Love and Gender: An Empirical Account

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ABSTRACT

We present new evidence on the prevalence, correlates, dynamics, and hedonic consequences of experienced love from data describing the mood, emotion, and time-use of 3,867 adults every waking half-hour for ten days (N=1.12 million) supplemented by a second experience sample of 7,255 adults. Our findings allude to the similarity of experience across gender and to its functional and adaptive nature—i.e., men and women report comparable degrees of (passionate) partner love, such love declines for both genders after early marriage but rises after prolonged partner separations, and greater reported love predicts substantially higher in-the-moment well-being across gender. The gender differences we do find—women report child love more frequently than men and men exhibit a less severe drop in partner love (and possibly passion) over marriage (a pattern suggestively mediated by children)—also corroborate a functional account of love that recognizes the varying role of men and women in relationships.

STATEMENT OF RELEVANCE

While artists, writers, philosophers and social scientists have asserted the centrality of love for relationships, health, longevity, and well-being, scholars have yet to produce a detailed empirical account of how men and women actually experience love, across its many forms. Our investigation—leveraging high-frequency self-reported mobile data with unprecedented detail on the time-use and emotion of several thousand US adults—aspires to provide such an account. In contrast to popular proclamations that men and women hail from different relational planets, we document striking similarities across gender in the experience of love, particularly partner love. For both men and women, love is elevated in early stages of relationships or after prolonged partner separation, seemingly declines and transforms in nature over the course of a relationship and contributes substantially to mood and happiness. We do find differences—men report far less child love and sustain less severe declines over time in partner love (and possibly passion) than women. Across these similarities and differences, our findings allude to an adaptive, universal, and highly functional emotion that helps to sustain relationships and well-being.

Love and Gender: An Empirical Account

Given its presumed indispensability for relationships, physical and mental health, and even longevity (e.g., see Levin 2022), the proliferation of theories seeking to explain the causes, dynamics, and consequences of love—across its many forms—is unsurprising. These evolutionary, socio-cultural, social-psychological, and clinical perspectives offer (sometimes) differing accounts as to how men and women experience love (e.g., Aron & Aron 1986; Hazan and Shaver 1987; Frank, 1988; Sternberg, 1996; Buss, 1988; Tooby & Cosmides, 2005; Perrin et al., 2011). Despite its potential to help clarify theoretical understanding, empirical evidence as to the experience of love is limited, however. Existing studies of prevalence largely focus on partner love, are often reliant on small, non-representative, samples, and provide a mixed account across gender (e.g., Hendrick & Hendrick 1986; Dion and Dion 1975; Montgomery 2005; Gonzaga et al. 2001). And studies documenting the prevalence of, or attitudes towards, passionate and companionate love—the two types of partner love typically distinguished by scholars and lay-persons (e.g., Hatfield, Purvis, & Rapson, 2020; Fehr 1994)—offer a similarly mixed account. For example, some studies find greater companionate love among women (e.g., Hatfield et al. 2008; Sprecher & Regan 1998) and passionate love among men (e.g. Sumter, Valkenburg & Peter 2013) while others document modest or insignificant differences (e.g., Hatfield & Rapson 1996; Murstein & Tuerkheimer 1998).

One explanation for the absence of a consensus empirical account is the practical challenge associated with defining, conceptualizing, and measuring love. Academics have alternatively defined love as an attitude, motivational state, and emotion and have advanced several conceptual taxonomies and typologies to capture its phenomenological complexity (see Fehr 2019). While scales and indices have emerged to measure such constructs, their length and complexity pose difficulties for large-scale administration (see Sternberg & Sternberg 2019).

We seek to overcome these challenges with new data providing unprecedented detail into the emotion, time-use, and well-being of a large sample of US adults. Our use of an experience sample, in which participants self-define love and report it in-the-moment, is endorsed by research suggesting lay-people broadly define love as an emotion (Shaver et al., 1987), without fine-grained distinctions cited by researchers (Fehr & Russell, 1991), and with similar proto-typicality across gender (Fehr & Broughton 2001). It is also supported by research lauding experience samples, relative to retrospective and reflective measures, for exhibiting less bias due

to imperfect recall, experimenter demand, or focusing illusions (e.g., Sudman, Bradburn, & Schwarz, 1996).

Several properties of our primary dataset position it as unusually compelling for emotion research, even relative to other experience samples. First, its size (over 1.1 million observations), its unusually high compliance (participants were generously paid to complete reports) and demographic diversity (the firm that collected the data provided smartphones to those in the sample who did not own one) allude to high ecological validity. Second, while a potential complication for studies of self-reported emotion, particularly love, is systematic bias due to variable willingness to report emotion, our ability to observe multiple emotions affords strategies to assess/address plausible forms of such bias. For instance, if one had confidence in the unbiasedness of estimates of gender differences only among those willing to express some other (positive) emotion, one could compare unrestricted and restricted estimates of gender differences to gauge the degree of potential bias. Finally, the high-frequency of the data, the length of the panel, and the scope of measured variables permits analyses extending beyond descriptions of prevalence to those examining causes, dynamics, and consequences. For example, with these data, we can infer the target (child, partner, family/ friends) and type (passion) of love from social and emotional context, disentangle within- and between-participant variability, assess short-run (e.g., the effect of partner separation on love) and long-run (e.g., trajectory of partner love over time) dynamics, and even estimate the contemporaneous effect of love on well-being.

Study 1

In the first, main, study, a diverse sample of adults (N = 3,867) reported details of their time-use, mood, and their emotional experience, every half-hour for a ten-day period from 2011 to 2013 via an electronic diary on their mobile phone (n = 1,126,113).

Methods

Participants

Participants who were 18 to 64 years in age, English-speaking, and lived in the contiguous US, were recruited by a market research firm seeking a representative sample to complete a mobile-phone based electronic diary measuring time-use, emotion and well-being (the firm sought to understand the social/psychological context of consumer behavior). The study

was administered across four waves of roughly one-thousand participants each paid $100 to $150 depending on the wave. Enrollees who did not have a smartphone were provided a phone for the duration of the study and the objectives of the present research were not communicated to participants. The approximately 97 percent of participants who reported data for 7 or more of the 10 days were included in the dataset—an extremely high compliance rate we attribute to the size of the incentives and the diary's ease of use. For each participant, we observe scores of demographic ad background variables including income, age, race/ethnicity, household status, and marital duration. Table 1, Panel A, summarizes the demographic characteristics of the sample. Additional detail on sample recruitment, diary curation, and variable definitions are reported in the supplementary online materials (see SOM).

Procedure and Data

Participants were asked to complete a report via push-notification on their mobile app every waking 30-minute interval for a period of roughly ten days. For each period, participants reported what they were doing (*activities*, e.g. eating), who they were with (*social context*, e.g. on their own), and where they were (*location*, e.g. at home) by selecting options on a series of successive screens. Participants additionally reported their mood and alertness (on a 1 to 5 scale) and their experience of 16 specific emotions, including love, by selecting the corresponding labeled-emoji.[1] Love was indicated with the word "loving" accompanied by a smiling emoji with hearts. We focus our analysis on the most frequent categories of social time-use, sometimes consolidating minor categories into larger ones: Partner, children, other family/friends, alone, colleagues. We also construct measures of exclusive time-use for social categories of interest—i.e., a partner, children, or other family/friends (e.g., time with a partner but not children, or other family/friends). Table 1, Panel B, summarizes social time-use across participants. The most notable gender differences in average time-use are that men spend more time alone and women spend more time with children.

[1] The emotions measured by the app, beyond love, include: anger, boredom, confidence, contentedness, excitement, exhaustion, frustration, happiness, hope, interested, loneliness, overwhelmed, relief, sadness, and worry.

Table 1.
Summary of Demographic Variables and Social Time-Use (Study 1)

	All	Men	Women	Difference Test (p-value)
Number of Subjects	3867	1969	1898	-
Observations per Subject	43.8	43.7	43.9	0.63
Panel A. Demographic Variables (Average)				
Male [1,0]	0.51	1.00	0.00	-
Age [years]	44.1	44.1	44.2	0.75
College Graduate [1,0]	0.39	0.40	0.41	0.46
Household Income [categorically measured $]	82,547	88,342	76,515	0.00
Race/Ethnicity [1,0]				
White	0.74	0.74	0.75	0.42
Black or African American	0.14	0.13	0.14	0.29
Hispanic	0.09	0.09	0.09	0.93
Asian	0.04	0.04	0.03	0.02
Household and Employment Status [1,0]				
Married or Engaged	0.60	0.63	0.60	0.00
Employed Full-Time	0.58	0.68	0.47	0.00
Student	0.03	0.03	0.03	0.88
Parent w/ Children in Household	0.47	0.43	0.50	0.00
Panel B. Social Time Use (Average Prevalence)				
Romantic Partner	0.29	0.29	0.28	0.09
Exclusive of children, other family/friends	0.14	0.15	0.13	0.00
Children	0.23	0.18	0.29	0.00
Exclusive of partner, other family/friends	0.09	0.05	0.13	0.00
Other Family (siblings, parents) / Friends	0.15	0.14	0.16	0.97
Exclusive of partner, children	0.09	0.09	0.09	0.35
Alone	0.42	0.46	0.38	0.00
Exclusive of partner, children, other family/friends	0.37	0.41	0.33	0.00
Multiple Targets of Love (partner, children, other family/friends)	0.16	0.15	0.18	0.00
Colleagues	0.14	0.15	0.13	0.00

Notes: This table summarizes demographic (Panel A) and social time-use (Panel B) variables, overall and by gender, for Study 1 participants. The final column reports the p-value for a statistical test of mean differences with standard errors clustered at the person-level. Household income is measured categorically. Supplementary Online Materials describe the detailed construction of time-use variables.

Results

Overall Prevalence and Gender Gap

Participants reported feeling love in 3.2 percent (95 percent CI: 2.9 to 3.5) of response periods. Of the sixteen measured emotions, love ranked ninth in prevalence and sixth among the seven positive emotions. Men reported feeling love during 2.3 percent (CI: 2.0 to 2.8) of periods,

significantly less often than the 4.0 percent (CI: 3.5 to 4.5) of periods reported by women ($p < 0.001$). The absolute size of the gender gap was the third largest among the sixteen emotions, exceeded only by gaps in confidence and exhaustion. Between-subject variance explained 31 percent of overall variation in love, while the remaining variation is explained by within-subject variance. Given potential compositional differences correlated with both gender and love, we estimate the covariate-adjusted gender difference in prevalence, γ, with the following equation:

$$Love_{it} = \alpha + \gamma Male_i + \boldsymbol{X}\lambda + \epsilon_i$$

Here $Love_{it}$ refers to the momentary report of love for person i at half-hour t, $\boldsymbol{X}$ is a vector of demographic covariates, and *Male* indicates gender (see SOM for detail). Robust standard errors clustered by participant controls for the non-independence of observations. The regression indicates that, adjusting for demographic differences, men reported love in 1.3 percent fewer periods than women, (95% CI: [-0.019, -0.007], $p < 0.001$), implying that on average, men reported love 33% less often than did women.

Heterogeneity by Other Demographic Categories

While the prevalence of love extends to every demographic category, the estimates indicate notable differences. For example, with respect to race/ethnicity, relative to non-Hispanic white participants, love was reported far more frequently by black participants (b = 0.023, CI: [0.008, 0.037], p = 0.002). Relative to participants in their 20s, reported love was higher for those in their 30s (b = 0.010, CI: [0.000, 0.020], p = 0.06), but did not meaningfully differ for older decades of age. Finally, reported love was highest for those in the lowest income category (< $50k) relative to other categories (b = 0.016, CI: [0.024, 0.008], p < 0.001). We observed no significant differences in prevalence across the four remaining categories of income.

Gender Gap by Love Target

We assess the gender gap across three distinct targets of love—a romantic partner, children, and (other) family/friends—through two strategies. First, we assess the gender gap in love in the exclusive presence of a partner, children, or other family/friends by re-estimating the baseline regression after restriction to the time-use sample of interest. Second, we estimate reported love separately across demographic categories—marriage and parenthood—likely to be correlated with target-specific time-use.

Table 2.
Gender Gaps in Experienced Love

	Study 1			Study 2
	Female Baseline	Absolute (M - F)	Relative (M - F) / F	Relative (M - F) / F
Panel A. Overall Gender Gap				
Unadjusted Gender Gap	0.040	-0.016*** (0.003)	-0.40	-0.30***
Covariate-Adjusted Gender Gap	0.040	-0.013*** (0.003)	-0.33	-0.31***
Panel B. Adjusted Gender Gap by Social Target				
Romantic Partner	0.061	-0.014** (0.007)	-0.23	-0.09
Children	0.064	-0.026*** (0.007)	-0.41	-0.44**
Other Family/Friends	0.042	-0.015* (0.008)	-0.36	-0.38
Alone	0.020	-0.006 (0.004)	-0.30	--
Panel C. Adjusted Gender Gap by Target-Relevant Demographic				
Married (or engaged) with no Children	0.033	-0.009 (0.006)	-0.27	--
Married (or engaged) with Children	0.038	-0.012** (0.005)	-0.32	--
Unmarried (and unengaged) with no Children	0.036	-0.011 (0.007)	-0.31	--
Unmarried (and unengaged) with Children	0.060	-0.034*** (0.010)	-0.57	--

Notes: This table summarizes the estimated male-female gender gap in overall love, love by social target, and love by target-relevant demographic. Panel A reports the overall gender gap with and without adjustment by covariates (Study 1 and Study 2). Panel B reports the gender gap inlove in the exclusive company of a social target (Study 1) and by explicitly defined social target (Study 2). Panel C reports the gender gap for samples restricted to demographic categories (marriage/engagement and parenthood) relevant to social target (Study 1). Asterisks indicate statistical significanceat the 1 percent (***), 5 percent (**) and 10 percent (*) level.

Table 2 reports estimates of the absolute, and relative, male–female gap in prevalence overall and by inferred target (for reference we also include the estimated gap for time spent alone). The analysis suggests that while men are less likely to report love across target-relevant social-time use, the gender gap in reported love is largest in the exclusive presence of children (b = -0.026, CI: [-0.039, -0.013], p < 0.001; relative gap of 41%) and smallest in the exclusive presence of a partner (b = -0.014, CI: [-0.026, -0.001], p = 0.04; relative gap of 23%). Presenting the comparison differently, conditional on reporting love, men are 28 percent more likely than women, controlling for demographics, to be spending time with a partner (b = 0.056, CI: [0.007, 0.106], *p* = 0.03), and 52 percent less likely to be spending time with children (b = -0.109, CI: [-

0.135, -0.082], $p < 0.001$). The heterogeneity in gap magnitude across inferred target parallels the pattern of covariate-adjusted gaps across marital/parental status, also reported in the table.

Explanations for the Gender Gap in Reported Love

Assuming observed gender differences in reported love reflect actual differences in experience (an assumption we engage in subsequent analyses), our data permit us to estimate the share of the average gender gap in love statistically attributable to systematic gender differences in time-use (e.g., women spending more time with children than men), differences in the likelihood of love given particular time-use (e.g., women experiencing love more often when with children than men), and the interaction of these two factors. We implement the decomposition of mean differences with a technique routinely used in other disciplines to disentangle the determinants of group-differences in wage, education and health outcomes (e.g., Oaxaca 1973; Neumark 1988). The procedure entails the use of linear regression models to predict counterfactual love (more specifically, demographic-adjusted participant-level residual love) for men, if men were to assume the average time-use of women (fixing the propensity to report love), to predict counterfactual love for men, if men were to assume the same propensity to report love given time-use as women (fixing time-use), and to predict counterfactual love when both time-use and propensity to report love given time-use change simultaneously (relative to the two other counterfactuals) (see SOM).

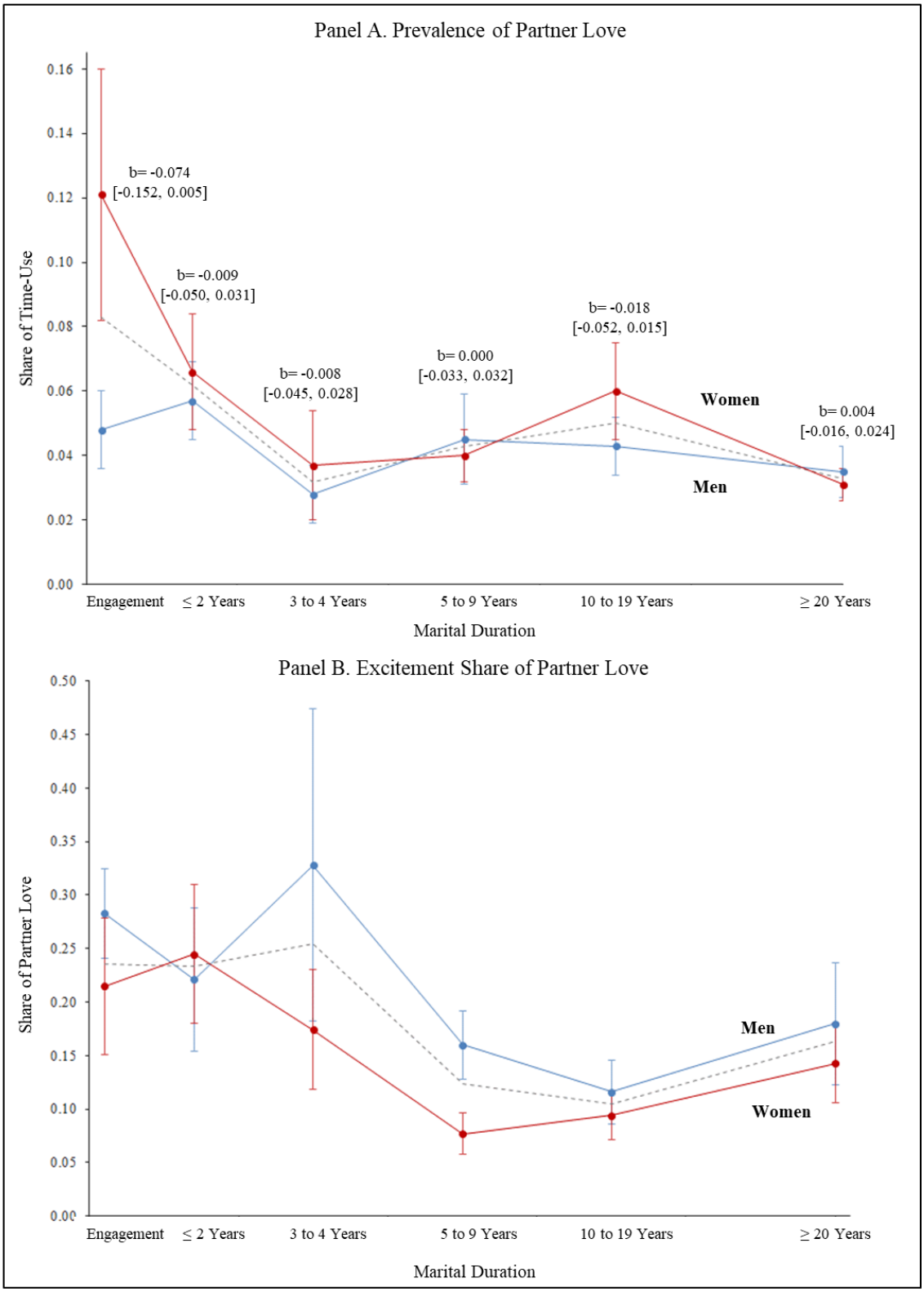
The decomposition indicates that the 0.0125 (CI: [0.006, 0.019], $p < 0.001$) male-female difference in average predicted residual love can be largely explained by gender differences in time-use coefficients (b = 0.009, CI: [0.003, 0.015], p = 0.01) and gender differences in the interaction of time-use and time-use coefficients (b = 0.006, CI: [0.002, 0.010], p = 0.01). Further inspection indicates that gender differences in experiences with children account for 79 percent of the predicted gender gap in love (i.e., gender differences in the child time-use coefficient explains 30 percent of the predicted gap (b = 0.004, CI: [0.001, 0.007], p = 0.02) while differences in the interaction between child time-use and child time-use coefficients explains an additional 49 percent of the gap (b = 0.006, CI: [0.001, 0.011], p = 0.02).

Long-Run Dynamics of Partner Love

Next, we examine the prevalence of partner love and its progression over the course of a relationship. We can generate insight into the long-run dynamics of partner love by comparing its prevalence across cohorts of marital duration. Accordingly, Figure 1, Panel A, plots the

Figure 1

Partner Love across Gender and Marital Cohorts (Study 1)



Notes: Panel A displays the average share of reported love, across half-hour periods in the exclusive presence of a partner, by gender and marital cohort (Study 1). Coefficient estimates refer to the average covariate-adjusted male-female difference in love for each cohort estimated from separate pooled regressions. 95% confidence intervals are reported in brackets. Panel B displays the average share of excited partner love by gender and marital cohort (Study 1). Error bars indicate +/- 1 standard error.

average love for married (and engaged) men and women in the exclusive presence of a partner across cohorts. The figure also reports the covariate-adjusted (excluding age and gender; including flexible controls for age) male-female gap in partner love for each cohort, estimated from separate pooled regressions. The figure conveys that while engaged women are more likely to report love in the presence of a partner than engaged men, married men and women do not meaningfully differ in partner love. Notably, across genders, love is reported 46 percent less frequently after 2 years of marriage relative to early marriage/engagement, $p = 0.004$. This difference in partner love is larger for women than men ($b = -0.039$, CI: [-0.085, 0.007], $p = 0.10$). Estimated separately by gender, partner love declines 58 percent for women ($p = 0.01$) across early and late marriage and 28 percent for men ($p = 0.15$).

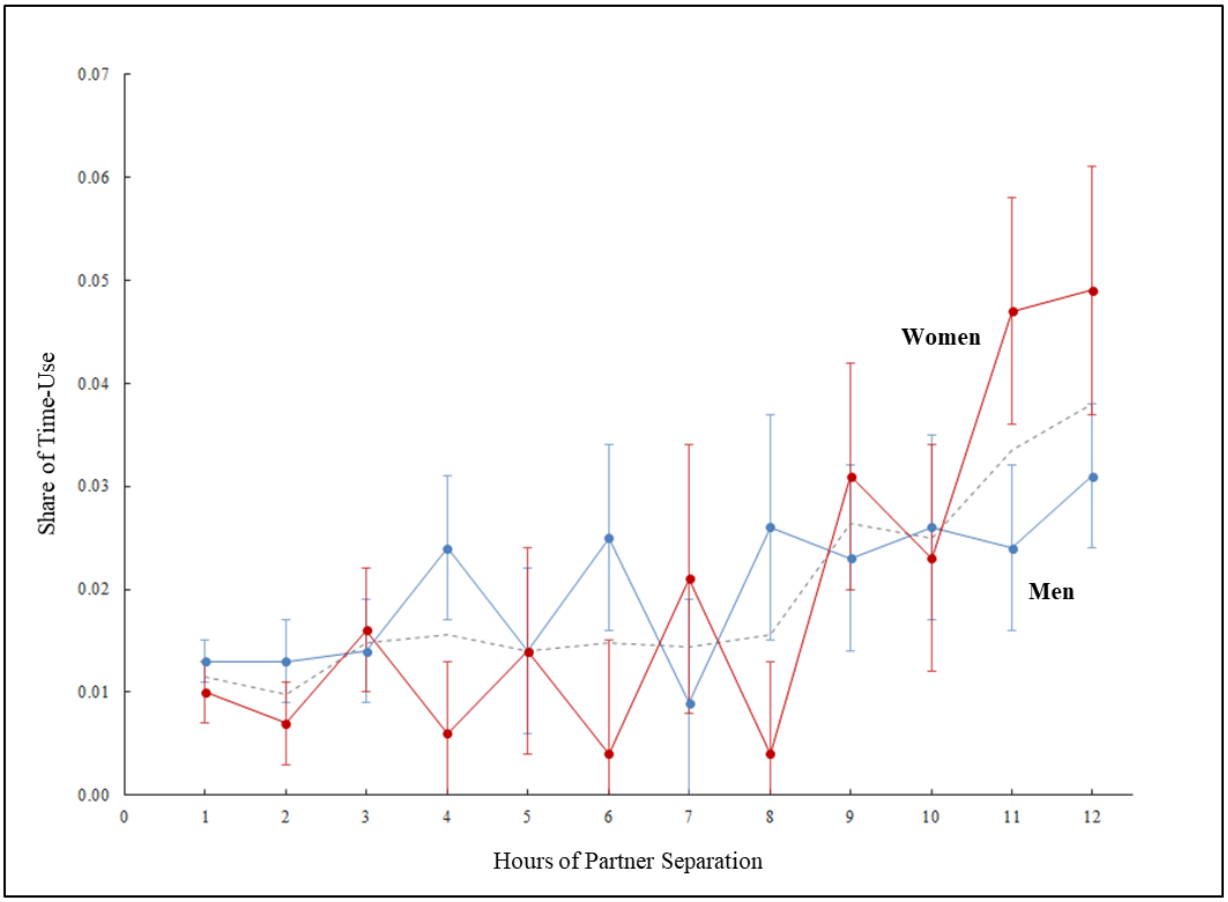
We can infer the presence of passionate partner love from the concurrence of love and excitement, an emotion often invoked in descriptions of passionate love. Overall, married/ engaged men exhibit a modestly greater, but not statistically distinguishable, share of excited partner love than women (0.18 versus 0.15, $p = 0.41$). The second panel of the figure tracks the reported share of partner love involving excitement across marital cohorts. As with overall love of partner, we observe a 41 percent decline in passionate partner love in later, relative to earlier marriage ($p = 0.01$). This difference is, once again, more pronounced for women than men (-47% versus -32%) though the difference is not statistically significant. Despite the decline over time, even later relational cohorts exhibit a non-trivial degree of (passionate) partner love.

Short-Run Dynamics of Partner Love

The structure of the data also permits us to test how love responds to changes in short-term relational dynamics, such as (temporal) separation from a partner. We implement this test among the married/engaged by assigning each partner interaction an hours-of-separation variable indicating the elapsed time since the most recent same-day partner interaction (we exclude the initial partner interaction each day and abandon the exclusive time-use restriction). This results in 27,008 non-zero partner separations across 2,224 married/engaged participants. We then calculate the residual likelihood of reported love for each partner interaction, after controlling for a participant's average propensity to report love. Figure 2 displays average residual partner love across hours of partner separation. The figure depicts elevated residual love after roughly 8 hours of separation. Regressions confirm this graphical intuition in revealing a 26 percent increase in

residual love after 8 hours of separation (b = 0.011, CI: [0.004, 0.019], p = 0.003), an increase directionally larger for women (37 percent) than men (15 percent), p = 0.15.

Figure 2
Residual Partner Love by Hours of Partner Separation (Study 1)



Notes: This figure displays the average share of within-subject residual love in the (potentially non-exclusive) presence of a partner by gender and hours of within-day partner separation for married/engaged participants (Study 1). The first partner interaction each day is excluded. Half-hour periods are rounded up to the nearest hour. Error bars indicate +/- 1 standard error.

Hedonic Returns to Love

Does love contribute to increased subjective well-being? We address this question by estimating the within-subject marginal return to love with respect to two in-the-moment measures of well-being, mood (1-5) and happiness (1,0). We implement this test through simple regressions of the form:

$$WB_{it} = \alpha + \varphi\ love_{it} + \boldsymbol{Z}\pi + +\boldsymbol{V}\rho + \delta_i + \epsilon_{it}$$

The estimate of interest, φ, captures the predicted marginal increase in well-being, WB_{it}, in the presence of love for participant *i* at time *t*, after controlling for a participant's average willingness

to report love over the panel, and vectors that flexibly control for social time-use, **Z**, and specific emotions (excluding happiness), **V**. The estimates suggest a substantial marginal increase in average mood (b = 0.24, CI= [0.22, 0.27], p < 0.001) and an 18.8 percent increase in the likelihood of happiness (CI: [0.173, 0.204], p < 0.001) in the presence of love. We find no significant difference between men and women in the marginal return to love for either measure of well-being.

Differential Reporting of Emotion by Gender

Finally, we explore the possibility that gender differences in reported love may not reflect differences in emotional experience but instead reflect systematic gender differences in the willingness to report experienced emotion. We address potential bias due to differential reporting by estimating the gender gap under varying assumptions about the hypothesized nature of such selection. For example, if one assumes no gender selection in reported love conditioned on participants reporting *any* emotion, the unbiased estimate of the gender gap, conditioned on any emotional expression is: $E(love^{men} | \boldsymbol{X}, emotion) - E(love^{women} | \boldsymbol{X}, emotion) = -0.014$ (CI: [-0.020, -0.007], p < 0.001). Alternatively, if one were to assume an absence of gender selection only conditioned on the expression of a positive emotion, the unbiased gap estimate, conditioned on positive emotional expression, is -0.016 (CI: [-0.022, -0.009], p < 0.001). Finally, we can restrict the sample to participants reporting at least one instance of love during the study period; doing so leads to a gap of -0.014, (CI: [-0.025, -0.002], p = 0.03). The similarity of these conditional and restricted estimates with our baseline estimate of -0.013 (Table 2), and the modest gender differences in overall emotional expression (men: 0.71, women: 0.70) and positive emotion expression (men: 0.49, women: 0.46) is consistent with the absence of significant differential reporting of love by gender.

Study 2

Study 2 was designed to provide insight into gender differences in love, across explicitly differentiated target and type, from a large, naturalistic, online sample (see SOM).

Methods

Participants

The second study was administered to a representative population of online US users in 2014 via Google Surveys, a market-research product deploying short surveys as an alternative to

paywalls for thousands of online websites. Our survey included five questions of which the first was a screening question that asked whether the individual had recently experienced any of four emotions, including love. Of the 25,354 individuals exposed to the screening question, 7,255 chose to answer the question and 778 participants reported a recent experience of love, thereby qualifying them to proceed through the remaining survey questions (for those providing an alternative answer or no answer, the survey ended). Of qualified respondents, 508 completed all five survey questions. Among respondents with complete surveys, for whom we observe self-reported gender, marital status, and parental status, 45 percent were men, 65 percent had children, and 64 percent were married. Google also provided demographic data for a majority of the 25,354 exposed to the initial question, including gender for 66 percent of the sample.

Procedure

The initial screening question specifically asked participants to identify which, if any, of four emotions they experienced during the last one-hour from a menu with two positive and two negative emotions: Worry, love, excitement, and anger (and a none-of-the-above option; order of emotions was randomized). These emotions were of roughly equal prevalence based on Study 1 data. Those who responded with love proceeded to a second question asking whether their love was directed towards a romantic partner, child, another family member, or a place or thing, followed by a third question asking whether the love was best described as love of companionship, passion, or caregiving. The final two questions asked the respondent to self-report gender and marital/parental status.

Results

Overall Prevalence and Gender Gap

The data offers two measures of prevalence—3.1% of the 25,354 individuals exposed to the first question reported feeling love during the prior hour while, among the 7,255 who answered the first question, 10.7% reported love. Perhaps more instructively, the male-female difference of 4.3% (men: 10.1%, women: 14.4%, $p < 0.001$) among first-question respondents for whom gender was inferred suggests that men experienced love 30% less often than women. Adjusting responses by inferred age and region yields a similar gap in love of 31% ($p < 0.001$).

Gender Gap by Love Target and Love Type

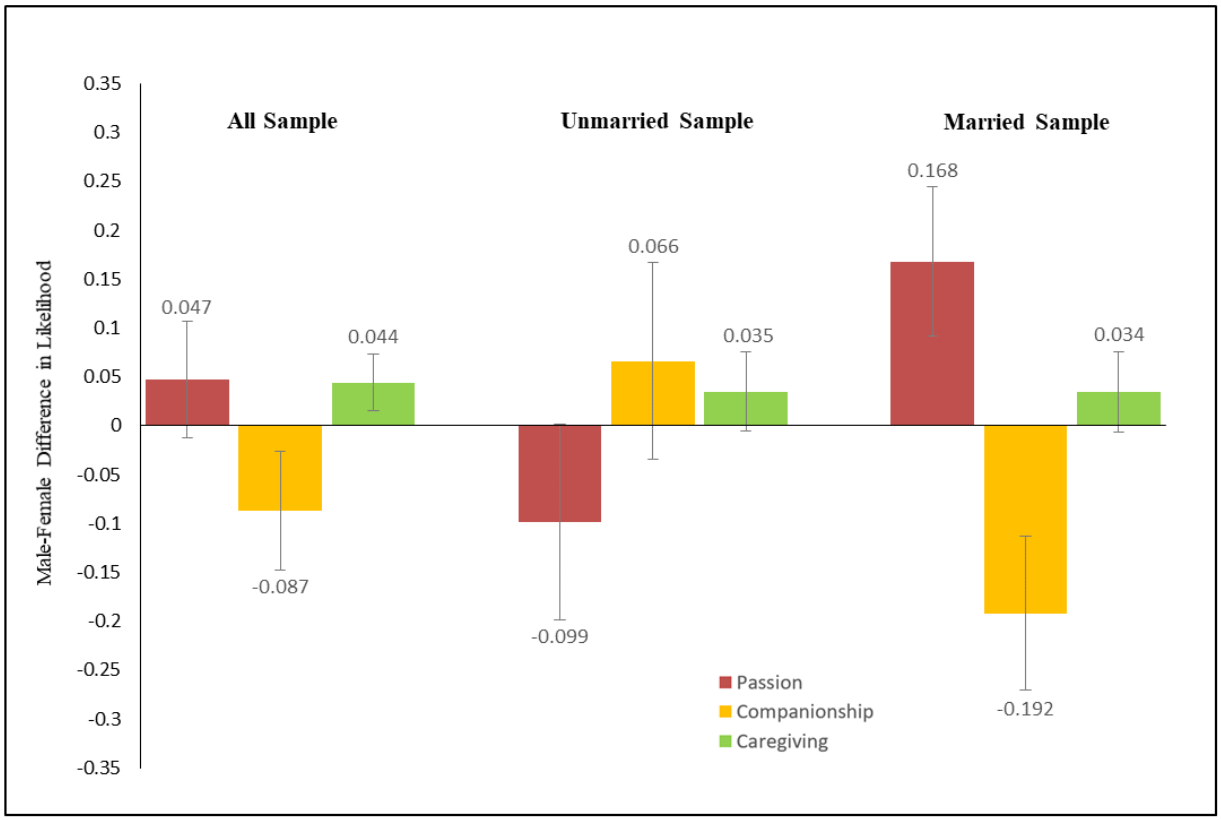
As a first strategy for estimating the gender gap in love by target, we compare responses to the screening question using data on gender from Google. The data reveals a male-female deficit of -9% for partner love ($p = 0.49$), a -44% gap for child love ($p = 0.01$), and a -38% gap for family love ($p = 0.16$). As a second strategy for estimating relative gender differences in love by target—permitting us to explicitly control for marital and parental status, age, income, and time-of-day—we estimate the differential likelihood across self-reported gender that reported love is directed towards a particular target. The results indicate men are 25 percent more likely direct their love towards a romantic partner than women ($b = 0.119$, CI: [0.029, 0.210], $p = 0.01$) and 46 percent less likely to direct it towards a child ($b = -0.127$, CI: [-0.198, -0.056], $p < 0.001$).

An additional aim of Study 2 was to clarify how men and women characterize partner love overall and across relationship status. The data indicates that men and women are equally likely to characterize partner love as passionate (men: 42%, women: 41%, $p = 0.93$), while men, relative to women, are directionally less likely to view partner love as companionate (men: 47%, women: 52%, $p = 0.37$) and modestly more likely to view love of their partner as caregiving (men: 8%, women: 3%, $p = 0.07$). Figure 3 summarizes the interaction between gender, marriage, and characterization of partner love by displaying covariate-adjusted difference in the likelihood that men, relative to women, characterize their partner love as either passionate, companionate, or caregiving.

The analysis implies that while unmarried men relative to unmarried women, are directionally, but not significantly, less likely to characterize their love as passionate, married men are significantly more likely than married women to view their love of partner as passionate ($b = 0.168$, CI: [0.019, 0.318], $p = 0.03$) and less likely to see it as companionate ($b = -0.192$, CI: [-0.348, -0.036], $p = 0.02$). The interaction between gender and marital status in passion is large and significant, as estimated from a separate pooled regression ($b = 0.298$, CI: [0.058, 0.538], $p = 0.02$). This appears driven by the 55 percent reduction in female passion associated with marriage ($b = -0.330$, CI: [-0.511, -0.148], $p = 0.00$), compared to the non-significant 23 percent reduction in male passion associated with marriage ($b = -0.104$, CI: [-0.311, 0.103], $p = 0.32$).

Figure 3

Male-Female Difference in Characterization of Partner Love by Marital Status (Study 2)



Notes: This figure displays the estimated difference with which men relative to women characterize partner love across marital status (Study 2). Each estimate is generated from a separate regression of love type (passion, companionship, caregiving) on an indicator for gender and a vector of covariates including marital status (first set of regressions only), parental status, inferred age, inferred income, and time-of-day. Bars indicate +/- 1 standard error.

General Discussion

Across two studies offering exceptional detail on time-use, emotion and well-being, we provide new data on the prevalence of love, its situational correlates, short- and long-run dynamics, and its hedonic returns. Our first contribution is to estimate the prevalence of love from a large-scale, high-compliance, experience sample of time-use and emotion. These data reveal that love is rare, relative to other emotions, but pervasive across demographic backgrounds, supporting assertions as to its universality (e.g., Jankowiak and Fischer 1992). (Strikingly, its prevalence is extremely high among poor and black participants, even after controlling for covariates—a result suggesting some socio-cultural variability in experience/expression). While men are less likely to report love than women, the gender difference varies by the inferred target of love, with larger differences in child and family/friend

love and smaller differences in partner love. Indeed, among the married, we find no significant gender gap in partner love. A second experience sample yields a gender gap of near-identical magnitude to the first and also indicates an insignificant gender gap in partner love.

Our second contribution is to offer a potential explanation for observed (gender) differences in love. In the primary data, 69 percent of overall variation in love can be explained by within- rather than between-participant variability, alluding to the importance of situational context. A decomposition of the overall gender difference in love into differences in time-use and love associated with such time-use suggests that 79 percent of the gender gap can be statistically explained by systematic gender differences in experiences with children—resulting from both differences in time-spent with children and differences in love experienced while in their company. While a strict causal interpretation requires strong assumptions (see SOM), the magnitude of these partial correlations is consistent with children playing an outsized role in explaining the gap (a possibility also reflected in the smaller gap among those without children).

Why are women more likely to report love when with children than men? One possibility is that such differences emerge from systematic differences in the nature or quality of time-use. Comparing the most common activities undertaken by men (talk: 0.29; eat/drink: 0.21; relax: 0.18; chore: 0.13) and women (talk: 0.34; eat/drink: 0.22; chore: 0.18; relax: 0.15) with children, however, doesn't allude to meaningful disparity. Another possibility is that men and women differ in their conceptualization of child love or their willingness to report it. While we cannot rule this out, we note that men are actually more likely than women to report any positive emotion when with children ($p < 0.001$). One is left to speculate that the greater propensity of women to report child love is either due to unobserved differences in the quality/nature of time-use, definitional differences relating to children, or innate/learned differences in the propensity to experience such love (see Buss 2019).

Our third contribution is to produce the first empirical estimates of the hedonic returns to love from longitudinal, in-the-moment, data. We find that within-participant variation in love, after controlling for detailed time-use and the presence of other emotions, substantially predicts variation in two measures of well-being, mood and happiness. The marginal increase in well-being predicted from the presence of love is larger than all but one other positive emotion and is statistically indistinguishable across gender. To contextualize the size of the effect, we estimate that the hedonic return to love is roughly double the difference in well-being between a typical

Saturday and Tuesday (the happiest and least-happiest days of the week). The pronounced influence of love on contemporaneous well-being is consistent with research asserting the functional importance of love for health, self-esteem, and longevity (e.g., see Levin 2022).

Finally, we present new evidence explicating the nature and dynamics of partner love. Overall we find striking similarities in the expression and conceptualization of partner love across gender. Beyond a small gender difference in partner love (and no gender difference among the married), we find that men and women characterize their partner love with comparable degrees of passion (both studies) and companionship (Study 2). In the short-run, the evidence supports the proverbial belief that (temporal) distance makes the heart grow fonder as both men and women report elevated love for their partner after lengthy separations. In the long-run, we affirm popular assertions in finding a diminution in partner love and (inferred) passion across relationship cohorts (Study 1) and marital status (Study 2) (e.g., see Carswell and Impett 2021; Berscheid 2010). Such cohort comparisons likely understate the decline in love due to survivorship bias, i.e., if divorce is more likely among those reporting less love/passion.

The implied decline in partner love over relational time masks a potentially informative gender difference, however. Across studies, the decline in partner love appears more severe for women than for men. An intriguing possibility is that this difference in trajectory may once again have to do with children—for example, if (passionate) partner love, among men, is elevated in the presence of children (either because such love leads to a couple to have children or because such children shift male perceptions of their partner) but not women. This conjecture finds support in Study 2, where, among men, children predict a 54 percent marginal increase in passionate partner love ($p = 0.08$) and strongly mediate the association between marriage and passion (for women, children do not affect partner love).

Across studies, our investigation provides an empirical account of a highly functional, situationally dependent, culturally pervasive, and adaptive emotion that seemingly helps to facilitate and sustain relationships and strongly contributes to well-being (consistent with Frank, 1988; Gonzaga et al., 2001; Berscheid & Ammazzalorso, 2001; Tooby & Cosmides, 2005). In arguable contrast to the differences suggested by other theory and popular characterizations (e.g., Gray, 1992), this evidence points to a largely similar experience of love, particularly partner love, across gender. The differences we do find—e.g., the trajectory of partner love over time and the effect of children on both child love and possibly partner love—may also reflect

differences in the functional role of men and women in relationships and in parenthood. Lastly, our analyses emphasize the usefulness of clear and differential empirical predictions as to the correlates, dynamics, and consequences of love for adjudicating between existing theories. For example, one could leverage estimates of between- and within-participant variation to test the plausibility of individual-difference based theories of love (e.g., attachment theory) if such models were more formally parametrized. And the documented gender difference in partner love trajectory should, in principle, be useful for distinguishing between models of partner love.

Conclusion and Limits

We note three limits to our findings. First, individuals likely differ in their definition or conceptualization of love and these differences may be correlated with gender. While any field investigation of emotion must contend with this challenge, we are reassured by research arguing that the conceptualization of love shows little difference across gender (Fehr & Broughton, 2001) and by the similarity of our estimates across distinct representations of emotion (pictorial labels and text). Second, gender differences in willingness to report emotion may confound estimates of gender differences in experienced emotion. Our data permits us to stress-test the sensitivity of gender gap estimates to bias emerging from specific models of gender-based selection. The similarity between our baseline estimates and estimates conditional on the expression of other (positive) emotion does not suggest meaningful bias due to differential reporting. However, we cannot rule out such bias definitively. If men are less likely to report love than women (the intuitive direction of bias), the true gender gap in love may be even smaller than we estimate.

Finally, given the absence of explicit, or naturally occurring, randomization, causal interpretation of the potential causes, dynamics, and consequences of love rely on statistical and theoretical assumptions (see SOM). For example, conclusions about the long-term dynamics of partner love assume the absence of systematic differences in unobserved features across cohorts correlated with love. Even absent such confounds, the comparisons may underestimate the decline in love/passion due to survivorship bias. And while causal interpretation of short-run dynamics and hedonic returns may rest on more plausible assumptions, due to the high-frequency of the data, such interpretation still rests on assumptions about the direction of causation and the conceptual relationship between love, behavior, and well-being (e.g., an exogenous surge of love might prompt a parent to spend more time with children rather than the child prompting feelings of parental love).

Authorship Contributions

Saurabh Bhargava conceptualized the research, analyzed the data, and wrote/edited/approved the draft. Karim K. Kassam conceptualized the research and edited/approved the draft.

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