

Universality of the Triangular Theory of Love: Adaptation and Psychometric Properties of the Triangular Love Scale in 21 Countries

Introduction

Love is an inherent part of human experience and one of the most important elements of close relationships. Researchers' interest in love is manifested in a handful of approaches that provide a potential theoretical framework for this unique feeling (e.g., philosophical, Secomb, 2007; economic, Becker, 1973; and biological perspectives; e.g., Sorokowski et al., 2017).

The social sciences present several well-known theories of love. (A comprehensive review of theories can be found in Sternberg & Sternberg, 2019). Among the most popular theoretical approaches, one theory highlights a division into passionate (intense and arousing) and companionate (tender and affective) love (Feybesse & Hatfield, 2019; Hatfield & Walster, 1985), which suggests the parallel importance of love's different aspects. Another popular typology refers to love styles, as first described by Lee (1973) and as further adapted by Hendrick and Hendrick (1986, 2019). This theoretical framework specifies six styles of love: Eros (passionate love), Ludus (game-playing love), Storge (friendship love), Pragma (logical, pragmatic love), Mania (possessive, dependent love) and Agape (all-giving, selfless love). Attachment Theory (Bowlby, 2012), describing infant-parent bonding, has also given rise to a theoretical framework for understanding romantic love (Hazan & Shaver, 1987; Mikulincer & Shaver, 2019). Finally, one of the most meaningful and commonly cited theories is Sternberg's Triangular Theory of Love (Sternberg, 1986, 1988, 2006, 2019), which is also the subject of the current study.

According to the Triangular Theory, love is understood in terms of three components that can be seen as vertices of a triangle. These components are intimacy, passion, and commitment/decision. Intimacy refers to closeness, connectedness, communication, caring,

and emotional investment and is sometimes described as the “warm” love component (Sternberg, 1986). Actually, intimacy understood in these ways is not exclusively for romantic relationships and it can also appear toward a sibling, parent, or a close friend (Sternberg & Grajek, 1984). The “hot” component – passion - pertains to romance, excitement, physical attraction and even sometimes obsession, and sexual arousal. In a loving couple, sexual attraction, and therefore higher frequency of sexual intercourse, may be a very important part of a relationship as it fosters reproduction (Sorokowski et al., 2017). Finally, commitment/decision – the “cold” component of love - refers to the cognitive decisions regarding relationship maintenance. The short-term aspect of commitment is the decision that one loves a certain other, while the long-term aspect pertains to maintaining a particular relationship (Sternberg, 1986).

According to Sternberg’s assumptions and further empirical research on his theory, the intensity of the three love components varies as a function of relationship duration. Sternberg (1986) suggested that passion is likely to peak quickly but also to decrease rapidly with time, while commitment generally increases for long-term relationships. Intimacy, in contrast, increases slowly, but then it often decreases with time (Sternberg, 1986). Based on the theory of Sternberg (1986), Wojciszke (2002) proposed that a relationship can be divided into 6 phases. He measured the intensity of each love component within each phase; his results were consistent with the theoretical assumptions of Sternberg (1986). At the same time, however, the dynamics of each love component depend on various factors and can vary greatly across couples (Sprecher & Regan, 1998). Acker and Davis (1992) reported that passion decreases over time, but only in females; they observed no time-related fluctuations in the level of intimacy; the level of commitment was indeed higher in more “serious” relationships (Acker & Davis, 1992). Another, more complex approach suggests that passion changes as a function

of changes in intimacy, that is, passion is low when intimacy is stable, but an increase in intimacy will also give rise to stronger passion (Baumeister & Bratslavsky, 1999).

Levels of all three love components have also been reported to vary across the lifespan. Adolescents reported lower levels of all three components as compared with young adults, while older adults scored lower on passion and intimacy measures and similarly on the commitment scale as compared with young and middle-aged adults (Sumter, Valkenburg, & Peter, 2013). Considering that age should be positively related to a relationship duration in those people who maintain the relationships from early adulthood, the study by Sumter and colleagues (2013) partially confirms Sternberg's predictions (Sternberg, 1986).

The proposed three components of love can be measured with Sternberg's Triangular Love Scale (STLS) (Sternberg 1986, 1997). Together with the growing body of literature on the Triangular Theory of Love, various studies have investigated the psychometric properties of the STLS (e.g., Lemieux & Hale, 2000; Overbeek, Ha, Scholte, de Kemp, & Engels, 2007). They revealed its high correlations with other measures of love (Acker & Davis, 1992; Chojnacki & Walsh, 1990; Hendrick & Hendrick, 1986; Levy & Davis, 1988; Whitley Jounior, 1992), which suggested that the questionnaire was a valid measure of the love construct. Sternberg (1997) showed that both versions (the 36-item and the 45-item versions) of the scale had satisfactory subscale reliabilities and overall scale reliability. Factor analysis reported in this study revealed three factors ("straightforwardly interpretable as commitment, intimacy, and passion") accounted for approximately 60 percent of the variance in the data. Although some of the items in the 36-item version of the scale correlated higher with subscales other than their designated ones than with the designated ones, this problem was less pronounced in the 45-item version of the scale. However, a few other studies on Triangular Theory of Love as measured by the STLS indicated a high item-overlap of this scale (Acker & Davis, 1992; Chojnacki & Walsh, 1990; Hendrick & Hendrick,

1989). Hendrick and Hendrick (1989) did not observe the three assumed clusters among undergraduate students – many STLS items loaded on more than one factor. The internal consistency for the total 45-item scale was .97 (Hendrick & Hendrick, 1986), suggesting that the measured construct had rather one rather than three factors. Further psychometric study evaluating a 36-item version of the STLS on a non-student sample also revealed that some items overlapped or loaded weakly on multiple implemented factors (Acker & Davis, 1992). Confirmatory and exploratory factor analyses of the 45-item STLS reported by Whitley (1992) showed that although the three-factor model provided the best fit to the data, even this solution revealed certain problems with many items loading on more than one scale. In summary, some research regarding STLS suggest that the questionnaire provides a good measure of a higher-order construct of love. However, the proposed factorial structure remains questionable as previous outcomes have not been consistent.

Although the STLS sometimes has been used in different cultures (Cassepp-Borges & Martins Teodoro, 2009; Ng & Cheng, 2010), with rare exceptions, available research involving non-Western samples rarely focused on the psychometric properties of STLS. Considering that some of the previous studies on the STLS (even those involving exclusively American respondents) reveal certain psychometric problems, examining the properties of this scale in other cultures seems warranted to further test the universality of the Triangular Theory of Love and to assess the properties of the scale proposed as a measure of love in this theory.

The Present Study

To address the issue of the rather inconsistent and culturally homogeneous body of previous psychometric research regarding the STLS, we conducted a large-scale cross-cultural study with the use of this scale. In total, we examined more than 11,000 respondents who underwent exactly the same research procedure, completing the 45-item version of STLS in order to

assess its validity and reliability. Our cross-cultural sample included also non-Western countries (see Methods section). Moreover, our participants pool covered both students and community samples. The presented project had several research aims:

- A) testing the universality of the Triangular Theory of Love;
- B) testing the dynamics of changes in love components as a function of relationship duration, following the ideas suggested by Sternberg (1986) (another proof of the correctness of the proposed construct);
- C) testing the cross-country equivalence (measurement invariance) of STLS; to complete this research aim we decided to limit our sample to countries with a sample size of more than approximately 100 participants per country, who declared being in relationship at the time scale completion.

Method

Participants

The current research comprised 11,422 participants from 45 countries who completed STLS. However, for the purpose of our investigation, we proceeded with a two-step selection process. First, we excluded all participants who declared being single ($n = 1724$, 15%), divorced ($n = 148$, 1.3%) or widowed ($n = 20$, 0.1%) at the time of the study. Thus, all participants in the final sample were in a relationship – on average for almost 8 years ($M = 91.30$ months, $SD = 111.46$). In the second step, we excluded all countries with a total sample size lower than 100 participants. As illustrated in Table S1 (see supplementary files), this resulted in a total sample of 6965 participants from 21 countries included in the final analysis (Algeria (DZ), Australia (AU), Belgium (BE), Croatia (HR), Hungary (HU), India (IN), Italy (IT), Lithuania (LT), Nigeria (NG), Pakistan (PK), Peru (PE), Poland (PL), Russia (RU), Serbia (XS), Slovakia (SK), Slovenia (SI), South Korea (KR), Spain (ES), Turkey (TR),

Uruguay (UY), Vietnam (VN)). In the final sample, our participants' ages ranged from 18 to 76 ($M = 30.73$, $SD = 11.07$). There were 3094 (44.4%) men and 3865 (55.5%) women; 6 people did not indicate their sex. The whole sample was almost evenly distributed across a student sample (44%) and a community sample (56%). There were $n = 3625$ (52%) participants who were dating at the moment of the study, $n = 629$ (9%) who were engaged, and $n = 2711$ (38.9%) who were married.

The database with raw data (supplementary file X) includes 11422 participants from 45 countries. Although the final analyses were conducted for 21 countries (as mentioned above), Supplementary File X contains data on all participants, including those who declared that were single, divorced or widowed, and on all countries, including those with sample sizes <100 (i.e., Austria, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Cuba, El Salvador, Estonia, Georgia, Germany, Greece, Indonesia, Iran, Jordan, Malaysia, Mexico, Norway, Portugal, Romania, Sweden, The Netherlands, Uganda, United States). All the data presented in Supplementary File X can be used for the purpose of other research, without additional requests, but citing this article.

Instrument

All participants filled out the 45-item version of STLS, with 15 items measuring intimacy (sample item: "I receive considerable emotional support from ____."), 15 – passion (sample item: "There is nothing more important to me than my relationship with ____") and 15 – commitment (sample item: "I view my relationship with ____ as permanent."). The subjects were asked to rate their agreement with each statement on a 9-point Likert scale ranging between 1 (not at all) and 9 (extremely). Internal consistency of the scales was very high: intimacy, Cronbach's $\alpha = .93$, passion $\alpha = .92$ and commitment $\alpha = .92$.

Procedure

The global study protocol was approved by the Ethics Committee of the Institute of Psychology, University of Wrocław, and local collaborators obtained additional permits when this was legally required. All participants provided informed consent prior to their inclusion in the study. Great care was exercised to ensure similar recruitment methods across all study sites – this was achieved by detailed data-collection protocols. The authors were instructed that the studies should be conducted face-to-face or on some group meetings (not over the Internet, but the use computer software during the data collection meetings was allowed). Before the study began, all coauthors received the questionnaire from the corresponding author. They were asked to report any major problems related to the questionnaires (e.g., cultural taboos related to some particular questions). The included measures were accepted by all collaborating research groups.

The questionnaires were completed in the participants' native language. At each study site where English was not a primary language, local authors were asked to conduct a translation/back-translation procedure (Sechrest et al., 1972). This process typically involves the primary collaborator translating the measures into the native language and then the second collaborator translating the measures back into English. Differences between the original English scale and back-translation were to be discussed and mutual agreements were to be made on the most appropriate translation. If there were two or more groups collecting data in one country, they were informed that they should arrange translation and back translation between groups. Data collection was conducted simultaneously across all locations. Questionnaires translated to X languages are attached as supplementary materials and might be used for further studies, without additional requests, after citing this article. The data from each study site were coded based on an exemplary questionnaire provided by the

corresponding author and input in individual databases, standardized in advance, and afterwards merged.

Results

The main research problem of our investigation focused on psychometric parameters of the STLS. More specifically, the first aim of our analyses was to examine if the assumed, three-factor structure of this instrument replicated in our dataset. The second goal of our statistical analyses was to examine the measurement invariance of the STLS, including the test of configural invariance (i.e., that the same, three-factor structure of STLS exists across countries); metric invariance, which requires that all factors loadings are the same in all countries; and scalar invariance, which shows that differences in the means of STLS scales may be attributed to means of the underlying, latent constructs – intimacy, passion, and commitment. In other words, configural invariance requires that the fit of three-factor model in multi-group confirmatory factor analysis be above the recommended criteria (Hu & Bentler, 1999), meaning that a Comparative Fit Index (*CFI*) and Tucker Lewis Index (*TLI*) above .90 was interpreted as showing adequate fit (and values above .95 as showing good fit), a root mean square error of approximation (*RMSEA*) below .08, and a standardized root mean square residual (*SRMR*) below .06, indicating no misfit. Metric invariance provides an additional constraint into the model as it requires factor loadings to be equal, while scalar invariance additionally forces measurement intercepts to be equal (see: Chen, 2007; Cheung & Rensvold, 2002).

The overall fit of the model estimated in the *laavan* package for R (Rosseel, 2012) with the Weighed Least Square with adjusted Means (WLSM) estimator on the total sample was good, with *CFI* = .954, *TLI* = .951, *RMSEA* = .067 (90% CI: .066-.069) and *SRMR* = .048. As illustrated on Figure 1, although the latent correlations between variables were high:

$r = .75$ between intimacy and passion and $r_s = .81$ between intimacy and commitment and passion and commitment, they fell below $r = .85$, that is, the recommended cut-off for low discriminant validity (Kline, 2011). All factor loadings were robust, ranging from $\lambda = .58$ to $\lambda = .81$ in the case of intimacy (median $\lambda = .73$), from $\lambda = .57$ to $\lambda = .80$ in the case of passion (median $\lambda = .73$), and from $\lambda = .72$ to $\lambda = .85$ in the case of commitment (median $\lambda = .78$). High factor loadings resulted in very high composite reliability of latent factors (Hancock & Mueller, 2001): $H = .95$ in the case of intimacy, $H = .94$ in the case of passion, and $H = .96$ in the case of commitment.

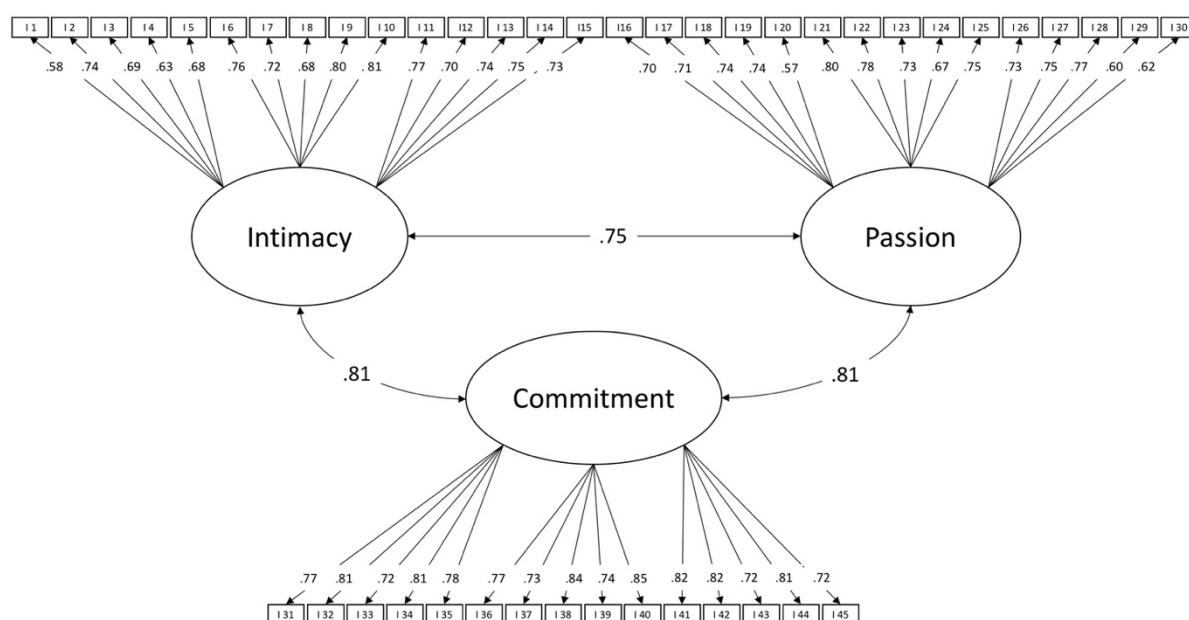


Figure 1. The overall three-factor model of love as measured by STLS.

To examine measurement invariance across countries, we proceeded with a series of three multi-group CFA models, adding constraints at each step. The first model tested configural invariance (the same three-factor structure in all countries). The second model examined metric invariance (equality of forced factor loadings across countries), while the third tested

scalar invariance (equality of measurement intercepts). We relied on usually applied cut-off criteria recommended for testing measurement invariance (Chen, 2007; Cheung & Rensvold, 2002): a change of CFI (ΔCFI) of less than .01 ($\Delta CFI < .01$) and a change of *RMSEA* of less than .015 ($\Delta RMSEA < .015$), which indicate that compared models do not differ in terms of model fit. As illustrated in Table 1, the fit of all models was acceptable according to these criteria. Importantly, the decrease in fit of a more constrained model in comparison to a more liberal configural and metric invariance model did not exceed the usually recommended criteria – the difference between the configural and the scalar model was estimated at $\Delta CFI = .01$ and $\Delta RMSEA = .003$, while the difference between the configural and the metric model was $\Delta CFI = .003$ and $\Delta RMSEA = .004$, and between the metric and the scalar model, $\Delta CFI = .014$ and $\Delta RMSEA = .007$. Therefore, we conclude that the STLS in our study was invariant across countries.

Table 1. A Summary of Measurement Invariance Tests

| Invariance | $\chi^2(df)$ | <i>CFI</i> | <i>RMSEA</i> | $\Delta\chi^2 (\Delta df)$ | ΔCFI | $\Delta RMSEA$ |
|------------|---------------|------------|--------------|----------------------------|--------------|----------------|
| Configural | 11893 (16014) | .945 | .074 | | | |
| Metric | 23328 (16686) | .948 | .070 | 1668.5 (672) | .003 | .004 |
| Scalar | 27384 (17358) | .935 | .077 | 8564.7 (672) | .014 | .007 |

We tested also measurement invariance across men and women. It became apparent that also, in this case, configural ($CFI = .952$, $RMSEA = .068$), metric ($CFI = .969$, $RMSEA = .054$) and scalar ($CFI = .968$, $RMSEA = .055$) invariance were established.

In an attempt to examine if the intensity of love factors changes with relationship duration, we conducted a multivariate analysis of variance (MANOVA), with love factors as dependent variables and relationship length categorized into 7 categories (up to 1 year, 1-3

years, 3-6 years, 6-10 years, 10-15 years, 15-20 years, and 21 or more years). There were statistically significant differences across categories in the case of intimacy, $F(6, 6162) = 5.23, p < .001, \eta_p^2 = .005$, passion, $F(6, 6159) = 11.88, p < .001, \eta_p^2 = .011$ and commitment, $F(6, 6153) = 19.54, p < .001, \eta_p^2 = .019$.

As illustrated on Figure 2, intimacy tended to grow among participants with the relationship experience of up to 6 years, and then declined. A pairwise comparison with Sidak corrections showed significant differences in the declared intensity of intimacy between participants who stayed in the relationship up to 1 year and these with 3-6-years-long experience ($p < .001$), as well as between these who stayed in the relationship for 3-6 years and participants with a 6-10-years-long experience ($p = .01$) and over 20 years-long experience ($p = .005$).

Passion tended to decline linearly with relationship duration (see Figure 2). Pairwise comparisons showed statistically significant differences between participants with the shortest relationships (up-to-1-year) and these with 1-3 year-long experience ($p = .004$), 3-6 years-long relationship duration ($p = .006$), as well as these with 20 years-long or longer relationship ($p = .008$). People staying in the relationship for 1-3 years declared significantly higher passion than these with 6-10 years ($p = .02$), 15-20 years long relationships ($p = .008$), and 21 years or more experience ($p < .001$). Participants whose relationships lasted 3-6 years were more passionate than these with the shortest experience (up-to-1-year, $p = .006$), as well as these who were in their relationship for 6-10 years ($p = .02$), 15-20 years ($p = .008$) and 21 and more years ($p < .001$). Finally, people with 10-15 years in the relationship declared higher passion than these with 20-years long or longer relationship ($p = .009$).

In the case of commitment, there was a linear positive trend, indicating growing commitment with time: indeed, people with the shortest experience in the relationship (up-to-1-year) were characterized by significantly lower commitment than all remaining categories

(all $ps < .001$). Participants with slightly longer relationships (1-3 years) were less committed than those staying in the relationship for 3-6 years ($p = .01$), and over 20 years ($p = .008$).

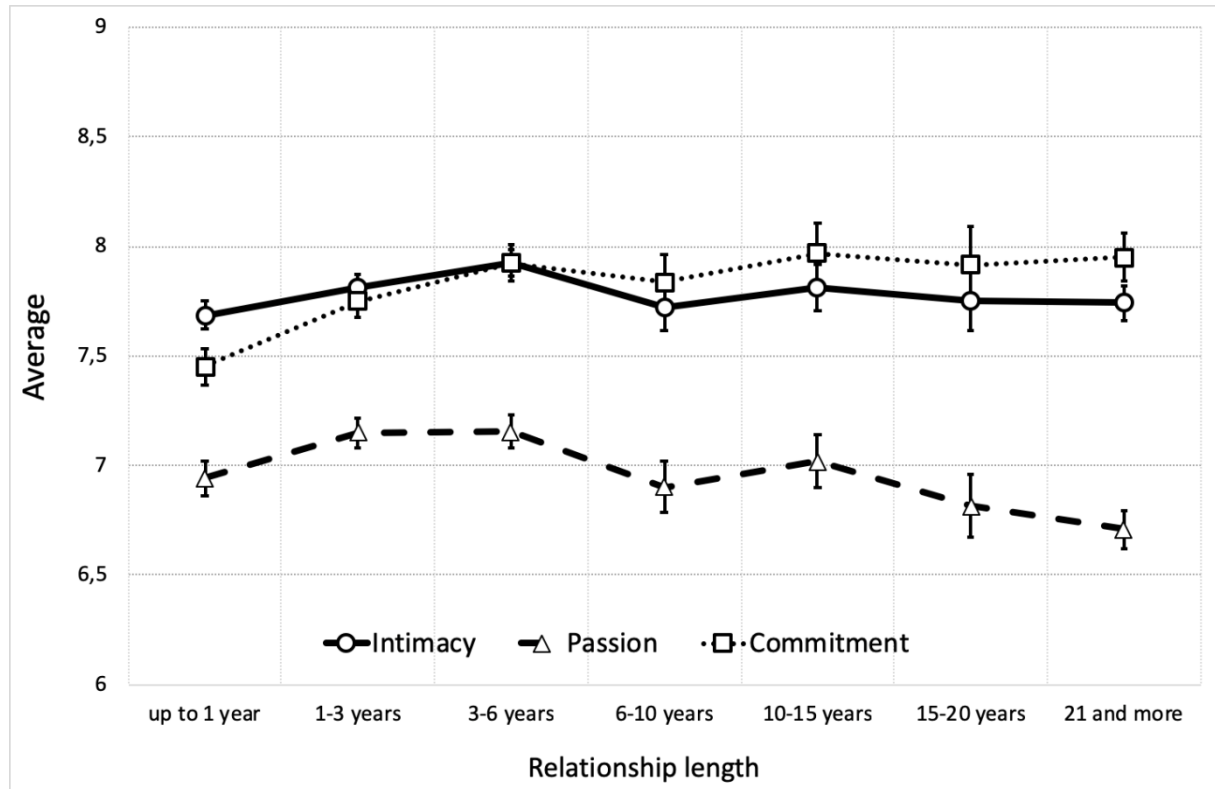


Figure 2. Changes in the intensity of love aspects with the relationship's length.

Discussion

The results of this study show that, as assumed, the Triangular Theory of Love has a triangular factor structure in a global sample. We tested configural invariance, metric invariance, and scalar invariance, which confirmed the cultural universality of the theoretical construct of love presented by Sternberg (1986, 1988, 1997) and which justifies the further use of versions of STLS scales used in the current research (see Supplementary File X).

Temporal dynamics of the love components are yet another proof of the correctness of general Love Theory as suggested by Sternberg (1986) and other authors (e.g. Wojciszke, 2002). Passion tended to decline linearly with increasing relationship duration, while

commitment exhibited a positive linear trend, indicating growth of commitment with time. However, it should be highlighted, that, although these changes were statistically significant, they were associated with rather low absolute changes in the levels of love components.

The results suggest one further direction for future research. In our study and in previous work (Acker & Davis, 1992; Chojnacki & Walsh, 1990; Hendrick & Hendrick, 1989), despite discriminant validity among the three scales of the STLS, the correlations among subscales have been substantial. One possible reason is simply that intimacy, passion, and commitment tend to occur together in most, although certainly not all, love relationships. Especially in the early stages of a successful relationship, people may idealize their partners (Hall, Taylor, 1976; Murray, Holmes, 1997) and highly agree with (positive) statements in the STLS. Therefore, it may be advisable, in the future, to think about behavioral or even psychophysiological measures that would correspond to the three aspects of love—intimacy, passion, and commitment—and that might be less susceptible to halo effects (Nisbett & Wilson, 1977) than ratings expressed on a Likert scale.

The Triangular Theory of Love is one of the most frequently used and cited theoretical love concepts used in empirical research (e.g., Billeto et al., 2015; Sabiniewicz et al., 2017; Weisman et al., 2015). Unfortunately, similar to other studies from the area of social sciences (see Henrich et al., 2010), previous research comprised almost exclusively Western samples. One of the most important aims of the current research was enriching the existing research by conducting a large-scale cross-cultural study. We also hope that the collected data and possibilities provided by the STLS versions adapted in a few dozen countries will further promote future research on the Triangular Theory of Love. All our data are free for use by any interested person. Based on the current dataset, scientists can conduct numerous analyses and publish articles concerning various love-related research questions: they can examine cross-cultural differences in marital satisfaction, identifying other country-level predictors of love.

Although differences in love levels have been investigated in a few cross-cultural studies (e.g. Dion and Dion, 1996; De Munck, & Korotayev, 1999), due to the vast amount of data from this set data set, the data may also serve as a reference point in further studies regarding love. Cultural dimensions might influence romantic relationships (Dion & Dion, 1993). For example, Gao (2001) found that level of passion was higher in American compared with Chinese couples, while intimacy and commitment did not vary between the samples. On the other hand, another study comparing European and Chinese Canadians found differences between these two samples, with Chinese Canadians scoring lower than European Canadians, a difference mediated by gender-role traditionalism (Marshall, 2008). To further investigate the bases of such differences, new studies based on our data might include various, new potential country-level predictors, like, for example Schwartz's value orientations (Schwartz, 2006), Hofstede's culture dimensions (Hofstede, 2001) or other variables likely related to love, like partnership satisfaction (Sorokowski et., al. 2017).

To sum up, we found that the Triangular Theory of Love and its accompanying Triangular Love Scale seem to show good construct validity across cultures. We hope others will accept our invitation to further analyze our data and also to conduct their own studies into the structure of love across a large range of cultures.

References

- Acevedo, B. P., Aron, A., Fisher, H. E., & Brown, L. L. (2012). Neural correlates of long-term intense romantic love. *Social Cognitive and Affective Neuroscience*, 7(2), 145–159.
- Acker, M., & Davis, M. H. (1992). Intimacy, Passion and Commitment in Adult Romantic Relationships: A Test of the Triangular Theory of Love. *Journal of Social and Personal Relationships*, 9(1), 21–50. <https://doi.org/10.1177/0265407592091002>
- Baumeister, R. F., & Bratslavsky, E. (1999). Passion, intimacy, and time: Passionate love as a function of change in intimacy. *Personality and Social Psychology Review*, 3(1), 49–67.
- Becker, G. S. (1973). A theory of marriage: Part I. *Journal of Political Economy*, 81(4), 813–846.
- Billedo, C. J., Kerkhof, P., & Finkenauer, C. (2015). The use of social networking sites for relationship maintenance in long-distance and geographically close romantic relationships. *Cyberpsychology, Behavior, and Social Networking*, 18(3), 152–157.
- Bowlby, J. (2012). *The making and breaking of affectional bonds*. Routledge.
- Cassepp-Borges, V., & Martins Teodoro, M. L. (2009). Versión reducida de la escala triangular del amor: Características del sentimiento en Brasil. *Interamerican Journal of Psychology*, 43(1), 30–38.
- Chojnacki, J. T. (1990). Reliability and Concurrent Validity of the Sternberg Triangular Love Scale. *Psychological Reports*, 67(5), 219. <https://doi.org/10.2466/PR0.67.5.219-224>
- De Munck, V. C., & Korotayev, A. (1999). Sexual equality and romantic love: A reanalysis of Rosenblatt's study on the function of romantic love. *Cross-Cultural Research*, 33(3), 265–277.
- Dion, K. K., & Dion, K. L. (1993). Individualistic and collectivistic perspectives on gender and the cultural context of love and intimacy. *Journal of Social Issues*, 49(3), 53–69. <https://doi.org/10.1111/j.1540-4560.1993.tb01168.x>

- Dion, K. K., & Dion, K. L. (1996). Cultural perspectives on romantic love. *Personal Relationships*, 3(1), 5-17.
- Feybesse, C., & Hatfield, E. (2019). Passionate love. In R. J. Sternberg & K. Sternberg (Eds.), *The new psychology of love* (2nd ed., pp. 183-207). New York: Cambridge University Press.
- Gao, G. (2001). Intimacy, passion, and commitment in Chinese and US American romantic relationships. *International Journal of Intercultural Relations*, 25(3), 329–342.
[https://doi.org/10.1016/S0147-1767\(01\)00007-4](https://doi.org/10.1016/S0147-1767(01)00007-4)
- Ha, T., Overbeek, G., De Greef, M., Scholte, R. H. J., & Engels, R. C. M. E. (2010). The importance of relationships with parents and best friends for adolescents' romantic relationship quality: Differences between indigenous and ethnic Dutch adolescents. *International Journal of Behavioral Development*, 34(2), 121–127.
<https://doi.org/10.1177/0165025409360293>.
- Hall, J. A., & Taylor, S. E. (1976). When love is blind: Maintaining idealized images of one's spouse. *Human Relations*, 29(8), 751-761.
- Hancock, G. R., & Mueller, R. O. (2001). Rethinking construct reliability within latent variable systems. In R. Cudeck, S. du Toit, & D. Sorbom (Eds.), *Structural equation modeling: Present and future* (pp. 195–216). Lincolnwood, IL: Scientific Software International.
- Hatfield, E., Bensman, L., & Rapson, R. L. (2012). A brief history of social scientists' attempts to measure passionate love. *Journal of Social and Personal Relationships*, 29(2), 143–164.
- Hatfield, E., & Walster, G. W. (1985). *A new look at love*. University Press of America.
- Hazan, C., & Shaver, P. R. (1987). Romantic love conceptualized as an attachment process. *American Psychologist*, 46(3), 333–341. <https://doi.org/10.1037/0022-3514.52.3.511>

- Hendrick, C., & Hendrick, S. S. (1986). A theory and method of love. *Journal of Personality and Social Psychology*, *50*(2), 392–402.
- Hendrick, C., & Hendrick, S. S. (1989). Research on love: Does it measure up? *Journal of Personality and Social Psychology*, *56*(5), 784–794. <https://doi.org/10.1037/0022-3514.56.5.784>
- Hendrick, C., & Hendrick, S. S. (2019). Styles of romantic love. In R. J. Sternberg & K. Sternberg (Eds.), *The new psychology of love* (2nd ed., pp. 223-239). New York: Cambridge University Press.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world?. *Behavioral and Brain Sciences*, *33*, 61-83.
- Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. Thousand Oaks, CA: Sage Publications.
- Hopcroft, R. L. (2006). Sex, status, and reproductive success in the contemporary United States. *Evolution and Human Behavior*, *27*(2), 104–120. <https://doi.org/10.1016/j.evolhumbehav.2005.07.004>
- Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York: Guilford Press.
- Lee, J. A. (1973). *Colours of love: An exploration of the ways of loving*. New Press.
- Lemieux, R., & Hale, J. L. (2000). Intimacy, passion, and commitment among married individuals: Further testing of the Triangular Theory of Love. *Psychological Reports*, *87*(3), 941–948.
- Levy, M. B., & Davis, K. E. (1988). Lovestyles and attachment styles compared: Their relations to each other and to various relationship characteristics. *Journal of Social and Personal Relationships*, *5*(4), 439–471. <https://doi.org/10.1177/0265407588054004>
- Madey, S. F., & Rodgers, L. (2015). The Effect of Attachment and Sternberg ' s Triangular

- Theory of Love on Relationship Satisfaction. *Individual Differences Research*, 7, 76–84.
- Marshall, T. C. (2008). Cultural differences in intimacy: The influence of gender-role ideology and individualism-collectivism. *Journal of Social and Personal Relationships*, 25(1), 143–168. <https://doi.org/10.1177/0265407507086810>
- Mikulincer, M., & Shaver, P. R. (2019). A behavioral systems approach to romantic love relationships: Attachment, caregiving, and sex. In R. J. Sternberg & K. Sternberg (Eds.), *The new psychology of love* (pp. 259-279). New York: Cambridge University Press.
- Murray, S. L., & Holmes, J. G. (1997). A leap of faith? Positive illusions in romantic relationships. *Personality and Social Psychology Bulletin*, 23, 586-604.
- Ng, T. K., & Cheng, C. H. K. (2010). The effects of intimacy, passion, and commitment on satisfaction in romantic relationships among Hong Kong Chinese people. *Journal of Psychology in Chinese Societies*, 11(2), 123–146.
- Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250.
- Overbeek, G., Ha, T., Scholte, R., de Kemp, R., & Engels, R. C. M. E. (2007). Brief report: Intimacy, passion, and commitment in romantic relationships-Validation of a “triangular love scale” for adolescents. *Journal of Adolescence*, 30(3), 523–528. <https://doi.org/10.1016/j.adolescence.2006.12.002>
- Rosseel, Y. (2012). lavaan: an R package for structural equation modeling. *Journal of Statistical Software*, 48, 1–36.
- Sabiniewicz, A., Borkowska, B., Serafińska, K., & Sorokowski, P. (2017). Is love related to selfies? Romantic selfie posting behavior and love levels among women and men. *Personality and Individual Differences*, 111, 297-300.
- Sechrest, L., Fay, T. L., & Zaidi, S. H. (1972). Problems of translation in cross-cultural

- research. *Journal of Cross-Cultural Psychology*, 3, 41-56.
- Secomb, L. (2007). *Philosophy and Love: From Plato to Popular Culture*. Edinburgh University Press.
- Schwartz, S. H. (2006). A theory of cultural value orientations: explication and applications. *Comparative Sociology*, 5, 137–182. doi: 10.1163/156913306778667357
- Sprecher, S., & Regan, P. C. (1998). Passionate and companionate love in courting and young married couples. *Sociological Inquiry*, 68(2), 163–185. <https://doi.org/10.1111/j.1475-682X.1998.tb00459.x>
- Sorokowski, P., Randall, A. K., Groyecka, A., Frackowiak, T., Cantarero, K., Hilpert, P., ... & Bettache, K. (2017). Marital satisfaction, sex, age, marriage duration, religion, number of children, economic status, education, and collectivistic values: Data from 33 countries. *Frontiers in Psychology*, 8, 1199.
- Sorokowski, P., Sorokowska, A., Butovskaya, M., Karwowski, M., Groyecka, A., Wojciszke, B., & Pawłowski, B. (2017). Love influences reproductive success in humans. *Frontiers in Psychology*, 8, 1922.
- Sternberg, R. J. (1986). A triangular theory of love. *Psychological Review*, 93(2), 119.
- Sternberg, R. J. (1988). *The triangle of love: Intimacy, passion, commitment*. Basic Books (AZ).
- Sternberg, R. J. (1997). Construct validation of a triangular love scale. *European Journal of Social Psychology*, 27, 313–335.
- Sternberg, R.J. (2006). A duplex theory of love. In R. J. Sternberg & K. Weis (Eds.), *The new psychology of love* (pp. 184–199). New Haven, CT: Yale University Press.
- Sternberg, R. J. (2019). When love goes awry (Part 1): Applications of the duplex theory of love and its development to relationships gone bad. In R. J. Sternberg & K. Sternberg

- (Eds.), *The new psychology of love* (2nd ed., pp. 280-299). New York: Cambridge University Press.
- Sternberg, R. J., & Grajek, S. (1984). The nature of love. *Journal of Personality and Social Psychology*, 47(2), 312.
- Sternberg, R. J., & Sternberg, K. (2019). *The new psychology of love* (2nd ed.). New York: Cambridge University Press.
- Sumter, S. R., Valkenburg, P. M., & Peter, J. (2013). Perceptions of love across the lifespan: Differences in passion, intimacy, and commitment. *International Journal of Behavioral Development*, 37(5), 417–427. <https://doi.org/10.1177/0165025413492486>
- Weisman, O., Schneiderman, I., Zagoory-Sharon, O., & Feldman, R. (2015). Early stage romantic love is associated with reduced daily cortisol production. *Adaptive Human Behavior and Physiology*, 1(1), 41-53.
- Whitley Jounior, B. E. (1992). Reliability and aspects of the construct validity of Sternberg's triangular love scale. *Journal of Social and Personal Relationships*, 10, 475–480. <https://doi.org/0803973233>
- Wojciszke, B. (2002). From the first sight to the last drop: A six stage model of the dynamics of love. *Polish Psychological Bulletin*, 33, 15-26.
- Zsok, F., Haucke, M., De Wit, C. Y., & Barelds, D. P. H. (2017). What kind of love is love at first sight? An empirical investigation. *Personal Relationships*, 1–17. <https://doi.org/10.1111/pere.12218>

| | Estimate | Std.Err | Standardized | p |
|-----------------|----------|---------|--------------|-------|
| Intimacy | | | | |
| Item 1 | 1 | | 0.579 | |
| Item 2 | 1.23 | 0.037 | 0.743 | 0.000 |
| Item 3 | 1.131 | 0.039 | 0.686 | 0.000 |
| Item 4 | 0.895 | 0.031 | 0.63 | 0.000 |
| Item 5 | 1.124 | 0.038 | 0.682 | 0.000 |
| Item 6 | 1.309 | 0.045 | 0.759 | 0.000 |
| Item 7 | 1.074 | 0.035 | 0.719 | 0.000 |
| Item 8 | 1.13 | 0.041 | 0.683 | 0.000 |
| Item 9 | 1.094 | 0.037 | 0.8 | 0.000 |
| Item 10 | 1.228 | 0.042 | 0.805 | 0.000 |
| Item 11 | 1.26 | 0.044 | 0.765 | 0.000 |
| Item 12 | 1.15 | 0.041 | 0.703 | 0.000 |
| Item 13 | 1.386 | 0.051 | 0.742 | 0.000 |
| Item 14 | 1.251 | 0.043 | 0.754 | 0.000 |
| Item 15 | 1.308 | 0.046 | 0.729 | 0.000 |
| Passion | | | | |
| Item 1 | 1 | | 0.699 | |
| Item 2 | 1.003 | 0.02 | 0.711 | 0.000 |
| Item 3 | 1.167 | 0.026 | 0.739 | 0.000 |
| Item 4 | 0.965 | 0.021 | 0.744 | 0.000 |
| Item 5 | 1.016 | 0.027 | 0.565 | 0.000 |

| | | | | |
|------------|-------|-------|-------|-------|
| Item 6 | 1.367 | 0.033 | 0.797 | 0.000 |
| Item 7 | 1.166 | 0.028 | 0.777 | 0.000 |
| Item 8 | 1.239 | 0.032 | 0.726 | 0.000 |
| Item 9 | 1.014 | 0.026 | 0.665 | 0.000 |
| Item 10 | 1.212 | 0.028 | 0.748 | 0.000 |
| Item 11 | 1.209 | 0.029 | 0.734 | 0.000 |
| Item 12 | 1.327 | 0.034 | 0.747 | 0.000 |
| Item 13 | 1.182 | 0.028 | 0.768 | 0.000 |
| Item 14 | 1.105 | 0.028 | 0.6 | 0.000 |
| Item 15 | 1.105 | 0.027 | 0.616 | 0.000 |
| Commitment | | | | |
| Item 1 | 1 | | 0.765 | |
| Item 2 | 1.183 | 0.027 | 0.806 | 0.000 |
| Item 3 | 1.228 | 0.032 | 0.718 | 0.000 |
| Item 4 | 1.339 | 0.036 | 0.807 | 0.000 |
| Item 5 | 1.377 | 0.036 | 0.783 | 0.000 |
| Item 6 | 1.429 | 0.039 | 0.766 | 0.000 |
| Item 7 | 1.161 | 0.032 | 0.733 | 0.000 |
| Item 8 | 1.289 | 0.033 | 0.843 | 0.000 |
| Item 9 | 1.461 | 0.04 | 0.736 | 0.000 |
| Item 10 | 1.352 | 0.031 | 0.846 | 0.000 |
| Item 11 | 1.398 | 0.037 | 0.815 | 0.000 |
| Item 12 | 1.251 | 0.033 | 0.821 | 0.000 |
| Item 13 | 0.995 | 0.029 | 0.716 | 0.000 |

| | | | | |
|---------|-------|-------|-------|-------|
| Item 14 | 1.111 | 0.028 | 0.812 | 0.000 |
| Item 15 | 1.083 | 0.029 | 0.724 | 0.000 |

| Country | Sample Size | Sex | | Relationship | | | Relationship Experience | | | | | | | Love Factors | | |
|----------------|-------------|-------|-------|--------------|---------|---------|-------------------------|-----------|-----------|------------|-------------|-------------|-------------|--------------|-------------|-------------|
| | | Men | Women | Dating | Engaged | Married | up to 1 year | 1-3 years | 3-6 years | 6-10 years | 10-15 years | 15-20 years | 21 and more | Intimacy | Passion | Commitment |
| Algeria (DZ) | 325 | 44,6% | 55,4% | 43,4% | 14,5% | 42,2% | 27,0% | 26,7% | 18,9% | 11,9% | 9,1% | 3,8% | 2,5% | 7,45 (1,26) | 7,1 (1,58) | 7,8 (1,38) |
| Australia (AU) | 287 | 45,5% | 54,5% | 53,7% | 9,4% | 36,9% | 25,4% | 22,5% | 15,6% | 12,3% | 6,5% | 6,2% | 11,6% | 8,07 (0,85) | 7,1 (1,49) | 8,01 (1,08) |
| Belgium (BE) | 278 | 45,0% | 55,0% | 65,5% | 5,8% | 28,8% | 19,7% | 18,6% | 24,1% | 12,8% | 10,6% | 3,3% | 10,9% | 7,88 (0,86) | 6,96 (1,3) | 7,85 (1,05) |
| Croatia (HR) | 239 | 41,0% | 59,0% | 52,3% | 1,7% | 46,0% | 22,2% | 17,5% | 9,4% | 5,6% | 7,7% | 8,5% | 29,1% | 7,96 (0,99) | 7,01 (1,44) | 7,89 (1,23) |
| Hungary | 831 | 49,9% | 50,1% | 62,7% | 8,1% | 29,2% | 23,8% | 28,4% | 18,4% | 4,9% | 5,9% | 4,4% | 14,2% | 8,14 | 7,53 | 8,17 (1,22) |

| | | | | | | | | | | | | | | | | |
|----------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|--------|--------|-------------|
| (HU) | | % | | % | | | % | % | % | | | | % | (0,89) | (1,32) | |
| India (IN) | 235 | 48,9% | 51,1% | 46,8% | 3,8% | 49,4% | 22,2% | 20,4% | 21,7% | 8,1% | 5,0% | 8,1% | 14,5% | 7,94 | 7,39 | 8 (1,14) |
| Italy (IT) | 308 | 33,4% | 66,6% | 14,0% | 45,1% | 40,9% | 12,9% | 20,6% | 23,0% | 7,3% | 5,2% | 6,6% | 24,4% | 8,06 | 7,34 | 8,1 (1,11) |
| Lithuania (LT) | 183 | 50,3% | 49,7% | 58,5% | 3,8% | 37,7% | 29,4% | 26,0% | 19,8% | 5,6% | 5,6% | 4,5% | 9,0% | 7,84 | 6,88 | 7,84 (1,28) |
| Nigeria (NG) | 151 | 43,0% | 57,0% | 53,6% | 13,9% | 32,5% | 22,6% | 39,6% | 18,9% | 9,4% | 5,7% | 1,9% | 1,9% | 7,07 | 6,65 | 7,18 (1,5) |
| Pakistan (PK) | 548 | 47,8% | 52,2% | 39,8% | 22,3% | 38,0% | 19,5% | 37,3% | 17,1% | 7,9% | 6,8% | 3,6% | 7,9% | 6,57 | | 6,73 (1,57) |
| Peru (PE) | 117 | 29,9% | 70,1% | 80,3% | 11,1% | 8,5% | 38,5% | 31,6% | 20,5% | 5,1% | | 0,9% | 3,4% | 7,79 | 6,87 | 7,61 (1,2) |
| Poland (PL) | 410 | 55,7% | 44,3% | 50,5% | 15,9% | 33,7% | 18,0% | 22,9% | 22,9% | 13,0% | | | | 7,87 | 7,28 | 7,86 (1,39) |
| Russia | 167 | 44,3% | 55,7% | 39,5% | 5,4% | 55,1% | 22,6% | 26,5% | 11,6% | 15,5% | 8,4% | 5,8% | 9,7% | 7,81 | 6,84 | 7,86 (1,36) |

| | | | | | | | | | | | | | | | | | |
|------------------|-----|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------------|-----------|
| (RU) | | % | | % | | | % | % | % | % | | | | (1,2) | (1,61) | | |
| Serbia (XS) | 407 | 45,5% | 54,5% | 60,0% | 2,2% | 37,8% | 25,3% | 29,3% | 22,5% | | 4,0% | 4,3% | 3,7% | 10,8% | 8,02 | 6,96 | 7,7 (1,3) |
| Slovakia (SK) | 318 | 25,8% | 74,2% | 61,6% | 4,4% | 34,0% | 14,3% | 24,8% | 22,5% | 12,7% | | | 16,0% | 7,95 | 6,89 | 8,04 (1,1) | |
| Slovenia (SI) | 470 | 49,4% | 50,6% | 60,0% | 2,8% | 37,2% | 13,1% | 22,6% | 19,7% | | | | 22,2% | 8,1 | 7,14 | 8,13 (1,04) | |
| South Korea (KR) | 134 | 50,7% | 49,3% | 38,8% | 0,7% | 60,4% | 23,3% | 18,0% | | | 12,0% | 12,8% | 21,1% | 7,29 | 6,36 | 7,05 (1,35) | |
| Spain (ES) | 263 | 38,5% | 61,5% | 61,2% | 1,9% | 36,9% | 13,2% | 23,7% | 18,7% | | | | 32,3% | 7,93 | 7,17 | 7,93 (1,14) | |
| Turkey (TR) | 694 | 43,9% | 56,1% | 52,3% | 3,6% | 44,1% | 22,4% | 25,8% | 14,4% | | | | 21,0% | 7,57 | 6,59 | 7,19 (1,87) | |
| Uruguay (UY) | 251 | 40,6% | 59,4% | 74,5% | 3,6% | 21,9% | 22,8% | 26,4% | 18,0% | 10,0% | | | 12,8% | 8,06 | 6,68 | 7,78 (1,27) | |
| Vietnam | 349 | 38,3% | 61,7% | 26,1% | 2,0% | 71,9% | 16,4% | 19,8% | 25,3% | 21,3% | 15,1% | 2,2% | | 7,28 | 6,72 | 7,52 (1,5) | |

| | | | | | | | | | | | | | | | | |
|------|--|---|--|---|--|--|---|---|---|---|---|--|--|--------|--------|--|
| (VN) | | % | | % | | | % | % | % | % | % | | | (1,36) | (1,55) | |
|------|--|---|--|---|--|--|---|---|---|---|---|--|--|--------|--------|--|

