



**Daniela Zibenberg**

**Lovesick: Enlarging the nomologic and  
nosologic nets of love disorder**

**Dissertação de Mestrado**

Dissertation presented to the Programa de Pós Graduação em Psicologia Clínica, in Psicologia Social: indivíduo e sociedade, of the Departamento de Psicologia da Pontifícia Universidade Católica do Rio de Janeiro – PUC-Rio for the degree of Master in Clinical Psychology.

Advisor: Prof. Jean Carlos Natividade

Rio de Janeiro,  
February 2024



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## Abstract

Zibenberg, Daniela; Natividade, Jean Carlos (Advisor). **Lovesick: Enlarging the nomologic and nosologic nets of love disorder**. Rio de Janeiro, 2024. 84p. Dissertação de Mestrado - Departamento de Psicologia, Pontifícia Universidade Católica do Rio de Janeiro.

Addiction is a psychological and/or physical dependence on substances, activities, or behaviors. Tolerance increase, difficulty in interrupting or reducing the investment in the relationship, and frequent concern with it are possible symptoms of a love disorder, a behavior addiction in romantic relationships. However, this pathology is not an official diagnosis, and literature about this theme is scarce. In this manner, the present study aimed to characterize love disorder's nomological and nosological nets. For that, two studies were conducted. An online questionnaire composed of sociodemographic questions and a battery of scales was answered by 1,310 adults, with a mean age of 30.3 years ( $SD = 12.2$ ). In the first study, satisfactory evidence of validity was found for the Love Addiction Inventory - Brazil, based on the internal structure, and in the relationships with other variables, such as self-esteem and convergent instruments. In the second study, the nomological and nosological nets of love disorder were investigated, and relations between love addiction, emotional dependence, pathological love, attachment, passion, personality, relationship satisfaction, and stress were explored. It was found that the love disorder nomological net is constituted of a positive relation with stress and a negative relation with relationship satisfaction. Data points out the love disorder as a distinct pathology from passion that can be partially explained by attachment-related anxiety and personality characteristics. These findings are relevant to clinical diagnosis and future intervention research.

## Keywords

Addictive Behavior; Scales; Dependency; Interpersonal Relations

## Resumo

Zibenberg, Daniela; Natividade, Jean Carlos. **Doente de amor: Ampliando a rede nomológica e nosológica do transtorno do amor**. Rio de Janeiro, 2024. 84p. Dissertação de Mestrado - Departamento de Psicologia, Pontifícia Universidade Católica do Rio de Janeiro.

Adição é uma dependência psicológica e/ou física em substâncias, atividades, ou comportamentos. Aumento da tolerância, dificuldade em interromper ou reduzir o investimento no relacionamento e preocupação frequente com o mesmo são possíveis sintomas de um transtorno de amor, uma adição comportamental em relacionamentos amorosos. No entanto, tal patologia não se configura como um diagnóstico oficial e a literatura a respeito deste tema é escassa. Dessa maneira, o presente estudo buscou caracterizar as redes nomológica e nosológica do transtorno de relacionamento amoroso. Para isso, foram realizados dois estudos. Responderam a um questionário online 1.310 adultos, com média de idade de 30,3 anos ( $DP = 12,2$ ) composto por perguntas sociodemográficas e uma bateria de escalas. No primeiro estudo, encontrou-se evidências de validade satisfatórias para a *Love Addiction Inventory* Brasil, baseadas na estrutura interna, na relação com outras variáveis, como autoestima, e instrumentos equivalentes. No segundo estudo, as redes nomológica e nosológica do transtorno do amor foram investigadas, e buscou-se por relações entre adição ao amor, dependência emocional, amor patológico, apego, paixão, satisfação com o relacionamento, estresse e personalidade. Encontrou-se que a rede nomológica do transtorno do amor é constituída por relação positiva com estresse, e relação negativa com satisfação com o relacionamento. Os dados apontam para o transtorno de amor como uma patologia distinta da paixão, que pode ser parcialmente explicada pela ansiedade relacionada ao apego e por características de personalidade. Tais achados são relevantes para diagnósticos clínicos e futuras pesquisas de intervenção.

## Palavras-Chave

Comportamento Aditivo; Dependência; Escala; Relacionamentos Interpessoais.

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CFI = Comparative Fit Index

DSM= Diagnostic and statistical manual of mental disorders

ED= Emotional Dependence

ICD-11= International Classification of Diseases 11th Revision

Ladit= Love Addiction Disorder Identification Test

LA= Love Addiction

LAI= Love Addiction Inventory

LAI-BR= Love Addiction Inventory - Brazil

RMSEA = Root Mean Square Error of Approximation

TLI = Tucker-Lewis Index (TLI)

WHO= World Health Organization

WLSMV= Weighted Least Square Mean and Variance Adjusted

## Introduction

Written language is a way to know the world, and different writings can show the importance of love. In scientific literature, several authors have tried to define it in styles, shapes, and meanings (e.g., Lee, 1988; Levine, 2005; Natividade et al., 2022; Sternberg, 1986). In arts, the first love poem was written 4.000 years ago (Gutiérrez, 2011), and various texts and verses exemplify its grandeur.

For example, the Bible passage 1 Corinthians 13,2 states that “If I have the gift of prophecy and can fathom all mysteries and all knowledge, and if I have a faith that can move mountains, but do not have love, I am nothing”; Carlos Drummond de Andrade, a Brazilian poet, questions “*Que pode uma criatura senão, entre criaturas, amar?*” (What can a creature do if not, between creatures, love?) (Andrade, 1951, p. 49); Rupi Kaur, Indian poet, wrote that “Nothing even matters/ except love and human connection/ who you loved/ and how deeply you loved them” (Kaur, 2017, p. 238); The Brazilian song “Happiness”, from the Tom Jobim and Vinicius de Moraes, verses that “*Fundamental é mesmo o amor, é impossível ser feliz sozinho*” (Love is fundamental, it is impossible to be happy on your own) (Jobim & Moraes, 1959).

In this sense, if life is love, and love is fundamental, depending on love would be something natural and expected. In this sense, Bráulio Bessa, a Brazilian poet, says that “*Se o amor fosse doença, seria dessas sem cura*” (If love was a disease, It would be one of those with no cure) (Bressa, 2018); Martha Medeiros, a Brazilian writer, affirms that “*Basta sentir o amor para que fiquemos dependentes dele, uma dependência boa, daquilo que nos faz sentir vivos*” (You just have to feel love to become dependent of it, a good dependence, of that which makes us feel alive) (Medeiros, 2004); And the song “Dependent”, from the group Sorriso Maroto, exposes that “*Parece que a gente já tá dependente um do outro. Isso é amor*” (It seems like we're already dependent on one another. This is love) (Lima & Silva, 2016).

Thus, a priori, pathologizing dependence on love would possibly include considering sick all of those who are happy in their relationships. The experience of love inevitably involves some suffering, and some conflict in a relationship is equally expected. Similarly, investing a great amount of available time and energy in a romantic relationship is expected, once it is a mechanism of partner retention (e.g., Fisher et al., 2005; Fisher et al., 2016). However, continuous exaggerated attention in the relationship, rearranging of priorities, mood oscillation, and obsessive thoughts can be exhaustive (Perrota, 2020).

In 1975, Peele and Brodsky talked about love addiction as a condition of dependency in intimate relationships, analogous to chemical dependency. In 1986, Melody Beattie wrote the book “Codependent No More: How to Stop Controlling Others and Start Caring for Yourself”, in which the author described individuals that gave to, controlled and took care of other people while themselves were left empty (Beattie, 2017). To this point, relationships with addictive characteristics of compulsion and obsession, which frequently bring suffering and prejudice to those involved, becomes evident. Although more than four decades have passed, love and relationship addiction studies have barely advanced.

Some authors have proposed diagnostic criteria for dependency in romantic relationships (e.g., Griffiths, 2005; Reynaud et al., 2010; Sophia et al., 2007). Nevertheless, love addiction is not an official diagnostic, for example, in the reference manuals such as DSM and IDC. In Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, Text Revised (DSM-5-TR; APA, 2023), the definition of mental disorder includes a syndrome with signals and symptoms characterized by a clinically significant disturbance in frequency and intensity in cognition, emotional regulation or behavior that reflects in suffering, prejudice in activities and/or in development. A pathology is a speech about the mind’s suffering which occurs in the body (Berlink, 1998; Ceccarelli, 2005). That is a psychic suffering that will be cured, treated, and taken care of by another, as a doctor, who will take care of the passion’s excesses. In this regard, to consider love addiction a pathology is fundamental to have psychic suffering and somatic markers that interfere in a clinically significant way. Hence, by definition, love addiction must be a pattern of frequent behavior towards a love object that necessarily leads to negative consequences (Sussman, 2010).

In the literature, some terms are used as synonyms for love addiction, such as emotional dependence, pathological love, affective dependence, interpersonal dependence, dependent personality disorder, love dependence, obsessive love, and relationship dependence (Bution & Wechsler, 2016). However, it is worth highlighting that not all these terms reflect the same construct, often used erroneously. Additionally, in case the nomenclature of this condition follows the pattern adopted in the DSM-5-TR for non-substance-related addictions (American Psychiatric Association, 2023), it is suggested the utilization of the term Love Disorder.

The advances in the study of abusive use of several objects are notorious, as an example of the inclusion of Gaming Disorder, online or offline, in ICD-11 (WHO, 2021). Also, it has been studied the abusive use of smartphones and internet (Castellon et al., 2022; Martins & Pimenta, 2019), shopping (Lima et al., 2022), physical exercise (Restrepo et al.,

2021), pornography (Taylor, 2020), among others. I.e., it has been scientifically recognized that there may be an abusive use of games in a similar way to an abusive use of substances, and steps are being taken to recognize the abusive use of other objects, such as love and romantic relationships.

One could ask whether love addiction occurs in current compromised relationships or with rejected passions. Whether it is jumping from one relationship to another (addiction to relationships) or being fixed in a single specific relationship and centralizing its importance (addiction to a relationship). Whether there is a minimum relationship length for a diagnostic/condition of love addiction, once other recognized behavior addictions need to be evident over at least 12 months (e.g., WHO, 2021). Whether love addiction occurs only in the context of harmful and abusive relationships to the individual, i.e., if the problem is in the partner that is abusive and aggressive (the drug) or on the use that is made of the partner (the individual cannot leave or stop the relationship). Moreover, it is questioned if love addiction, pathological love, emotional dependence, attachment, personality, and passion are the same or different constructs and if love addiction is actually related to impairment.

Previous studies have found a negative association of pathological love and emotional dependence with self-esteem and a positive association with suicidal and parasuicidal behaviors and the report of physical, psychological and/or sexual violence (Neves & Hur, 2021; Orsolini et al., 2022; Ramos et al., 2020). Above that, the scientific evidence regarding the love addiction treatment is limited (Reynaud et al., 2010; Sanches & John, 2019). There are few available instruments with psychometric robustness to assess love addiction, which creates even more barriers to its study (Costa et al., 2021), even as are reduced the systematic studies of comorbidities, epidemiology, neurobiology, personality traits, and genetic factors related to love addiction (Reynaud et al., 2010). Although it is a cross-cultural phenomenon (e.g., Camarillo et al., 2020; Fisher, 2014; Orsolini et al., 2022; Sophia, 2014), its scientific study is still insufficient.

The present study seeks to advance the scientific understanding of Love Disorder, specifically in comprehending its nomological and nosological nets. The nomological net refers to the relationships between constructs, their observable manifestations, and their interrelationships, including theoretical constructs different from it (Cronbach & Meehl, 1955; Pasquali, 2007). The nosological concerns the identification of signs and symptoms of a disease for diagnosis purposes (American Psychiatric Association, 2018; Conselho Federal de Psicologia, 2013). Therefore, two studies were conducted. The first study aimed to adapt an instrument that measures love addiction to the Brazilian context and analyze its validity

evidence based on internal structure, relations with other variables, and convergent validity. The second study aimed to explore relations between the constructs of love addiction, pathological love, emotional dependence, attachment, passion, personality, relationship satisfaction, and stress. Thereby, it is possible to observe convergences and divergences between the elected constructs and test variables that can explain love disorder.

This study is only one more step towards the search for evidence supporting treatment and diagnostics related to the abusive use of objects (behavior addictions), mainly in the field of romantic relationships. The chosen variables do not contemplate all the nomological and nosological love disorder nets. More studies will be necessary, but this is one more effort to put behavior addictions under the same umbrella as substance addictions (Griffiths, 2019).

Moreover, the search for the term “emotional dependency” in Google in February 2024 resulted in 48.400.000 results. Several songs illustrate love similar to an addiction, with phrases such as “It has been a week since I am clean from you (...) Do not text me, or I will relapse” (Milhomem et al., 2020), “My drug is my baby, I’ll be using for the rest of my life” (Schuster et al., 2017) and “I’m addicted to you, hooked on your love, like a powerful drug” (Davis et al., 2013). Anonymous self-help groups keep concentrating on relationship themes, such as Women Who Love Too Much, Love and Sex Addicts, and Addicted to Romance Anonymous, and marital conflicts are a great portion of the reasons why people seek psychotherapy services (e.g., Ribeiro et al., 2016), being a subject of demand twice as high as any area in the United States in 1981, totalizing 40% of the problems of why people seek professional help (Veroff et al., 1981). Understanding variables related to love disorder and defining characteristics of this possible diagnosis allows for advances in interventions for these cases and in the maintenance of healthy and satisfactory relationships. After all, love is really fundamental.

**Manuscript 1: Addicted to Love? Validity Evidence for the Love Addiction Inventory - Brazil**

## **Abstract**

The Love Addiction Inventory is an instrument elaborated to measure behaviors and feelings across six dimensions that constitute addiction to a romantic partner: salience, tolerance, mood modification, relapse, withdrawal and conflict. The present study aimed to adapt and provide validity evidence for the Brazilian version of the Love Addiction Inventory (LAI). Participants were 1,310 Brazilian adults in a romantic relationship. Results indicated adequate reliability indexes and validity evidence based on the instrument's internal structure and the relation with other variables (e.g., convergent validity). A satisfactory fit for the six-factor structure was observed and positive correlations between LAI scores, emotional dependence, and other markers of addiction were identified. Additionally, negative correlations were found with self-esteem. These results facilitate symptom monitoring in clinical patients and provide a valuable tool for exploring interventions aimed at treating love addiction in future research.

*Key-words:* Behavioral Disorders; Scales; Dependency; Interpersonal Relations

## Resumo

O Love Addiction Inventory é um instrumento elaborado para mensurar comportamentos e sentimentos das seis dimensões que compõem a adição a um(a) parceiro(a) amoroso(a): saliência, tolerância, modificação de humor, recaída, abstinência e conflito. O presente estudo buscou adaptar e fornecer evidências de validade para a versão brasileira do Love Addiction Inventory (LAI). Responderam a um questionário online 1310 adultos brasileiros em relacionamento amoroso. Os dados apontam para adequados índices de fidedignidade e evidências de validade baseadas na estrutura interna do instrumento, validade convergente, e baseadas na relação com outras variáveis. Destacam-se correlações positivas entre a LAI com a dependência emocional e outros marcadores de adição, e correlações negativas com autoestima. Estes achados possibilitam o rastreio de sintomas de adição ao amor em pacientes clínicos e disponibiliza um instrumento útil para a investigação de intervenções para o tratamento de adição ao amor em estudos futuros.

*Palavras-chave:* Distúrbios do Comportamento; Escalas; Dependência; Relações

Interpessoais



A systematic review and meta-analysis conducted between 2019 and 2022 estimated the prevalence of different behavior addictions in 40 different countries (Alimoradi et al., 2022). Internet, smartphone, gaming, social media, food, sex, exercise, gambling and shopping addiction were analyzed. Overall prevalence was 11.1%, ranging from 5.3% for gaming to 30.7% for smartphones. Another study provided data on prevalence for exercise, sex, shopping, online chatting, video gaming and eating addictions with a Canadian sample (Thege et al., 2015). A prevalence of 12% of at least one excessive behavior was found, ranging from 1% for online chatting to 6.5% for eating. Besides the expressive prevalence of behavior addictions, love addiction is not usually included in any of these works, mostly due to absence of clear criteria and available instruments to assess it.

Love addiction refers to a pattern of behaviors directed towards an amorous object that leads necessarily to negative consequences (Sussman, 2010). Although not yet recognized in diagnostic manuals such as the DSM-5-TR or ICD-11, this condition is associated with clinical impairment, such as suicidal and parasuicidal behaviors and is characterized as an independent mental disorder that may require psychotherapy or pharmacological treatment (Orsolini et al., 2022; Sanches & John, 2019). Love addiction scientific investigation in diverse contexts is substantial, such as cross-cultural comparisons and studies to recognize it as a potential legitim behavior disturbance. However, there is a lack of available instruments to measure love addiction in Brazil. Consequently, this study aimed to adapt and seek validity evidence for a Brazilian version of an instrument measuring Love addiction, the Love Addiction Inventory (LAI; Costa et al., 2021).

### **Love Addiction and Behavioral Addictions**

Sussman (2010) defines love addiction as a pattern of behaviors toward an amorous object that leads necessarily to negative consequences (Sussman, 2010). Although it is not an officially recognized psychiatric nosology, it could be considered a behavioral addiction present and studied in various cultures, such as Spain, United States of America, Italy, and Brazil (e.g., Briggie, 2015; Camarillo et al., 2020; Fisher, 2014; Griffiths, 2019; Orsolini et al., 2022; Redcay & Simonetti, 2018; Sanches & John, 2019; Sophia, 2014).

Substance-Related Disorders encompass substances consumed in excess that activate the brain's reward system, related to dopamine secretion, which, in turn, reinforces the behaviors and makes other activities be neglected (APA, 2023). Gambling disorder is a

behavior addiction that has been officially recognized due to evidence of the brain's reward system activation and similar behavior symptoms to other substance-related addictions (APA, 2023). It has been studied the abusive use of smartphones (Castellon et al., 2022), shopping (Lima et al., 2022), physical exercise (Restrepo et al., 2021), and pornography (Taylor, 2020), among others. Nevertheless, other behavior addictions, as well as LA, are not yet considered official diagnoses due to the lack of scientific evidence.

The American Psychiatric Association defines addiction as a "... state of psychological and/or physical dependence on the use of drugs or other substances, such as alcohol, or on activities or behaviors. The term is often used as an equivalent term for substance use disorder or substance dependence and can be applied to non-substance-related behavioral addictions, such as sex, exercise, and gambling" (APA, Dictionary of Psychology, 2023). Therefore, Love addiction is configured as a non-substance-related behavior addiction. However, love addiction does not converge with the nomenclatures adopted in reference manuals (e.g., DSM-5-TR; ICD-11) for behavioral addictions such as Alcohol Use Disorder and Gambling Disorder (APA, 2023; WHO, 2021), being a most adequate term Love Disorder or Romantic Relationship Disorder, following the logic of previously defined addictions.

Alcohol Use Disorder and Gambling Disorder include a clinically significant impairment or distress, for at least 12 months, accompanied by at least two criteria, for Alcohol, and at least four criteria for Gambling (APA, 2023). Alcohol criteria are, for example, consumption in greater amounts than intended, persistent desire or unsuccessful efforts to reduce alcohol consumption, excessive time spent on activities to obtain alcohol, social or interpersonal problems due to alcohol use and abandonment or prejudice in other activities. Similarly, some of Gambling criteria are irritability when interrupting the gambling behavior, unsuccessful efforts to reduce the behavior, frequent preoccupation with gambling, lying to hide the involvement with gambling, prejudice in relationships, work, study or financial situation due to gambling. Hence, love addiction, to be considered a behavioral addiction disorder, should have kindred criteria. Besides of a clinically significant impairment or distress, for at least 12 months, it should include, for example, unsuccessful efforts to reduce the investment in the relationship, social and interpersonal problems due to investment in the relationship, abandonment and prejudice in other activities, frequent preoccupation with the relationship, lying about the actual involvement, and more.

## **Relationship Between Love Addiction and Emotional Dependence and Self-Esteem**

In a systematic review, Bution and Wechsler (2016) defined emotional dependence as the need of the romantic partner to achieve emotional stability, which puts the romantic relationship in central importance in the individual's life. The Emotional Dependence Questionnaire (*Cuestionario de Dependência Emocional*; Hoyos & Arredondo, 2006) utilizes a definition for emotional dependence as the expectation that the romantic partner covers a persistent pattern of unsatisfied affective needs (Castelló, 2005). Thus, emotional dependence comprehends the separation anxiety and fear of losing the loved object, fear of loneliness, constant need of affect, impulsivity and aggressiveness towards a possible rupture in the relationship, modifying plans to satisfy the loved object and staying more time with it, and seeking attention and exclusivity of the romantic partner (Hoyos e Arredondo, 2006). Emotional dependence can also be understood as a behavioral dependence (Camarillo et al., 2020; Olave et al., 2021). Hence, a positive relationship of emotional dependence with the Brazilian version of the LAI is expected as a criterion and content-related validity evidence based on the relationship between equivalent instruments (Borsa et al., 2012).

Moreover, a negative relationship between love disorder and self-esteem is expected. Impairment in self-esteem may possibly lead the individual to enrich more strongly the importance of a romantic relationship (salience) and engage more often in a problematic behavior pattern, the same way it is possible that low self-esteem can be a consequence of an addictive pattern. Accordingly, previous studies have found a negative association between behavioral dependence in romantic relationships and self-esteem (e.g., Fônsaca et al., 2020; Gori et al., 2023; Neves & Hur, 2021).

## **The Love Addiction Inventory**

The Love Addiction Inventory (LAI; Costa et al., 2021) is an instrument that seeks to assess the addiction to love, developed for the Italian population and based on Griffith's (2005) theoretical model applied to miscellaneous behavioral addictions. The LAI is composed of 24 items, with four items to each of the six factors that reflect the dimensions of the behavioral addiction model: Salience, Tolerance, Mood modification, Relapse, Withdrawal, and Conflict. Salience refers to the central and primary importance the loved object occupies in the person's life, becoming the focus of its thoughts, behaviors, and feelings. Tolerance concerns the crescent need to increase the time spent or thinking about the loved object. Mood modification includes the presence of the loved object or thoughts about it to cope with stress and reach emotional stability. Relapse indicates difficulty in stopping or

reducing the time, attention, and thoughts spent on the loved object. Withdrawal corresponds to the signals and physical and/or psychological symptoms when distant emotionally or physically from the loved object (e.g., irritability, anxiety, nausea, insomnia, tachycardia). Finally, conflict relates to the influence of the preoccupation with the loved object in daily activities such as work, study, friendship, and leisure, resulting in a reduction or abandonment of interest and activities valued before (Costa et al., 2019; Griffiths, 2005).

In the original LAI elaboration study, 663 Italian adults participated, of which 94.4% were women. Not all participants were currently in a romantic relationship, but they all had at least been through one relationship for at least six months. The data collection was made online, and data supported satisfactory psychometric evidence of the instrument, with an alpha coefficient of .94 for the total scale, .95 for the salience factor, .86 for the withdrawal factor, .89 for the tolerance factor, .91 for the mood modification factor, .77 to the relapse factor, and .85 to the conflict factor. The six factors explained 74% of the variance, and negative correlations with positive affect and positive correlations with negative affect were found.

## **Present Study**

The scientific evidence regarding the treatment of love addiction is limited (e.g., Maglia et al., 2023; Reynaud et al., 2010; Sanches & John, 2019), and there are few instruments with psychometric robustness available to assess it, which creates even more barriers to its scientific study (Costa et al., 2021). In this way, to enlarge the acknowledgment of the professionals that act in the treatment of love disorder, enable the symptom tracking on clinical patients, provide information about love addiction on a Brazilian sample, and disclose a helpful instrument to future studies about this phenomena, the present study aimed to adapt and seek validity evidence for the Brazilian version of the Love Addiction Inventory based on the characterization of its factor structure, reliability coefficients, and relationship with equivalent instruments and other variables.

## **Method**

### **Participants**

Participants of this study were 1,310 Brazilian adults, with a mean age of 30.3 years old ( $SD = 12.2$ ), 84.3% women, 15.1% men, and 0.60% other/did not want to declare. All participants were currently in a romantic relationship, with a mean length of 1,811.2 days (4.96 years) ( $SD = 3,131.6$  days), from which 15.8% were married, 7.6% were in a common-law marriage, 2.3% were engaged, 44.4% were in courtship, 12.7% were going out

together, and 17.2% were in other types of relationships (e.g., friends with benefits). Besides that, 68.8% of the participants declared themselves heterosexual, 24.3% bisexuals, 4.8% gays/lesbians, and 2.2% other/did not want to declare, from which 76.8% were in a relationship with a man, 22.7% with a woman and 0.5% other/did not want to declare. 18.3% of the participants were in non-monogamic relationships, but the participants were requested to choose only one partner to answer the questionnaire. 11.8% had children together and 29.5% lived together. Concerning education, the participants declared to have complete graduate course (16.6%), incomplete graduate course (6.1%), complete high education (22.3%), incomplete high education (36.3%), complete high school (15.6%), incomplete high school (2%), complete elementary school (0.5%) and incomplete elementary school (0.6%). Furthermore, 939 participants declared their race/ethnicity, from which 68.1% declared themselves as whites, 23.1% mixed race/brown, 6.2% black, 1.6% yellow, 0.2% indigenous, 0.9% did not want to declare, and were from the South region of the country 10.1% of the participants, from the Southeast region 62.8%, the Midwest region 5.3%, the Northeast region 16.9%, the North region 3.2% and were not currently in Brazil 1.7% of the respondents.

## Measures

The participants answered an online-based questionnaire composed of sociodemographic questions, such as gender, age, education, presence of children, relationship characteristics, and the scales described below. The questionnaire also included control items to guarantee the data selection of participants who were attentive to their answers.

*Love Addiction Inventory - Brazilian version (LAI-BR)*. This scale was adapted to Brazil in this study from the original scale of Costa et al. (2021). It is a self-report scale compound of 24 items to assess love addiction. The respondent must mark 1-Never to 5-Very frequently, how often it behaves as described in each affirmative. Item examples are “Feel anxious when you are not in the company of your partner” and “Stay with your partner to relieve stress.” The alpha coefficients in the original study varied from .77 to .95.

*Emotional Dependence Questionnaire (Fonsêca et al., 2020)*. Compound of 23 items to assess cognitive and psychological aspects of emotional dependence. The respondent must rate each affirmative on a scale of 1- Completely false in me to 6- It perfectly describes me. Examples of items are “When my partner needs to go away for a few days, I feel anguish” and “I need to have one person to whom I will be more special than the others.” In the

original study, the instrument presented a one-factor structure and alpha coefficient of .92. In the present study, the alpha coefficient was .94.

*Rosenberg Self-Esteem Scale* (Hutz & Zanon, 2011). Brazilian version of Rosenberg's Self-Esteem Scale (Rosenberg, 1965). Compound of 10 items to assess self-esteem. The respondent must rate from 1-Totally Disagree to 4- Totally agree, how much each item describes himself. Items examples are "I feel I do not have much to be proud of" and "On the whole, I am satisfied with myself". The original study found a one-factor structure and alpha coefficient of .90. In the present study, the alpha coefficient was .91.

*Love Addiction Disorder Identification Test (LADIT)* (Zibenberg & Natividade, for this study). The Love Addiction Disorder Identification Test (LADIT), developed for this study, comprises 14 items specifically designed to assess love addiction disorder and negative relationship consequences. These items are structured in three different response formats: three items requiring a 'Yes' or 'No' answer (e.g., 'Have you or someone else ever been hurt or harmed as a consequence of your current relationship?'), four items rated on a scale from 1 ('Never') to 11 ('Every day of the week') (e.g., 'How often have you failed to do what was normally expected of you because of your relationship?') and seven items rated from 1 ('Strongly disagree') to 7 ('Strongly agree') (e.g., 'I fear that life without my partner is boring, empty, and graceless'). The instrument's items were inspired by the Brazilian versions of the Alcohol Use Disorder Identification Test (AUDIT) by Santos et al. (2012), which assesses in 10 items the frequency, adverse consequences of alcohol consumption, and dependency, as well as the Internet Addiction Test by Conti et al. (2012), which measures in 18 items internet addiction. Higher scores on the LADIT indicate greater levels of love addiction disorder and negative relationship consequences. The scale demonstrated a one-factor structure (CFI = 0.96, TLI = 0.95, RMSEA = 0.059, estimator WLSMV) with an alpha coefficient of .83.

## Procedures

**Translation.** The original scale, Love Addiction Inventory (Costa et al., 2021), available in English and Italian, was independently translated from English to Portuguese by three researchers with English language training. Another researcher compared the translations, joined them in a Portuguese version, and revised it. Then, two other researchers did a back translation of the Portuguese version into English and Italian. The back-translated items, from English and Italian, were compared with the original English and Italian versions by another researcher. The controversial items in the back-translation were adjusted. In

addition, the adjusted Portuguese version of the items was presented to a group of researchers with an advanced understanding of the instrument's theme to verify its comprehension. Minor adjustments were made to the items, and then the scale was applied to a small group of adults in a pilot study. These participants were instructed to respond to the items and to identify any aspects they found challenging to understand. The final Brazilian version of the scale was obtained through this process.

**Ethical and Data Collection.** Participants were recruited by disclosing an online questionnaire on social media (WhatsApp, Instagram, TikTok, etc.). All participants must have consent to participate in the research. The Free and Informed Consent Term, the estimated time to answer, and information about the anonymous and voluntary participation according to the Ethic Committee terms were available on the questionnaire's first page. This research was approved by the *Comitê de Ética em Pesquisa da Universidade Estácio de Sá - CEP/UNESA*, under the protocol number 5.903.034.

**Data Analysis.** Primarily, data was cleaned, maintaining only the participants who answered correctly to the control items. Then, a correlation analysis between all the LAI-BR items, and a confirmatory factor analysis to analyze its factor structure were conducted. We tested a six-factor model, like the original scale version, a one-factor model, and a six-factor model with a general factor explaining them. Alpha and omega coefficients were calculated for the adapted measure, and alpha coefficients for the other measures used in this research. In sequence, correlation analyses were conducted between the LAI-BR and the measures of emotional dependence, self-esteem, love addiction disorder, and the variables relationship length, age, and meeting frequency. Also, descriptive analyses were made about the mean, standard deviation, and percentile of LAI-BR of the respondents of this study, and mean differences in the LAI-BR scores were calculated.

## Results

Initially, evidence of validity based on the scale's internal structure was sought. Confirmatory factor analyses were conducted for this purpose, and the fit of three models was tested: A single factor explaining the 24 items of the scale, a second-order factor explaining the six factors, and six correlated factors. A robust estimator suitable for ordinal data, Weighted Least Square Mean and Variance Adjusted - WLSMV, was used in these analyses. The analyses were conducted with the lavaan package (Rosseel, 2012), version 0.6.16, in the R software, version 4.3.2 (R Core Team, 2023).

Table 1 shows the results from the confirmatory factor analysis. The six correlated factors structure (Figure 1), as described in Costa et al. (2021), achieved a slightly better fit than the second-order factor structure, though both exhibited satisfactory fit indices. While the least suitable among the three, the unifactorial model still demonstrated an adequate fit. Despite the six-factor and second-order factor structures having satisfactory fit indices, with the former slightly outperforming, they aligned with the original instrument version. Consequently, per Costa et al. (2021), a composite total score for the LAI-BR was computed in addition to the scores for each factor.

The LAI-BR factors exhibited correlations ranging from .51 to .88. The factor loadings for the items varied from .43 to .88, as seen in Figure 1. The LAI-BR items showed intercorrelations within a range of .20 to .77 (Table 2). To estimate the reliability of the LAI-BR, alpha and omega coefficients were calculated for Salience with values of  $\alpha = .92$  and  $\Omega = .92$ ; Withdrawal with  $\alpha = .87$  and  $\Omega = .87$ ; Tolerance with  $\alpha = .88$  and  $\Omega = .88$ ; Mood Modification with  $\alpha = .86$  and  $\Omega = .86$ ; Relapse with  $\alpha = .72$  and  $\Omega = .74$ ; and Conflict with  $\alpha = .85$  and  $\Omega = .85$ .



Table 1

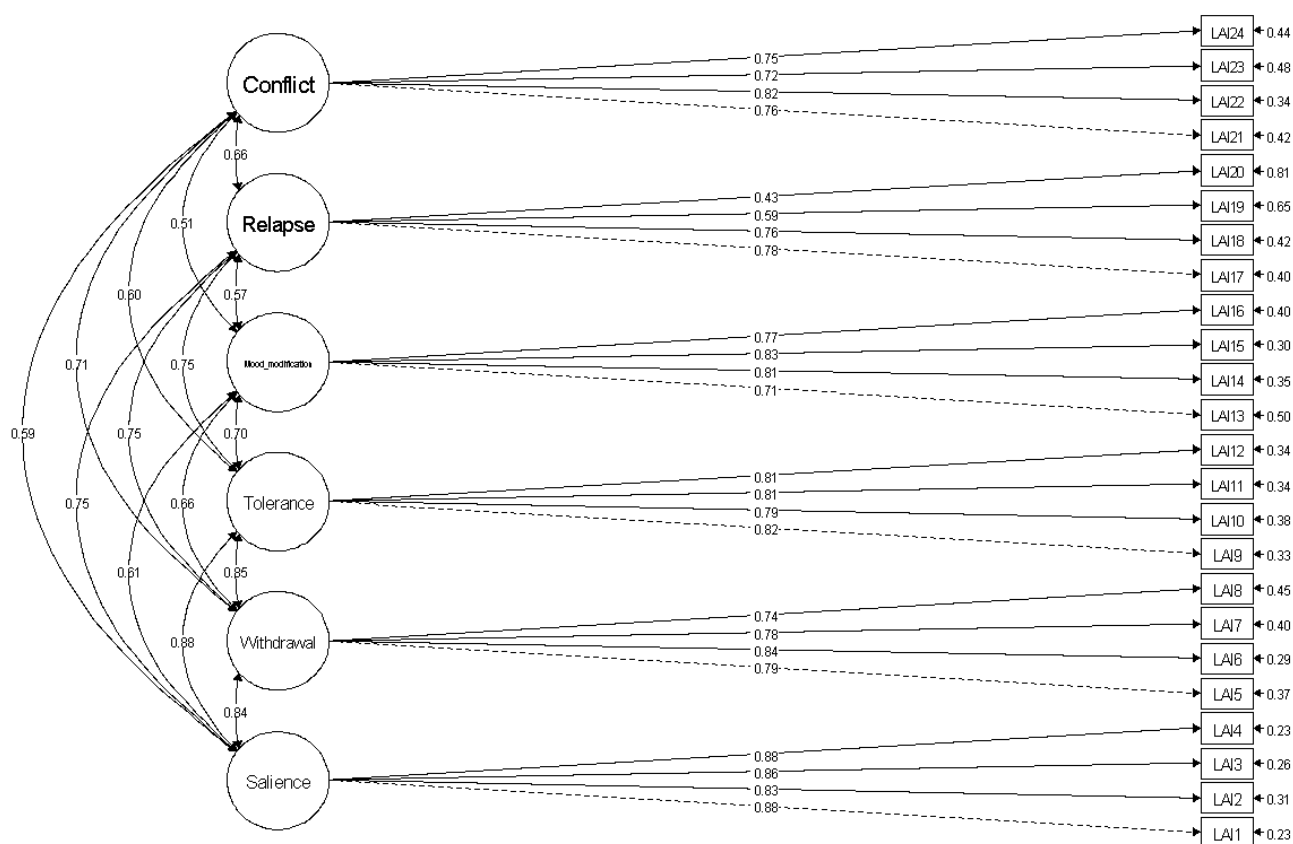
*Adjustment Indexes for the Three Tested Models*

	One factor	One second-order factor and six factors	Six Factors
$\chi^2$	3521.1	933.4	789.9
$gl$	252	246	237
$p$	< .001	< .001	< .001
$\chi^2/gl$	13.9	3.79	3.33
CFI	0.976	0.995	0.997
TLI	0.970	0.995	0.996
RMSEA	0.073	0.033	0.027
IC90% RMSEA	0.070-0.075	0.030-0.035	0.025-0.029

*Note.* Estimador Weighted Least Square Mean and Variance Adjusted (WLSMV).

$N = 1,306$ .

Figure 1

*Confirmatory Factor Model of the Love Addiction Inventory - Brazil*

Note.  $N = 1,306$ .

Table 2.

*Love Addiction Inventory - Brazil item's correlations*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
LAI 1	-																						
LAI 2	.72	-																					
LAI 3	.77	.72	-																				
LAI 4	.77	.72	.76	-																			
LAI 5	.59	.54	.58	.60	-																		
LAI 6	.63	.57	.62	.62	.72	-																	
LAI 7	.58	.52	.57	.59	.58	.64	-																
LAI 8	.53	.49	.52	.53	.55	.61	.63	-															
LAI 9	.67	.62	.64	.66	.55	.57	.53	.47	-														
LAI 10	.61	.57	.60	.60	.52	.57	.53	.51	.66	-													
LAI 11	.64	.60	.60	.62	.52	.57	.54	.51	.66	.71	-												
LAI 12	.61	.57	.61	.60	.58	.60	.54	.47	.62	.62	.62	-											
LAI 13	.37	.35	.36	.38	.36	.38	.32	.32	.41	.35	.37	.49	-										
LAI 14	.42	.38	.40	.42	.43	.45	.42	.43	.44	.39	.41	.48	.61	-									
LAI 15	.46	.43	.47	.47	.46	.49	.45	.44	.48	.43	.46	.53	.55	.60	-								
LAI 16	.40	.38	.40	.42	.37	.41	.38	.34	.42	.39	.41	.52	.66	.67	.58	-							

*Note.* N = 1,296; All correlations  $p < .001$ .

In search of validity evidence based on relationships with other variables, correlation analyses were conducted between the factors of the LAI-BR and emotional dependence, self-esteem, and the measure of love addiction disorder and negative relationship consequences, as well as variables such as meeting frequency, age, and relationship length. The results are presented in Table 3. All six factors of the LAI-BR and the composite total LAI score were positively correlated with measures of emotional dependence and love addiction disorder and negatively correlated with self-esteem. Furthermore, the LAI-BR factors and the total composite score showed negative correlations with the frequency of encounters, age, and relationship length, except for the Mood Modification factor with meeting frequency.

Furthermore, invariance across gender was established. In the configural invariance model, the Comparative Fit Index (CFI) was 0.97, the Tucker-Lewis Index (TLI) was 0.97, and the Root Mean Square Error of Approximation (RMSEA) was 0.041. For the scalar invariance model, a change in CFI ( $\Delta$ CFI) of -0.002 was observed. For the metric invariance model, the  $\Delta$ CFI was 0.000, and for the strict invariance model, the  $\Delta$ CFI was also 0.000. These findings suggest that the differences in LAI-BR responses are attributable to a latent trait rather than to issues with the instrument or its interpretation.

Additionally, mean differences in the LAI-BR were tested between gender, relationship type, and habitation (if partners lived together or in separate houses). The results of Student *t* and ANOVA tests are shown in Table 4. Men had higher scores only on the Conflict factor,  $t(284.7)=1.26$ ,  $p=.003$ ,  $d=0.09$ . There were no significant differences found for gender on the factors Salience ( $p=.10$ ), Withdrawal ( $p=.50$ ), Tolerance ( $p=.48$ ), Mood Modification ( $p=.80$ ), Relapse ( $p=.80$ ), and the composite LAI score ( $p=.21$ ).

Table 3

*Correlations Between the Love Addiction Inventory - Brazil and the Measures of Emotional Dependence, Self Esteem, Love Addiction Disorder, and Demographic Variables*

	1	2	3	4	5	6	7	8 (N=1,012)	9 (N=639)	10 (N=1,021)	11	12
1- Salience	—											
2- Withdrawal	.75**	—										
3- Tolerance	.80**	.74**	—									
4- Mood Mod	.54**	.56**	.60**	—								
5- Relapse	.62**	.61**	.61**	.46**	—							
6- Conflict	.52**	.61**	.51**	.43**	.54**	—						
7- LAI	.87**	.87**	.88**	.74**	.78**	.73**	—					
8- Emo Dep	.64**	.74**	.64**	.55**	.56**	.63**	.77**	—				
9- Self-Esteem	-.25**	-.34**	-.31**	-.35**	-.21**	-.31**	-.36**	-.42**	—			
10- LADIT	.58**	.68**	.57**	.48**	.54**	.65**	.71**	.74**	-.41**	—		
11- Meeting Freq	-.21**	-.19**	-.29**	-.05	-.14**	-.07*	-.20**	-.15**	.13**	-.14**	—	
12- Age	-.09*	-.06*	-.16**	-.29**	-.13**	-.08*	-.17**	-.14**	.22**	-.12*	.13**	—
13- Length	-.19**	-.15**	-.24**	-.23**	-.22**	-.10**	-.23**	-.21**	.21**	-.23**	.31**	.64**

*Note.* LAI= Love Addiction Inventory - BR; Mood Mod= Mood Modification; Emo Dep= Emotional Dependence; LADIT= Love Addiction Disorder Identification Test; Meeting Freq=Meeting Frequency; Length = Relationship length. When not mentioned,  $N = 1,296$ .

\*\*  $p < .001$

\*  $p < .05$

Concerning relationship type, all ANOVA test results were significant: Salience,  $F(3, 136.3) = 36.1, p < .001, \eta^2=0.08$ , Withdrawal  $F(3, 137.2) = 30.6, p < .001, \eta^2 = 0.07$ , Tolerance  $F(3, 129.2) = 59.8, p < .001, \eta^2 = 0.12$ , Mood Modification  $F(3, 137.8)=22.3, p < .001, \eta^2=0.04$ , Relapse  $F(3, 135.7)=45.6, p<.001, \eta^2=0.08$ , Conflict  $F(3, 138.1) = 7.31, p < .001, \eta^2 = 0.01$ , and the composite score  $F(3, 136.8) = 44.0, p < .001, \eta^2 = 0.09$ . For Salience and Conflict, the Going Out group scored higher, followed by Courtship, Married, and Engaged. For Withdraw, Tolerance, Relapse, and the composite score, higher scores were found in the Going Out group, followed by Courtship, Engaged, and Married groups. For Mood Modification, the Courtship group had superior scores, followed by Going Out, Engaged, and Married.

Besides, higher love addiction scores were found for those who were living apart, in comparison with those who were living together, in all factors: Salience  $t(778.9) = -8.41, p < .001, d = -0.50$ , Withdrawal  $t(864.8) = -6.54, p < .001, d = -0.38$ , Tolerance  $t(748.8) = -12.0, p < .001, d = -0.73$ , Mood Modification  $t(738.5) = -5.15, p < .001, d = -0.31$ , Relapse  $t(797.9) = -8.61, p < .001, d = -0.51$ , Conflict  $t(793.9) = -4.01, p < .001, d = -0.24$ , and the composite score  $t(792.3) = -9.33, p < .001, d = -0.56$ .

Additionally, the means, standard deviation, and percentiles of the Love Addiction Inventory - Brazil (LAI-BR) were calculated for each factor and the total composite score. The normative Table 5 shows the results. The mean score for LAI-BR factors ranged from 2.43 to 3.08.

Table 4

*Mean Differences Between Gender, Relationship Type, and Habitation for the Love Addiction Inventory - Brazil*

		Salience	Withdraw	Tolerance	Mood Mod	Relapse	Conflict	LAI
	<i>N</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Men	193	2.98 (1.05)	2.47 (0.99)	3.13 (1.04)	2.61 (1.02)	2.56 (0.91)	2.64 (0.90)	2.73 (0.77)
Women	1095	2.84 (1.15)	2.42 (1.05)	3.07 (1.09)	2.59 (1.06)	2.58 (1.02)	2.42 (1.00)	2.65 (0.87)
Married	305	2,46 (1,02) <sup>ab</sup>	2,12 (0,85) <sup>ab</sup>	2,53 (0,98) <sup>ab</sup>	2,20 (0,97) <sup>ab</sup>	2,10 (0,82) <sup>ab</sup>	2,29 (0,89) <sup>ab</sup>	2,28 (0,73) <sup>ab</sup>
Engaged	30	2,26 (1,12) <sup>ab</sup>	2,23 (0,95) <sup>a</sup>	2,78 (1,05) <sup>a</sup>	2,62 (0,93)	2,40 (1,07) <sup>a</sup>	2,05 (0,87) <sup>a</sup>	2,39 (0,81) <sup>a</sup>
Courtship	574	2,84 (1,09) <sup>acd</sup>	2,35 (1,00) <sup>ad</sup>	3,08 (1,03) <sup>ad</sup>	2,76 (1,02) <sup>d</sup>	2,62 (0,97) <sup>ad</sup>	2,50 (0,99) <sup>d</sup>	2,69 (0,82) <sup>ad</sup>
Going out	387	3,29 (1,15) <sup>bcd</sup>	2,83 (1,12) <sup>bcd</sup>	3,56 (1,04) <sup>bcd</sup>	2,68 (1,11) <sup>d</sup>	2,91 (1,05) <sup>bcd</sup>	2,56 (1,05) <sup>cd</sup>	2,97 (0,89) <sup>bcd</sup>
Living together	385	2.48 (1.04)	2.17 (0.89)	2.56 (1.01)	2.37 (1.03)	2.23 (0.91)	2.29 (0.92)	2.35 (0.77)
Living apart	911	3.03 (1.13)	2.55 (1.08)	3.31 (1.05)	2.69 (1.06)	2.72 (1.01)	2.53 (1.01)	2.81 (0.85)

*Note.* Withdraw= Withdrawal; Mood Mod= Mood Modification.

Tukey HSD Post hoc: <sup>a</sup> significant differences with going out ( $p < .05$ ); <sup>b</sup> significant differences with courtship; <sup>c</sup> significant differences with engaged; <sup>d</sup> significant differences with marriage.



Table 5

*Mean, Standard Deviation and Percentiles for Love Addiction Inventory Brazil*

	Salience	Withdrawa l	Tolerance	Mood Modificatio n	Relapse	Conflict	LAI
Mean	2.87	2.43	3.08	2.60	2.58	2.46	2.67
(SD)	(1.14)	(1.04)	(1.09)	(1.06)	(1.00)	(0.99)	(0.86)
Percentile							
5	1.00	1.00	1.25	1.00	1.00	1.00	1.37
10	1.25	1.25	1.50	1.25	1.25	1.25	1.58
20	1.75	1.50	2.00	1.50	1.75	1.50	1.87
30	2.25	1.75	2.50	2.00	2.00	1.75	2.12
40	2.50	2.00	2.75	2.25	2.25	2.00	2.37
50	2.75	2.25	3.00	2.50	2.50	2.25	2.58
60	3.00	2.50	3.50	2.75	2.75	2.50	2.83
70	3.50	3.00	3.75	3.25	3.00	3.00	3.08
80	4.00	3.25	4.00	3.50	3.50	3.25	3.45
90	4.50	4.00	4.50	4.00	4.00	4.00	3.87
95	5.00	4.50	5.00	4.50	4.50	4.50	4.21

*Note.*  $N = 1,296$ .

## Discussion

The present study adapted and presented validity evidence of the Love Addiction Inventory - Brazil. First, evidence based on the instrument's internal structure was shown. A confirmatory factor analysis was conducted, and satisfactory indexes were presented to the six-factor structure, kindred to the original Italian instrument structure (Costa et al., 2021). A CFI and TLI .95 or higher and an RMSEA .06 or below, as found in the LAI-BR, are considered a good model-data fit (Hu & Bentler, 1999). All four items of each factor were maintained equally with the factor's nomination: Salience, Withdrawal, Tolerance, Mood Modification, Relapse, and Conflict. Besides, reliability coefficients were also adequate. All items were significantly intercorrelated, and alpha and omega values ranged from .72 to .92, with acceptable values of .70 or above (Nunnally & Bernstein, 1994).

Evidence based on the relationship with equivalent measures and other variables was presented in sequence. All the Love Addiction Inventory - Brazil factors were significantly and positively correlated with emotional dependence and with the love addiction disorder measure. The love addiction disorder identification test measure assess love as an addiction, with alcohol and internet items adapted to access behaviors and feelings related to romantic relationships, and the emotional dependence measure assesses the need of a romantic partner to cover affective needs, with aspects such as separation anxiety, fear of abandonment and seeking the partner's attention (Castelló, 2005; Fôñseca et al., 2020; Hoyos & Arredondo, 2006). These correlations indicate that the LAI-BR measures love addiction once it is positively and significantly related to equivalent measures and similar constructs.

Love addiction was significantly and negatively correlated with self-esteem. This relation was expected since previous studies indicated a negative relationship between love addiction and similar conditions (e.g., emotional dependence, pathological love) with self-esteem (Fôñseca et al., 2020; Gori et al., 2023; Neves & Hur, 2021). It is possible that low self-esteem can lead to addictive patterns in romantic relationships, as well as love addiction brings prejudices for the individual's well-being, such as harm to self-esteem.

Furthermore, Salience, Withdrawal, Tolerance, Conflict, and Relapse significantly and negatively correlated with meeting frequency. Thus, the less the frequency of a partner's encounter, the higher the love addiction levels. It may be that less encounter frequency can be perceived as uncertainty about the relationship through less investment or long distance, which, in turn, increases love addiction. Besides, it is also possible that higher levels of love

addiction cause in the relationship a minor desire in the partner to meet, which decreases the meeting frequency and probably the relationship quality.

All LAI-BR factors were significantly and negatively correlated with age and relationship length. These corroborate the hypothesis that love addiction is associated with uncertainty, in which individuals in longer relationships or older, who have more experience in relationships would feel more confident of their relationships and consequently present lower levels of love addiction. Thus, love addiction seems to be more prevalent in younger individuals and shorter relationships. Previous studies have found a higher prevalence of romantic love with obsession in short-term relationships (Maglia et al., 2023), higher levels of pathological love in individuals with shorter relationships (Neves & Hur, 2021), and younger individuals with pathological love in comparison to individuals without the condition (Sophia, 2014).

Moreover, mean differences were calculated for gender, relationship type, and habitation. Superior love addiction scores were found for men, in comparison to women, only on the Conflict factor, and the size effect was not strong. This factor encompasses neglecting activities and commitments to be with a romantic partner. Previous studies have found that men presented superior abnegation scores (Neves & Hur, 2021), a factor from pathological love that refers to opting to suffer and sacrifice to prioritize the romantic partner's well-being (Sophia, 2014). Hence, a possible explanation for men's superior scores is the caretaker gender role attributed to men (e.g., Pinho, 2005), who may choose to give up on their own activities to prioritize their partner's well-being. This relationship could also be mediated by other variables such as consciousness personality factor. Differences in Salience, Withdrawal, Tolerance, Mood Modification, Relapse, and the composite score were not found between men and women, which suggests that love addiction is similar for both genders.

Besides, love addiction scores were also higher for those living apart in comparison to those living together. Previous studies also found a greater prevalence of people living without the partner in individuals with pathological love (Sophia, 2014). Furthermore, superior means were presented in the Going out and Courtship groups, while lower means were found for the Engaged and Married groups. These findings once again corroborate the idea that love addiction is linked to investment and uncertainty.

The married and engaged groups, as well as the living together group, have more compromised relationships than the courtship, going out, and living apart groups, which in turn leads to lesser levels of love addiction. However, it is also possible that living with the partner decreases love addiction characteristics such as the sense of urgency to meet, the

withdrawal symptoms, and the need to spend more time with the partner, because the partners are possibly already frequently and more certainly meeting each other, and engaged and married couples are mostly the ones that live together. Beyond that, the Mood Modification factor was the only factor that Courtship scores surpassed the Going out group scores, which can reflect the greater intimacy the partners share in a courtship compared to going out. In courtship, the partner is probably part of the individual's support network and helps with coping, while in going out, they are still trying to get to know each other. Although mood modification should include only the use of the partner, similar to a drug that alleviates distress, a part of partner coping may be reflected in the item's responses.

In addition, the standards of love addiction from the participants of this study were provided. The lowest mean score on LAI-BR factors was 2.43 (Withdrawal), followed by 2.46 (Conflict), 2.58 (Relapse), 2.60 (Mood Modification), 2.87 (Salience) and 3.08 (Tolerance). Scores over 5 for Salience, Withdrawal, and Tolerance, over 4.50 for Mood Modification, Relapse, and Conflict, and 4.21 for the LAI composite score could be considered possible love addiction cases once above the 95 percentile. However, although a large sample of 1,310 participants took part in this study, caution should be taken in generalizations on these scores. All the participants were Brazilian adults currently in a romantic relationship, mostly women from the South East region. Participants had high education and were mostly white. Hopefully, the provided means, percentile, and standard deviations can help in cross-cultural comparisons and give some parameters to clinical professionals. However, they should not be used to assume a diagnosis, a need for treatment or be generalized to populations other than the one that took part in this study.

Love addiction is associated with harm and impairment, such as anxiety and depression (Suárez et al., 2021). Literature about this addiction is still scarce, and little is known about prevention and treatment (Maglia et al., 2023; Reynaud et al., 2010; Sanches & John, 2019). Of the few instruments available to measure love addiction, the Love Addiction Inventory is the only one based on a robust model of addiction that can be applied to any behavioral addiction (Griffiths, 2005). Besides, with a Brazilian instrument version, cross-cultural comparisons can be made, along with LAI-BR's clinical use, to track love addiction symptoms and in future studies.

The present study has some limitations that could be addressed in future studies. The instrument's temporal stability was not tested, and to be given a diagnosis, love addiction disorder symptoms have to be present for at least 12 months. Strategic foresight is to collect longitudinal data and verify temporal stability and symptom persistence. Some limitations of

the original LAI study were maintained in the current study, such as the use of exclusively self-report measures and a higher proportion of females. Beyond that, men who agree to take a survey about love addiction may leave the data biased.

Furthermore, clinical samples were not included, and because love addiction disorder is not an official diagnosis, it was not possible to ask participants if a previous health professional had previously given the participant this diagnosis. Including clinical samples makes it possible to use statistical analysis such as the ROC curve on dimensional data as the LAI-BR to calculate the sensitivity and specificity of the test, consequently defining a cut point to diagnosis (e.g., Hoo et al., 2017). Finally, future studies could also explore relations between love addiction and other variables such as Big Five personality factors, the presence of violence and abuse in the relationship, and variables associated with the development of healthy, gentle, and genuinely satisfying relationships.

## **Manuscript 2: Lovesickness: Love Addiction Disorder Nomological and Nosological Nets Characterization**

## **Abstract**

Love disorder is a proposed nomenclature for love addiction, a behavioral addiction in romantic relationships. There is a lack of scientific evidence to consider love disorder an official pathology. Hence, the present study aimed to advance the comprehension of love disorder by characterizing its nomological and nosological nets. For that, relations were explored between the constructs of love addiction, pathological love, emotional dependence, attachment, passion, borderline and dependent personality, relationship satisfaction, and stress. Participants were 1.310 Brazilian adults in a relationship. Results showed love disorder as a distinct construct from passion, personality, and attachment avoidance, with a negative relation with relationship satisfaction, and positive relation with stress. Besides, love disorder seems to be best represented by love addiction, than by emotional dependence and pathological love, and partially explained by attachment anxiety.

*Key-words:* Addictive Behavior; Scales; Dependency; Interpersonal Relations

## Resumo

Transtorno de amor é uma nomenclatura proposta para a adição ao amor, uma adição comportamental em relacionamentos amorosos. Há uma escassez de evidências científicas para considerar o transtorno do amor uma patologia oficial. Dessa maneira, o presente estudo buscou avançar na compreensão do transtorno do amor, pela caracterização de suas redes nomológica e nosológica. Para isso, foram exploradas relações entre os construtos adição ao amor, amor patológico, dependência emocional, apego, paixão, personalidade dependente e borderline, satisfação com o relacionamento e estresse. Um questionário online foi respondido por 1310 adultos brasileiros. Os dados apontam para o transtorno do amor como um construto distinto da paixão, personalidade e evitação relacionada ao apego, com relação negativa com satisfação com o relacionamento, e positiva com o estresse. Ademais, o transtorno do amor parece ser melhor representado pela adição ao amor, do que pela dependência emocional, e pode ser parcialmente explicado pela ansiedade relacionada ao apego.

*Key-words:* Comportamento Aditivo; Escalas; Dependência; Relações Interpessoais



People desire romantic relationships. For example, 55 billion matches have happened in the relationships app Tinder (Tinder, 2023), and in Brazil, 2022, 814.576 marriages were registered (ANOREG/BR, 2022). However, when a relationship is demarcated by a pattern of negative consequences toward a loved object, this condition is understood as a love addiction (Sussman, 2010). Nevertheless, Love Disorder is not an official diagnostic (e.g., CID-11; DSM-5) due to a lack of scientific evidence. To this extent, the present study aimed to advance in the acknowledgment of Love Disorder by characterizing its nomological and nosological nets. In addition to that, relations were tested between love addiction, pathological love, emotional dependence, attachment, personality, passion, relationship satisfaction, and stress.

### **Love Addiction**

Love addiction (LA) encompasses a pattern of restricted and repetitive behaviors directed toward a loved object, invariably resulting in negative consequences (e.g., social, interpersonal, safety, and legal issues) (Sussman, 2010). Is a potential disorder characterized by problematic patterns in romantic relationships, marked by an overwhelming desire and craving, despite the adverse consequences (Reynaud et al., 2010).

Redcay and Simonetti (2018) defined love addiction in 11 criteria divided into four factors: Impaired control (unsuccess in reducing or ending the relationship with the loved object, despite the desire to do it; an urgent desire to keep contact; frequent preoccupation with the loved object); Impairment (in other responsibilities (e.g., work, financial, family); continuous contact despite the problems; reduce interest in other activities; lies to keep the maladaptive behaviors (e.g., violence, self-harm)); Disregard of partner's behavior (continuous contact despite problems); And relapse to prevent or reduce undesirable or unbearable emotions. Nevertheless, Reynaud et al. (2010) considered love addiction a problematic pattern of relationships that persists for at least 12 months, accompanied by at least three of the following: withdrawal syndrome with a compulsive need for the loved object; Significant time (in reality or thought) spent on the relationship; Reduction in other activities; Desire to reduce the relationship; Relationship maintenance despite adverse consequences; And attachment difficulties. Finally, Costa and collaborators (2021) defined the criteria: Salience (thoughts and behaviors are oriented to the loved object, which is an essential part of life); Tolerance (need to increase the time (in person and thought) in the relationship); Mood Modification (the loved object becomes a way of coping with uncomfortable emotions); Relapse (difficulty in reducing the investment in the relationship);

Withdrawal (physical withdrawal symptoms in the absence of the loved object); And Conflict (interference in other life activities).

### **Pathological Love**

Pathological love is commonly used as a synonym for love addiction (e.g., Bution & Wechsler, 2016; Sussman, 2010). Pathological love (PL) comprehends the lack of control to pay attention and care for a romantic partner (Sophia et al., 2007). Criteria for PL are withdrawal symptoms (e.g., tachycardia, insomnia, nausea) in the emotional or physical distance from the partner; Taking care of the partner in higher frequency and amount than the intended; Bigger amount of time and energy spent in thought and behaviors to control the partner; Unsuccessful tries to reduce the attention paid on the partner; Abandonment of interests and activities that were valued before; And maintenance of the relationship, despite the impairments.

### **Emotional Dependence**

Another construct frequently addressed as a synonym to love addiction is emotional dependence (e.g., Bution & Wechsler, 2016). Emotional dependence (ED) manifests the need for the relationship to achieve emotional stability (Bution & Wechsler, 2016). It is understood as a relational disorder marked by addictive and maladaptive behaviors toward a romantic object in the maladaptive try to satisfy a pattern of unsatisfied emotional needs (Castelló, 2005; Moral & Sirvent, 2008). It is understood as a behavioral addiction (Camarillo et al., 2020; Olave et al., 2021), even being related to other addictions (e.g., exercise, alcohol, and other drugs) (Barbarias et al., 2019; Momeñe et al., 2021; Olave et al., 2021).

Individuals with ED feel a craving for the loved object, a compulsive need to be with it (withdrawal), separation anxiety (fear of abandonment and distance, automatic thoughts concerning loss), centralize the relationship, depend on it in a subordinate way, fear to lose it, need continuous affect reaffirmations, seek attention, exclusivity and centrality in the partner's life, and modify plans to satisfy and spend more time with the loved object (Bution & Wechsler, 2016; Camarillo et al., 2020; Hoyos & Arredondo, 2006; Villa-Moral et al., 2018). Moreover, individuals with ED can express impulsivity and aggressivity towards the possibility of rupture, and experience an emotional emptiness.

### **Attachment**

The attachment system develops in childhood through the child's interactions with their caregiver, providing the security necessary to explore their environment (Bowlby, 1969). The attachment system continues throughout adult life, and shapes behaviors, thoughts, and feelings experienced in romantic relationships (Consoli et al., 2018; Shaver & Hazan, 1987).

Attachment can be comprehended along the continuous dimensions of anxiety and avoidance (Shiramizu et al., 2013). While anxiety refers to the greater need and desire for emotional and physical proximity and concern with relationship continuity, avoidance concerns the discomfort with emotional intimacy and partner dependency (Natividade & Shiramizu, 2015). Hence, attachment covers the comfort and security level in establishing intimacy in relationships.

More specifically, high levels of attachment-related anxiety are translated into a constant concern with the availability and permanence of the attachment figure. As a consequence of the uncertainty of the availability, the individual focus on the attachment figure (the romantic partner) and, thus, watches over for rejection and abandonment signs, monitors the partner's behavior, searches constantly for the partner's reaffirmation and proximity, stop exploring other environments, perceives more easily relationship threats and passes through more fluctuations in the relationship (Bowlby, 1969, 1973; Campbell & Marshall, 2011; Collins & Read, 1990; Fraley & Shaver, 2000; Shaver & Hazan, 1987). Therefore, attachment-related anxiety can explain patterns observed in the love disorder.

### **Personality disorders**

Personality disorders grasp inflexible and stable functioning patterns (behavior, emotion, thoughts) that differentiate from the expected for an individual and that lead to significant clinical suffering or impairment (APA, 2023). Two personality disorders that seem to assemble the nosology of love disorder are the Dependent Personality Disorder (DPD) and Borderline Personality Disorder (BPD).

DPD is characterized by a global, invasive, and excessive need to be taken care of, which leads to fear of abandonment and submission behaviors in all contexts (APA, 2023). Individuals with DPD present difficulties in assuming responsibilities, making decisions, and doing things alone, fear of abandonment, and helplessness in the lack of care, and this care need is present in all relationships, not only in the romantic field. People with DPD are often involved in uncomfortable situations, which include unsatisfactory relationships and engaging in consecutive romantic relationships to avoid being alone (APA, 2023). Furthermore, the DPD is related to practice and being a victim of abuse in relationships (Disney, 2013).

As for BPD, this disorder encompasses a pattern of impulsivity and instability in relationships, self-image, and affects (APA, 2023). People with BPD display exaggerated efforts to avoid abandonment, vary between idealization and devaluation of relationships, present impulsive and self-destructive behavior (e.g., substance abuse), self-harm, affective instability, chronic feeling of emptiness, intense range, and dissociative symptoms (APA,

2023). Besides, the romantic relationships of people with BPD are chaotic and unstable, marked by ups and downs, repetitive discussions, desperate actions to avoid abandonment, less satisfaction, greater hostility towards the partner, insecure attachment, passive-aggressive communication, and a higher number of romantic relationships with shorter duration (Dias & Natividade, 2022; Navarro-Gómez et al., 2017; Wongpakaran et al., 2019).

### **Passion**

Passion, also named obsessive love or lovesickness (Hatfield & Rapson, 1987), is a state of intense desire to union with a person (Hatfield & Walster, 1978). People who fall in love feel pleasure and a desperate desire for the passionate object, which becomes a central goal in the individual's life (Reynaud et al., 2010). Passion is an experience of pleasure, motivation, reward, and suffering. It is expected that people in love suffer in the absence of the partner (separation anxiety), present sympathetic nervous system responses (sweat, butterflies in the stomach, racing heart), and change their priorities and habits to fit the partner (Fisher, 2014). Falling in love is an addictive experience (Redcay & Simonetti, 2018).

Passion is a universal motivational state that yields to wanting to be together and protect the relationship. A craving and motivation towards the amorous object, that evolved to motivate human beings to focus on a partner, invest time and energy in the relationship and, finally, reproduce (Aron et al., 2005; Fisher et al., 2005; Fisher et al., 2016; Reynaud et al., 2010). Naturally, attention is given to the loved object, priorities are rearranged, the humor oscillates, the sympathetic nervous system is activated, obsessive thoughts about the loved object occur, preoccupations concerning the loved object, a desire of emotional union, of physical proximity and knowing the partner, a motivation to keep the bond, compulsion, craving, attraction, withdrawal, euphoria, lack of control, and serving the partner to influence its feelings (Fisher et al., 2010; Fisher et al., 2016; Hatfield & Sprecher, 1986; Perrota, 2020). Thus, it is necessary to differentiate passion from love disorder.

### **Nomologic and Nosological Nets**

A mental disorder includes a syndrome with signals and symptoms characterized by a clinically significant frequent and intense disturbance of cognition, emotional regulation or behavior that reflects in suffering, impairment in activities, or in the individual's development (APA, 2023). Therefore, for the love disorder to be considered a pathology or official disorder, the presence of somatic markers and evident suffering and impairment is necessary. Moreover, it has to be an independent disorder from other pathologies.

Thus, a negative relationship with relationship satisfaction and a positive relationship with stress are expected with love disorder to indicate suffering and impairment. If love

disorder does not present an apparent impairment, there is no reason to consider it a pathology. Besides, following the logic of other addictive disorders, symptoms must be present for at least 12 months (APA, 2023). However, it is worth highlighting that the criteria and definitions proposed for love disorder exposed in this study are already theoretically based on the indispensable presence of negative consequences (e.g., Sophia et al., 2007; Sussman, 2010).

In addition, love disorder is expected to be different from passion, borderline and dependent personality disorders, and attachment-related anxiety to be considered an independent disorder and construct. Although love addiction has been differentiated from mania, impulsivity, personality disorders, erotomania, obsessive compulsive disorder, and sex addiction (e.g., Borrello et al., 2023; Sanches & John, 2019; Sophia et al., 2007; Sophia, 2014), evidence regarding love disorder is still restricted and to be considered an official nosology, it needs to be different from other constructs and diagnostics.

The nomological net evolves the net of relations between the construct, the observable properties of the construct, and theoretical constructs different from it (Cronbach & Meehl, 1955; Pasquali, 2007), while the nosological net apprehends the signals and symptoms of a disease (Conselho Federal de Psicologia, 2013; American Psychiatric Association, 2018). Thus, the present study aimed to advance in the characterization of the nomological and nosological nets of love disorder. More specifically, explore relations between the constructs of love addiction, pathological love, emotional dependence, attachment, personality, passion, relationship satisfaction, and stress to verify its convergence, divergence, and correlations.

## Method

### Participants

Participants of this study were 1,310 Brazilian adults, with a mean age of 30,3 years old ( $SD = 12,2$ ), 84.3% women, 15.1% men, and 0.60% other/did not want to declare. All participants were currently in a romantic relationship, with a mean length of 1,811.2 days (4.96 years) ( $SD = 3,131.6$  days), from which 15.8% were married, 7.6% were in a common-law marriage, 2.3% were engaged, 44.4% were in courtship, 12.7% were going out together and 17.2% were in other types of relationships (e.g., friends with benefits). Besides that, 68.8% of the participants declared themselves heterosexual, 24.3% bisexuals, 4.8% gays/lesbians and 2.2% other/did not want to declare, from which 76.8% were in a relationship with a man, 22.7% with a women and 0.5% other/did not want to declare. 18.3%

of the participants were in non-monogamic relationships, but the participants were requested to choose only one partner to answer the questionnaire. 11.8% had children together and 29.5% lived together. Concerning education, the participants declared to have complete graduate course (16.6%), incomplete graduate course (6.1%), complete high education (22.3%), incomplete high education (36.3%), complete high school (15.6%), incomplete high school (2%), complete elementary school (0.5%) and incomplete elementary school (0.6%). Furthermore, 939 participants declared their race/ethnicity, from which 68.1% declared themselves as whites, 23.1% mixed race/brown, 6.2% black, 1.6% yellow, 0.2% indigenous, 0.9% did not want to declare, and were from the South region of the country 10.1% of the participants, from the Southeast region 62.8%, the Midwest region 5.3%, the Northeast region 16.9%, the North region 3.2% and were not currently in Brazil 1.7% of the respondents.

### Measures

Participants answered a questionnaire compound of sociodemographic questions as gender, age, education, and relationship characteristics, and the scales described below. The questionnaire also included control items to guarantee the data selection only of participants who were aware of their responses.

*Love Addiction Inventory - Brazil* (Zibenberg & Natividade, Unpublished Manuscript). Self-report scale composed of 24 items to assess love addiction. The respondent must sign 1-Never to 5-Very often to indicate the frequency of the respondent's behaviors described in each affirmative. Item examples are "Feel anxious when you are not in the company of your partner" and "Stay with your partner to relieve stress". Alpha coefficients on the Brazilian version ranged from .72 to .92 in the six factors of the Love Addiction Inventory.

*Questionário de Dependência Emocional (Emotional Dependence Questionnaire)* (Fonsêca et al., 2020). Scale compound of 23 items to assess cognitive and psychological aspects of emotional dependence. The respondent must rate each affirmative on a scale of 1- Completely false in me to 6- It perfectly describes me. Items examples are "When my partner needs to go away for a few days, I feel anguish" and "I need to have one person to whom I will be more special than the others". In the original study, the instrument presented a one-factor structure and alpha coefficient of .92, and in the present study alpha coefficient .94.

*Escala do Amor (Love Scale; Sophia, 2014)*. Compound of 22 items to be answered in a scale of four points, ranging from 1-Never/Rarely to 4-Always/Almost always to assess pathological love. The scale is compound by four factors Control, Dissatisfaction (with the relationship), Abnegation and Idealization and items examples are "In general, I maintain

relationships that cause me anxiety and suffering” and “I feel a profound spiritual connection with the person I love, which I can not explain in words”. The original study presented an alpha coefficient of .31 to Idealization, .77 to Abnegation, .85 to Dissatisfaction and .86 to Control, and in the present study were found alpha coefficients of .26, .80, .63, and .79, respectively.

*Passionate Love Scale - Reduced (Natividade & Zibenberg, In Elaboration).* Brazilian version of Hatfield and Sprecher (1986) instrument to measure passionate love. Compound by 15 items that must be answered in a Likert scale of five points, in which 1=Not true at all and 5 = Totally true. Item examples are “I want \_\_\_ physically, emotionally, mentally” and “I would rather be with \_\_\_ than anyone else”. In the original Brazilian study, the scale presented a CFI of .96, TLI of .95, RMSEA of .059, and alpha of .91, and in the present study an alpha coefficient of .88.

*Experience in Close Relationship Reduced Brazil -Reduced (Natividade & Shiramizu, 2015).* A scale compound of 10 items to assess the attachment-related dimensions of anxiety and avoidance. The respondent must sign from 1 = Completely disagree to 7 = Completely agree how much it agrees with each item. Item examples are “I try to avoid getting too close to my partner” and “I get frustrated if my romantic partner is not available when I need them”. The instrument presented alpha coefficients of .73 for both factors in the original Brazilian study; and of .68 for avoidance, and .81 for anxiety in the present study.

*Instrumento de Avaliação dos Transtornos da Personalidade (Personality Disorders Assessment Instrument; Guimarães et al., 2016).* Instrument compound of 207 items to assess personality disorders. The respondent must mark from 1=Completely disagree to 6 = Completely agree how much each affirmative describes it. Only 13 items concerning the Dependent Personality Disorder factor were used in this study. Item examples are “I can do things not in my interest to obtain attention” and “I dislike making decisions on my own”. The original and present studies found an alpha coefficient of .90 for this factor.

*McLean Screening Instrument for Borderline Personality Disorder (Dias & Natividade, 2022).* Instrument composed of ten items to assess borderline personality disorder. The respondent must mark each affirmative “yes” or “no” if the affirmative describes the respondent. Item examples are “Have you been extremely moody?” and “Have you chronically felt empty”. The original study found an alpha coefficient of .69, and the present study found an alpha coefficient of .74.

*Escala de Nível de Satisfação com o Relacionamento Amoroso - ENSRA-R (Level of Satisfaction with the Romantic Relationship Scale; Londero-Santos et al., 2021).* An



instrument to assess the satisfaction with the relationship is composed of five items in affirmative form, in which the participant must sign, on a scale of nine points, how much it agrees with each affirmative, being 0 = Do not agree with anything and 8 = Completely agree. The higher the punctuation, the higher the relationship satisfaction. An item example is “Our relationship makes me happy”. The scale presented an alpha coefficient of .91 in the original study and the present.

*The Kessler Psychological Distress Scale (K10)* (Lins et al., 2010). The Brazilian version of the Kessler Distress Scale instrument (Kessler et al., 2003) composed of 10 items to assess the frequency that anxiety and depression symptoms were experienced in the last month. The respondent must sign from 1 = Never to 5 = All the time, the frequency it experiences each affirmative. The instrument presented an alpha coefficient of .84 in Lins et al. (2010) study and .90 in the present study.

## Procedures

**Ethical and Data Collection.** Participants were recruited by disclosing an online questionnaire on social media (WhatsApp, Instagram, Tiktok, etc.). All participants must had consent in participating in the research. The Free and Informed Consent Term and the estimated time to answer were available on the questionnaire’s first page and information about the anonymous and voluntary participation according to the Ethic Committee terms. This research was approved by the *Comitê de Ética em Pesquisa da Universidade Estácio de Sá - CEP/UNESA*, under the protocol number 5.903.034.

**Analysis.** Initially, data was cleaned, with the maintenance exclusively of participants who correctly answered the control item, and 572 participants were excluded from the analysis. A correlation analysis was computed between love addiction, pathological love, emotional dependence, anxiety, and avoidance related to attachment, passion, borderline and dependent personality, stress, and relationship satisfaction. Posteriorly, a Fruchterman-Reingold force-directed graph drawing algorithm was used to visualize the love addiction nomological net graphically, and multidimensional scaling analysis was also conducted to check the similarity relationships among the selected variables in a geometric space. In sequence, an exploratory factor analysis was conducted, including the variables love addiction, pathological love, emotional dependence, attachment, passion, and borderline and dependent personality. Finally, a model composed of the variables anxiety and avoidance related to attachment and dependent and borderline personality was tested as a predictor for love addiction, emotional dependence, and pathological love.



## Results

First, correlation analyses were conducted between love addiction, pathological love, emotional dependence, anxiety and avoidance factors of attachment, passion, borderline and dependent personality, stress, and relationship satisfaction. Pearson coefficients are presented in Table 1. Positive correlations were found between all love addiction factors and the composite love addiction score with emotional dependence and with all four factors and the composite score of pathological love. Besides, love addiction, emotional dependence, and pathological love were positively correlated to attachment-related anxiety, dependent and borderline personality, stress, and passion (except for the Dissatisfaction factor from Pathological Love, which presented a negative correlation). In addition, the factors Salience, Tolerance, Mood Modification, the LAI composite score, Emotional Dependence, Dissatisfaction, Idealization, and the pathological love composite score negatively correlated to attachment-related avoidance, and all factors and composite scores from love addiction, emotional dependence, and pathological love were negatively correlated with relationship satisfaction, except for the LAI factor Mood Modification. It should be noted that passion was not significantly correlated to stress, but was positively correlated to relationship satisfaction.

A multidimensional scaling analysis was conducted, and the results are illustrated in Figure 1. In this analysis, variables such as love addiction, pathological love, emotional dependence, passion, personality, and attachment were distributed within a Cartesian space (Mead, 1992). Notably, there were larger distances between passion and attachment-related avoidance. In contrast, the remaining variables, including love addiction, emotional dependence, pathological love, personality, and attachment-related anxiety, were positioned closer to each other. This proximity indicates a higher similarity among these variables and a greater dissimilarity with passion and attachment-related avoidance.

Furthermore, the analysis employed a Fruchterman-Reingold force-directed layout algorithm. This algorithm uses lines like springs to maintain an ideal distance between variables. In the applied code, the absolute value of the correlation coefficient was proportional to the spring's force, adjustable through the weight of the edges. Stronger correlations, indicated by heavier edges, draw the variables closer together (Fruchterman & Reingold, 1991). The resulting graphic (see Figure 2) visually represents the strength of correlations through the thickness of the lines and spatial distances, effectively illustrating the correlation net of love addiction. All correlation coefficients were .60 or higher.

Table 1

*Correlations between Love Addiction, Pathological Love, Emotional Dependence, Attachment, Passion, Personality, Relationship Satisfaction, and Stress.*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1) LAI - S	-																		
2) LAI- W	.75*	-																	
3) LAI- T	.80*	.74*	-																
4) LAI- M	.54*	.56*	.60*	-															
5) LAI - R	.62*	.61*	.61*	.46*	-														
6) LAI - C	.52*	.61*	.51*	.43*	.54*	-													
7) LAI	.87*	.87*	.88*	.74*	.78*	.73*	-												
8) Emo Dep <sup>1</sup>	.64*	.74*	.64*	.55*	.56*	.63*	.77*	-											
9) PL - D <sup>2</sup>	.19*	.37*	.21*	.08**	.20*	.33*	.28*	.32*	-										
10) PL - A <sup>2</sup>	.42*	.50*	.42*	.41*	.37*	.52*	.54*	.54*	.18*	-									
11) PL - C <sup>2</sup>	.49*	.60*	.49*	.44*	.47*	.54*	.62*	.74*	.46*	.53*	-								
12) PL - Id <sup>2</sup>	.39*	.36*	.38*	.31*	.33*	.23*	.41*	.37*	-.03	.34*	.36*	-							
13) PL <sup>2</sup>	.53*	.65*	.53*	.43*	.48*	.57*	.65*	.68*	.61*	.72*	.81*	.62*	-						
14) Anxiety <sup>3</sup>	.47*	.60*	.52*	.36*	.42*	.47*	.58*	.73*	.52*	.38*	.66*	.27*	.66*	-					
15) Avoidance <sup>3</sup>	-.13*	-.06*	-.12*	-.22*	-.05	-.04	-.13*	-.14*	.42*	-.07*	.05	-.16*	.10*	-.01	-				
16) Dep Pers <sup>4</sup>	.35*	.45*	.36*	.41*	.33*	.42*	.48*	.63*	.34*	.38*	.57*	.13*	.49*	.55*	.05	-			

17) Bor Pers <sup>4</sup>	.29*	.38*	.32*	.36*	.27*	.32*	.40*	.43*	.42*	.28*	.55*	.18*	.52*	.47*	.15*	.55*	-		
18) Passion <sup>5</sup>	.52*	.43*	.53*	.38*	.36*	.25*	0,51*	0,46*	-.26*	.30*	.24*	.43*	.24*	.27*	-.42*	.12*	.01	-	
19) Stress <sup>6</sup>	.34*	.47*	.38*	.40*	.32*	.38*	.47*	.50*	.48*	.38*	.55*	.20*	.58*	.48*	.14*	.60*	.64*	.02	-
20) Rel Sat <sup>7</sup>	-.13*	-.31*	-.15*	-.03	-.16*	-.27*	-.21*	-.26*	-.85*	-.13*	-.37*	.06**	-.50*	-.46*	-.39*	-.26*	-.36*	.31*	-.42*

*Note.* LAI = Love Addiction Inventory - BR; S = Salience; W = Withdrawal; T = Tolerance; M = Mood Modification; R = Relapse; C = Conflict; Emo Dep = Emotional Dependence; PL = Pathological Love; D = Dissatisfaction; A = Abnegation; C = Control; Id = Idealization; Attach Ax = Attachment anxiety; Attach Av = Attachment Avoidance; Dep Pers = Dependent Personality; Bor Pers = Borderline Personality; Rel. Sat. = Relationship Satisfaction. When not mentioned,  $N = 1,296$ ; <sup>1</sup> $N = 1,012$ ; <sup>2</sup> $N = 1,015$ ; <sup>3</sup> $N = 974$ ; <sup>4</sup> $N = 639$ ; <sup>5</sup> $N = 1197$ ; <sup>6</sup> $N = 982$ ; <sup>7</sup> $N = 1,226$ .

\* $p < .001$ ; \*\* $p < .05$

Figure 1a

*Multidimensional Scaling Analysis for Love Addiction, Pathological Love, Emotional Dependence, Passion, Personality, Attachment and Relationship Satisfaction*

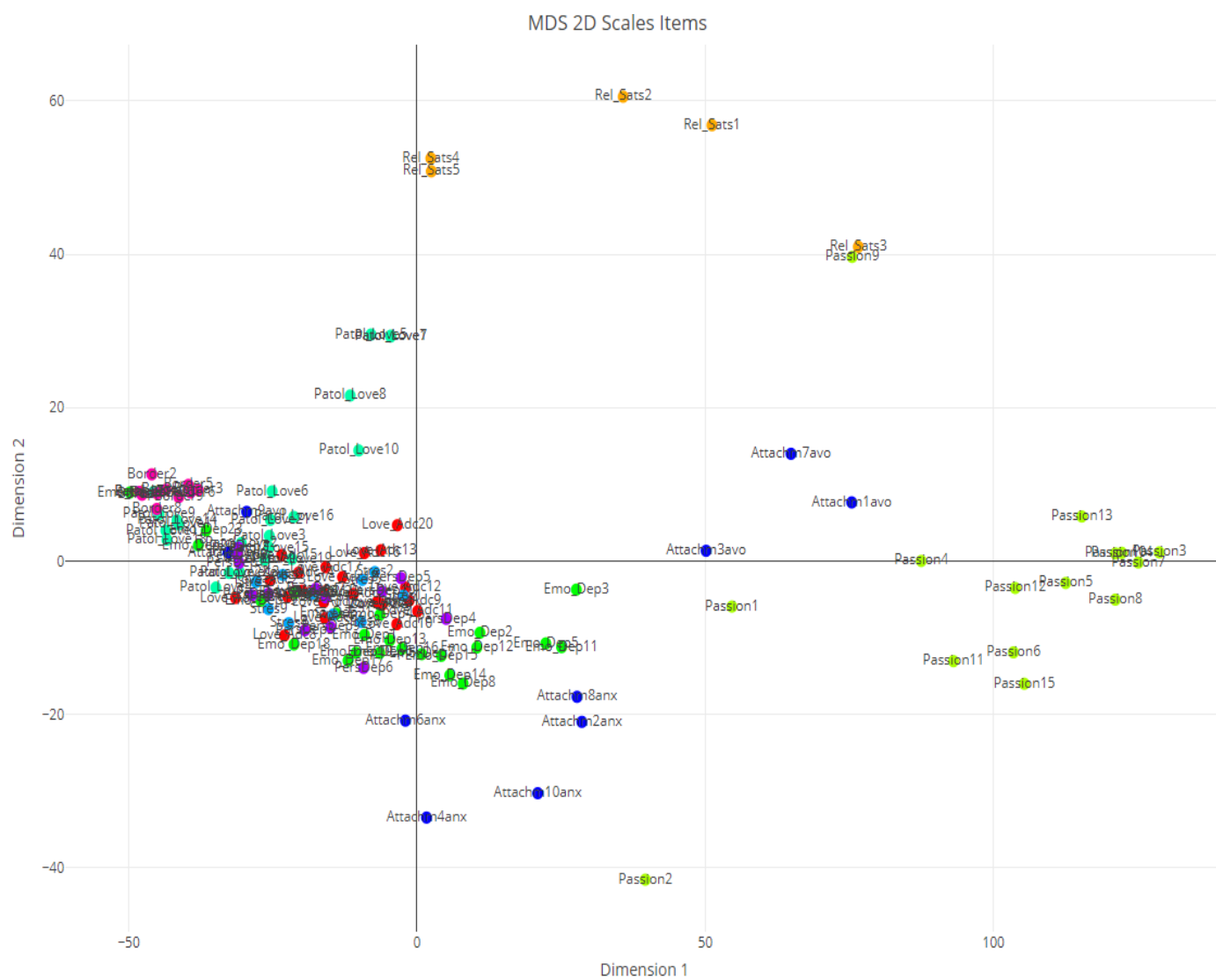


Figure 1b

*Multidimensional Scaling Analysis for Love Addiction, Pathological Love, Emotional Dependence and Personality*

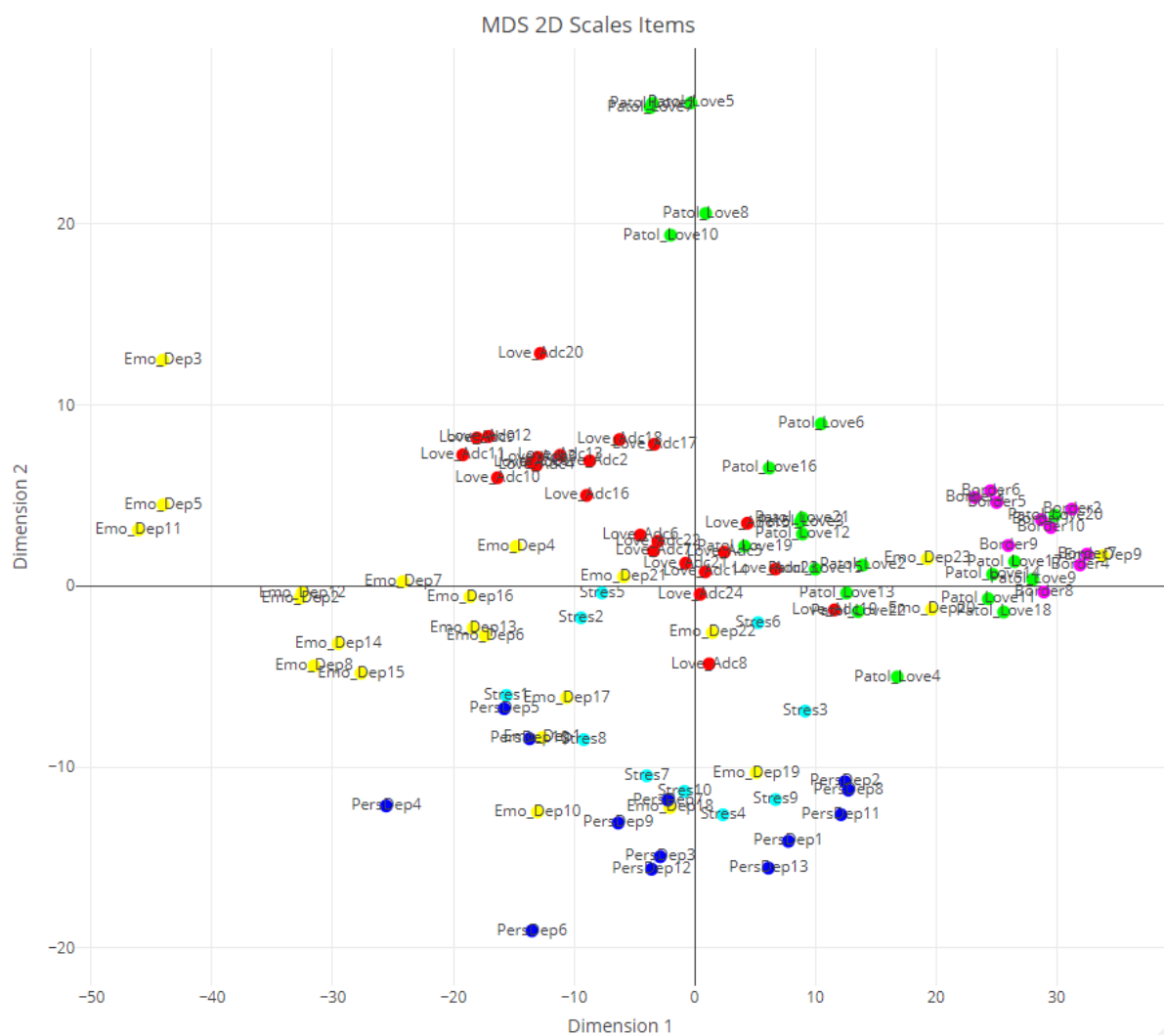
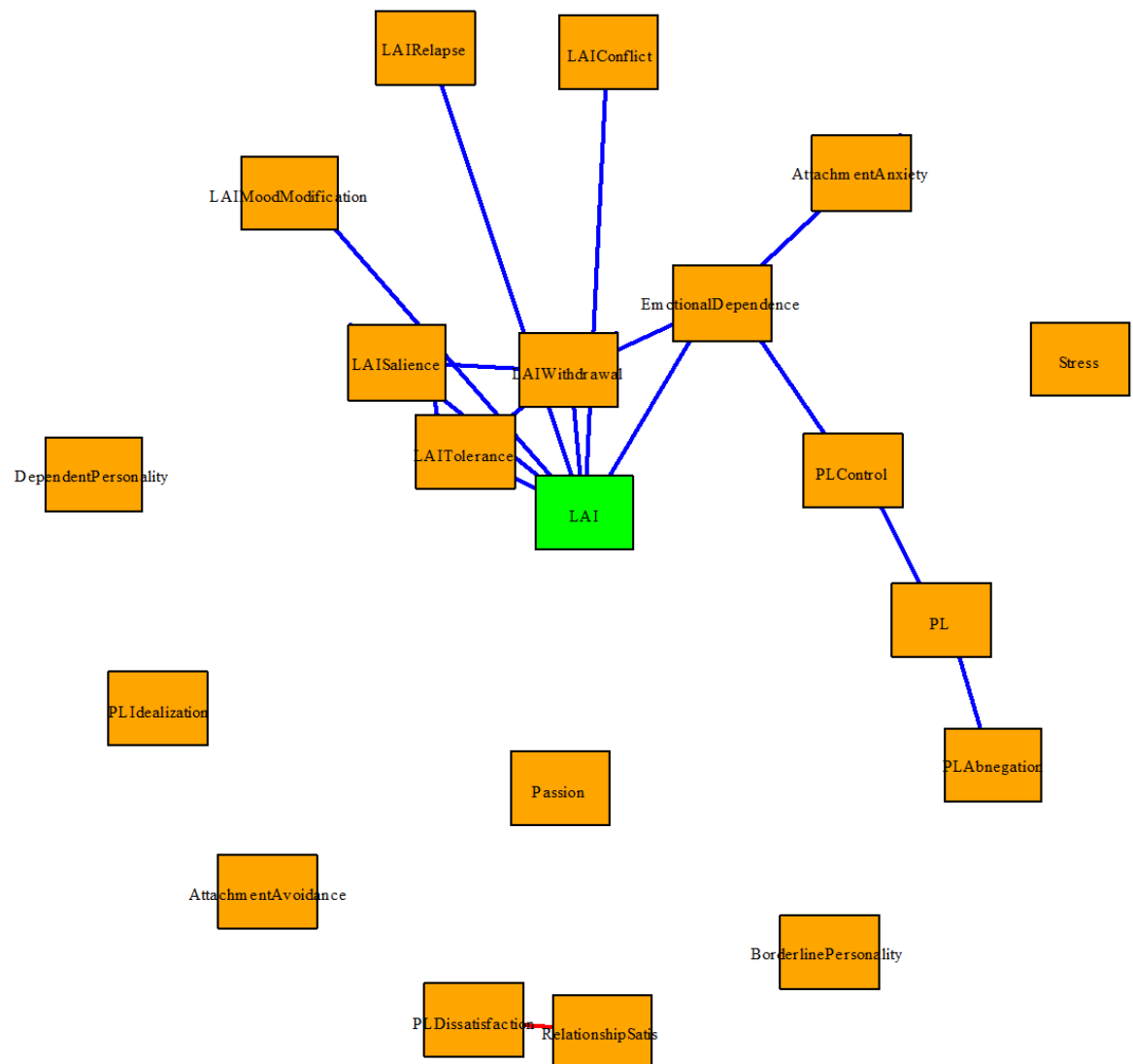




Figure 2b

*Love Addiction Correlation Net Above .70, Graphically Represented by Fruchterman-Reingold Algorithm.*



Note: All correlations  $p > .70$

Additionally, exploratory factor analysis was conducted, incorporating variables such as love addiction, emotional dependence, pathological love, attachment-related anxiety and avoidance, passion, borderline personality, and dependent personality (Table 2). The Bartlett Test of Sphericity yielded a significant result ( $p < .001$ ), and the Kaiser-Meyer-Olkin (KMO) was .96, indicating adequacy for factor analysis. A Principal Axis Factoring approach was utilized, applying an oblimin rotation with a predetermined extraction of three factors. Factor loadings below .20 were omitted for clarity.

The composition of the factors the following: Factor I comprised all 24 items of love addiction, 15 items of emotional dependence, 11 items of pathological love, three items of attachment-related anxiety, and five items of passion. Factor II included eight items of emotional dependence, four items of pathological love, two items of attachment-related anxiety, 13 items of dependent personality, and nine items of borderline personality. Finally, Factor III encompassed six items of pathological love, five items of attachment-related avoidance, one item of borderline personality, and 10 items of passion.



Table 1

*Factor Loadings for Love Addiction, Emotional Dependence, Pathological Love, Passion, Attachment, and Personality for a three-factor model.*

	Factor I	Factor II	Factor III
LAI 1	<b>.79</b>		
LAI 2	<b>.78</b>		
LAI 3	<b>.80</b>		
LAI 4	<b>.80</b>		
LAI 5	<b>.70</b>		
LAI 6	<b>.78</b>		
LAI 7	<b>.69</b>		
LAI 8	<b>.62</b>		-.23
LAI 9	<b>.74</b>		
LAI 10	<b>.75</b>		
LAI 11	<b>.75</b>		
LAI 12	<b>.70</b>		
LAI 13	<b>.34</b>	.23	
LAI 14	<b>.39</b>	.32	
LAI 15	<b>.43</b>	.25	
LAI 16	<b>.36</b>	.31	
LAI 17	<b>.60</b>		
LAI 18	<b>.59</b>		
LAI 19	<b>.53</b>		-.25
LAI 20	<b>.33</b>		
LAI 21	<b>.50</b>		
LAI 22	<b>.58</b>		
LAI 23	<b>.50</b>		-.22
LAI 24	<b>.44</b>	.21	
Emo Dep 1	.31	<b>.46</b>	
Emo Dep 2	.41	<b>.41</b>	
Emo Dep 3	<b>.38</b>		

Emo Dep 4	<b>.50</b>	.22	
Emo Dep 5	<b>.41</b>	.35	
Emo Dep 6	<b>.48</b>	.21	
Emo Dep 7	<b>.60</b>	.23	
Emo Dep 8	<b>.45</b>	.34	
Emo Dep 9		<b>.22</b>	
Emo Dep 10		<b>.60</b>	
Emo Dep 11	.35	<b>.40</b>	
Emo Dep 12	.28	<b>.36</b>	
Emo Dep 13	<b>.50</b>	.30	
Emo Dep 14	<b>.46</b>	.36	
Emo Dep 15	<b>.43</b>	.42	
Emo Dep 16	<b>.62</b>		
Emo Dep 17	<b>.48</b>	.29	
Emo Dep 18	.35	<b>.50</b>	
Emo Dep 19		<b>.55</b>	
Emo Dep 20	<b>.35</b>	.27	
Emo Dep 21	<b>.58</b>		
Emo Dep 22	<b>.31</b>	.26	
Emo Dep 23	<b>.33</b>		
Pathological Love 1	-.31		<b>.74</b>
Pathological Love 2	<b>.33</b>	.22	
Pathological Love 3	<b>.37</b>	.22	
Pathological Love 4	.28	.25	<b>-.45</b>
Pathological Love 5	-.24		<b>.77</b>
Pathological Love 6	<b>.33</b>		
Pathological Love 7	-.27		<b>.78</b>
Pathological Love 8			<b>.67</b>
Pathological Love 9		<b>.27</b>	<b>-.22</b>
Pathological Love 10	.31		<b>.42</b>
Pathological Love 11		<b>.37</b>	

Pathological Love 12	<b>.39</b>		
Pathological Love 13	<b>.43</b>		-.23
Pathological Love 14	<b>.34</b>	.26	
Pathological Love 15		<b>.22</b>	
Pathological Love 16	<b>.30</b>		
Pathological Love 17	<b>.29</b>		-.24
Pathological Love 18	<b>.34</b>	.30	-.20
Pathological Love 19	<b>.30</b>	.28	
Pathological Love 20			
Pathological Love 21		<b>.31</b>	
Pathological Love 22	<b>.49</b>	.26	
Attachment Avoidance 1			<b>.49</b>
Attachment Anxiety 1	.29	<b>.46</b>	
Attachment Avoidance 2		.35	<b>.42</b>
Attachment Anxiety 2	<b>.43</b>		-.39
Attachment Avoidance 3			<b>-.44</b>
Attachment Anxiety 3	<b>.332</b>	.328	
Attachment Avoidance 4			<b>.51</b>
Attachment Anxiety 4	.30	<b>.34</b>	
Attachment Avoidance 5			<b>-.25</b>
Attachment Anxiety 5	<b>.44</b>		-.21
Dependent Pers 1		<b>.67</b>	
Dependent Pers 2		<b>.69</b>	
Dependent Pers 3		<b>.68</b>	
Dependent Pers 4		<b>.72</b>	
Dependent Pers 5		<b>.58</b>	
Dependent Pers 6		<b>.63</b>	
Dependent Pers 7		<b>.60</b>	
Dependent Pers 8		<b>.62</b>	
Dependent Pers 9		<b>.57</b>	
Dependent Pers 10		<b>.57</b>	

Dependent Pers 11		<b>.71</b>	
Dependent Pers 12		<b>.63</b>	
Dependent Pers 13		<b>.58</b>	
Borderline Pers 1		<b>.27</b>	
Borderline Pers 2		<b>.24</b>	
Borderline Pers 3		<b>.22</b>	
Borderline Pers 4		<b>.38</b>	
Borderline Pers 5		<b>.24</b>	
Borderline Pers 6			<b>-.21</b>
Borderline Pers 7		<b>.35</b>	
Borderline Pers 8		<b>.44</b>	<b>-.25</b>
Borderline Pers 9		<b>.46</b>	
Borderline Pers 10		<b>.31</b>	
Passion 1	<b>.36</b>	<b>.25</b>	<b>.39</b>
Passion 2	<b>.73</b>		
Passion 3	<b>.29</b>		<b>.55</b>
Passion 4	<b>.45</b>		<b>.40</b>
Passion 5	<b>.27</b>		<b>.42</b>
Passion 6	<b>.42</b>		<b>.30</b>
Passion 7	<b>.37</b>		<b>.61</b>
Passion 8	<b>.49</b>		<b>.53</b>
Passion 9			<b>.71</b>
Passion 10	<b>.38</b>	<b>-.21</b>	<b>.43</b>
Passion 11	<b>.61</b>		<b>.27</b>
Passion 12	<b>.24</b>		<b>.41</b>
Passion 13	<b>.25</b>		<b>.52</b>
Passion 14	<b>.40</b>		<b>.54</b>
Passion 15	<b>.42</b>		<b>.23</b>

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Note: Numbers in bold indicate the corresponding factor column. Dependent Pers= Dependent Personality; Borderline Pers= Borderline Personality.

Lastly, a regression analysis was conducted with a model compounded by the variables attachment (Anxiety and Avoidance) and personality (Dependent and Borderline) to predict the love addiction composite score, the pathological love composite score, and the emotional dependence (Table 3). The model was capable of explaining 41% of love addiction, 62% of emotional dependence, and 48% of pathological love. All variables were significant, except for borderline personality predicting emotional dependence.

Table 3

*Predictor of Love Addiction, Pathological Love and Emotional Dependence*

Love Addiction			
	$\beta$	$t$	$p$
<i>Constant</i>		78.02	<.001
Borderline Personality	.12	3.06	.002
Dependent Personality	.17	4.39	<.001
Attachment Anxiety	.44	11.66	<.001
Attachment Avoidance	-.16	-5.11	<.001
R <sup>2</sup>	.41		
Emotional Dependence			
	$\beta$	$t$	$p$
<i>Constant</i>		73.71	<.001
Borderline Personality	.03	1.13	.26
Dependent Personality	.33	10.37	<.001
Attachment Anxiety	.52	17.08	<.001
Attachment Avoidance	-.16	-6.50	<.001
R <sup>2</sup>	.62		
Pathological Love			
	$\beta$	$t$	$p$
<i>Constant</i>		111.75	<.001
Borderline Personality	.22	6.23	<.001
Dependent Personality	.10	2.64	.008

Attachment Anxiety	.49	13.85	<.001
Attachment Avoidance	.09	3.16	.002

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$R^2$	.48
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## Discussion

The present study aimed to advance in the characterization of the nomological and nosological nets of love disorder, a possible nomenclature for the behavior addiction in love/a romantic relationship. Although some authors have tried to define criteria for love as an addiction (e.g., Reynaud et al., Sophia et al. (2007), there is a need to understand Love Disorder from a nosological standpoint better (Sanches & John, 2019). I.e., to verify if Love Disorder is an independent disorder (distinct from personality and attachment characteristics), with notable impairment (relation with stress and relationship satisfaction), different from the typical experience of falling in love (separated from passion), and encompassed in which constructs in previous literature (emotional dependence, pathological love, and love addiction).

To this end, correlation, multidimensional scaling, Fruchterman-Reingold force-directed algorithm, exploratory factor analysis, and regression analysis were conducted. The significance, direction, and strength of the correlations and regressions were analyzed, along with factor loadings distributions, line's thickness, and variables distances. Our findings suggest that love addiction, pathological love, emotional dependence, borderline and dependent personality, attachment anxiety and avoidance, and passion, although related, are not the same constructs. Thus, Love Disorder can be a legitim and independent addictive disorder.

The three factors from the exploratory factor analysis can be named as: Love Disorder (Factor I), Personality (Factor II), and Relationship Satisfaction (Factor III). Factor I included love addiction related items. Therefore, Love Disorder seems to comprehend symptoms from: love addiction factors Salience, Withdrawal, Mood Modification, Tolerance, Relapse, and Conflict; Emotional dependence items mostly related to attention seeking, separation anxiety, constant affective expression, and plan's modification to satisfy and be with the romantic partner (Fonseca et al., 2020; Hoyos e Arredondo, 2006; Rodrigues & Arantes, 2021); Pathological love Abnegation factor, and items concerning an intuition about the relationship, helping the partner, and attention and power-seeking; Attachment anxiety-related items concerning a desire for proximity and caring about the partner reciprocally; And passion items regarding obsession. Criteria for Love Disorder should be related to Factor I content, as well as Love Disorder assessment.

Passion items grouped in Factor I bring in their content: having obsessive and uncontrollable thoughts about the loved person, preferring to be with the loved object,



wanting to know everything about it, and feeling bad when the relationship is not going well. Aron and Acevedo (2009) have proposed that passionate love can be divided into romantic love and obsession. While the first is positively correlated with marital satisfaction, the second is not. Thus, love disorder may be related to obsessive passion and not related to romantic passion. Besides, the correlation with passion shows a possible neurochemical correlation of the reward's system once passion and addictions are associated with dopamine secretion and the reward's system activation (APA, 2023; Aron et al., 2005). Hence, this association is evidence of a somatic marker, which must exist in love as an addiction to be considered a disorder. Furthermore, passion was positively correlated with relationship satisfaction and was not significantly related to stress. In this manner, passion does not seem to be related to impairment and, consequently, to pathology.

The findings of attachment-related anxiety items mostly grouped in Factor I are in accordance with previous studies that have found anxious attachment as a predictor of emotional dependence and pathological love and a positive association of anxious attachment styles with love addiction (Gori et al., 2023; Gutiérrez & Castro, 2021; Neves & Hur, 2021). This shows that love disorder is characterized by the preoccupation with attachment figure permanence and fear of being abandoned (Natividade & Shiramizu, 2015; Perrota, 2020; Sussman, 2010).

Factor II contained personality traits related items. Notably, all borderline and dependent personality items, except for one from the borderline category, which was grouped in Factor III, were included in this factor. Pathological love items referring to Idealization and Control factors, more specifically that apprehend the tendency to take care of others and having troubled relationships, and emotional dependence items concerning fear of being alone and not being able to tolerate loneliness, being needy and fragile, and presenting limit expression towards a potential breakup, were also included in this factor. Hence, pathological love and emotional dependence constructs include personality traits, along with addiction to love characteristics. Previous studies have exposed how emotional dependence has been erroneously considered a behavioral addiction instead of a personality manifestation (Maglia et al., 2023; Perrota, 2020).

It is important to recognize that a love disorder is not merely a symptom of other personality disorders. Unlike other personality disorders, which influence all relational contexts, a love disorder is typically confined to the romantic sphere (Sanches & John, 2019; Sophia et al., 2007). Prior research has revealed that certain personality traits are linked to addiction, such as conscientiousness with work addiction (Kun et al., 2020), impulsivity with

alcoholism (Miller, 1991), and neuroticism with social media addiction (Huang, 2022). Therefore, while borderline and dependent personality traits may be risk factors for a love disorder, they do not explain all variations within this disorder. There are instances of love disorder that occur independently of personality disorders. Borderline and dependent personality disorders can be a comorbidity in people with love disorder, just like it happens with Substance Use Disorder or Gambling Disorder and any Personality Disorder.

In the proposed regression model, attachment and personality were significant predictors for emotional dependence, love addiction and pathological love, except for borderline personality with emotional dependence. Attachment anxiety was a prominent predictor for the three factors, along with dependent personality for emotional dependence and borderline personality for pathological love. This results show that attachment and personality can explain some of the variation of Love Disorder, but corroborate the findings that attachment and personality traits do not directly correspond to Love Disorder, and an addiction to love can happen independently from attachment related anxiety or borderline and dependent personality disorders.

Finally, Factor III was nominated Relationship Satisfaction, since it was composed of items related to it. Along with one borderline personality item and passion items related to romantic passion, this factor included the Dissatisfaction factor from pathological love, an item from pathological love about having a spiritual connection with the loved one, and attachment related avoidance. Attachment-related avoidance was also negatively correlated to emotional dependence, pathological love and love addiction. Avoidance is associated with less comfort with dependency and intimacy in relationships (Natividade & Shiramizu, 2015; Shiramizu et al., 2013). Therefore, avoidance and other relationship satisfaction variables seem to be part of Love Disorder nomological net, but not a criterion for its diagnosis. Future studies should investigate this association.

Moreover, pathological love, emotional dependence and love addiction were positively correlated, but data shows some differences in these constructs. Love addiction, emotional dependence and pathological love items were not all grouped in the same factor, and although the three variables contained love addiction related content, while emotional dependence included personality characteristics, pathological love included personality and relationship satisfaction characteristics. These findings suggest that pathological love, emotional dependence and love addiction should not be used as synonyms or equivalent terms, and do not equally represent Love Disorder.

Furthermore, love addiction, emotional dependence, and pathological love were positively associated with stress, and negatively associated with relationship satisfaction (except for the Mood Modification and Idealization factors). Love addiction Mood modification factor was not correlated with relationship satisfaction possibly because this factor inevitably includes partner coping mechanisms, which are positively associated with relationship satisfaction (e.g., Rusu et al., 2020) and the pathological love Idealization factor refers to an intuition and spiritual connection in the relationship, which is probably related to relationship maintenance, but not to relationship satisfaction. For love disorder to be considered an official disorder, apart from being present for at least 12 months (e.g., APA, 2023), it needs to be associated with clinically significant impairment. Thus, its nosology includes impairment in relationship satisfaction and in the individual's well-being, which is more evidence that love disorder is linked with individual and interpersonal prejudice.

It is challenging to diagnose love addiction (Maglia et al., 2023). Little is known about diagnosis criteria, treatment guidelines, and associated variables. Besides, multiple terms are adopted to refer to similar pathologies, i.e., behavior addictions applied to romantic relationships. A unified term is necessary to advance in scientific study and communication. Although terms such as emotional dependence and affective dependence are common (e.g., Bution & Wechsler, 2016; Özal et al., 2023), the nomenclature “dependence” reflects natural responses of the central nervous system and not necessarily an addiction (APA, 2023). “Love disorder” seems to agree with the nomenclature adopted for other behavioral addictions (APA, 2023; WHO, 2021).

This study could not investigate all the variables involved in the love disorder nomological net, also because including more variables would increase the response time of survey participants. Furthermore, only variables that seemed to explain or represent love disorder were included, which explains why almost everything was related in this study. Besides, only self-report measures were used, and other similar measures for love disorder, such as a measure for affective dependence, were not used. Future studies could address these gaps and invest in qualitative and dyadic investigation of love disorder. Overmore, previous studies have found an association with addiction brain areas when exploring individuals who were in love and single and individuals with rejected passions with functional magnetic resonance imaging (fMRI) (Fisher et al., 2010; Wang et al., 2020). Strategic foresight is to investigate these neurochemical correlates specifically in people with love disorder, with at least 12 months of relationship. Another suggestion is to investigate which processes are involved in love disorder so professionals can work on treatment strategies for known

processes present in love disorder (e.g., withdrawal, emotional dysregulation) (Hoffman & Hayes, 2018) and include questions about the respondent's amount of previous relationships and their duration.

Love disorder is still a little explored field. This study has sought to advance more in pathological love, emotional dependence, and love addiction nomological and nosological nets to understand love disorder more appropriately. It is one more effort to check if love can be an addiction located under the same umbrella of other behavior and substance addictions (Griffiths, 2019; Earp et al., 2017). If a lovebug can be caught, and one can have lovesickness with clinically significant impairment, then one should have the right to get a based in evidence treatment.

## Conclusion

The present study aimed to advance the scientific understanding of Love Disorder, a behavior addiction in romantic relationships, more specifically in the comprehension of its nomological and nosological nets. To this end, an online questionnaire was answered by 1.310 Brazilian adults and two studies were conducted.

Study 1 presented satisfactory validity evidence to the Love Addiction Inventory - Brazil. Validity evidence concerning the internal structure, with a confirmatory factor analysis; the instrument's criteria and content validity, in comparison with equivalent measures; and internal consistency analysis, with inter-item correlations and accuracy indicators were all presented, as recommended for instrument adaptations (Borsa et al., 2012; International Test Commission, 2017). The Brazilian instrument presented a six factors structure, equal to the original version, with the same four items to each factor: Salience, Withdrawal, Tolerance, Mood Modification, Relapse and Conflict.

Moreover, the LAI-BR presented positive correlations with emotional dependence and other addiction markers, and negative correlations with self-esteem, meeting frequency, age, and relationship length. Also, superior means were found in the LAI-BR for men in the Conflict factor, in comparison to women, and mostly on all factors and in the composite score in less compromised relationships (e.g., going out, courtship), in comparison to more compromised relationships (e.g., engaged, married), and in partners who lived in separate houses, in comparison to those that lived together.

In study 2, correlation, multidimensional scaling, Fruchterman-Reingold algorithm, exploratory factor analysis and regression analysis were conducted to explore relations between love addiction, pathological love, emotional dependence, anxiety and avoidance related to attachment, passion, borderline and dependent personality, stress and relationship satisfaction. Love disorder nosological net, which comprehends the signs and symptoms (American Psychiatric Association, 2018; Conselho Federal de Psicologia, 2013), included: the love addiction factors Salience, Withdrawal, Tolerance, Mood Modification, Relapse, and Conflict; all items concerning the Attention Seeking factor, six out of seven items concerning the Separation Anxiety factor, half the items concerning Affective Expression factor, all Modification of Plans factor items, one out of three Borderline Expression factor items, and none items from Fear of Being Alone factor (Hoyos & Arredondo, 2006; Rodrigues &

Arantes, 2021) from emotional dependence<sup>1</sup>; Attachment related anxiety items concerning a desire for proximity and caring about the partner reciprocally; Abnegation factor, one Idealization factor item concerning an intuition about the relationship, five Control factor items concerning helping the loved person, wanting power in the relationship, feeling emotionally dependent and being upset when not receiving attention, and none items from Dissatisfaction factor, from pathological love; And passion items concerning obsession. Thus, the nosological net includes symptoms and signs such as the described in the detached factors.

Besides, the nomological net evolves the net of relationships between constructs, their observable manifestations, and their interrelationships, including theoretical constructs different from it (Cronbach & Meehl, 1955; Pasquali, 2007). Love disorder, as the construct, presented mainly positive relations with attachment related anxiety, positive relations with borderline and dependent personality, positive relation with passion, although passion was visually a distant construct, positive relation with stress, negative relation with relationship satisfaction, and negative relationship with attachment related avoidance, although avoidance was visually and in the exploratory factor analysis clearly a distant concept. Concerning other theoretical constructs and its observable properties, love disorder was measured in this research by love addiction, pathological love and emotional dependence. However, since love disorder apprehends love as a behavior addiction, not all the variable's content of emotional dependence and pathological love constituted love disorder, once these constructs seem to include personality traits, beyond addictive characteristics.

It was questioned if love addiction occurs in current compromised relationships, or with rejected passions. This study shows that love addiction is least likely to happen in compromised relationships, and perceived investment is a notorious factor to it. Thus, rejected passions would be a promising field for the development of love addiction, but symptoms would have to be present for at least 12 months. Moreover, compromised relationships can have differences in the perception of investment made and received, so, love addiction can happen in current compromised relationships. It was also questioned if love addiction is jumping from one relationship to another (addiction to relationships) or being fixed in a single specific relationship and centralizing its importance (addiction to a relationship). This study explored love addiction as an addiction to a specific relationship.

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<sup>1</sup> Hoyos and Arredondo (2006) originally developed the Emotional Dependence Questionnaire with six factors. Although this structure was not found in the Brazilian version, to analyze the scale's items content, the original factors were used.

However, jumping from one relationship to another can possibly reflect another behavior addiction, such as flirting or romance.

Besides, it was questioned if love addiction occurs only in abusive relationships context. Although abuse was not included as a variable in this research, love addiction presented correlations with impairment (e.g., stress, prejudice in relationship satisfaction) independently from the presence of abuse or any other violence. Finally, it was questioned if love addiction, pathological love, emotional dependence, attachment, personality and passion are the same or different constructs, and if love addiction is actually related to impairment. Love addiction seems to be partially the same construct as pathological love and emotional dependence, needing to remove some personality traits included in the last two. Although related, the findings from this study shows that attachment, personality and passion are distinct constructs from love addiction, and that love addiction has a relation with impairment, through stress and relationship satisfaction.

Still, several questions are left unanswered by this study and future studies should address the present limitations. Only self-report measures were used, clinical samples could not be used since love disorder is not an official diagnosis, and many variables were left out of this investigation, such as abuse and processes involved in love disorder (e.g., cognitive distortions, emotional dysregulation). Future studies could investigate love disorder in a longitudinal perspective, with a 12 month interval follow-up to check symptoms, along with qualitative and dyadic investigations. However, love addiction, pathological love and emotional dependence are associated with clinically significant impairment in an individual's life (e.g., Neves & Hur, 2021; Orsolini et al., 2022; Ramos et al., 2020), and this study slightly advances in scientific evidence regarding love disorder, disclosing information about a Brazilian sample, which allows cross-cultural comparisons, a robust instrument to measure love addiction adapted to Brazil, and information about love disorder nomological and nosological nets, which helps with treatment evidences, comorbidities and traits associated with it.

It is worth highlighting that not all the terms often used as synonyms reflect the same construct, such as emotional dependence, pathological love, affective dependence, interpersonal dependence, dependent personality disorder, love dependence, obsessive love and relationship dependence (Bution & Wechsler, 2016). The utilization of a single term is important for evidence-based psychology. A suggestion can be made for the use of the term Love Disorder, following the logic adopted for non-substance-related addictions (e.g., APA, 2023), and attempts for the erroneous utilization of the selected terms as synonyms.

Thus, as Bráulio Bessa (2018) said “*Se o amor fosse doença, seria dessas sem cura*” (If love was a disease, It would be one of those with no cure) (Bressa, 2018). Love disorder has to be different from the healthy experience of falling in love, loving and relating, which naturally involves some suffering. However, love addiction, emotional dependence and pathological love were positively associated with stress, and negatively related to relationship satisfaction. Hence, an addiction, contrary to a healthy enthusiasm, includes negative consequences, i.e., is a pathology because something is taken out of life, not added something positive (Griffiths, 2019). Since love is all we are, all we can do, all that matters, fundamental, and a good dependence, it should lead to health and satisfaction, to just love.



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## Attachments

### Love Addiction Inventory - Brazil (LAI-BR; Zibenberg & Natividade)

Assinale o quão frequente você... (Signalize how often do you...)

	Nunca (Never)	Raramente (Rarely)	Às vezes (Sometimes)	Frequentemente (Often)	Muito frequentemente (Very often)
	1	2	3	4	5
1. Sente a necessidade urgente de encontrar com seu(sua) parceiro(a).	1	2	3	4	5
2. Tenta urgentemente ver seu(sua) parceiro(a).	1	2	3	4	5
3. Sente a necessidade urgente de estar com seu(sua) parceiro(a).	1	2	3	4	5
4. Sente o desejo urgente de querer estar na companhia de seu(sua) parceiro(a).	1	2	3	4	5
5. Se sente agitado quando não está com seu(sua) parceiro(a).	1	2	3	4	5
6. Se sente ansioso(a) quando não está na companhia de seu(sua) parceiro(a).	1	2	3	4	5
7. Se sente deprimido na ausência de seu(sua) parceiro(a).	1	2	3	4	5
8. Se sente abandonado(a) quando não está com seu(sua) parceiro(a).	1	2	3	4	5
9. Sente a necessidade de passar cada vez mais tempo com seu(sua) parceiro(a) para sentir prazer.	1	2	3	4	5
10. Sente a necessidade de aumentar o número de encontros com seu(sua) parceiro(a) para se sentir feliz.	1	2	3	4	5
11. Sente a necessidade de aumentar o número de encontros com seu(sua) parceiro(a) para se sentir satisfeito(a).	1	2	3	4	5
12. Sente a necessidade de passar mais tempo com seu(sua) parceiro(a) para se sentir relaxado(a).	1	2	3	4	5
13. Fica com seu(sua) parceiro(a) para aliviar o estresse.	1	2	3	4	5
14. Passa tempo com seu(sua) parceiro(a) para esquecer do seu sofrimento.	1	2	3	4	5



15. Passa tempo com seu(sua) parceiro(a) para evitar ficar de mau humor.	1	2	3	4	5
16. Passa tempo com seu(sua) parceiro(a) para aliviar seus sentimentos negativos.	1	2	3	4	5
17. Não consegue passar menos tempo com seu(sua) parceiro(a).	1	2	3	4	5
18. Não consegue diminuir a duração dos encontros com seu(sua) parceiro(a).	1	2	3	4	5
19. Falha em evitar encontrar seu(sua) parceiro(a).	1	2	3	4	5
20. Não consegue reduzir o tempo que passa com seu(sua) parceiro(a).	1	2	3	4	5
21. Abandona seus hobbies para estar com seu(sua) parceiro(a).	1	2	3	4	5
22. Abandona suas atividades sociais e recreativas para estar se relacionando com seu(sua) parceiro(a).	1	2	3	4	5
23. Por vezes, deixa de lado compromissos familiares e sociais devido ao relacionamento com seu(sua) parceiro(a).	1	2	3	4	5
24. Negligencia seu tempo de estudo ou trabalho para estar se relacionando com seu(sua) parceiro(a).	1	2	3	4	5

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Figure 1.

*Multidimensional Scaling Analysis for Love Addiction, Pathological Love, Emotional Dependence, Passion, Personality, Attachment, and Relationship Satisfaction*

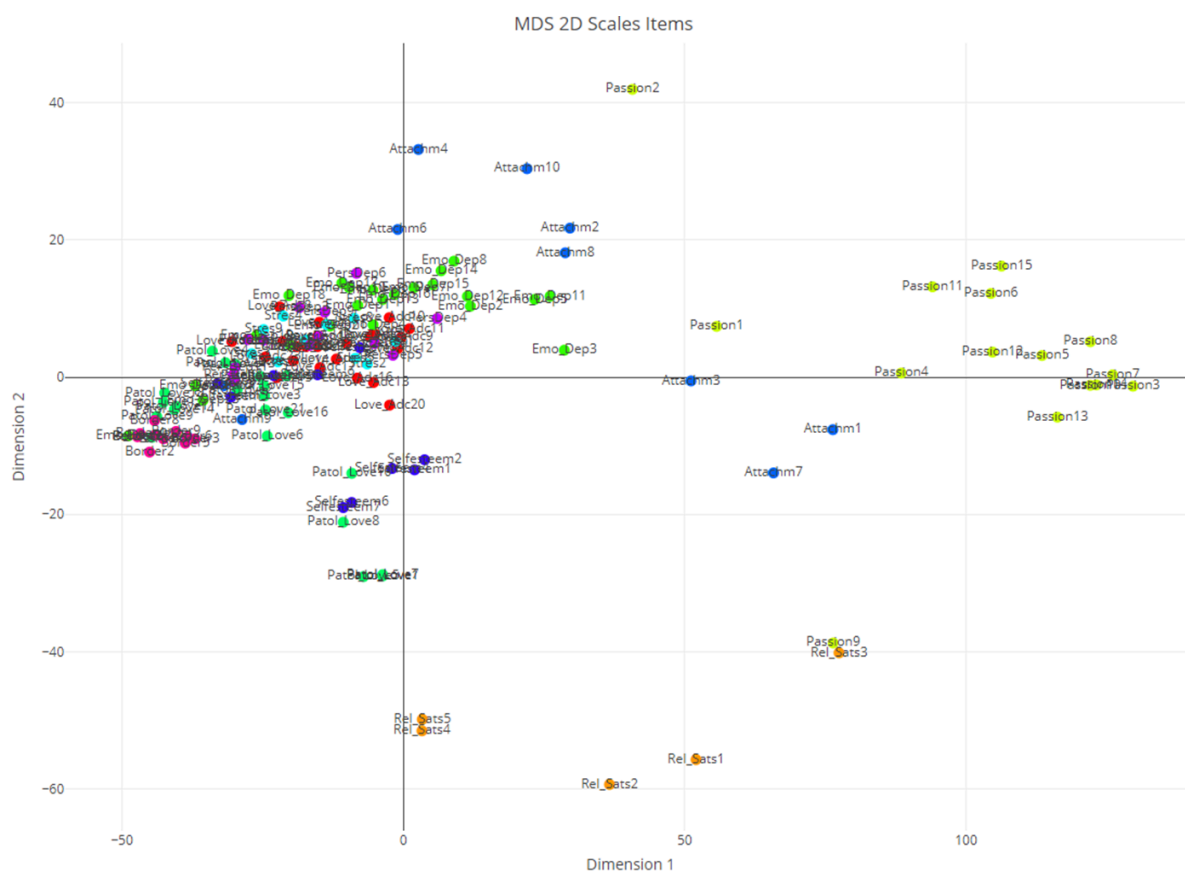


Figure 2.

*Multidimensional Scaling Analysis for Love Addiction, Pathological Love, Emotional Dependence, Personality, Attachment, and Self-esteem*

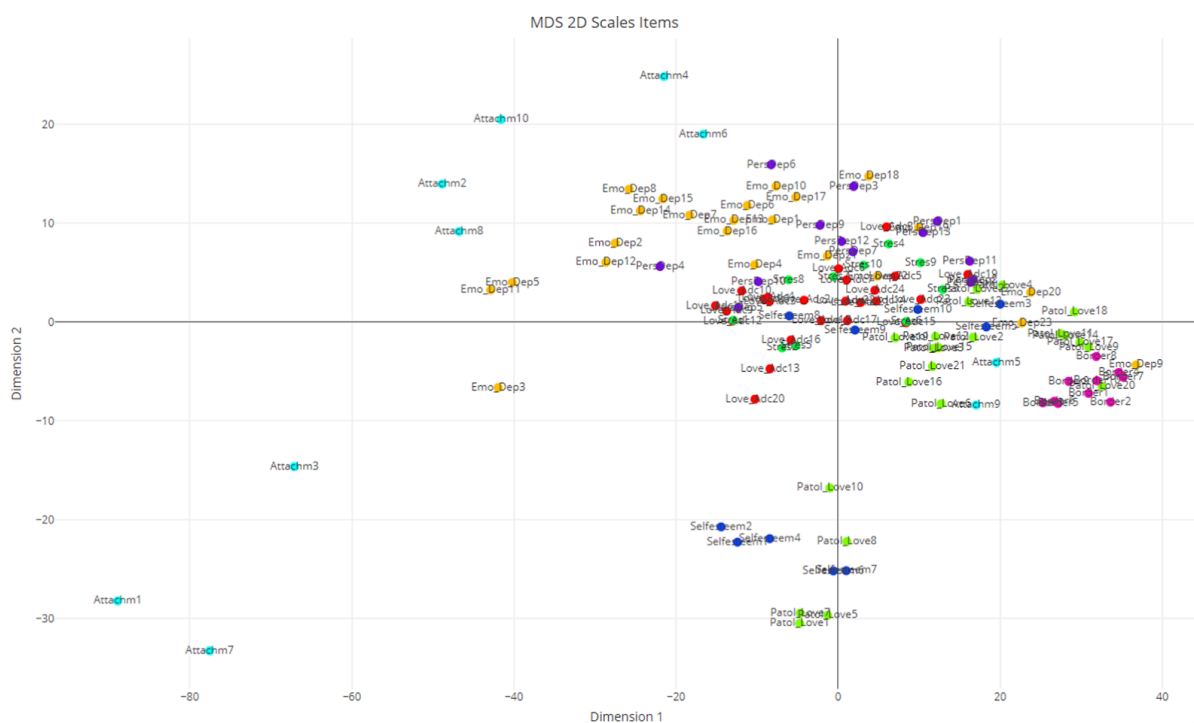


Figure 3.

*Multidimensional Scaling Analysis for Love Addiction, Pathological Love, Emotional Dependence, Personality, and Stress*

