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THE MULTIDIMENSIONAL EVALUATION OF LOVE (MEVOL) SCALE: DEVELOPMENT AND PRELIMINARY VALIDATION

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Recent research has conceptualized love as a complex sentiment that leads to multiple emotions rather than a single, pure emotion (Bartels & Zeki, 2000). However, many authors have continued to measure love as a unidimensional construct. The present study introduces the Multidimensional Evaluation of Love (MEVOL) Scale which measures several novel aspects of love. Study 1 showed a seven-dimension structure of MEVOL Scale through a confirmatory factor analysis. Study 2 replicated these results and found preliminary validity, as compared with the Passionate Love Scale (Hatfield & Sprecher, 1986), the 7-item Companionate Love Scale (Sprecher & Regan, 1998; Sternberg, 1986), and the 3-item Personal Assessment of Intimacy in Relationships Scale (Schaefer & Olson, 1981). Overall, the results allowed for the creation of a quick and easy-to-administer questionnaire comprising a 21-item measure and two explicit questions; this questionnaire can be used to assess the various dimensions of love.

Key words: Romantic love; Measures; Perspective taking; Sexual attraction; Idealization.

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Early theories in social and personality psychology conceived of the construct of love in terms of people's individual styles of loving (Hendrick & Hendrick, 1986; Lee, 1977), or divided it into various types of love (Hatfield, 1984), or as an emotional system (Fisher, 1998), or as a constellation of behaviors, cognitions, and emotions (Aron & Aron, 1991; Hatfield & Sprecher, 1986). More recently, researchers' investigations of love have drawn on the field of neuroscience, with neuroscientists suggesting that romantic love is a complex sentiment involving cognitive, erotic, emotional, and goal-directed components that are difficult to separate (Aron & Aron, 1991; Aron et al., 2005; Bartels & Zeki, 2000, 2004; Mashek, Aron, & Fisher, 2000).

The influence of different disciplines in the study of love — social and personality psychology on the one hand, and neuroscience on the other — is suggestive of the different perspectives that theorists hold with regard to the definition of love. On the one hand, scientists have argued that romantic love can be explained as a specific emotion (Gonzaga, Keltner, Londahl, & Smith, 2001; Shaver, Schwartz, Kirson, & O'Connor, 1987; Shaver, Morgan, & Wu, 1996), and on the other hand, neuroscientists have suggested that romantic love is a mix of emotions rather than a pure one (Aron & Aron, 1991; Aron et al., 2005; Bartels & Zeki, 2000, 2004; Mashek et al., 2000). These differing perspectives reflect the fact that the underlying theories of love give rise to different knowledge about the underlying mechanisms of love and different tools used to measure the construct of love.

Regarding the issue of measurement, scientists have focused on the assessment of love, which has generally involved the use of self-report questionnaires; thus, several scales have been proposed (for an overview, see Hatfield, Bensman, & Rapson, 2012). Many authors, even if they evaluate love as unidimensional, include within the description of their questionnaires several dimensions that may feature in romantic love (e.g., Hatfield & Sprecher, 1986; Tennov, 1979) suggesting that many variables are involved in this complex sentiment. The main dimensions that have been investigated so far are: *erotic feeling* (Hatfield & Sprecher, 1986), *idealization* (e.g., Fehr, 1994; Fengler, 1974; Hatfield & Sprecher, 1986; Tennov, 1979), *negative emotion* (Hatfield & Sprecher, 1986), *positive emotion* (Hatfield & Sprecher, 1986), and *obsessive behavior* (Hatfield & Sprecher, 1986; Tennov, 1979). Surprisingly, despite the fact that previous authors have mentioned these dimensions, none have analyzed them separately. For example, these dimensions are in part already included in the Passionate Love Scale (Hatfield & Sprecher, 1986) which is a measure designed in the field of psychology and built to assess cognitive, physiological, and behavioral indicators of passionate love. However, the outcome of this scale is represented by a unique value which describes the level of passionate love felt for the partners and it is not possible to obtain a reliable measure of a specific dimension. Therefore, our first goal in this study was to support the multidimensional measurement of love by investigating several dimensions simultaneously. It is important to specify that multidimensionality means the possibility of obtaining a single value for each of the dimensions mentioned above. In fact, in the literature, there is an enormous number of multidimensional scales that investigate other aspects of love. For example, the Triangular Love Scale (Sternberg,1997) which assesses different kinds of love; the Love Attitude Scale (Hendrick, Hendrick, & Dicke, 1998) which assesses six types of love, or the Love Schema Scale (Hatfield & Rapson, 1993, 2005) designed to measure six love styles.

Furthermore, several other important dimensions are involved in romantic relationships. For example, the ability to predict what one's partner is thinking and the awareness of being loved or not. This dimension, also known as perspective taking (PT), implies a complex cognitive process that is essential for social interactions (Dixon & Moore, 1990; Ruby & Decety, 2004). It involves the ability to infer knowledge and thoughts of other people from previous and/or online information (Dixon & Moore, 1990). Relative to this point, Wlodarski and Dunbar (2014) showed that, when individuals in love were primed with images of their partners, their performance improved when attributing emotional states to others. Other research has similar implications: lovers can more quickly recognize the intentions of their partner than those of a friend or stranger (Ortigue, Patel, Bianchi-Demicheli, & Grafton, 2010). However, it is not clear whether people who feel rejected — in other words, those who have taken the perspective that their partner does not love them — show the same *erotic feeling*, *idealization*, *negative emotion*, *positive emotion*, and *obsessive behavior* as those who feel reciprocated. Determining the role that this PT ability plays in love was our second goal in the present research.

Our third goal in this research was to measure love as a subjective feeling (Sternberg, 1995; Watts & Stenner, 2005). Indeed, love can be extremely subjective, and the concept of love can have dissimilar meanings depending on individuals' personalities (Brown, Acevedo, & Fisher, 2013) and past experiences (Bolmont, Cacioppo, & Cacioppo, 2014). Surprisingly, however, no measures for assessing individual experiences of love exist in the literature.

To reach these goals in the present study, we propose a novel measure of love: The Multidimensional Evaluation of Love (MEVOL) Scale. Moreover, its psychometric properties will be presented, such as reliability and validity.

The Structure of MEVOL Scale

As mentioned previously, researchers have used perspectives from various fields in an attempt to disentangle the underlying mechanism of love. MEVOL is a scale that combines knowledge from social and personal psychology and from neuroscience. In this sense, MEVOL Scale is based on a definition of romantic love as a mix of fast-moving feelings that can have different meanings based on individuals' experiences and personalities. We designed MEVOL Scale with the goal of measuring not just the components of love that are prototypical of romantic love but also certain novel aspects of love that researchers have not yet investigated. MEVOL is a multidimensional scale that is quick and easy to administer.

Dimensions of MEVOL Scale

As previously mentioned, love is not a one-dimensional emotion; rather, it is made up of several components, thus making this sentiment quite complicated. To make these dimensions measurable, we took several steps. Based on the literature on love we selected five dimensions of love that have been identified in previous research (Fehr, 1994; Fengler, 1974; Hatfield & Sprecher, 1986; Sternberg, 1997; Tennov, 1979). In addition, we included two other important dimensions in this new scale. The following are the five aspects deriving from the literature.

Positive idealization. Idealization is the tendency to exaggerate the qualities of another person, as if that person were perfect; it represents an essential part of falling in love (Hattis, 1965). This process is often present, but mainly at the beginning of love relationships (Tennov, 1979). In one study, scholars showed that people tend to see their partners more positively than those partners perceive themselves. This mechanism has been shown to predict satisfaction in a relationship (Murray, Holmes, & Griffin, 1996).

Sexual attraction. This dimension refers to sexual desire and sexual excitement toward a partner. It is a predominant dimension in love-based or romantic relationships, and many authors have found that sexual desire is strongly present in love (Aron & Aron, 1991; Hendrik & Hendrik, 1992). Other theorists have stated that love and sexual desire present different expressive behaviors, relationship outcomes, and experiential correlates (Gonzaga, Turner, Keltner, Campos, & Altemus, 2006).

Positive and negative emotion. These dimensions refer to the levels of positive and negative feeling that partners experience during love-based or amorous relationships. Sprecher and Regan (1998) suggested that both positive and negative emotions fuel love, noting that lovers alternate between states of excitement or joy when events go right and grief or desolation when they do not.

Obsessive thinking. This dimension refers to intrusive thoughts or actions that are obsessively focused on the partner. Researchers have demonstrated that romantic lovers spend more time thinking about their beloved than thinking about other people (Fisher, 1998; Hatfield & Sprecher, 1986; O'Leary, Acevedo, Aron, Huddy, & Mashek, 2012), which may lead to obsessive behaviors that are comparable to those found in addiction (Aron et al., 2005).

Furthermore, in order to investigate new aspects that often surface in a clinical setting two other novel and exploratory dimensions have been introduced in the questionnaire:

Taking love for granted. This refers to the feeling of being excessively certain of the partner's love. People with a high score on this dimension perceive their partners as being always present and completely in love.

Negative idealization. We distinguished two kinds of idealization: *positive*, which, as said before, represents simple admiration of the partner's qualities, and *negative*, which implies a devaluation of the self that leads to an indirect enhancement of the partner.

Perspective Taking (PT)

What is PT, and why is it important in the definition of love? As stated in the introduction, PT represents the ability to read one's partner's mind. This process could reveal various kinds of love sentiments that have not previously been explored. During scientific experiments with love paradigms, researchers commonly evaluate the extent to which participants are in love but rarely consider the degree to which those participants feel loved. It is important to underline that PT does not represent one of the love dimensions described above; rather, it is a meta-thought that deserves attention when seeking to obtain a clear picture of a relationship. For example, during an assessment, it is possible to find two people who declare that they are madly in love and to have both of them actually obtain high scores on a general love scale. If the evaluation stops at this point, researchers would conclude that both people are deeply in love, and this would not be a mistake. However, if PT is also assessed, the researchers might discover that one of the two does not feel loved by his or her partner. The differences between the two enamored people could relate to various processes that require attention, both in clinical assessment and in scientific research. Therefore, this factor represents an important aspect of love relationships.

For these reasons, to investigate PT, we selected particular items to reflect the awareness of being loved. Therefore, we added another measure to our investigation called *PT-positive* that reflects the feeling of reciprocation from a partner. Obviously, lower scores on this dimension will reflect the opposite feeling. In this sense this dimension of PT represents a new way of conceptualizing love, as it provides information about meta-thoughts that can influence lovers' feelings.

STUDY 1

Study 1 was a preliminary construction of the MEVOL Scale. First, a team composed of the authors and two psychotherapists constructed a pool of items that could be used to assess the components of love. One purpose of this study was to identify the items that could represent the multiple components that are representative of love; in this sense, we tried to combine the dimensions found in the previous literature with a new dimension that we identified. Furthermore, within these dimensions, we designed some items to carefully reflect PT. Another goal of the present study was to create a reliable scale that would be easily administrable during experiments or in a clinical setting.

Methods

Participants

The sample comprised 143 students (114 women) who were native Italian speakers; we recruited the students from psychology classes at the University of Padua. The participants' average age was 21.35

years (*SD* = 6.50). To be eligible for this study, the students had to be either married or currently in a close relationship, regardless of their gender identity and sexual orientation. Of the participants, 11% were dating regularly, 86% were engaged (of whom 7% were living together), and the remaining 3% were married. The average length of time that the participants had been in their relationships was four months for those who were dating regularly, 21 months for those who were engaged, and 241 months for those who were married. Most (78%) of the participants declared that they were actually in love, but 4% of them declared that they were not in love, and the remaining 18% were unsure as to whether they were in love or not.

Materials

We collected the data through a survey divided into three blocks, resulting in complete profiles of the participants. The first block comprised demographic questions about topics such as age, gender, and sexual orientation. The second part comprised specific questions about the participants' relationships: length of relationship, type of relationship (e.g., married, engaged, single or dating regularly), the partner's name or nickname, and whether they were living together. The third block contained both the first version of MEVOL Scale, in which participants were asked to respond on a scale from 1 (*absolutely false*) to 6 (*absolutely true*) to 33 items, and the Italian validation of the Passionate Love Scale (PLS-R-IT; Cannas Aghedu, Veneziani, Manari, Feybesse, & Bisiacchi, 2018), which was composed of 15 statements that the participants rated from 1 (*not at all true*) to 9 (*definitely true*). In this phase the PLS-R-IT was submitted in order to have the possibility to use some items of the scale to build some of the dimensions. Moreover, we measured the reliability of the PLS-R-IT using Cronbach's α, and the results suggest that its internal consistency was very good, just as in the original version (α = .914).

Procedure

We implemented the entire experiment using LimeSurvey (LimeSurvey GmbH Survey Services and Consulting, Hamburg, Germany, http://www.limesurvey.org) an open-source survey tool that uses online forms. The participants provided consent after being informed that they could stop the experiment whenever they wanted; they also certified that they were over 18 years old. The two questionnaires, MEVOL and PLS-R-IT, were presented randomly to ensure there were no order effects. The Ethical Committee for Psychological Research at the University of Padua has approved this research.

Results

Data Analysis Strategy

We analyzed the data using the statistical software Mplus (Version 7; Muthén & Muthén, 2012) and Statistical Package for Social Sciences (IBM SPSS, Version 21, 2012).

As stated above in the description of MEVOL's Scale structure, we designed an initial pool of 33 items, with the aim of capturing seven dimensions of love: *positive idealization* (four items, of which one we took from the PLS-R-IT), *negative idealization* (four items), *taking love for granted* (three items), *sexual attraction* (three items), *positive emotion* (seven items), *negative emotion* (nine items), and *obsessive thinking* (three items).

Through a confirmatory factor analysis (CFA), we tested this seven-factor solution on an initial set of items. The purpose was twofold; the first goal was to sustain the hypothesized seven-factor structure for MEVOL. In a CFA, a model is accepted or rejected on the basis of goodness-of-fit indices. In the present study we designed the scale with the idea of having seven separated dimensions that are supposed to be independent. Therefore, as suggested in the Encyclopedia of Statistics in Behavioral Science (Stangl, 2008), we ran only the CFA which represent a good way to show the goodness of the model. As Hu and Bentler (1999) suggested, we took several fit indices into account to prove the goodness of the model's fit to the data: the Satorra-Bentler scaled chi-square (SBχ^2; Satorra & Bentler, 1994), the χ^2/df ratio, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI; sometimes called the non-normed fit index), and the standardized root mean square residual (SRMR). Although a nonsignificant chi-square indicates a good fit to the data, this value is usually significant in large samples. Therefore, chi-square is usually combined with the χ^2/df ratio, which suggests an adequate fit for values less than 3. RMSEA values less than .08 and SRMR values less than .10 also usually suggest an acceptable fit (Hu & Bentler, 1999). Finally, a CFI or TLI higher than .90 is recommended for an adequate fit. However, these indices, as computed in Mplus, may be lower than they would be when calculated in other packages, as covariances among exogenous observed variables are not constrained to zero in Mplus (Widaman & Thompson, 2003).

The second aim of the CFA was to identify which statements did not adequately capture their intended love components, thus allowing us to reduce the number of items. The aim of this item-deletion procedure was to refine the instrument, thus resulting in the inclusion of only the items that adequately measured the hypothesized dimensions of love while maintaining the originally theorized structure as much as possible. As decision criteria for this item-selection process, we took the following factors into account: the factor loadings, the modification indices, and the meaning of the items. A factor loading represents the correlation between an item and its hypothesized factor, thus indicating the strength of the association between that indicator (i.e., item) and its latent dimension (i.e., factor; Bollen, 1989; Jöreskog & Sörbom, 1999). A factor loading is usually considered meaningful if it has a value of .32 or higher (Tabachnick & Fidell, 2007). Modification indices suggest misfit causes, as they identify items whose loadings involve factors other than those specified in the model and correlated measurement errors between items. Correlated error measurements are not recommended, as they indicate that "some of the covariance in the indicators not explained by the latent variable is due to another exogenous common cause" (Brown, 2006, p. 157); these errors thus cause a loss of validity and theoretical meaningfulness for the instrument (Bagozzi, 1983; Fornell, 1983). A modification index is conceived as significant for a value higher than 3.48; this value is usually approximated to 4 (Brown, 2006). We developed all of the instrument's items with the aim of detecting exactly one love component. Each item should therefore show a meaningful factor loading for its own component, and no modification indices should suggest that an item saturates more than one factor. Additionally, the measurement errors should not be correlated between items. We thus took factor loadings and modification indices' values into account in the item-selection procedure, which was also driven by items' meanings. Regarding this point, we categorized the items by relative importance and by their representativeness regarding PT and the essential dimensions.

Before analyzing the data, we tested for normal distribution and multivariate normality. The absolute values of skewness and kurtosis suggested a violation of multivariate normality, which we confirmed using Mardia's test (multivariate skewness: $b_{1p} = 268.75$, $p < .001$; multivariate kurtosis: $b_{2p} = 1139.16$, $p < .001$). Therefore, due to the partial nonnormality of our data, we employed in the CFA a robust maximum likelihood estimation procedure, starting from the asymptotic covariance matrix of polychoric correlations.

Confirmatory Factor Analysis

We tested the hypothesized seven-factor solution using a CFA. Overall, the indices of fit were not satisfactory. The Satorra-Bentler chi-square was significant: $SB\chi^2$ (474) = 930.93, $p \cong .00$. In addition, the χ^2/df and RMSEA values suggested an adequate fit, χ^2/df = 1.96; RMSEA = .08, 95% CI [.074, .090]. Nevertheless, the other indices were not satisfactory (CFI = .72; TLI = .69; SRMR = .11). As a first step, we therefore proceeded to take into account the factor loadings. The factor loadings for taking love for granted, sexual attraction, positive emotion, and obsessive thinking, were all significant and ranged from .47 (Item 1 of obsessive thinking) to .88 (Item 1 of sexual attraction). We found two low but significant factor loadings with regard to the other subscales: Item 2 of positive idealization (.24, p =.005) and Item 1 of *negative emotion* (.23, p = .017). In addition, Item 9 of the negative emotion subscale was not significant (.04, p = .433). As a first attempt at instrument refinement, we discarded the three items with low or no significance and then retested the seven-factor structure on the remaining 30 items. Although this led to fit improvement, taken together, the fit indices in the CFA were still not satisfactory: $SB\chi^2$ (384) = 723.70, $p \cong .00$; χ^2/df = 1.88; RMSEA = .08, 95% CI [.067, .085]; CFI = .78; TLI = .69; SRMR = .11. Nevertheless, all the factor loadings were significant and clearly above the threshold value of .32; they ranged from .39 (Item 7 of negative emotion) to .88 (Item 1 of sexual attraction). We thus took the modification indices into account, starting with the items that the results implied could saturate more than one factor. Thus, following the modification indices' suggestions, we progressively dropped Item 4 of negative idealization, Items 3 and 6 of positive emotion, and Item 8 of negative emotion. Notably, these items were discarded one by one, and we did not always eliminate the item with the highest modification index; our decisions were driven by the meaning of the item. As already noted, we intentionally maintained either some items either because of their meaning or to provide an indicator of PT. Our goal was to develop a scale with at least three items for each subscale. Therefore, although the modification indices suggested that the first item of the positive idealization subscale also detected aspects of taking love for granted, we decided not to discard this item. Moreover, we retained Item 3 of the obsessive thinking subscale even though it seemed to saturate aspects of positive idealization so as to ensure the presence of at least three obsessive thinking items. Finally, we retained Item 7 of positive emotion and the Item 4 of negative emotion to provide pure measures of anxiety and trust, respectively, as both of them are considered important aspects of love.

After discarding four items (Item 4 of negative idealization; Items 3 and 6 of positive emotion; and Item 8 of negative emotion), we retested the hypothesized seven-factor structure with the remaining 26 items. The resulting fit indices showed improvement and seemed to be acceptable: $SB\chi^2$ (278) = 469.48, $p \cong .00$; χ^2/df = 1.69; RMSEA = .07, 95% CI [.058, .080]; CFI = .83; TLI = .80; SRMR = .09. Nevertheless, the modification indices suggested correlated measurement errors between various items. Therefore, driven by the meaning of the items and the modification indices, we proceeded to discard Item 3 of negative emotion, which seemed to covary with the error measurement of various items. We then tested the seven-factor structure on the remaining 25 items: $SB\chi^2$ (254) = 432.54, $p \cong .00$; χ^2/df = 1.70; RMSEA = .07, 95% CI [.059, .081]; CFI = .83; TLI = .80; SRMR = .09. In this 25-item version, most of the subscales involved three items, with the sole exceptions being the positive emotion and negative emotion subscales. In an attempt to equalize the number of items in all subscales, we therefore decided to discard two items from the positive emotion subscale and two items from the negative emotion subscale. This process was exclusively driven by item meaning. Thus, Items 4 and 5 of the positive emotion subscale were dropped, as they measured more than one dimension and therefore could not be considered pure measures. Similarly, we dropped Items 2 and 6 of the negative emotion subscale, as their meanings reflected measures that were already included in the subscale.

We then tested the seven-factor structure using this 21-item version, and the fit indices indicated a satisfactory fit to the data: SBχ^2 (168) = 277.77, $p \cong .00$; $\chi^2/df = 1.65$; RMSEA = .07, 95% CI [.053, .081]; CFI = .86; TLI = .83; SRMR = .09. Regarding the factor loadings, as reported in Table 1, they were all significant, ranging from .40 (Item 3 of negative idealization) to .87 (Item 1 of sexual attraction).

TABLE 1
Standardized factor loadings of the MEVOL subscales in its final version

Subscale	Item	Factor loadings CFA	
		Study 1	Study 2
Positive idealization	1.	.77	.76
	2.	.77	.79
	3.	.58	.62
Negative idealization	1.	.64	.62
	2.	.70	.71
	3.	.40	.63
Taking love for granted	1.	.66	.68
	2.	.67	.52
	3.	.70	.78
Sexual attraction	1.	.87	.81
	2. (R)	.65	.55
	3. (R)	.75	.71
Positive emotion	1.	.64	.64
	2.	.67	.61
	3.	.66	.75
Negative emotion	1.	.57	.57
	2.	.68	.62
	3.	.61	.69
Obsessive thinking	1.	.55	.60
	2.	.76	.69
	3.	.47	.57

Note: R indicates items that have to be recoded. All the factor loadings were standardized and significant at $p < .001$.

Concerning the relationships between the love components, our hypotheses were largely confirmed, as reported in Table 2. Indeed, positive idealization was unrelated to negative idealization, taking love for granted, and negative emotion; moderately associated with obsessive thinking; and highly linked to sexual attraction and positive emotion. As expected, negative idealization was related to lower levels of taking love for granted and positive emotion, as well as to higher levels of negative emotion and obsessive thinking; no significant link was found between this love component and sexual attraction. Moreover, in line with our predictions, taking love for granted was unrelated to either sexual attraction or obsessive thinking, but it was related to higher levels of positive emotion and lower levels of negative emotion. Sexual attraction was linked to positive emotion and obsessive thinking, but no significant association was

found with negative emotion. Positive emotion was related to lower levels of negative emotion; however, it was unrelated to obsessive thinking, which was highly associated with negative emotion.

The fits of the indices were satisfactory, and the love components showed the predicted pattern of relationships. Therefore, we discarded no further items; the final version of the MEVOL Scale comprised 21 items, three for each of the seven love dimensions.

TABLE 2
Latent correlations between the MEVOL subscales in the CFA (Study 1)

Subscale	1	2	3	4	5	6
1. Positive idealization	-					
2. Negative idealization	.03	-				
3. Taking love for granted	.05	–.39***	-			
4. Sexual attraction	.75***	.03	–.04	-		
5. Positive emotion	.77***	–.34*	.33*	.72***	-	
6. Negative emotion	.06	.48**	–.15	.07	–.29	-
7. Obsessive thinking	.39**	.64***	.06	.33**	.14	72***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Instrument reliability

For each love component, we proceeded to sum the scores of the three items to provide subscale scores and then determined each subscale's standard deviation and Cronbach's α (see Table 3). Although Cronbach's α values of at last .50 are acceptable, values of at least .70 are preferred (George & Mallery, 2003). As reported in Table 3, the Cronbach's α values for positive idealization, taking love for granted, and sexual attraction, were all above .70; these subscales were therefore reliable. We found acceptable but low levels of reliability for negative idealization, positive emotion, and negative emotion. In addition, obsessive thinking showed a poor but still acceptable Cronbach's α value. Most of the MEVOL subscales thus showed low levels of reliability.

Discussion

In Study 1, we supported the hypothesis that love can be measured as a multidimensional construct. We identified six representative dimensions of MEVOL from the literature: *sexual attraction*, *idealization*, *negative emotion*, *positive emotion*, and *obsessive thinking*; in addition, we aimed to introduce a final dimension: *being taken for granted*. We aimed to represent most of the components that can intervene during romantic relationships. We identified a pool of items that could represent the seven dimensions, starting from a pool of 33 items; after several statistical analyses, we obtained a 21-item scale. Moreover, for each dimension, we performed a reliability test using Cronbach's α. The results showed that MEVOL Scale can be a reliable scale for measuring the seven main components that characterize love. Nevertheless, it has to be noted that α values are influenced by the number of items involved; therefore, it is not surprising to find low α coefficients in three-item subscales (John & Benet-Martìnez, 2000). However, to confirm the reliability and validity of MEVOL Scale, we performed another study.

TABLE 3
Means, standard deviations, and Cronbach's α values of the MEVOL subscales

Measure	*M*		*SD*		Cronbach's α	
	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2
Positive idealization	16.69	16.82	3.65	3.69	.71	.76
Negative idealization	8.80	8.23	3.57	3.99	.60	.68
Taking love for granted	8.80	8.85	3.59	3.75	.71	.71
Sexual attraction	15.40	7.71	3.21	1.74	.79	.72
Positive emotion	15.85	15.77	2.20	2.67	.68	.70
Negative emotion	8.17	16.63	3.61	9.62	.65	.66
Obsessive thinking	10.19	9.26	3.67	3.80	.59	.65

Note. Response scales ranged from 1 to 6.

STUDY 2

This study was a further replication of the key findings from Study 1's factor analysis and scale construction results. The present study examines the following hypothesis. MEVOL Scale should measure the components of love that other scales have already taken into account, so we expect that a) MEVOL is correlated with other love questionnaires. Researchers have demonstrated that people in love activate peculiar brain areas (Bartels & Zeki, 2000), therefore we expect b) people who are madly in love to differ from those who are not and those who are not sure if they are in love. Moreover, scholars have shown that people who are rejected often feel despair and a profound sense of loss (Fisher, Brown, Aron, Strong, & Mashek, 2010), so we expect that c) people who do not feel loved and those who do feel loved display different measures.

Methods

Participants

The sample comprised 477 people (58% women) who we recruited either from the Psychology Department at the University of Padua or through online advertisements. The participants' average age was 30.75 years (*SD* = 8.97), and all participants were native Italian speakers. The eligible criteria were the same as in Study 1.

In terms of religious background, 64% of participants were Catholic, 21% were atheist, and 13% were agnostic; the remaining number classified themselves as belonging to other religions. Regarding education, 93% of the subjects had at least a high-school education, and the remaining 7% had a middle-school diploma. Of the participants, 19% were dating regularly, 67% were engaged (of whom 41% were living together), and 14% were married. The average length of time that the participants had been in their relationships was 10 months for those who were dating regularly, 39 months for those who were engaged, and 143 months for those who were married. When asked if they were in love, 76% of the sample declared that they were, 6% declared that they were not, and 18% were unsure.

Materials

The structure of the survey was quite similar to that of Study 1. We added some demographic questions regarding level of education and religious background in the first block of questions. In the third block, we added two other tests to the MEVOL Scale and the PLS-R-IT: the 7-item adapted Companionate Love Scale (CLS; Sprecher & Regan, 1998; Sternberg, 1986), and the 3-item Personal Assessment of Intimacy in Relationships Scale (PAIR; Schaefer & Olson, 1981). CLS is designed to assess companionate love or "the affection and tenderness we feel for those with whom our lives are deeply entwined" (Hatfield & Rapson, 1993, p. 9). PAIR is a 3-item sexual intimacy scale taken from Schaefer and Olson (1981); it describes how partners see their relationships in terms of sex behaviors. We translated these two questionnaires into Italian using the same procedure that we used for the PLS-R-IT, including back-translation. Despite the fact that the only validated scale in the Italian language is the PLS-R-IT (Cannas Aghedu et al., 2018), we calculated the reliability of the instruments that we used before performing the validity test. The

CLS items showed acceptable levels of internal consistency (α = .65). PAIR's reliability was quite low (α = .41), as is usual for three-item measures (John & Benet-Martinez, 2000). We asked the participants to rate items on a scale from 1 (*absolutely false*) to 6 (*absolutely true*). We also added a fourth block to the survey with two explicit questions (EQ) so as to control for the subjectivity of the love construct. One of these questions investigated the participants' feelings relating to the love they experience toward their partners (e.g., "Do you love__? If so, how much from 1 to 10 would you rate your love for___?"), and the other explored PT regarding the loved ones' feelings (e.g., "Does___ love you? If so, how much from 1 to 10 would you rate his/her love for you?"). Finally, we presented questions to investigate certain important events that could influence the participants' responses (e.g., arguments, disagreements, and misunderstandings).

Procedure

As in Study 1, we conducted the entire experiment using LimeSurvey which is an open-source tool to create online forms. The participants provided consent after being informed that they could stop the experiment whenever they wanted; they also certified that they were over 18 years old. We presented the scales randomly across participants.

Results

Preliminary Analysis

As a first step, we performed a CFA with the aim of confirming the seven-factor structure of the MEVOL Scale in its final, 21-item version. As in the first study, Mardia's test confirmed a violation of normality (multivariate skewness: b_{1p} = 48.35, $p < .001$; multivariate kurtosis: b_{2p} = 478.69, $p < .001$). Due to the nonnormality of our data, we therefore performed the CFA while employing a robust maximum-likelihood estimation procedure, as in Study 1.

Goodness-of-fit indices confirmed the seven-factor structure, as hypothesized. Indeed, although the Satorra-Bentler chi-square was significant, $SB\chi^2$ (168) = 489.15, $p \cong .00$, all the other indices suggested a good fit to the data (χ^2/df = 2.91; RMSEA = .06, 95% CI [.057, .070]; CFI = .88;[1] TLI = .85; SRMR = .07). As reported in Table 1, the standardized factor loadings were all significant at $p < .001$, ranging from .52 (Item 2 of taking love for granted) to .81 (Item 1 of sexual attraction). Regarding the relationships between love components, as reported in Table 4, the findings largely confirmed the results from Study 1.

As reported in Table 3, all the MEVOL subscales showed acceptable levels of reliability, with values ranging from .60 (positive emotion) to .72 (sexual attraction). The main psychometric features of the scale in its final, 21-item version were therefore largely replicated, thus sustaining the preliminary results from Study 1. Based on these encouraging findings, we proceeded to test MEVOL's convergence and validity issues.

Validity Issues

Convergent and divergent validity

We selected three measures to validate MEVOL Scale. Specifically, we expected PLS-R-IT, which measures passionate love, to have high correlations with all MEVOL's category; CLS, which

measures companionate love, to be primarily associated with positive emotion and less correlated with the dimensions that are linked to negative feelings; and PAIR, which measures sex satisfaction, to be correlated with sexual attraction.

TABLE 4
Latent correlations between the MEVOL subscales in the CFA (Study 2)

Subscale	1	2	3	4	5	6
1. Positive idealization	-					
2. Negative idealization	.07	_-				
3. Taking love for granted	.25**	–.22**	_-			
4. Sexual attraction	.66***	.12	.05	-		
5. Positive emotion	.83***	–.26**	.47***	.45***	-	
6. Negative emotion	.22**	.84***	–.23**	.23**	–.17*	-
7. Obsessive thinking	.49***	.73***	.20*	.29***	.22**	.78***

*$p < .05$. **$p < .01$. ***$p < .001$.

Consistently with our hypotheses, the results shown in Table 5 highlight the correlations between MEVOL Scale and the PLS-R-IT. Similarly, in line with our predictions, CLS was highly correlated with all the dimensions of MEVOL Scale except those that are linked to negative feelings. Moreover, as expected, we observed a positive correlation between sexual attraction and PAIR. The last hypothesis that we tested, based on previous findings of Sprecher and Regan (1998), involved the correlations between the length of a relationship and several measures: obsessive thinking, sexual attraction, and CLS. Our results showed that sexual attraction was negatively related with the passage of time ($r = –.20$, $p < .001$) but that the other measures were not correlated.

TABLE 5
Pearson correlations between MEVOL's subscales and PLS-R-IT, CLS, and PAIR

MEVOL's subscales	Love measures		
	PLS-R-IT	CLS	PAIR
Positive idealization	.68***	.52***	.31***
Negative idealization	.34***	.04	.04
Taking love for granted	.14**	.11**	.05
Sexual attraction	.56***	.37***	.27***
Positive emotion	.42***	.43***	.30***
Negative emotion	.42***	.05	–.01
Obsessive thinking	.63**	.25***	.06

Note. PLS-R-IT = Italian validation of the Passionate Love Scale (reduced version); CLS = Companionate Love Scale; PAIR = Personal Assessment of Intimacy in relationship Scale.
*$p < .05$. **$p < .01$. ***$p < .001$.

Perspective taking and subjective measures

As previously mentioned, we extracted one measure called *PT-positive* to measure PT. It was composed of Item 1 of the positive emotion subscale summed with the reverse scores of Items 2 and 3 of the negative idealization subscale and Item 1 of the negative emotion subscale. The reliability was acceptable ($\alpha = .67$) and allowed us to compute a single score of PT-positive. To analyze the data for the EQ, we divided the participants into four groups. The first group included those who had declared that they were currently in love (EQ-yes); the second group comprised those who were unsure as to whether they were in love (EQ-unsure); the third group consisted of those who felt loved by their partners (EQ-yes-PT); and the fourth group was made up of those who were unsure of their partners' love (EQ-unsure-PT). People who were not in love or those who did not feel loved at all by their partners were not taken into consideration for this analysis, as there were few such participants (and, therefore, their results would not be representative). Therefore, the four groups were compared with respect to the MEVOL's subscales, including PT-positive, and PLS-R-IT.

The majority of these variables had nonnormal distributions; therefore, we analyzed the differences between the four groups using a Mann-Whitney *U* test of variance for nonparametric variables with nonnormal distributions. Regarding effect size, Grissom and Kim (2012) suggested, for a two-group independent-samples design, dividing the Mann-Whitney *U* statistic by the product of the two sample sizes. In line with our hypothesis, as shown in Table 6, there are important differences in both the MEVOL and PLS-R-IT scores between people who are in love and those who are unsure. Specifically, the EQ-yes group had significantly higher scores than did the EQ-*unsure* group with regard to the positive idealization, sexual attraction, positive emotion, obsessive thinking, PT-positive subscales and to the PLS-R-IT scores. As expected, the EQ-yes-PT and EQ-unsure-PT groups had significant differences on several dimensions (see Table 7). In particular, those in the EQ-yes-PT group were more positively oriented than those in the EQ-unsure-PT group, as can be noted from the former group's significantly higher scores in the positive idealization, taking love for granted, positive emotion, PT-positive dimensions and its lower scores in the negative idealization and negative emotion dimensions.

TABLE 6
Differences between people in love (EQ-yes) and people who were unsure (EQ-unsure) in MEVOL's subscales and PLS-R-IT

	EQ-yes (N = 360) Mean (*SD*)	EQ-unsure (N = 86) Mean (*SD*)	*U*	Effect size η^2
Positive idealization	14.90 (2.56)	11.70 (3.60)	7428***	0.23
Negative idealization	8.19 (3.92)	8.80 (4.26)	14344	0.46
Taking love for granted	8.71 (3.74)	8.05 (3.69)	13902	0.45
Sexual attraction	15.06 (3.17)	13.30 (4.05)	11555***	0.37
Positive emotion	15.84 (2.09)	12.87 (3.26)	6893***	0.22
Negative emotion	7.93 (3.69)	8.24 (4.03)	15030	0.48
Obsessive thinking	9.12 (3.89)	7.48 (3.12)	11764***	0.37
PT-positive	18.81 (4.12)	16.91 (5.01)	12230**	0.39
PLS-R-IT	101.55 (18.36)	83.26 (22.85)	8202***	0.26

Note. PT = perspective taking; PLS-R-IT = Italian validation of the Passionate Love Scale (reduced version); EQ = explicit question; *SD* = standard deviation.
*p < .05. **p < .01. ***p < .001.

Another aspect that we analyzed in the explicit questions' answers was the intensity of love, which participants in the EQ-yes and EQ-yes-PT groups rated from 1 to 10. For the EQ-yes group, the intensity was positively correlated with the positive idealization, sexual attraction, positive emotion, and obsessive thinking subscales, as well as with the CLS, PLS-R-IT, and PAIR scores (all $r > .20$; all $p < .001$). For the EQ-yes-PT group, intensity was positively correlated with the positive idealization, taking love for granted, sexual attraction, and positive emotion subscales, as well as with the CLS and PLS-R-IT scores (all $r > .13$; all $p < .05$); intensity in this group was also negatively correlated with the negative idealization and negative emotion subscales (all $r < –.15$; all $p < .05$).

TABLE 7
Differences between people that felt loved by their partner (EQ-yes-PT) and people who were unsure (EQ-unsure-PT) in MEVOL's subscales and PLS-R-IT

	EQ-yes-PT (N = 333) Mean (SD)	EQ-unsure-PT (N = 121) Mean (SD)	U	Effect size η^2
Positive idealization	14.55 (2.98)	12.68 (3.74)	14174***	0.35
Negative idealization	7.69 (3.64)	9.48 (4.54)	15678***	0.38
Taking love for granted	9.12 (3.80)	7.64 (3.31)	15487***	0.38
Sexual attraction	14.47 (3.56)	14.55 (3.82)	19425	0.48
Positive emotion	15.92 (2.05)	13.37 (3.23)	10399***	0.25
Negative emotion	7.46 (3.44)	8.67 (4.37)	17288**	0.42
Obsessive thinking	8.92 (3.83)	7.91 (3.80)	16936	0.42
PT-positive	19.43 (3.69)	16.46 (4.98)	13106***	0.32
PLS-R-IT	98.75 (21.20)	89.05 (25.20)	15365***	0.38

Note. PT = perspective taking; PLS-R-IT = Italian validation of the Passionate Love Scale (reduced version); EQ = explicit question; *SD* = standard deviation.
*$p < .05$. **$p < .01$. ***$p < .001$.

Moreover, to support the fact that the assessment of PT should be integrated within the evaluation of love in order to have a complete profile of participants, a box plot was used to demonstrate the importance of this dimension (see Figure 1). As you can see a significant number of participants that were passionately in love (PLS-R-IT > 86) declared that they were not sure that they were loved in return (EQ-unsure-PT).

Discussion

The present study widely supported MEVOL Scale's psychometric features in its final, 21-item version (see Appendix). Indeed, the scale's factorial structure and reliability were confirmed, as were the relationships between MEVOL dimensions reported in Study 1. We also checked MEVOL's preliminary validity, and the results are in line with our expectations; indeed, MEVOL Scale showed high correlations with other love measures. Furthermore, as Sprecher and Regan (1998) previously hypothesized, PLS-R-IT (but not CLS) correlates with negative emotion; in contrast, CLS is primarily associated with positive emotion. Our data suggest that obsessive thinking is common not only in the early stages of relationships, as Acevedo and Aron (2009) hypothesized; rather, this dimension is more strongly correlated with the intensity of love.

Our results suggest that various profiles can emerge depending on the status of a relationship (e.g., in love vs. unsure). Our data also suggest that people who are not sure if they are in love tend to display low positive idealization and positive emotion and that those who are not sure if they are loved present higher negative feelings. We also analyzed PT, which led to surprising results. As we expected, people who felt loved tended to show more positive sentiments than did people who were unsure if they felt loved. This is the first study to show the importance of considering PT when assessing love, as it provides an index of meta-thought for people who are in love. These results showed that it is extremely important to evaluate love as a multidimensional construct because several dimensions may intervene and therefore create different profiles of love relationships.

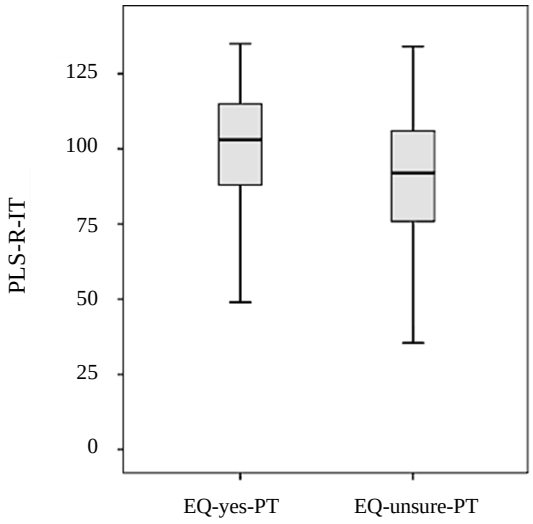

FIGURE 1
Box plot of level of passionate love among people who feel loved by their partner (EQ-yes-PT) and who declared that they were not sure that they were loved in return (EQ-unsure-PT).

General Discussion

This research introduced MEVOL, which is a scale for assessing love's components based on the latest research from different perspectives (e.g., social psychology and neuroscience) that suggest that love is composed of many dimensions (e.g., Acevedo, Aron, Fisher, & Brown, 2012; Bartels & Zeki, 2000; Hatfield & Sprecher, 1986.). The results indicate that MEVOL is short, clear, and homogenous and that it has strong psychometric properties, including a clear factorial structure and acceptable internal consistency and construct validity.

Study 1 aimed to identify and create MEVOL's structure, resulting in a 21-item scale with seven factors: *positive idealization*, *negative idealization*, *taking love for granted*, *sexual attraction*, *positive emotion*, *negative emotion*, and *obsessive thinking*. Study 2 confirmed the findings of Study 1, included a preliminary validity test and added two other measures to assess PT through indirect estimation using particular items from the seven dimensions.

Study 2's results indicate that MEVOL can be considered a reliable and validated scale that can diversify and measure love's components. Specifically, several aspects that had not previously been inves-

tigated are essential to the assessment of love. The high correlation between MEVOL Scale and other love measures provides support for the scale's construct validity. As Hatfield and Sprecher (1986) theorized, PLS represents a measure of passionate love that includes cognitive, behavioral, and emotional components. Therefore, the high correlations between MEVOL's dimensions and PLS indicate that our scale involves various components of love. Furthermore, the weak correlation between PLS and taking love for granted indicates that this dimension is new to the assessment of love. Moreover, CLS has a high correlation with all MEVOL components (but particularly with those that are linked to positive feelings). It is noteworthy to underline the fact that PAIR, which is a measure of sexual satisfaction, did not correlate with any of the negative dimensions of MEVOL but did correlate with sexual attraction, positive emotion, and positive idealization. This indicates that MEVOL's dimensions are independent and that each one measures a different aspect (sometimes in contrast). Moreover, another aspect that MEVOL Scale highlights is that love can be considered a subjective experience (Watts & Stenner, 2005). We directly asked people if they would define themselves as *in love*, *not in love*, or *unsure*. In line with our expectations, people who stated that they were in love and those who were unsure had different configurations of love components.

The present study shows also the importance of PT (Dixon & Moore, 1990). As expected, the results demonstrate that people who think that their partners are not very involved in their relationships showed more negative feelings. These findings are in line with previous studies, which demonstrated that lovers who are rejected display deep senses of loss and negative affect; sometimes, these feelings can lead to clinical depression and even to suicide and/or homicide (Fisher et al., 2010). Moreover, the results showed that evaluating participants only with a unidimensional measure could neglect some aspects that can be crucial for the assessment; for example, two participants could obtain the same PLS score but they perceive the love from their partner differently. Furthermore, the novelty of PT implies that several other mechanisms may deserve attention from scientists or clinicians. It is important to specify that the PT-positive's index should not be considered an integral dimension of MEVOL but as an extra indicator that provides additional value to the evaluation.

The current study has evident limitations. The results are representative only of our sample, so we cannot infer causality between the dimensions and love states. For example, our results show that people who are in love seem to have lower levels of negative emotion and negative idealization than other people, but we could expect to also find people who are in love but who have high negative feelings. Moreover, two dimensions, negative idealization and taking love for granted, have been introduced as exploratory and therefore there is no literature that supports them. Furthermore, Study 1 presents important limits especially with regard to sample size, which should be larger to fully meet the criteria for a CFA, and gender imbalance among participants. However, these limits have been overcome with Study 2. Another limitation of the present study is represented by the fact that for the validity indices, two scales not validated in Italian have been used.

There are several implications of this study. First, MEVOL Scale reflects the multidimensionality of the love construct using a clear and well-defined structure. Therefore, MEVOL — even combined with other measures (e.g., PLS) — represents a good scale that can be employed during scientific research. For instance, in future researches that investigate romantic love it will be possible, through MEVOL, to select participants, not only on the basis of the single love score (e.g., measured with the PLS) but also on the basis of the seven dimensions which will give a more clear profile for each participant. One of the main issues present in romantic love studies is the selection of participants based on a single score. In this way, we risk equating two participants who are actually very different from each other. For example, if we evaluated two people who are madly in love with their partner they would probably get the same score in the uni-

dimensional scale. However, the administration of MEVOL Scale could reveal that one of the two subjects has low PT-positive scores, so we know that this subject does not feel reciprocated by his/her partner. These two subjects, therefore, despite having the same score on the unidimensional scale, could have different emotional reactions during love paradigms. In this way, MEVOL Scale helps to overcome this issue and avoid misinterpretation of results. Another implication of MEVOL is in the clinical setting. Although, the seven dimensions of MEVOL Scale are characteristics of romantic love, high levels of negative emotions and negative idealization could suggest an unhealthy relationship. However, these interpretations are speculative, as data are not yet available to confirm these hypotheses. Therefore, we recommend for future studies to investigate possible correlations between psychopathology and the different profiles that emerge with the administration of MEVOL Scale.

Moreover, MEVOL Scale represents an Italian study, so we suggest further validation in other countries. For further study, we suggest investigating MEVOL's potential in neuroscientific paradigms; Aron and colleagues (2005) found a strong positive correlation between PLS and the brain areas associated with love, so we could expect interesting findings in a similar study of MEVOL's subscales. We also expect that in further studies more dimensions will be taken into account as part of this complex concept.

Note

1. As already noted, CFI and TLI index computed in Mplus may be lower than they would be as calculated in other packages, as in Mplus covariances among exogenous observed variables are not constrained to zero (e.g., Widaman & Thompson, 2003). As an additional check, we repeated the same confirmatory factor analysis with LISREL 8.71, which uses a different chi-square to calculate the null model from Mplus (Jöreskog & Sörbom, 2004): the resulting CFI was .93, while the TLI (NNFI) was .91, thus confirming the adequate fit of the model to the data.

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APPENDIX

Items of MEVOL Scale (translated into English)[1]

Subscale	Item
EMONEG	I live with constant fear that the relationship with _____ may end.
EMONEG*	Sometimes I have worried that _____ wants to leave me.
EMONEG	Sometimes I am afraid that _____ may cheat on me.
EMOPOS*	I think that _____ is happy that we are together.
EMOPOS	_____ makes me feel safe.
EMOPOS	When I am with _____ I have good moments.
IDNEG	Sometimes I feel emotionally more fragile than _____.
IDNEG*	I know _____ does not think of me as much as I think of him/her.
IDNEG*	When we argue I have the feeling _____ does not suffer as much as me.
IDPOS	_____ represents what I always wanted.
IDPOS	I am attracted by _____'s mind.
IDPOS	I would rather be with _____ than anyone else.
OBS	If I broke up with _____, I would not stop crying.
OBS	When we argue I obsessively check the phone with the hope that _____ will contact me.
OBS	I become paranoid when _____ is late in answering my messages.
SEX	I am very sexually attracted to _____.
SEX	Sometimes I do not want to kiss _____.
SEX	The sexual attraction towards _____ has decreased with the passing of time.
TLFG	I take it as a given that my relationship with _____ is guaranteed.
TLFG	I think _____ likes me too much.
TLFG	I think _____'s thoughts are obsessively focused on me.
EQ-love	Right now, are you in love with_____?
EQ-love-PT	Does_____ currently love you?

Note. EMONEG = negative emotion; EMOPOS = positive emotion; IDNEG = negative idealization; IDPOS = positive idealization; OBS = obsessive thinking; SEX = sexual attraction; TLFG = taking love for granted; EQ-love = explicit question love feeling; EQ-love-PT = explicit question love perceived. The * indicates the items selected to evaluate the PT.

NOTE

1. A copy of the Italian version of the MEVOL Scale can be obtained from authors.