

Quadrangular Love Theory and Scale: Validation and Psychometric Investigation

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This article comprehensively reviews the major components and dimensions of love that researchers operationalized in psychometric scales throughout recent decades. The Quadrangular Love Theory (QLT) synthesizes the achievements of psychometrics of love and demonstrates – theoretically and empirically - that they are grouped in four umbrella love dimensions: Compassion and Affection, which characterize the feelings toward a partner, and Closeness and Commitment, which characterize the feelings regarding a relationship. To test this theory, the authors developed the Quadrangular Love Scale (QLS) and explored its construct validity and psychometric properties in two studies utilizing various samples. Study 1 ($N = 592$) generally supported convergent and discriminant validities and internal reliability of the four dimensions. Study 2 ($N = 584$) provided additional support to the discriminant validity of QLS in terms of personality traits as predictors of major love feelings and love attitudes as typological differences of experiencing these feelings.

Keywords: romantic relationships, love theory, love scale, dimensions of love, psychometrics of love

Throughout recent decades, researchers have created several theories of love describing its major components and operationalized the construct empirically by psychometric scales. Four theories have been widely used in love research: (1) the color wheel theory of love (Lee, 1973, 1976), which evolved into the love attitudes theory (Hendrick & Hendrick, 1986; Hendrick, Hendrick, & Dicke, 1998), (2) the passionate and companionate love theory (Berscheid & Hatfield, 1978; Hatfield, 1982, 1988; Hatfield & Sprecher, 1986), (3) the triangular theory of love (Sternberg, 1987, 1997), and (4) the theory of love as attachment (Hazan & Shaver, 1987). We omit here other love theories, which did not develop into operational definitions of love in terms of psychometrics, or did not measure the love feelings.

Lee (1973, 1976) created the color wheel theory of love that posits six “colors” of love—three primary colors and three secondary colors. Lee (1973, 1976) first labels the primary colors of love as Eros, Storge, and Ludus. Eros represents an erotic style of loving; Storge is the type of love that develops over time; and Ludus represents a game-type of love, with a focus on having fun while moving from one romantic interest to another. The secondary colors of love—Mania, Pragma, and Agape—are combinations of two primary colors. Mania (preoccupied and possessive style) is a mix of Eros and Ludus; Pragma (practical style) is a mix of Ludus and Storge; and Agape (altruistic style) is a mix of Eros and Storge.

Hendrick and Hendrick (1986) further developed this theory, treating these six love styles as variables.

Passionate vs. companionate love theory (Berscheid & Hatfield, 1978; Hatfield, 1982, 1988; Hatfield & Sprecher, 1986) introduced an important dichotomy of love. Passionate love is characterized by a strong desire to be with a partner. Corresponding feelings, expressions, and behaviors differ depending on whether the love is reciprocated (e.g., feelings of ecstasy and fulfillment) or unrequited (e.g., feelings of anxiety and emptiness). Companionate love, on the other hand, represents feelings of intimacy, closeness, commitment, and equality with a significant other (Hatfield, 1982, 1988; Hatfield & Rapson, 1993).

Sternberg (1987) proposed the triangular theory of love, which postulated three main constituents: intimacy, passion, and commitment/decision. Intimacy is a feeling of “closeness, bondedness, and connectedness” (Sternberg, 1987, p. 38). Passion is a strong feeling enhanced by internal drives and motives in which people strive for “psychophysiological arousal” provided by their loved one; this is oftentimes associated with, but not limited to, sexual arousal (Sternberg, 1987, p. 43). Commitment/decision, is the experience of an individual to maintain their love and relationship with a loved one for a short (decision) or long (commitment) period. A combination of these dimensions comprises different types of love toward a loved one.

Hazan and Shaver (1987) conceptualized love as an attachment process utilizing the attachment theory developed by Bowlby (1969, 1973, 1980) and Ainsworth, Blehar, Waters, & Wall (1978). The authors explain how romantic love presents a culmination of characteristics of adult attachment. This theory was expanded as a biosocial process, which integrates three behavioral systems: attachment, caregiving, and sex (Mikulincer, 2006; Mikulincer, & Goodman, 2006). The combination of these systems explains the diversity of love experiences.

These theories have made substantial contributions to love research over the past 50 years. Recently, Berscheid (2010) summarized their major advancements and compiled the best candidates to study in a temporal perspective: Companionate Love, Romantic Love, Compassionate Love, and Adult Attachment Love. She described these kinds of love extensively as types, rather than as dimensions of love. We believe, however, that the salience of certain dimensions characterizes these types of love. Among those are *closeness/intimacy* and *commitment* for companionate love, *passion/affection* (and may be *intimacy*) for romantic love, *compassion* for compassionate love, and *closeness/intimacy* for adult attachment love. The constructs explored in the previous theories deepened our scientific understanding of love, from which four dimensions of love arise: *passion/affection*, *compassion*, *closeness/intimacy*, and *commitment*. Therefore, we believe these dimensions are good candidates to be main dimensions of love.

A comprehensive theoretical review of the major components and dimensions of love, which researchers operationalized in psychometric scales throughout recent decades, demonstrated that love feelings could be grouped in four main dimensions: Compassion, Affection, Closeness, and Commitment. Therefore, the Quadrangular Love Theory (QLT) proposes an integration approach, which synthesizes, expands, elaborates, and refines the conceptualization of love feelings in a cohesive manner and in specific operational definitions of their constituents. This theoretical proposal acknowledges the contributions made by prior theories while taking a further step to advance the study and interpretation of love. It brings a comprehensive description of the feelings associated with love through distinguishable, yet interdependent constructs. The article also reports an extensive multi-study exploration of the Quadrangular Love Scale (QLS) – a new love scale, which can facilitate the advancement of love research in several ways:

1. QLT compiles together – in a unified theory - four major constructs (Compassion, Affection, Closeness, and Commitment), which previous theories identified, but studied separately from each other, with some overlapping.
2. QLT refines and elaborates the conceptual descriptions and names of these four major love dimensions to better define their multifold meanings and avoid their overlapping.
3. QLT classifies these four major dimensions in two mega groups: *the feelings toward a partner* and *the feelings regarding the relationship* with a partner.
4. QLT compiles an extended and comprehensive list of descriptors - specific love feelings/dimensions – which theoretically should be within the framework of these four dimensions. Those love feelings were studied extensively in earlier research, yet some were missing in modern love research. In QLT, they fit in a comprehensive structure.
5. QLS creates a list of scale items, which tap all conceptually defined descriptive feelings of QLT. Some items have been borrowed from a variety of previous scales, with some modifications. The others are newly composed.
6. QLS proposes the newly composed and psychometrically explored scales of Compassion, Affection, Closeness, and Commitment. They are shorter than their previous analogues and are therefore more practical for the research of all these dimensions in one study. They contain the refined list of items, which precisely tap the descriptors of four major dimensions according to updated theory. There has not been a scale for Affection in love so far, while Closeness was not studied within a conceptual structure of love.
7. QLS proposes the psychometrically explored scales of those four dimensions with specifically tapped descriptive items, which fall

under their respective dimensions. This allows studying not only the variables of these four dimensions, but also more specific feelings pertaining to those.

The Quadrangular Love Theory

Based on the comprehensive review of the various concepts discussed and investigated at length by prior researchers, we define love in terms of the combination of four major constructs—Compassion, Affection, Closeness, and Commitment—with several descriptive characteristics of each (see Table 1). The corresponding Quadrangular Love Scale (QLS) defines these dimensions conceptually and operationally.

Both groups of feelings are related to each other: partner's characteristics affect relationship quality (it is easier to feel close to an attractive partner) and relationship qualities affect feelings toward a partner (positive interactions inspire further admiration of a partner). Nevertheless, these two groups of feelings are distinctively different in terms of their objects: a partner vs. relationship with the partner. This is an important distinction that we propose for the study in the field of romantic relationships, which allows a deeper and more differentiated understanding of love. Prior social cognition and relationship research have tangibly addressed this distinction between perceptions of people and relationships (Baldwin, 1992; Fletcher, Simpson, & Thomas, 2000).

In the same vein, Sternberg's duplex model (2006) summarized 26 common "love stories." Although some of these stories focus only on partner characteristics, many focus on the nature of relationships. A theoretical conception proposed in the QLT and QLS makes the explicit distinction of love-related feelings between person-focused and relationship-focused.

These two mega dimensions (with different foci of sources and directions of feelings) have never been explicitly discussed in previous literature. Therefore, we theoretically propose these two in this article since the four major dimensions reasonably fall under their umbrellas. The distinction between these two mega dimensions allows to explore separately the sources and causes of feelings of compassion and affection, primarily in the qualities of a partner, from the sources and causes of feelings of closeness and commitment, primarily in the quality of a relationship.

Table 1
The Descriptors of Four Constructs of Quadrangular Love Theory

Feelings toward the Partner	
<i>Compassion</i>	<i>Affection</i>
Care	Admiration
Concern	Respect
Empathy	Personality Attraction
Acceptance	Tenderness
Tolerance	Elation
Protection	Appreciation
Giving Advice	Compliment
Consolation	Physical Embrace
Support	Considerate
Nonjudgment	Physical Attraction
Feelings of the Relationship	
<i>Closeness</i>	<i>Commitment</i>
Attachment	Devotion
Openness	Desire for Relationship
Affiliation	Long-Term Orientation
Compatibility	Exclusiveness
Feeling Understood	Stability
Feeling Accepted	Forgiveness
Reliance	Coping
Trust	Investment
Emotional Comfort	Sacrifice
Seeking Help	Cooperation

Feelings toward a partner. This category includes two major dimensions: Compassion and Affection that represent partner-focused feelings, which characterize the feelings toward a partner, relatively independent of the relationship with the partner. Although these feelings toward a partner strive for a relationship with him/her, yet these particular feelings are still predominantly partner-focused, i.e. have partner's qualities as a source of emotional experience.

Compassion. The construct of compassion was only recently added to theoretical contemplation of love (Berscheid, 2010; Sprecher & Fehr, 2005), yet it was studied as a construct separate from other dimensions. The feelings within this dimension are directed to and concerned with the other person. It focuses on the needs of a romantic partner. Compassion assumes that a partner is suffering or in need of reassurance (Goetz, Keltner, & Simon-Thomas, 2010; Sprecher & Fehr, 2005). Therefore, social support is among defining characteristics of this dimension (Cobb,

1976; Salazar 2015), along with reassurance of a romantic partner's importance and value (Taylor, 2007).

Compassion is a selfless dimension of love with emotional and behavioral focus on the other person. Within this dimension, people experience a number of feelings, especially care, concern, and empathy. Those that experience high levels of compassion to their romantic partners also experience overall acceptance, tolerance, and nonjudgment to these individuals. These feelings are expressed through protection, support, consolation, and giving advice to the partner (see Table 1).

Affection. Passionate love is a classic construct of romantic love. Therefore, prior theorists (Hatfield & Sprecher, 1986; Sternberg, 1987, 1997) included these sexually saturated feelings of intense arousal—psychological and physiological—toward a loved one in their love conceptions. The overwhelming power of passion was considered as a distinctive feature of romantic love, while affection remained in its shadow. The concept of affection did not receive such attention in scientific literature as passion so far (Floyd & Morman, 1998; Floyd, et al., 2005).

Passion is an intense feeling of love, while affection embraces a broader spectrum of calmer affectionate feelings that a lover may experience toward their partner. Therefore, converging passion and affection in one continuum expands the range of love feelings from high (passion) to moderate (affection) intensity. In addition to passion, the feelings within this Affection dimension include respect, admiration, tenderness, and appreciation. People that experience great affection also experience high levels of physical and character attraction to their romantic partners. These feelings are expressed to the partners by providing compliments, being considerate, and physically embracing them (see Table 1).

Feelings of the relationship. This category consists of two major dimensions: Closeness, the degree of psychological proximity, and Commitment, the intent for longevity of the relationship. Closeness and Commitment are relationship-focused feelings, which have the source of emotional experience in relationship with a partner - rather than in the partner's qualities - even though these feelings of a relationship certainly depend on the partner's qualities.

Closeness. Many researchers include Intimacy among the key characteristics of love (Hatfield, 1982; Hatfield & Rapson, 1993; Sternberg, 1987). The terms intimacy and closeness are frequently used interchangeably in love studies. Some believe these concepts, being fundamental, are vague and poorly defined in personal relationship research (Parks & Floyd, 1996). Intimacy is very multifaceted construct with multiple connotations, including sexual and emotional intimacy (Birnie-Porter & Lydon, 2013), the feelings of high-intensity (Moss & Schwebel, 1993; Nowinski, 1988). This construct overlaps with attachment

process (Bartholomew, 1990; Hazan & Shaver, 1987). Within romantic relationships, partners experience attachment to other person, which can be close or more distant, warm or cold, secure or insecure, etc.

In QLT, we prefer using the construct Closeness, being more focused, as the dimension lying in foundation of both intimacy and attachment. The construct received substantial elaboration in previous research (Berscheid, Snyder, & Omoto, 1989, 2004; Dibble, Levine, & Park, 2011).

Closeness refers specifically to the feelings of quality of a relationship with a partner (*being at psychologically close distance to a partner*), rather than with the qualities of the partner him/herself. It also stands for the degree of psychological distance between two people in a relationship from the perspective of one of them. Like most definitions of intimacy highlight, the construct of closeness emphasizes emotional closeness within the relationship between two individuals. Such emotional closeness is established and strengthened through self-disclosure (Bowman, 2008) revealing to the other person private and personal experiences, thoughts, feelings, and emotions. Close relationships are built upon the notion of interdependency and the readiness for self-disclosure. This then leads to a greater level of acceptance of the partner and increases perceived closeness.

Thus, closeness is a love dimension characterized by the degree of perceived psychological proximity and affiliation within a romantic relationship, which include feelings of being compatible with and accepted and understood by the other. These feelings are accompanied by emotional comfort and feelings of trust and reliance toward the other. Then, an individual would be more open with the other and seek the other's help (see Table 1).

Commitment. Commitment is an intention to initiate, continue, and maintain the relationship with a partner. Researchers studied this feeling among the core constructs in their theories of relationship and love (Johnson, 1999; Rusbult, 1980; Rusbult, Martz, & Agnew, 1998; Sternberg, 1997), describing varieties of experiences associated with it, considering types of commitments, and the role of investment a person gives in a romantic relationship in this feeling.

Commitment is an intention to engage and remain in an exclusive relationship. The concept may designate a short-term or a long-term intention to stay in the relationship and imply a willingness to invest in the relationship. With high commitment come many experiences that people have in their close relationships. Commitment is characterized by feelings of exclusiveness and stability of the relationship; a desire for and devotion to the relationship with the intent of it lasting a long time; and a willingness to invest in the relationship through forgiveness, sacrifice, cooperation, and managing difficulties within the relationship fairly (see Table 1).

Operational Definition of Quadrangular Love

To create a comprehensive scale with items that are representative of each dimension, we reviewed the characteristics of love explored in previous studies. For this compilation, we looked for a number of previously validated scales as well as empirical articles that suggest the presence of particular feelings (items) that can be categorized under a particular dimension. We developed the QLS as a comprehensive self-report instrument, which specifically expresses the constructs presented in Table 1. Each of the four major dimensions is comprised of ten minor items representing feelings, which presumably fall under their respective dimension. Each feeling was then described with a single most representative statement. Each theoretically selected item describes the dimension under which it is listed.

For Compassion, we modified several items from the Compassionate Love Scale (Sprecher & Fehr, 2005) and the Prototype of Compassionate Love (Fehr & Sprecher, 2009). For Affection, we modified some items from the Passionate Love Scale (Hatfield & Sprecher, 1986), also taking into consideration the affectionate feelings and behaviors described by Floyd and Morman (1998). For Closeness, we modified several items from the Unidimensional Relationship Closeness Scale (Dibble, Levine, & Park, 2011) and the self-disclosure and trust descriptors of love (Larzelere & Huston, 1980). For Commitment, we modified some items from the Prototype of Love and Commitment (Fehr, 1988), the Investment Model Scale (Rusbult, Martz, & Agnew, 1998) as well as the items of long-term orientation, sacrifice, and coping developed by Finkel, et al., (2002) and Rusbult and Buunk (1993). The comprehensive review of the previous scales and generation of the set of items brought us to ten items for each of the four dimensions (see Appendix). Each of the items for their respective dimensions were either modified from previous scales assessing the same construct or developed based on previous literature to account for important characteristics of each dimension.

The general purpose of the series of studies was to show that all this comprehensive variety of characteristics and dimensions of love, which researchers explored throughout recent decades, could be classified within four basic groups and measured with QLS.

Study 1

The purpose of this study was to develop the QLS as a measurement scale and provide its initial validation. The study explored the validity and reliability of the QLS psychometrics with two large convenience samples: one from the United States (Louisiana and Michigan) and the other from the United Kingdom. The sample of participants from the United Kingdom was used to explore validity of the scale and replicability of results with

another sample with a similar language background. We were not as interested in generalizing beyond a college-age demographic as much as we were interested in testing the generalizability outside of a traditional United States college sample. This is reflected in the similar age demographics of both samples. For both samples, we used the same research design. Some analyses were conducted on the combined sample, while others on samples separately.

Method

Participants

We recruited a total of 608 participants from two separate sources: one sample from the United States and the other, from the United Kingdom. For the United States sample, we recruited 337 undergraduate students, who participated for course credit for their introductory psychology courses. The data for 14 participants were eliminated during data screening because of errors, inconsistencies in responses, or missing values in measurements. The total number of participants remaining for statistical analysis was 322 (143 male and 179 female) with 83 from a small liberal arts college in Michigan and 239 from a large research university in Louisiana. Participants' ages ranged from 18 to 40 years ($M = 19.84$; $SD = 2.63$). For the United Kingdom sample, we recruited a total of 271 participants using the Prolific recruitment system (Prolific, 2018)¹. Participants received 2.50 GBP for completing the study. The data for one participant was eliminated because of inconsistencies in responses, leaving an analyzable sample of 270 (50% male and 50% female). Participants' ages ranged from 18 to 40 years ($M = 22.99$; $SD = 4.69$).

Instruments

The QLS created for this study consisted of 40 items (see Appendix), 10 items for each dimension — Compassion, Affection, Closeness, and Commitment. Each item is a characteristic of a feeling expressed in a statement (e.g., the item “Care” corresponds to the statement “I care about this person’s well-being”). Participants also answered the questions addressing demographic variables and some aspects of individual romantic relationships, presumably associated with QLS dimensions. For external validation, we included four general questions about how compassionate, affectionate, close, and committed they feel toward their romantic partners. For validation purposes, we also included in this survey the following scales:

- Compassionate Love Scale (CLS; Sprecher & Fehr, 2005), to support the convergent validity of our Compassion subscale; CLS was treated as a unidimensional scale;

- Passionate Love Scale – short version (PLS; Hatfield & Sprecher, 1986) to support the convergent validity of our Affection subscale; PLS was treated as a unidimensional scale;
- Unidimensional Relationship Closeness Scale (Dibble, Levine, & Park, 2012) to support the convergent validity of our Closeness subscale;
- Investment Model Scale (Rusbult, Martz, & Agnew, 1998) to support the convergent validity of our Commitment subscale and relationship satisfaction; only commitment level and satisfaction level subscales were used in our study;
- Social Desirability Scale-17 (Stöber, 2001) to investigate whether QLS is affected by this bias; SDS-17 was treated as unidimensional scale.

The scores obtained with these instruments were expected to verify that the four scales of the QLS are consistent with and just as valid as these previously established separate measures.

Procedure

Participants rated their feelings toward their current, former, or possible prospective romantic partners (depending on a status of their relationship) using a Likert-type scale self-report assessment on the scale from -3 (strongly disagree) to +3 (strongly agree), with 0 indicating a neutral feeling. For our statistical analysis, we later transformed these scores to a scale of 1 (strongly disagree) to 7 (strongly agree).

The above-mentioned scales were administered in an online survey. The American participants completed this survey confidentially as a part of their research participation requirements in a course. The U.K. participants completed this survey anonymously and were remunerated for their time.

Results

Descriptive statistics and reliability

The descriptive statistics for the samples are presented in Table 2. All four dimensions of QLS showed high reliability for both U.S. and U.K. samples. For the U.S. sample, Compassion $\alpha = .86$, Affection $\alpha = .91$, Closeness $\alpha = .93$, and Commitment $\alpha = .92$. For the U.K. sample, Compassion $\alpha = .87$, Affection $\alpha = .93$, Closeness $\alpha = .93$, and Commitment $\alpha = .93$.

Factor analysis (the USA and UK samples together)

The KMO (.97) and Bartlett's Test ($p < .01$) showed that the results of the survey were adequate for factor analysis. To test the theoretical structure of our model, we ran a confirmatory factor analysis (CFA) using

Table 2
Descriptive Statistics for Males and Females for the Four Dimensions of QLS in the U.S. and U.K. Samples in Study 1

	Male <i>M (SD)</i>		Female <i>M (SD)</i>	
	U.S.	U.K.	U.S.	U.K.
	(<i>n</i> = 143)	(<i>n</i> = 135)	(<i>n</i> = 179)	(<i>n</i> = 135)
Compassion	6.05 (0.72)	6.13 (0.64)	6.15 (0.75)	6.06 (0.79)
Affection	6.03 (0.89)	6.17 (0.76)	6.15 (0.90)	6.04 (1.06)
Closeness	5.81 (1.06)	5.91 (0.91)	5.91 (1.09)	5.79 (1.13)
Commitment	5.61 (1.15)	5.79 (0.98)	5.73 (1.15)	5.65 (1.26)

maximum likelihood estimation. The criteria of minimum discrepancy over degrees of freedom (CMIN/DF) = 4.63; the comparative fit index (CFI) = .864; the root mean square error of approximation (RMSEA) = .078, were acceptable for the estimated model of QLS. The results of the factor loadings of the CFA (Table 3) demonstrated good fit between the model and our observed data. The items that correspond to their respective theoretical factors had the highest item-total correlation compared to the other factors in the model (Table 4). This largely supports our psychometric hypotheses. Moreover, the major dimensions of the QLS perfectly fit to two mega dimensions: Feelings toward the Partner and Feelings of the Relationship (see Figure 1). The dimensions had quite high correlations with each other, ranging from .86 to .95.

Table 3
*Factor Loadings for the Four Dimensions of the QLS in Study 1 (the Combined U.S. and U.K. Samples; *N* = 592)*

	Factor Loadings			
	Compassion	Affection	Closeness	Commitment
<i>Compassion</i>				
Consolation	.69			
Protection	.70			
Acceptance	.67			
Care	.81			
Nonjudgment	.32			
Empathy	.68			
Support	.81			
Giving Advice	.66			
Concern	.82			
Tolerance	.63			

Table 3 (continued)

<i>Affection</i>	
Physically Embrace	.66
Appreciation	.80
Considerate	.63
Respect	.72
Physical Attraction	.64
Elation	.81
Tenderness	.75
Compliment	.76
Admiration	.80
Personality Attraction	.75
<i>Closeness</i>	
Seeking Help	.69
Affiliation	.66
Compatibility	.83
Attachment	.74
Emotional Comfort	.73
Feeling Accepted	.69
Feeling Understood	.79
Reliance	.79
Openness	.74
Trust	.76
<i>Commitment</i>	
Desire for Relationship	.78
Forgiveness	.66
Long Term Orientation	.82
Coping	.61
Devotion	.86
Sacrifice	.63
Exclusiveness	.86
Cooperation	.75
Stability	.74
Investment	.85

Note: Factor loadings were computed for the entire sample, including participants previously and currently in romantic relationships as well as those who have never been in a relationship.

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Table 4
*Item-Total Correlations for the Four Dimensions of the QLS in Study 1
 (the Combined U.S. and U.K. Samples; N = 592)*

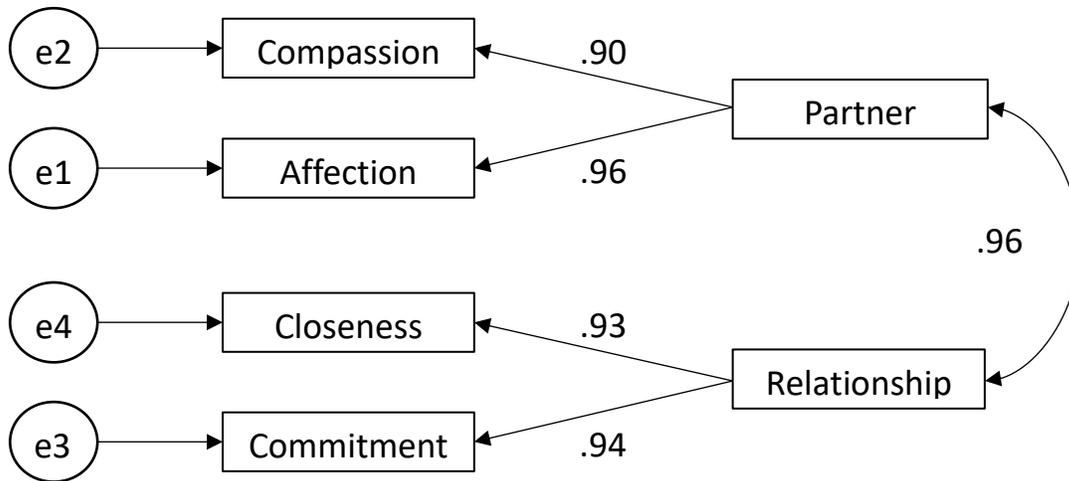
	Item-total Correlations			
	Compassion	Affection	Closeness	Commitment
<i>Compassion</i>				
Consolation	.69	.62	.58	.55
Protection	.67	.58	.57	.55
Acceptance	.70	.63	.63	.62
Care	.68	.63	.56	.59
Nonjudgment	.62	.34	.30	.31
Empathy	.71	.66	.65	.63
Support	.73	.66	.58	.60
Giving Advice	.60	.55	.48	.48
Concern	.71	.66	.58	.65
Tolerance	.67	.60	.55	.63
<i>Affection</i>				
Physically Embrace	.57	.66	.51	.52
Appreciation	.70	.76	.71	.72
Considerate	.61	.69	.58	.59
Respect	.67	.70	.65	.62
Physical Attraction	.54	.67	.53	.56
Elation	.66	.82	.72	.74
Tenderness	.62	.77	.62	.69
Compliment	.65	.77	.62	.64
Admiration	.66	.78	.71	.71
Personality Attraction	.63	.75	.67	.70
<i>Closeness</i>				
Seeking Help	.59	.61	.74	.61
Affiliation	.53	.60	.70	.59
Compatibility	.67	.75	.82	.76
Attachment	.64	.72	.71	.67
Emotional Comfort	.61	.63	.74	.62
Feeling Accepted	.57	.59	.74	.59
Feeling Understood	.59	.66	.82	.69
Reliance	.65	.70	.84	.75
Openness	.60	.66	.77	.66
Trust	.65	.70	.76	.68

Table 4 (continued)

<i>Commitment</i>				
Desire for Relationship	.65	.72	.71	.80
Forgiveness Long Term Orientation	.60	.64	.65	.70
Coping	.64	.71	.77	.87
Devotion	.61	.61	.56	.65
Sacrifice	.71	.77	.73	.84
Exclusiveness	.52	.59	.56	.71
Cooperation	.73	.79	.72	.82
Stability	.70	.71	.65	.73
Investment	.61	.69	.72	.83
	.69	.76	.71	.85

Note: All correlations are significant at the 0.01 level (2-tailed). Item-total correlations were computed for the entire sample, including participants previously and currently in romantic relationships as well as those who have never been in a relationship.

Figure 1. Structure of four scales for the US and UK samples. The Partner and Relationship factors are representative of our two main basic dimensions of Feelings toward Partner and Feelings toward Relationship.



Validity analysis

To assess convergent validity of the QLS, we computed correlations between each of the four dimensions of the QLS and the four previously-validated external love scales measuring the same or similar constructs (see Table 5). These findings, thus, support the convergent validity for the

four dimensions of QLS. The dimensions of the QLS demonstrate interdependence and correlate to each other for both U.S. and U.K. samples on the range from .78 to .89, $ps < .01$. The dimensions measured by other scales also highly correlated with each other (see Table 6). Good convergent validity was also supported in CFA with average variance extracted (AVE) for Compassion = .48, Affection = .54, Closeness = .55, and Commitment = .58. However, maximum shared variance (MSV) was higher than AVE for all dimensions: Compassion = .89, Affection = .91, Closeness = .89, and Commitment = .91, which indicates lower discriminant validity.

Table 5
Correlations among Four Major Dimensions of QLS and External Scales for the U.K. (N = 270) and U.S. (N = 322) Samples in Study 1

Scale	Compassion		Affection		Closeness		Commitment	
	U.S.	U.K.	U.S.	U.K.	U.S.	U.K.	U.S.	U.K.
Compassionate Love	.79	.86	.85	.89	.81	.83	.88	.87
Passionate Love	.62	.68	.80	.78	.66	.69	.79	.77
Relationship Closeness	.68	.78	.78	.86	.80	.82	.82	.86
Investment Model (Commitment)	.67	.75	.77	.79	.72	.77	.87	.87
Investment Model (Satisfaction Facet)	.67	.74	.75	.79	.80	.83	.83	.84
Social Desirability	<i>.13</i>	.26	.06	.16	<i>.13</i>	.19	.11	.23

Note: Bolded $rs = p < .01$; italicized $rs = p < .05$.

Table 6
External Variable Correlations for the U.K. (N = 270) and U.S. (N = 322) Samples in Study 1

Scale	Compassionate Love Scale		Passionate Love Scale		Relationship Closeness Scale		Investment Model Scale (Commitment)	
	U.S.	U.K.	U.S.	U.K.	U.S.	U.K.	U.S.	U.K.
Compassionate Love	-	-	.82**	.82**	.85**	.87**	.82**	.82**
Passionate Love			-	-	.81**	.83**	.82**	.79**
Relationship Closeness					-	-	.82**	.83**
Investment Model (Satisfaction Facet)	.76**	.77**	.71**	.72**	.83**	.82**	.79**	.79**
Social Desirability	.14*	.19**	-.01	.08	.06	.12*	.12*	.17**

Note: * $p < .05$; ** $p < .01$.

The discriminant validity of the QLS, however, was supported by high correlations of each of the dimensions with relationship satisfaction, such that those who experience high levels of each of the four dimensions also experience high levels of relationship satisfaction. Additionally, discriminant validity was supported when we compared scores of participants currently in romantic relationships with those of participants previously in a relationship or never been in a relationship. To do so, we conducted a one-way between-subjects ANOVA to look at QLS score differences based on participants' relationship status as a quasi-independent variable (see Table 7). The results show that participants currently in romantic relationships experience significantly higher levels of each of the dimensions than either participants previously in relationships and those who have never been in romantic relationships. Furthermore, those who have never been in a relationship rated their imaginary romantic partners higher than those who were in a previous relationship. The scores for these dimensions of the QLS do not differ for the participants with different length of current relationship from less than 1 month to more than three years. In the same way, the scores for these dimensions do not differ depending on the length of the previous relationship. The validity of these results was equally confirmed in both U.S. and U.K. samples. The QLS scores were not affected by social desirability (see Table 5).

Table 7

Results of ANOVA on Differences in Compassion, Affection, Closeness, and Commitment for those Currently in Love, Previously in Love, and Never Been in Love in Study 1

Dimensions	Overall (ANOVA)			Relationship Status		
	<i>F</i>	<i>p</i>	η^2	Current (<i>n</i> = 284)	Previous (<i>n</i> = 227)	Never (<i>n</i> = 81)
				<i>Mean</i>		
Compassion	90.04	.001	.21	6.45	5.69	6.06
Affection	88.08	.001	.21	6.51	5.57	6.16
Closeness	119.94	.001	.27	6.39	5.16	5.96
Commitment	149.26	.001	.32	6.31	4.88	5.80

Note: Scores on each dimension across the three relationship statuses, $p < .05$, 1-tailed. These differences are based on Tukey's HSD procedure to test pairwise comparisons.

Cluster analysis using Two-Step (Schwarz's Bayesian Criterion) methods (based on the means of four major dimensions of QLS) provided additional evidence of validity of QLS. This brought us to two distinct clusters of good quality (~0.7 Silhouette measure of cohesion and separation). The major clusters included 455 participants in cluster one, characterized by relatively high ratings of all four dimensions

(Compassion: 6.39; Affection: 6.48; Closeness: 6.30; Commitment: 6.18) and 137 participants in cluster two, characterized by moderate ratings of all four dimensions (Compassion: 5.14; Affection: 4.84; Closeness: 4.38; Commitment: 4.08).

Cluster one consisted predominantly of those who are currently in a relationship (58.5%), with the remaining participants in this cluster who rated their previous relationship (26.2%) and potential relationship (15.4%). Cluster two consisted mostly of those previously in a relationship (78.8%) with the remaining participants who rated their current relationship (13.1%) and their potential relationship (8.0%). The level of relationship satisfaction was higher (t -test = 22.54, $p < .001$) in cluster one ($M = 6.02$; $SD = .92$) than in cluster two ($M = 3.80$; $SD = 1.27$).

Discussion

Study 1 showed excellent reliability for all dimensions of QLS and relative independence of the items within the dimensions. CFA demonstrated a good fit of the results to the theoretical model of QLS. The highest item-total correlations with theoretical dimensions supported our psychometric hypotheses. The four main dimensions of QLS perfectly fit to two basic dimensions: Feelings toward the Partner and Feelings of the Relationship. The dimensions correlated with each other providing evidence of their interdependence.

Correlations between the four dimensions of QLS and the four previously developed validated assessments measuring the same constructs support convergent validity of the QLS. Although the four dimensions correlate to each other, we believe that this correlation between four dimensions is not the problem of QLS, but rather reflects the nature of the relations among these constructs. High correlations between similar dimensions measured by other scales support this assertion. They can be explained by the fact that the scores of positive feelings were in the high end range and dense in distribution, as in many other love studies. When people are in love, the halo effect and acquiescent bias tend to inflate all positive feelings. The proverbial phrase “love is blind” is not only about an individual inability to see the faults of their beloved, but also about their challenge to differentiate their various feelings embracing their beloved.

Good convergent validity of QLS was supported by AVE in CFA. Social desirability did not affect these dimensions. Two independent samples confirmed the validity of these results. The Compassion convergent validity was the only minor concern that we can attribute to the reversed wording of the Nonjudgment item, which may have caused some confusion for participants.

Study 1 demonstrated good discriminant validity with the fact that love dimensions correlated highly with relationship satisfaction. Additionally,

participants who are currently in a relationship rated all four dimensions significantly higher than the participants of the other two groups, while those who have never been in a relationship rated their feelings higher than those previously in a relationship. This can be interpreted that the dream for a future partner is sweeter than the memory of a previous partner. The lengths of relationships did not have an effect on the rating of the four dimensions of QLS.

Cluster analysis also provided evidence of validity of QLS as it revealed two distinct clusters based on relatively high versus low ratings on all four dimensions. These two clusters showed that most participants within the cluster with higher overall dimension ratings (and consequently, higher satisfaction) were currently in romantic relationships, whereas the cluster with lower overall ratings were comprised mostly of those previously in romantic relationships. Besides the limited support of discriminant validity in Study 1, the QLS needed further evidence for this validation. This was the main purpose of the Study 2.

Study 2

The purpose of the second study was to partially replicate Study 1 and provide additional evidence for the validity and reliability of the QLS. Theoretical dimensionality of QLS was explored by distinguishing the differences in the feelings experienced by participants. This study investigated the determinants and consequences of love feelings—Compassion, Affection, Closeness, and Commitment. Personality traits and love attitudes were considered as possible factors (determinants), which affect (determine) the degree of the love feelings, while relationship satisfaction – as possible consequences of love feelings. The higher or lower scores on the dimensions of QLS may also be associated with various degrees of relationship satisfaction, thus supporting the discriminant validity of QLS.

Method

Participants

We recruited 626 undergraduate participants in the USA who completed the study for introductory psychology course credit. Of this sample, 42 participants were removed from further analysis during thorough preliminary data screening because of errors, inconsistencies in responses, or missing values in measurements. The total number of participants remained for statistical analysis was 584 (199 male and 385 female) with 30 from a small liberal arts college in Michigan and 554 from a large university in Louisiana. Participants' ages ranged from 18 to 54 years ($M = 19.89$; $SD = 2.54$). Among those, 288 participants were

currently in a relationship (relationship length $M = 20.22$ months; $SD = 20.02$ months), and 218 were previously in a relationship (relationship length $M = 15.51$ months, $SD = 13.45$ months), whose relationships ended an average of 14.30 months ($SD = 12.36$ months) prior to the assessment. The remaining 78 participants had never been in a relationship.

Instruments

In addition to the QLS, in which the wording of the item *Nonjudgment* in QLS was changed from negative to positive direction to measure the construct the same way, as in other items, we utilized three other scales:

- Love Attitudes Scale: Short Form (LAS; Hendrick, Hendrick, & Dicke, 1998); the LAS had six subscales: eros, agape, ludus, mania, storge, and pragma, measuring different aspects of love attitudes;
- Big Five Inventory (BFI; John, Donahue, & Kentle, 1991); the BFI had five subscales: extroversion, agreeableness, openness, conscientiousness, neuroticism;
- Satisfaction Level Facet of the Investment Model Scale (Rusbult, Martz, & Agnew, 1998), shortened to five items. It was a unidimensional scale.

Procedure

This study followed a similar procedure as that of Study 1 such that the aforementioned scales were administered in an online survey, which all participants completed as a part of their research participation requirements in a psychology course. Participants rated each of the items of these assessments on a Likert-type scale from 1 (strongly disagree) to 7 (strongly agree).

Results

Reliability analysis

All four dimensions of QLS showed high internal reliability in their rating scores: Compassion ($\alpha = .91$); Affection ($\alpha = .93$); Closeness ($\alpha = .92$); Commitment ($\alpha = .92$). Reliability of other scales, which we used in Study 2, was within the range acceptable for further analysis, with Cronbach's α from .68 - .90.

Factor analysis

The KMO (.97) and Bartlett's Test ($p < .01$) showed that the results of the survey were adequate for factor analysis. The results of a maximum likelihood estimation CFA demonstrated a good fit between the model and our observed data. The criteria of CMIN/DF = 4.19; CFI = .866; RMSEA = .079 were acceptable for the estimated model of QLS. The theoretical structure of our model was analyzed with CFA (Table 8). The items had the highest item-total correlation with those dimensions that largely support our psychometric hypotheses (Table 9). The dimensions of QLS perfectly fit to two basic dimensions: Feelings toward the Partner and Feelings of the Relationship as in Studies 1. Good convergent validity was also supported in CFA with AVE for Compassion = .52, Affection = .58, Closeness = .54, and Commitment = .58.

Results of CFA for subsamples of participants who are currently in a relationship and previously in a relationship replicated those of the combined sample. The testing of an alternative model with one factor brought lower statistical indices (CMIN/DF = 5.61; CFI = .801; RMSEA = .096), even though after taking into account covariances between error variables, the model fit became more acceptable: CMIN/DF = 3.39; CFI = .906; RMSEA = .069.

Table 8
Factor Loadings of the Four Dimensions of the QLS in Study 2 (n = 506)

	Factor loadings			
	Compassion	Affection	Closeness	Commitment
<i>Compassion</i>				
Consolation	.61			
Protection	.73			
Acceptance	.73			
Care	.77			
Nonjudgment	.63			
Empathy	.76			
Support	.81			
Giving Advice	.67			
Concern	.80			
Tolerance	.65			

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Table 8 (continued)

<i>Affection</i>	
Physical Embrace	.68
Appreciation	.82
Considerate	.69
Respect	.78
Physical Attraction	.67
Elation	.82
Tenderness	.81
Compliment	.80
Admiration	.81
Personality Attraction	.74
<i>Closeness</i>	
Seeking Help	.68
Affiliation	.63
Compatibility	.81
Attachment	.78
Emotional Comfort	.70
Feeling Accepted	.69
Feeling Understood	.75
Reliance	.78
Openness	.75
Trust	.74
<i>Commitment</i>	
Desire for Relationship	.80
Forgiveness	.62
Long Term Orientation	.82
Coping	.69
Devotion	.84
Sacrifice	.57
Exclusiveness	.86
Cooperation	.76
Stability	.75
Investment	.85

Note: CFA factor loadings for Study 2 were only computed for participants who were currently or previously in romantic relationships.

Table 9
Item-Total Correlations for the Four Dimensions of the QLS in Study 2
(n = 506)

	Item-total Correlations			
	Compassion	Affection	Closeness	Commitment
<i>Compassion</i>				
Consolation	.69	.55	.58	.54
Protection	.76	.67	.63	.62
Acceptance	.76	.69	.60	.70
Care	.76	.72	.61	.66
Nonjudgment	.71	.61	.53	.63
Empathy	.75	.72	.73	.71
Support	.83	.74	.65	.69
Giving Advice	.72	.60	.51	.56
Concern	.80	.72	.65	.70
Tolerance	.73	.60	.50	.64
<i>Affection</i>				
Physically Embrace	.60	.72	.61	.60
Appreciation	.77	.82	.76	.74
Considerate	.67	.72	.58	.63
Respect	.76	.79	.70	.73
Physical Attraction	.59	.74	.54	.62
Elation	.71	.85	.73	.74
Tenderness	.75	.82	.68	.74
Compliment	.71	.83	.68	.74
Admiration	.72	.82	.72	.77
Personality Attraction	.65	.77	.69	.70
<i>Closeness</i>				
Seeking Help	.60	.59	.73	.56
Affiliation	.52	.60	.70	.57
Compatibility	.68	.78	.83	.75
Attachment	.70	.72	.75	.71
Emotional Comfort	.53	.60	.75	.57
Feeling Accepted	.53	.57	.77	.57
Feeling Understood	.59	.64	.81	.65
Reliance	.65	.70	.82	.73
Openness	.65	.66	.78	.64
Trust	.66	.67	.75	.69

Table 9 (continued)

<i>Commitment</i>				
Desire for Relationship	.70	.76	.72	.81
Forgiveness	.59	.58	.57	.67
Long Term Orientation	.68	.74	.75	.86
Coping	.69	.65	.57	.71
Devotion	.72	.76	.71	.85
Sacrifice	.55	.53	.45	.65
Exclusiveness	.75	.81	.74	.84
Cooperation	.77	.73	.63	.77
Stability	.63	.67	.74	.81
Investment	.73	.77	.69	.87

Note: All correlations are significant at the 0.01 level (2-tailed). Item-total correlations for Study 2 were only computed for participants who were currently or previously in romantic relationships.

Relationship satisfaction

Multiple linear regression of the four dimensions of love on relationship satisfaction showed statistically significant results ($R^2 = .71$, $p < .001$, $f^2 = 2.45$) with large effect size and strong unique predictive value of Compassion ($\beta = .10$, $p = .07$), Closeness ($\beta = .56$, $p < .001$), and Commitment ($\beta = .24$, $p < .001$). Affection had no effect on satisfaction above and beyond the other three dimensions.

Discriminant validity of QLS

First, we compared mean scores for different relationship statuses using ANOVA of four dimensions for three relationship statuses, computed correlations for relationship length and age, and used a t -test to compare results between genders. This analysis demonstrated the same pattern of differences as in Study 1. This general pattern is that participants who are currently in a relationship rated all four dimensions significantly higher compared to the two other groups. The longer their current relationship, the higher Compassion ($r = .12$, $p < .05$), Closeness ($r = .18$, $p < .01$), and Commitment ($r = .23$, $p < .001$), with no differences in Affection. Those who were in relationships in the past rated their feelings lower than those who have never been in relationships. The longer their previous relationship, the higher Compassion ($r = .18$, $p < .01$), Affection ($r = .21$, $p < .01$), Closeness ($r = .19$, $p < .01$), and Commitment ($r = .16$, $p < .05$). There are small gender differences in Compassion with women being more compassionate (mean difference of .19 higher than men, $p <$

.05), and no differences in the other three love dimensions. There were also no age differences regarding the four love dimensions.

Personality. Multiple linear regression of the love dimensions on five personality traits were used to determine how personality affects love feelings. The results showed that personality traits statistically significantly predict all four dimensions of love: $R^2 = .10$ ($p < .001$, $f^2 = .11$) for Compassion, $R^2 = .10$ ($p < .001$, $f^2 = .11$) for Affection, $R^2 = .07$ ($p < .001$, $f^2 = .08$) for Closeness, and $R^2 = .09$ ($p < .001$, $f^2 = .10$) for Commitment, yet with small effect size. For all love dimensions, the strongest predictors appeared to be Conscientiousness (Compassion: $\beta = .13$, $p < .01$; Affection: $\beta = .15$, $p < .01$; Closeness: $\beta = .14$, $p < .01$; Commitment: $\beta = .16$, $p < .001$) and Agreeableness (Compassion: $\beta = .22$, $p < .001$; Affection: $\beta = .19$, $p < .001$; Closeness: $\beta = .14$, $p < .01$; Commitment: $\beta = .19$, $p < .001$). Extroversion only predicted Closeness ($\beta = .10$, $p < .05$).

Love Attitudes. Multiple linear regression of the love dimensions on love attitudes identified differences in the degree of Compassion, Affection, Closeness, and Commitment for the feelings of participants with Eros, Agape, Ludus, Mania, Storge, and Pragma love attitudes. For the Eros attitude, the love dimensions significantly contributed to the explained variance, $R^2 = .55$ ($p < .001$, $f^2 = 1.22$), with high effect size. The participants with higher Eros attitude tend to have lower Compassion ($\beta = -.20$, $p < .01$) and higher Affection ($\beta = .54$, $p < .001$) in their feelings toward their partners than those with lower Eros attitude. Regarding their feelings of their relationships, participants with higher Eros exhibited higher Commitment ($\beta = .39$, $p < .001$) than those with lower Eros attitude.

For the Agape attitude, the love dimensions significantly contributed to the explained variance, $R^2 = .21$ ($p < .001$, $f^2 = .27$) with medium effect size. The participants with higher Agape attitude tend to have higher Commitment ($\beta = .60$, $p < .001$) and lower Closeness ($\beta = -.26$, $p < .01$) in their feelings of relationships than those with lower Agape attitude; there are no differences in Compassion and Affection toward the partner.

For the Ludus attitude, the love dimensions had a relatively low but significant contribution to the explained variance, $R^2 = .07$ ($p < .001$, $f^2 = .08$) with small effect size. The participants with higher Ludus attitude tend to have lower Commitment ($\beta = -.38$, $p < .001$) in their feelings of their relationships than those with lower Ludus attitude. There are no differences in Compassion and Affection toward their partners.

For the Mania attitude, the love dimensions had a relatively low but significant contribution to the explained variance, $R^2 = .03$ ($p < .01$, $f^2 = .03$) with small effect size. The participants with higher Mania attitude tend to have higher Affection ($\beta = .35$, $p < .01$) in their feelings toward their partners and lower Closeness ($\beta = -.27$, $p < .01$) in their feelings of their relationships than those with lower Mania attitude. There are no

differences in Compassion toward their partners and Commitment feelings of their relationships.

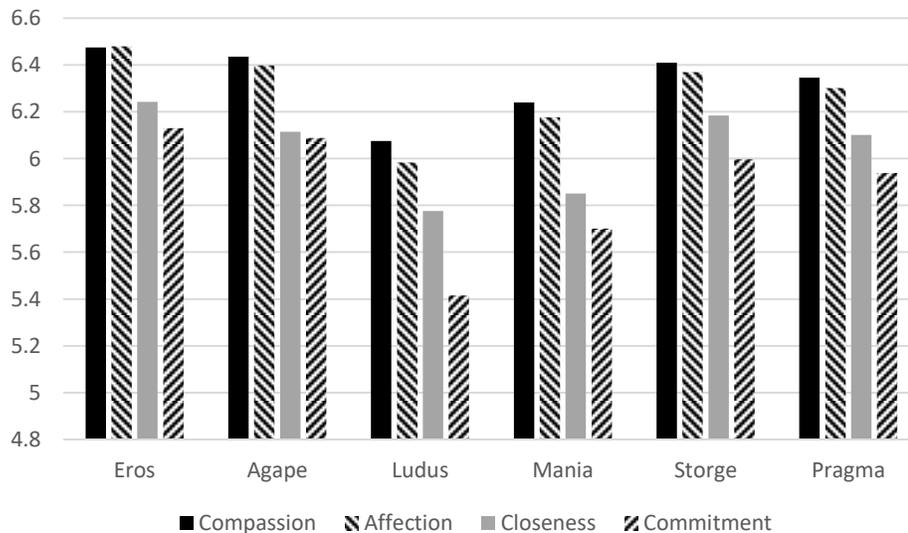
For the Storge attitude, the love dimensions had a relatively low but significant contribution to the explained variance, $R^2 = .08$ ($p < .001$, $f^2 = .09$) with small effect size. The participants with higher Storge attitude tend to have higher Closeness ($\beta = .16$, $p = .07$ in regression to rating scores; $\beta = .11$, $p < .05$ in regression to ranking scores) in their feelings of their relationships than those with lower Storge attitude. There are no differences in Compassion and Affection toward their partners.

For the Pragma attitude, the love dimensions had a relatively low but significant contribution to the explained variance, $R^2 = .05$ ($p < .001$, $f^2 = .05$) with small effect size. The participants with higher Pragma attitude tend to have higher Commitment ($\beta = .21$, $p = .05$) in their feelings of their relationships than those with lower Pragma attitude. There are no differences in Compassion and Affection toward their partners.

Overall regression of the rating of both original and centered variables of four mean scores of four dimensions (out of 40 items) and four basic dimensions on the love attitudes showed approximately similar results.

The typical profiles of four dimensions in participants with high degrees of six love attitudes are presented in Figure 2, which provide evidence of discriminant validity of QLS in terms of its capability to describe people with different love attitudes. The mean scores for Compassion and Affection are usually higher than for Closeness and Commitment for participants of all love styles (especially for Ludus and

Figure 2. Mean scores of four love dimensions in participants with high degrees of love attitudes ($N = 584$).



Mania). It is well noticeable that the mean scores of all four dimensions are substantially lower for participants with Ludus and Mania, which are known from previous research as having controversial feelings in their romantic relationships. The participants with Storge and Pragma love attitudes have relatively lower degree in all four dimensions, especially in Closeness and Commitment. This supports the discriminant validity of QLS in terms of “known group” differences.

Discussion

Study 2 demonstrated high reliability of the dimensions and a good fit of the QLS to the theoretical model of QLT. Four groups of results supported discriminant validity of QLS: (1) comparison of mean scores for different relationship statuses, (2) comparison of mean scores for relationship length, age, gender, and relationship satisfaction, (3) analysis of effect of personality traits on four dimensions of love, and (4) analysis of love dimension profiles as represented in love attitudes. The dimensions for three relationship statuses demonstrated the general pattern that participants who are currently in a relationship rated all dimensions higher than the two other groups. Participants who have been in their current relationships longer tend to have higher Compassion, Closeness, and Commitment, yet no differences in Affection. Even though those who were in relationships in the past rated their feelings lower than those who have never been in relationships, the longer their previous relationship resulted in higher Compassion, Affection, Closeness, and Commitment. Relationship satisfaction turned out to be higher for those with high Compassion, Closeness, and Commitment, while there was no effect on Affection in this regard. Women are more compassionate than men, yet there are no gender differences in the other three love dimensions. Age was not related to the degree of love dimensions.

The Big Five personality model provided some degree of predictability for the dimensions of love. Agreeableness and Conscientiousness contributed to all dimensions of QLS, while Extroversion contributed strongly only to Closeness.

The six love attitudes, especially *Eros* and *Agape*, both predict and help describe the four love dimensions. In terms of their feelings toward partners, linear regression analysis revealed that participants with higher *Eros* love attitude tend to have higher Affection, yet relatively lower Compassion. In terms of their feelings of their relationships, the results revealed that higher levels of *Eros* predict higher Commitment and Closeness compared to lower levels of *Eros*. Participants relatively high in *Agape* also demonstrated a tendency for higher Commitment and relatively lower Closeness than those with low *Agape*. Linear regression analysis provided confirmation that those with higher *Ludus* tend to have a lower degree of Commitment. Participants high in the *Mania* love

attitude have a tendency for higher Affection and lower Closeness, while they exhibit no differences in the degree of Compassion and Commitment. At the same time, they tend to have higher Commitment and Closeness to their partners, while they exhibit no differences in Compassion and Affection compared to those low in *Pragma* and *Storge*.

General Discussion

The development of the QLT and the psychometric investigation of the QLS aimed to provide a convergence of theoretical and empirical explorations of love conducted during recent 50 years through:

1. Identifying and rectifying the major dimensions of love and their taxonomy.
2. Providing the detailed conceptual descriptors of these overarching dimensions.
3. Refining the terminology and the descriptive constituents of love.
4. Developing a comprehensive self-report scale measuring love.

Building on prior research and existing love theories (Berscheid, 2010; Hatfield, 1982; Hatfield & Rapson, 1993; Hatfield & Sprecher, 1986; Sprecher & Fehr, 2005; Sternberg, 1987, 1997), QLT proposed a synthesis perspective and systemic framework for conceptual description of romantic love. The benefits of the proposed theory are in explicit and comprehensive definition of four dimensions of love—Compassion, Affection, Closeness, and Commitment—in terms of specific measurable constituent descriptors. That synthesizes, refines, and elaborates corresponding concepts of existing love theories.

The four dimensions fall into two categories of feelings in love: (1) *the feelings toward a partner* (Compassion and Affection), and (2) *the feelings regarding a relationship* with a partner (Closeness and Commitment). Being tightly intertwined, the two groups of feelings reflect different sources of emotional experiences.

In addition to this, a thorough review and selection of the love dimensions and descriptors, which previous researchers used in their studies throughout recent decades, lead to the development of a comprehensive taxonomy of love. As a result, the most inclusive scale of love was compiled with explicit operational definition of major love feelings and attitudes. A clear and specific definition of them in terms of constituent descriptors backed up construct validity of QLS. A series of two studies supported the reliability and validity of scale and investigated its psychometric properties. All dimensions are reliable measures of love feelings with high construct and convergent validity. The results also presented an extensive evidence of discriminant validity of the scale.

The results of confirmatory factor analysis in Studies 1 and 2 supported the validity of QLT and QLS to assess participants' love feelings *toward*

their partners and regarding their relationships. The CFA, which is especially suitable to test our theoretically grounded scale, demonstrated good fit for our theoretical model. The convergent correlations of items with their corresponding subscales were higher than the discriminant correlations of items with other subscales.

In addition to CFA, correlations of the four dimensions of QLS with external scales measuring the same constructs also supported convergent validity of the scale. Relationship satisfaction in Studies 1 and 2 is correlated with high degree of these feelings, with no effect of Affection in Study 2. QLS variables are not vulnerable to social desirability effect.

However, high correlations between four dimensions show their interdependence, which can be interpreted as a natural feature of love feelings. For example, if someone feels strong feelings of affection for their romantic partner, they may then feel a higher level of closeness to their romantic partner, or vice versa. How each of these dimensions influence each other should then be explored in further research to further gain a comprehensive understanding of the love feelings experienced in romantic relationships.

The high correlations between the four dimensions could also be due to the demographic characteristics of our samples. Most participants were of college-age, which may have affected how they interpret their own love feelings. For example, they may have greater difficulty distinguishing between each of the four main love feelings, especially if their relationships are the first they have been involved in or if they are experiencing the early stages of their relationships.

Finally, the high correlations may be due in part to specific items within the scale that may have blurred the lines between each of the dimensions. An exploratory factor analysis (EFA) could then be used to assess the factor loadings of each item on each of four factors. This would then allow for either the modification or removal of certain items to further the distinctiveness between the factors for future research.

The results revealed the highly dense distribution at the high end range, a relative consistency, and low variability of high ratings across the majority of QLS items within a single participant's data. The halo effect and acquiescence bias, which can be quite natural for love feelings, are the best explanations for these high correlations. Love feelings are especially prone to these effects since they are known for the overwhelming power: the feelings transfer from one emotion to another, from one fascination to another. When a person is in love, he or she is in love in all regards. This tendency leads to a limited range of scores within high end of spectrum, thus causing high correlations between dimensions.

This interpretation of high correlations between these dimensions of QLS is in accord with typical trend in love research. Since early measurements of love, the majority of scales have demonstrated high correlations between each other (Hendrick & Hendrick, 1989). Maybe

because of this, several love scales, such as the Passionate Love Scale (Hatfield & Sprecher, 1988) and the Loving and Liking Scales (Rubin, 1970) did not extract love dimensions. In particular, Rubin (1970) defined the conception of romantic love as including three components: affiliative and dependent need, a predisposition to help, and an orientation of exclusiveness and absorption. However, he did not attempt creating these three components of loving as psychometric dimensions. Further research by Fehr (1994) employing a factor analysis demonstrated that the liking and loving scales loaded together on a companionate love factor. Moreover, from the study of Masuda (2003) it appeared that both loving and liking scales are measuring similar constructs. Sternberg's (1997) dimensions of Intimacy, Passion, and Commitment also highly correlated to each other.

Only Love Attitudes Scale (Hendrick & Hendrick, 1986; Hendrick, Hendrick, & Dicke, 1998) and Adult Attachment Questionnaire (Hazan, & Shaver, 1987) were probably among few that established the sub-scales, which had moderate average correlations between their dimensions. Some of these scales, however, measure constructs, which deviate from the common concept of romantic love (e.g., *Ludus* and *Pragma*) and have negative connotations (e.g., *Ludus* and *Mania*). *Eros* and *Agape* love styles highly correlate to each other.

Meta-analytic factor analysis of correlations between several commonly used measures of love aggregated across studies, conducted by Graham (2011), revealed only three higher-order factors: general love, romantic obsession, and practical friendship. High correlations between love scales can explain this discouraging low variety of love dimensions.

In the light of these findings, the question remains whether researchers shall stay with the most parsimonious solutions in their factor analyses, such as love is love, or just distinguishing between some general overarching dimensions like love, obsession, friendship/pragma. Or, shall they try to continue exploring deeper the highly correlated network of various love dimensions using more sophisticated analyses than just basic factor analysis?

Study 2 showed the discriminant validity of QLT in terms of typological differences in the degree of four dimensions for people with different personalities, love attitudes, and relationship status. Big Five personality traits predicted the tendencies to embrace certain feelings measured by QLS: extroversion enhances the feeling of Closeness in the relationship, while Agreeableness and Conscientiousness personality traits increase experience of Compassion, Affection, Closeness, and Commitment.

Participants with different love attitudes have certain profiles of these four feelings. According to regression analysis, people with some love attitudes are more likely to experience certain feelings, thus providing evidence of discriminant validity of the scale. Participants of various

relationship statuses and lengths of relationship revealed differences in the dimensions of QLS.

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Appendix

Quadrangular Love Scale: Descriptors of Four Major Constructs and Corresponding Scale Items

Scale	Items
Compassion	
Consolation	I would console this person in times of need.
Protection	I would protect this person in times of need.
Acceptance	I accept this person for whom he/she is.
Care	I care about this person's well-being.
Nonjudgment	I tend not to judge this person.
Empathy	I can feel for this person's emotions.
Support	I would support this person in times of need.
Giving Advice	I would give advice to this person if he/she asks.
Concern	I would be concerned if this person were distressed.
Tolerance	I tolerate this person's shortcomings.
Affection	
Physically Embrace	I like to physically embrace this person.
Appreciation	I appreciate having this person in my life.
Considerate	I am considerate of this person's feelings.
Respect	I respect this person.
Physical Attraction	The appearance of this person is attractive to me.
Elation	I feel strong emotional enthusiasm in the presence of this person.
Tenderness	I have tender feelings toward this person.
Compliment	I enjoy giving this person compliments.
Admiration	I admire this person.
Personality Attraction	The personality of this person is attractive to me.

Quadrangular Love Scale (Continued)

Closeness	
Seeking Help	I am comfortable asking this person for help.
Affiliation	I feel that this person and I have a lot in common.
Compatibility	I feel compatible to this person.
Attachment	I feel emotionally bonded to this person.
Emotional Comfort	With this person, I can be myself.
Feeling Accepted	I feel accepted by this person.
Feeling Understood	I feel that I am understood by this person.
Reliance	I can count on this person in this relationship.
Openness	I feel comfortable sharing my feelings with this person.
Trust	I trust this person's good intentions.
Commitment	
Desire for Relationship	I want to be in this relationship.
Forgiveness	I can forgive this person's transgressions.
Long Term Orientation	I feel this relationship will last for a long time.
Coping	I want to manage difficulties fairly in this relationship.
Devotion	I feel devoted to this relationship.
Sacrifice	I can set aside my interests for this relationship.
Exclusiveness	I feel that this relationship is very special to me.
Cooperation	I am willing to cooperate with this person.
Stability	I feel that this relationship is stable.
Investment	I am ready to invest a great amount in this relationship.

Note: Descriptors in the first column are not included in the QLS survey for participants; they are for a researcher only. The scale items appear in a random order, rather than clustered by dimensions, as they are here. Participants are asked to rate each item on a scale of 1 (strongly disagree) to 7 (strongly agree).