance which participants place on different sensory experiences. In all cultural samples, men place high value in their romantic partners on expressive face and speaking, smile and laughter, voice, smell, skin, body characteristics, and lips, and they place less value on facial structure, hair, dress, dancing, and singing. Women in all cultures place high value for their romantic partners on many similar sensory characteristics as men do. They value expressive face and speaking, smile and laughter, voice, smell, body

characteristics, and lips, and place less value on facial structure, skin, hair, dress, dancing, and singing. Gender differences across cultures were analyzed with *t*-tests. Females value higher than males the smell of a romantic partner (females – 3.83, males – 3.62, $t = 3.98$, $p = .00$). On another hand, males value higher than females the following characteristics of their romantic partner: facial structure (females – 2.37, males – 2.88, $t = 9.68$, $p = .00$), hair (females – 2.35, males – 2.84, $t = 9.42$, $p = .00$), eyes (females – 2.91, males – 3.13, $t = 3.82$, $p = .00$), skin (females – 2.80, males – 3.24, $t = 7.36$, $p = .00$), body (females – 2.41, males – 2.79, $t = 5.20$, $p = .00$), dress (females – 3.39, males – 3.67, $t = 6.95$, $p = .00$), singing (females – 1.81, males – 2.17, $t = 5.58$, $p = .00$), lips (females – 3.20, males – 3.49, $t = 5.23$, $p = .00$). Thus, across four cultures, males hold higher expectations for their romantic female partner’s sensory characteristics, than females for their male partner’s.

The role of 13 sensory factors in romantic physical attraction was analyzed using linear regression. For males, the regression of these factors on physical attraction towards a partner was significant ($R = .50$, $p = .00$) with major positive contribution ($p < .05$) of dimensions of expressive face and speaking ($\beta = .265$), smile ($\beta = .138$), lips ($\beta = .210$), and negative contribution of voice ($\beta = -.132$) and dress ($\beta = -.125$). The former means that those men, who value in their partner the expressivity of face and speaking, the smile and lips, feel more attracted to their partner. The latter means that men placing

Table 2: Male results of ANOVA on sensory preferences in interpersonal physical attraction for four cultures

Dimensions	Overall (ANOVA)		Mean Scores			
	<i>F</i>	<i>P</i>	Portugal (<i>n</i> = 89)	Georgia (<i>n</i> = 181)	Russia (<i>n</i> = 169)	France (<i>n</i> = 94)
Expressive face and Speaking	19.96	.00	3.96	3.23	3.15	
			A	bc	bc	3.54

						D
Smile and Laughter	18.56	.00	3.99 A	3.37 b	3.12 c	3.65 d
Smell	3.18	.02	3.76 Abc	3.71 abc	3.59 abcd	3.38 d
Dancing	3.05	.02	2.69 abcd	2.93 abc	2.71 abcd	2.58 d
Facial structure	3.94	.00	2.95 abcd	3.02 abd	2.67 acd	2.95 abcd
Hair	2.21	.08	2.71 abcd	2.99 abcd	2.76 abcd	2.81 abcd
Eyes	3.79	.01	3.12 abcd	3.27 abd	2.92 acd	3.23 abcd
Voice	8.25	.00	3.32 Abd	3.08 abd	2.75 c	3.20 abd
Skin	2.67	.04	3.33 Abd	3.19 abd	3.11 abc	3.46 abd
Body characteristics	0.63	.59	3.62 abcd	3.70 abcd	3.63 abcd	3.77 abcd
Dress	8.34	.00	2.72 Abc	3.00 ab	2.55 ac	3.05 bd
Singing	1.38	.25	1.97 abcd	2.23 abcd	2.15 abcd	2.32 abcd
Lips	4.18	.00	3.67 Abd	3.48 abd	3.31 c	3.67 ad

Note: Cultures with different subscripts in a column differ significantly from one another, $p < .05$, 1-tailed.

Table 3: Female results of ANOVA on sensory preferences in interpersonal physical attraction for four cultures

Dimensions	Overall (ANOVA)		Mean Scores			
	<i>F</i>	<i>p</i>	Portugal (<i>n</i> = 159)	Georgia (<i>n</i> = 255)	Russia (<i>n</i> = 264)	France (<i>n</i> = 108)
Expressive face and Speaking	40.33	.00	3.87 A	3.18 bc	3.05 bc	3.58 d
Smile and Laughter	19.04	.00	3.85 Ad	3.40 bd	3.16 c	3.59 abd
Smell	2.92	.03	3.76 abcd	3.78 abcd	3.97 abcd	3.73 abcd
Dancing	1.67	.17	2.65 abcd	2.84 abcd	2.85 abcd	2.84 abcd
Facial structure	2.41	.06	2.35 abcd	2.40 abcd	2.27 abc	2.54 abd
Hair	0.80	.49	2.40 Abcd	2.32 abcd	2.32 abcd	2.45 abcd
Eyes	11.14	.00	3.03 Abd	3.04 abd	2.63 c	3.12 abd
Voice	13.08	.00	3.17 Abd	3.19 abd	2.74 c	3.29 abd
Skin	7.54	.00	2.95 Abd	2.94 abd	2.56 c	2.87 abd
Body characteristics	9.06	.00	3.08 A	3.52 bcd	3.49 bcd	3.41 bcd

Dress	3.72	.01	2.43 Abcd	2.47 abcd	2.29 abc	2.60 abd
Singing	7.05	.00	1.62 Acd	2.08 bd	1.74 acd	1.80 abcd
Lips	13.69	.00	3.60 Ad	2.98 bc	3.11 bcd	3.32 acd

Note: Cultures with different subscripts in a column differ significantly from one another, $p < .05$, 1-tailed.

less value on the characteristics of voice and the way their partner dresses have stronger physical attraction to the partner.

For females, the regression of those 13 factors on physical attraction towards a partner was also significant ($R = .40$, $p = .00$) with major positive contribution ($p < .05$) of dimensions of expressive face and speaking ($\beta = .184$), smile ($\beta = .146$), body ($\beta = .161$), dancing ($\beta = .115$), and negative contribution of voice ($\beta = -.121$) and dress ($\beta = -.098$). Thus, both men and women place great value on expressive face, speaking, and smile, and do not care as much about characteristics of voice and way their partner dress. Many other sensory factors, not listed above, also contribute to an overall model of physical attraction to a partner. They probably work all together, in orchestra, not separately from each other. As for gender differences, for women (but not for men), the body appearance, and a partner's ability to dance are important in fueling their attraction to a romantic partner. Lips of a partner are more important for men than for women across cultures.

Regression analysis of physical attraction on sensory factors, when ran separately by country, reveal results similar to those presented above, with a few cultural variations. Linear regression models for males and females in Portugal, Georgia, and Russia revealed statistically significant contributions of 13 sensory characteristics to romantic

physical attraction toward a partner. Expressive face, speaking, and smile are of universal importance for both genders across cultures. In addition, for Portuguese women, a partner's eyes ($\beta = .241$), as well as the partner's body ($\beta = .230$), are important factors in romantic attraction. For Georgian men, facial structure of their female partner is an important factor of romantic attraction ($\beta = .264$). For Georgian women, it was found that the skin of their male partner is an important factor in romantic attraction ($\beta = .305$). For Russian men, lips of their female partner is an important factor in romantic attraction ($\beta = .325$). For Russia women, dancing ability of their partner ($\beta = .197$) and the partner's body ($\beta = .173$) are important factors in romantic attraction. A linear regression model of physical attraction on sensory factors did not reach the level of statistical significance for males and females in France, even though $R = .426$ for males and $R = .409$ for females; therefore we cannot draw definite conclusions as to preferences. It is interesting to note that in France, men and women participants assigned more importance to how women dress than did participants in the other three cultures (see tables 2 and 3).

4) Discussion

This study provides additional evidence as to the validity of the French version of the Passionate Love Scale. Once again, the scale proven to be a reliable psychometric measure and the correlation found between the PLS and the Physical Attraction Scale provide more evidence as to the external and convergent validity of this instrument. It is interesting to note that the PLS did not correlate with the following sensory stimuli presented in the Sensory Experience Scale: smell, skin, and singing. This could indicate that the French do not assign much importance to those features when they are in love. We do not have data about these correlations with the other samples but it would

interesting to know if the results with the French sample would be reproduced in other cultures, or if these preferences were merely characteristic of our own French sample.

The results of this research seemed to indicate that this is the case since physical attraction could be linked with passionate love and some sensory experience features. This research also corroborated what is usually found in cross-cultural research on mate preferences (see chapters 3 and 4 for more information): there are more differences between men and women than between various cultures in what is considered to be attractive. In this study, women diverged more cross-culturally than did men. Also, men tended to place greater value on physical attributes (such as hair or body) than did women (who highlighted dancing and singing).

Theorists who take an evolutionary psychology perspective generally assume that many characteristics that women and men find attractive are not culturally arbitrary but hard wired (Meston & Buss, 2009) and the result of this study seem to provide some support for this premise. However, women's sensory preferences were influenced to some extent by culture and by the current love state (being in love right now or thinking in someone that was loved in the past).

Current love status did not have an effect on men's sensory experience. This could be indicating that personal feelings (being in love or not) play a more important role in women's romantic lives than in men's. Men seemed to have higher expectations (than do women) of their female partner's sensory characteristics. Previous research has secured results that go in the same direction. Men centered their reasons for having sex on physical appearance and physical desirability (Meston & Buss, 2007). Also, these results support the idea that men are more sexual aroused by visual cues than are women (Fisher, 2004).

One limitation of this research may be that the four cultures we selected might be more similar than we might wish cultures. One might argue that France and Portugal are very similar cultures, both being markedly different from Georgia and Russia. At the same time, all these cultures are situated near the middle of the two extremes of the individualistic-collectivistic dimension (Neto, 2008). One can predict that we would have found more significant differences in cultural preferences if we had compared people from a wider range of cultures on the individualism/collectivism dimension: say America (which is extremely individualistic), versus the cultures in our study, versus those in China (who are considered to be extremely collectivistic).

5) Conclusions

Lack of sexual attraction is often a deal breaker in romance. This study explored the relationship of sensory experience features—such as scent, body shape or expressive behavior—in sparking physical attraction and passionate love. It is well accepted that passionate love is tightly linked with sexual attraction but only a few studies have tested this assumed relationship empirically. The results we obtained with the French data indicate that a strong relationship exists between these two variables with both our male and female participants. Correlations between the PLS and the SES indicated that not all sensory experience features had a relationship with passionate love.

The cross-cultural analyses between the various gender and cultural samples in this study indicated that men and women differed more in the sensory features they considered to be important than did people from the various cultures. The scientific literature in this that males, in all cultures, tend to value physical attraction and physical attributes more than do women because youth, beauty or a well proportioned body in females indicate reproductive value and success (Buss, 1988). On the other hand, our

results also indicated that women from our four cultures valued physical attraction and sensory experience features as well. Scholars should probably more careful when asserting that beauty or physical characteristics are not important in woman's sexual attraction.

The next step of this research could be to use this same questionnaire in cultures that are more collectivistic or traditional. If we secure larger cultural differences with this more diverse sample (on the Sensory Experience Scale), it adds fuel to our contention that to some extent. Culture shapes men and women's preferences. Today, scholars have assembled a great deal of cross-cultural data about mate preferences but we have only sparse information about what types of sensory features make one's heart grow fonder. If we consider sensory experience as a low cognitive process (as opposed to creativity which can be considered to be a high cognitive process), passionate love seem to have a very linear relationship with sensory experience cues or with physical attraction. In this case, passionate love can be considered to generally spark the low cognitive processes that are related to it.

General discussion

The project explored feelings of passionate love that can be found within romantic relationships. As it was presented earlier, scientific studies on this topic were successful in conceptualizing this phenomenon and in finding ways to measure it accurately. One important part of this thesis was to explore the psychometric properties of Hatfield and Sprecher's Passionate Love Scale (PLS) in two cultures for the first time: Brazil and France. Our results suggested that the PLS was successfully adapted in both cases.

The French version reproduced the same results that were found in the original study (Hatfield & Sprecher, 1986). Also, study 3 and study 4 provided an opportunity to re-test the PLS with new samples and we were able to secure the same levels of internal consistency that we found in study 1. These secondary results provided more evidence that the French PLS is a reliable measure among French students. The social representation study with the French sample also provides further evidence that the PLS is a measure that is compatible with the French culture. Our French participants highlighted passionate love as being an emotion linked with sexuality, attraction, and mixed emotions. They "mentioned" topics that are taken into account by the PLS. Taking these results into account, it seem logical that French participants will consider that the PLS translated what they feel when they are passionate in love.

The PLS version we used in Brazil corresponds with the same version that was used in previous studies in Portugal (Feybesse, Neto, & Hatfield, 2011; Sim-Sim & Pulido, 2013). The Portuguese studies and the study included in this thesis indicated that the Portuguese version of the PLS is reliable in this culture, as well. However, gender differences with the PLS were not found in Portugal although they were found in Brazil. As we have seen in study 1, it is hard to explain why this happened, especially since we did not find any gender differences with the Passion component of Sternberg's scale

(TLS) or with the Eros subscale of the Love Attitude Scale (LAS). Since these are such similar constructs, we would have expected to find gender differences on none or all. It would be interesting to re-test the PLS in Brazil to determine if gender differences are found there, because our results suggested that their sex had a weak effect on the PLS scores. One problem we had was that we did not have enough male participants in all of the Brazilian regions to enable us to secure differences (if they were there). Men were insufficiently represented in the North, Northeast, and Southern regions. These small sample sizes prevented us from securing conclusive answers as to the question as to whether or not gender differences in fact existed. Our main interpretation of why so few men agreed to participate is that men may not have felt comfortable in sharing their romantic feelings, when answering the PLS. The Passion component of the Sternberg scale and the Eros subscale of the LAS tap passionate love in a more global way, and thus subjects may have felt less engagement when answering the various items. The Passionate Love Scale probably demanded more engagement in the part of participants. The items of the PLS asked participants “to declare” that the beloved was a powerful influence in their lives and that he or she was the only person who mattered in romance. Our Brazilian male participants might have desired to hide the importance of their feelings for “macho” reasons. They might have felt uncomfortable in “confessing” that one woman was the queen of their desire and that she possessed an irresistible power over them. We tend to believe that, in reality, they shared the same intensity of feeling as their female peers but were less willing to admit it.

Another surprising result found with the Love Attitude Scale is that we did not find any differences in love attitudes across the different Brazilian regions. Brazilians from the main five regions scored the same on the different subscales, indicating that they shared the various approaches to love, with the same conviction. We were expecting to find

significant differences in the love attitudes that have shown to be influenced by cultural factors (Pragma, Storge and Ludus love styles). Brazil is a continental country, which possesses important ethnic and cultural differences. Brazilians from different regions consider themselves to be quite different from each other, so we expected significant regional variations in at least some love styles. The fact that we did not find any might be related to the fact that most of our participants were college students, enrolled in public universities. This demographic represents a very select part of the Brazilian population, and it is far from representing the ethnic and cultural variations to be found in Brazil. College students are young adults, of European descent, who usually come from wealthy families (Schartzman, 2008). This is generally the case in all Brazilian public universities, so students might tend to share common views about romantic love and romantic relationships; this means that they are likely to express similar attitudes when completing the Love Attitude Scale. We might suppose that we would find at least a few cultural variations with the love styles if we had representative samples of each Brazilian region. Other similarities may be due to the fact that participants' in the various regions had similar involvement in romantic relationships: the majority of subjects in all regions were currently in love and half of them were involved in a steady, but recent, romantic relationship. This increases the probability that a sizable portion of our sample was likely to possess specific attitudes towards love, regardless of the region in which they lived.

The social representation study revealed significant cultural and gender differences between our French and Brazilian samples. This theory and method took an approach more likely to highlight group differences in our studies. As we have seen earlier in study 2, the French participants related passionate love to a rollercoaster of emotions while the Brazilian participants associated it with a tender / passionate experience

surrounded by positive attributes. Male participants tended to focus more on sex whereas female participants more often addressed the idea of attachment.

Romantic love is usually associated with attachment and long-term objectives while sex / lust is often perceived as something more fleeting, existing in “here and now” scenarios (Forster, Ozelsel & Eptude, 2010). Our French participants tended to consider passionate love to be a strong emotion, in which sex plays an important part. The Brazilian participants emphasized the idea of commitment and intimacy, in which sex plays a smaller role. They suggested the idea of union and marriage; therefore associating it with long-term objectives, whereas the French seemed to be engaged in a more in a “here and now” discourse. The social representation of passionate love we found among our Brazilian and French participants correlated with the views of attachment theory: romantic love is mainly organized around attachment, caregiving, and sex (Shaver, Hazan & Bradshaw, 1988).

Overall, participants in both cultures tended to view passionate love with a positive eye; this might not be the case had we conducted this same study in more traditional societies. These results corroborated with what was found previously in prototype studies of love, in the sense that western societies always provide love types with positive connotations (Fehr, 2006). It would be interesting to explore the social representations of people from traditional societies, because prototype analyses has revealed that in these type of cultures, love clustered with negative emotions (Fehr, 2006). These cultures probably represent passionate love with very different ideas than the ones we found with our samples.

Contrary to what we have found with the social representation study, our study about sensory experience in interpersonal physical attraction (study 4) indicated more gender than cultural differences. This indicated that men and women value different physical

characteristics in their romantic partners. Also, evolutionary psychology, in studies of mating preferences, tends to conclude that physical attraction is only truly important for men. Women are considered to be more attracted to men's ability in providing resources or security (Gouillou, 2014). Evolutionary theorists have concluded that this fact is not determined by culture but is rooted in biology instead. Some physical traits provide cues of fertility. Our results indicated that even if women from different cultures disagree on what is the most important sensory trait in attraction (smell, body, facial expression, etc.), they place a great value on physical attraction. The results with our French sample indicated that both men and women considered that passionate love to be strongly related to physical attraction. It is hard to determine if women are now catching up with men in valuing physical attraction in romantic relationships, or if they always cared about looks but in the past were simply forced to "settle" for more practical assets. Our cross-cultural samples are comprised of females enrolled in colleges situated in western countries, and they are probably freer to date or marry whom they wish because they are more independent. Therefore, they are probably less concerned with the social status of their romantic partners, and free to focus more on what they find attractive instead. Also, college women can expect to be financially independent in the future, so they might not be worry about finding a husband-provider but focus more on someone who is attractive to them. As we observed earlier, so far there only a few studies linking love with creativity, so it hard to be definitive about the effect that romantic love has on creativity. We feel that we are still in the first stages of understanding of this phenomenon. What is interesting to point out, is that currently interest in this topic is blossoming in academia. So far, love is thought to facilitate global thinking and positive moods and (it has been speculated) facilitates divergent thinking. Our results, however, went in the opposite direction: passionate love feelings had a negative effect on

creativity. Evoking love had a negative effect on both convergent and divergent thinking. If we consider what was found in previous research relating these two variables, we can notice that love had contradictory effects on cognitive tasks that are associated with the act of crafting creative productions. Our study (study 3) can be seen as one important contribution on the topic because it is one of the few we are aware of that really tested the relationship between these two variables directly. Passionate love and creativity are multidimensional constructs so they probably have a complex relationship that has to be explored in several ways. Passionate love can lead different people to behave and feel in different ways; creativity can be inhibited or facilitated in many different ways as well. We believe that passionate love might benefit creativity if one can help the other. People in love might be able, for example, to find innovative solutions when they are faced with interferences or obstacles that get in the way of their romantic relationships. The feelings of love can push them to make more efforts in finding alternatives that would help them when they are longing for their beloved. We are interested in developing a new experiment with similar protocols employed in study 3. Participants will have to provide original alternatives to problem-solving situations that are related to romantic love. Creativity might benefit from love when love can benefit from creativity as well. Today, evolutionary psychology considers that long-term pair bonding provided for the emergence of our cognitive abilities. Evidence using phylogenetic comparative methods and DNA analyses indicates that romantic attachment became a constraint trait in hominid evolution allowing ape brains to become modern human brains (Fletcher et al., 2015). This development allowed humans to develop social intelligence and cooperative skills (and creativity in the process). Love and creativity are both universal phenomenon that are in the core of

human nature, so one could infer that these two traits can have a significant impact on each other.

Finally, study 3 and 4 gave us the opportunity to explore the effect of passionate love on basic cognitive processes (sensory experience and physical attraction) and complex cognitive processes (creativity). Passionate love has a deep impact on cognitive processes. We noticed that passionate love had a linear (and negative) effect on these basic cognitive processes. In our study, passionate love had a positive relationship with sensory experience features and with physical attraction. We can speculate that this relationship would probably be the same regardless of the context. These variables are probably intertwined and have the same effect on one another. We predict that is not the case between complex cognitive processes. Even if we did not find a statistical relationship between passionate love and creativity one variable probably affects the other in a variety of ways. The type of creativity explored might play a role on how it is going to relate with passionate romantic feelings. The fact of being in a relationship with the beloved might (or might not) have an influence as well. Perhaps, people that exercise their creative skills often (professional artists for example) are able to use their romantic feelings to better benefit their creative performances. Great seducers might be wiser in handling creativity to conquer their prey, and so on...

General conclusion

This dissertation explored the topic of passionate love in many different ways. We were interested on working on the psychometric aspects of passionate love, getting social representation data about this emotion, and exploring the interaction between passionate love and cognitive processes. Our main hypothesis was that people around the world differ in the way they represent passionate love, but they present the exact same “symptoms” when they are experiencing passionate love. We consider that if we limit our answer to the results of our studies, our attempt was successful in validating our hypothesis, to some extent. Even if we could find distinctive social representations in how passionate love is portrayed, our psychometric studies indicated that passionate love tends to be experienced in the same way, with the same intensity, in all the cultures in which we have tested it. Thus, our results corroborate what was previously found in a number of similar studies, conducted in different cultures.

In this dissertation, we used the scientific literature available and conducted different studies, in order to answer to this main question: is passionate love a cultural universal? As we have seen, gender and culture tend to play a role on how passionate love is defined. Some people will highlight its sexual aspects; others will be more concerned about its relationship to interpersonal attachment. Our Brazilian participants considered passionate love to begin only when a romantic relationship is established, while our French respondents related passion to an infatuated state full of contradictory emotions. Cross-cultural studies on romantic love were successful in finding cultural variations in some romantic attitudes and noticed that people from different times and civilizations can have an opposite view as to the nature of passionate love.

If we take into account our psychometric studies, we can consider that all of our participants, regardless of their gender or culture, recognized that the items composing

the Passionate Love Scale represented their feelings of love. In this sense, they recognized that when they were in love they were engulfed in intrusive thinking about the beloved, they possess an extreme attraction for their beloved, they desired exclusivity, they idealized the beloved, praised the relationship, and so on... Modern anthropological studies showed that it is possible to collect discourses or to find folkloric tales describing these same experiences and “symptoms” in a vast number of cultures and eras. So far, no culture, in any era, could conclusively be considered to be free from this experience. For the last 15 years, fMRI studies, with passionate lovers possessing different sexual orientations or cultural backgrounds, “light up” the same brain regions, when lovers are looking at a picture of their beloved while their brains are being scanned. Also, scholars from different fields were able to find the biological roots of passionate love. So far, psychometric attempts at measuring romantic love have been successful all over the world. All this interlocking evidence led the field of evolutionary psychology to conclude that passionate love was, and still is, a key element to the development and survival of our species. Hominid evolution started to require biparental care so our large brains could overcome evolutionary barriers. Many ancestors of the *Homo sapiens* required pair-bonding to protect and satisfy energetic demands of their offspring. This suggests that we probably inherited feelings of romantic love from our ancestors, since these requirements were already existent in their time frame.

Passionate love reached and followed our prehistoric ancestors through history, moral development, and cultural transformations. Sometime passionate love was harshly persecuted and at other times it was extremely celebrated and valued. Funny enough, we seem to have treated it exactly as it makes us feel when we are under its spell: we pushed it on opposite extremes according to our beliefs or contexts. Our investigation leads us to the conclusion that culture plays a minor role in passionate love. This feeling

is mainly a biological phenomenon, crafted by evolution. People from all over the world seem to have experienced it, and this feeling has existed since the dawn of time. Passionate love does not care if you are a Chinese emperor from 2.000 BC or pretending to be one in the middle of the Brazilian carnival season in our modern times. Passionate love is going to strike you with no mercy at one point or another. Many people consider that this feeling to be socially constructed. The scientific evidence we have assembled so far, and our interpretation, suggest that causality probably goes the other way around: passionate love probably has always had a great deal of influence on culture. It certainly has shaped the way we live our lives since the beginning of time. Just to give a few examples: we get ready to change our routines and habits so we can start to relate to our beloved, to mate with our beloved, and manage to stay together in a given time or culture.

As we have seen previously, there are many ways to love as there scientific love typologies. Romantic love is surely not only passionate love. Even if love came before our species, one can easily assume that human culture and society made this feeling become more and more complex, as societies and organizations have evolved. Passionate love does not last forever and nature does not need us to “live happy ever after,” so many different ways of loving might be mainly based on social grounds. If we take Elaine Hatfield’s passionate and companionate love taxonomy as an example, “companionate love” might have little (or no) biological origins but great social and cultural ones. This type of romantic love is characterized to underpin high levels of intimacy and commitment in long-term unions. It can last far longer than any biological or reproductive human purposes and it is usually socially valued by many cultural and organizational structures. Culture might have helped romantic couple to maintain feelings of romantic love even when passion has left the stage.

To sum up, consider this following definition for romantic love as it seem to be what scholars of love are debating today: “*romantic love is a deep emotional and sexual attachment triggered by specific biological patterns that can surpass time and its original biological basis through interpersonal and social factors*”. Passionate love is tightly linked to biological factors whereas companionate love is tightly linked to interpersonal and social factors.

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