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Are Changes in Marital Satisfaction Sustained and Steady, or Sporadic and Dramatic?

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Although prominent theories of intimate relationships, and couples themselves, often conceive of relationships as fluctuating widely in their degree of closeness, longitudinal studies generally describe partners' satisfaction as stable and continuous or as steadily declining over time. The increasing use of *group-based trajectory models* (GBTMs) to identify distinct classes of change has reinforced this characterization, but these models fail to account for individual differences within classes and within-person variability across classes and may thus misrepresent how couples' satisfaction changes. The goal of the current analyses was to determine whether accounting for these additional sources of variance through growth mixture models (GMMs) alters characterizations of satisfaction changes over time. Applied to longitudinal data from 12 independent studies of first-married couples (combined N = 1,249 couples), GMMs that allowed for class-specific individual differences and within-person variability fit the data better than the GBTMs that constrained these to be equal across classes. Most notably, considerable within-person variability was evident within each class, consistent with the idea that spouses do indeed fluctuate in their satisfaction. Spouses who dissolved their marriages were 3.8–5.7 times more likely to be in classes characterized by greater volatility in satisfaction. Because the early years of marriage appear to be characterized by within-person fluctuations in satisfaction, time-varying correlates of these fluctuations are likely to be at least as important as time-invariant correlates in explaining why some marriages thrive where others falter.

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The data are available at https://osf.io/8dwu7/?view_only=7c7bd2d0a504499084752844b6569216.

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Public Significance Statement
Efforts to explain how initially satisfying marriages change have assumed that, for most couples, initially high satisfaction either remains stable or declines steadily. We use a new statistical approach to demonstrate that, contrary to this view, (a) for most newlyweds, satisfaction fluctuates substantially over the first few years of marriage; (b) for some couples, the decision to divorce is unrelated to average levels or linear declines in satisfaction; and (c) compared to individuals with intact marriages, individuals whose marriages dissolved in the first few years of marriage were likely to show greater volatility in their satisfaction. Thus, efforts to promote stronger relationships will likely benefit from devoting greater attention to factors that generate fluctuations in satisfaction (e.g., stress and changing life circumstances), more so than aspects of the relationship that are known to be relatively stable and immutable (e.g., partners' personality traits and communication patterns).

Keywords: marital satisfaction, marital dissolution, newlywed couples, group-based trajectory models, growth mixture modeling

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Intimate relationships change over time, and the nature of this change has important implications for the health of partners and their children (e.g., Thomas et al., 2017). Accordingly, describing how relationships change, and particularly how judgments of relationship satisfaction change, has been a perennial focus of relationship science (e.g., Bühler et al., 2021; Karney & Bradbury, 1995). While anecdotes and theoretical perspectives (e.g., Hazan & Shaver, 1987; Kelley & Thibaut, 1978) suggest that marriage is full of ups and downs, longitudinal studies describe satisfaction almost exclusively in terms of stability or steady declines (e.g., Lavner & Bradbury, 2010). The goal of the present study is to reconcile these discrepant descriptions of change in marital satisfaction by testing whether classification methods that acknowledge *within-person variability*, or fluctuating high and low points, and *within-class heterogeneity*, or individual differences within subgroups, result in descriptions of change that are better aligned with theories emphasizing fluctuating experiences of satisfaction.

Theoretical and Empirical Investigations of Relationship Development

Seminal theories of relationship development all recognize that, as couples respond to each other and to pressures outside their relationship, their satisfaction will fluctuate accordingly. Attachment perspectives (Hazan & Shaver, 1987), for example, note that, although internal working models of intimacy are relatively stable, their impact on partners' evaluations of the relationship varies depending on specific contexts and challenges faced by the couple (e.g., Campbell & Marshall, 2011). The vulnerability–stress–adaptation model (Karney & Bradbury, 1995) and its extensions (e.g., McNulty et al., 2021) similarly propose that satisfaction at any one time is the direct result of partners' experiences interacting with each other. To the extent that those interactions are affected by temporary circumstances (e.g., transition to parenthood) and partners' reactivity to external conditions (e.g., acute stressors), satisfaction should be characterized by varying degrees of within-person variability (e.g., Neff & Karney, 2007, 2009).

There is suggestive evidence that relationship satisfaction does fluctuate, at least across short timescales. Diary studies reveal that satisfaction and commitment fluctuate in response to time-varying stress (Neff & Karney, 2009), sexual satisfaction (Birnbaum et al., 2006; Zhao et al., 2022), and financial strain (Gajos et al., 2022), with individuals who report lower levels of attachment security and trust (Campbell et al., 2005, 2010; Campbell & Marshall, 2011; Cooper et al., 2018) and higher levels of stress (Zhao et al., 2022) showing greater volatility in their daily and weekly satisfaction ratings. Further, larger fluctuations in satisfaction and commitment have been related to depression (Whitton & Whisman, 2010) and relationship dissolution in dating couples (Arriaga, 2001), over and above initial levels and slopes. Yet, despite prolonged interest and this growing body of empirical work, it is unclear whether fluctuations across longer timescales (e.g., semiannually) are an integral aspect of long term, committed relationships such as marriage. Longer term dating relationships and marriages, compared to shorter term relationships, show less volatility in satisfaction across short timescales (i.e., days, weeks; Gajos et al., 2022; Totenhagen et al., 2016), and over longer timescales (i.e., semiannually), fluctuations have not been examined as antecedents of relationship dissolution in long-term partnerships (cf. Knopp et al., 2014). Thus, there is now a need for empirical work evaluating whether within-person variability is a discerning characteristic related to the healthy functioning of relationships across longer timescales.

Raquael J. Joiner

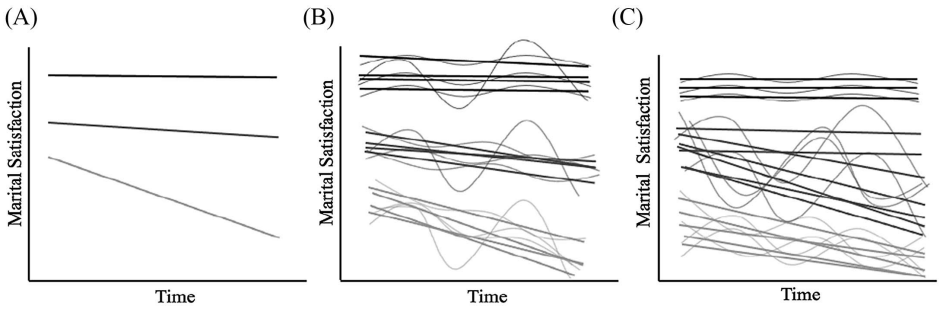
Group-Based Trajectory Models of Relationship Satisfaction

Although within-person variability has gained traction in short-term diary studies of relationship change, a parallel body of research utilizing group-based trajectory models (GBTMs; Sterba, 2013) fundamentally overlooks within-person variability and instead describes satisfaction change as either stable or declining steadily. Studies employing GBTMs to newlyweds' satisfaction data identify at least three classes of satisfaction change (see Figure 1A): (a) a class with a moderately high intercept and modest declines (cf. Anderson et al., 2010), (b) a less-populated class with a low intercept and steep declines, and (c) the most-populated class with a very high intercept and little if any subsequent change (see Proulx et al., 2017). The consistency of these patterns across studies supports the notion that, "For most couples, satisfaction does not decline over time but in fact remains relatively stable for long periods" (Karney & Bradbury, 2020, p. 110), and suggests that when satisfaction does change, it shows steady declines, albeit to different degrees depending on initial levels of satisfaction.

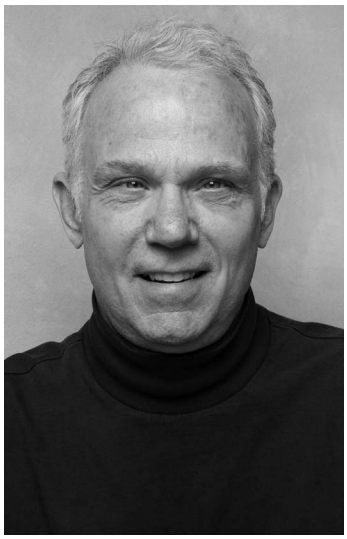
Critically, GBTMs are exploratory approaches in which resulting empirical descriptions can be highly influenced by imposed modeling constraints (Diallo et al., 2016; Infurna & Luthar, 2016). To date, most studies using GBTMs focus exclusively on differences in group-level mean trajectories (Figure 1A). By focusing on differences in group-level mean trajectories, these studies overlook (a) individual differences within subgroups, or *within-class heterogeneity* (Figure 1B) and (b) potential differences in the magnitude of with-class heterogeneity and within-person variability within each subgroup (see Figure 1C). Neither of these constraints is necessary, as *growth mixture models* (GMM; Grimm et al., 2017) are sophisticated GBTMs that can estimate class-specific within-class heterogeneity and within-person variability. To date, however, studies that have employed GMMs to study satisfaction changes continue to constrain the amount of within-class heterogeneity and within-person variability to be equal across subgroups (e.g., Lorber et al., 2015; Su et al., 2023). These equality constraints are common for two reasons. First, these are the default specifications for GMMs in Mplus (L. K. Muthén & Muthén, 2017). Second, such model constraints are often imposed for practical reasons (i.e., small sample size and convergence issues; McNeish & Harring, 2021).

Figure 1

Different Assumptions Underlying Group-Based Trajectory Modeling of Marital Satisfaction



Note. These three panels each depict three classes of hypothetical individuals grouped on the basis of their repeated self-reports of marital satisfaction. Panels A and B depict assumptions of the prevailing modeling approaches: Panel A shows that individuals within each class are assumed to follow the exact same developmental course (i.e., Nagin model or semiparametric group-based trajectory approach assuming no between-person heterogeneity within a class), and Panel B shows that the three classes are assumed to be equal in their amount of between-person heterogeneity and within-person variability (i.e., upward and downward fluctuations). Panel C reflects the assumptions adopted in the present analysis, in which within-class heterogeneity and within-person variability in satisfaction trajectories are allowed within each class and allowed to differ between classes.



Thomas N. Bradbury

Before accepting characterizations of satisfaction change that emerge from applying constrained GBTMs, it is important to know if and how the picture changes when those constraints are released. If models that account for these types of variability produce the same trajectory classes in the same proportions, that would suggest that stable and steady change processes prevail, and that while fluctuations are pervasive at shorter timescales, they may be a less distinguishing characteristic of marital satisfaction change at longer timescales. Much like a galvanic skin response to stress is detectable across seconds but not days, individuals' day-to-day evaluations of their relationships may be context dependent, but global evaluations across months and years may not be as volatile (Hertzog & Nesselroade, 2003). However, if accounting for these additional types of variability yields groups that vary in their relative degree of within-class heterogeneity and within-person variability, this would (a) bridge research on fluctuations at shorter timescales with empirical work that utilizes categorization methods across longer timescales and (b) raise the possibility that variability in satisfaction, perhaps more so than average levels or slopes, is a key indicator of the health of relationships of any duration.

Permitting these sources of variability also offers the opportunity to reexamine and potentially clarify associations between satisfaction and marital dissolution. Longitudinal studies of married couples have long observed that linear declines in satisfaction are associated with subsequent dissolution (e.g., Huston et al., 2001; Karney & Bradbury, 1997). Although results from studies using GBTMs are mostly aligned with these findings (i.e., classes characterized by greater declines in satisfaction have higher dissolution rates than classes characterized by high and stable satisfaction trajectories; e.g., Birditt et al., 2012; Lavner & Bradbury, 2010), results from GBTMs have also complicated the association between satisfaction trajectories and dissolution in two ways. First, even in highly satisfied classes, rates of dissolution are not zero, suggesting that even highly satisfied spouses sometimes choose to end their marriage. It is unclear, however, whether within each class there are significant differences in the satisfaction trajectories of spouses whose marriages dissolve versus those whose marriages remain intact. Additionally, associations between satisfaction and dissolution may differ across classes, either in degree (e.g., satisfaction slopes being more strongly associated with dissolution in some classes than in others) or in kind (i.e., different parameters of the satisfaction trajectory may be associated with dissolution for different classes). To date, research using constrained GBTMs has not been able to address these possibilities. Second, whereas most prior research has conducted post hoc comparisons in rates of dissolution across classes (e.g., Lavner & Bradbury, 2010), when marital dissolution is instead treated as a covariate of class membership, results from GBTMs vary depending on whether dissolution is excluded or included (Kanter et al., 2019). Specifically, class-membership proportions shift, with spouses showing greater fluctuations in satisfaction being more likely to be recategorized into different classes. By acknowledging within-class heterogeneity and potential class differences in within-class heterogeneity and within-person variability, our method overcomes limitations of prior work by directly examining (a) the association between dissolution and satisfaction changes within each class and (b) whether class differences in within-person variability relate to differential rates of dissolution.

The Present Study

The present study uses longitudinal data from 1,249 first-married newlywed couples to evaluate whether accounting for additional sources of variability in marital satisfaction trajectory classes reconciles discrepant theoretical and empirical accounts of how satisfaction changes. We first conducted replication analyses using the most commonly applied GBTM. Then, using GMMs, we tested three preregistered hypotheses:

Hypothesis 1: The GMM allowing for class differences in within-class heterogeneity and within-person variability will fit the data better than models in which these sources of variability are assumed to be equal across classes.

Hypothesis 2: The GMM will produce a 3-class solution: (a) a group with a stable, high mean satisfaction trajectory and minimal within-group heterogeneity and within-person variability; (b) a group with a medium-high, minimal decline mean trajectory group and moderate within-group heterogeneity and within-person variability; and (c) a group with a low, steeply declining mean trajectory and moderate within-group heterogeneity and within-person variability.

Justin A. Lavner

Hypothesis 3: The results from the GMM will challenge the notion that most spouses show high, stable trajectories of satisfaction across the first years of marriage.

Additional analyses that were not preregistered examined the association between class membership and dissolution and, within each class, the association between dissolution and specific parameters of the satisfaction trajectory (e.g., intercepts). Further, in exploratory analyses that are presented in the online Supplemental Materials, we examined demographic variables (e.g., income, premarital relationship length) as covariates of class membership.

Method

Transparency in Data, Analysis, and Materials

Sample size was determined based on simulation work by Kim (2012). De-identified data and analytic code on which the present conclusions are based are publicly accessible at https://tinyurl.com/4j75t9c8. We follow Journal Article Reporting Standards for Quantitative research (Appelbaum et al., 2018). Preregistered study hypotheses and analytic plans can be found at https://osf.io/6twy7. Given that questionnaires differed across studies and materials were not digitized for all studies, measures described below are not available online.

Participants

Twelve longitudinal studies conducted in the Western, Southern, and Midwestern regions of the United States included data on 1,342 newlywed couples. From this sample, we dropped three same-sex couples due to underrepresentation within the sample, 70 couples because at least one partner was not first-married, and 20 couples because their marital status was missing at the conclusion of the study. Table 1 describes the demographic characteristics of the remaining 1,249 couples.

Procedure

Data collection for each project received approval from their respective institution's internal review board. All studies used a longitudinal design. Couples were contacted by telephone or email prior to each assessment and either emailed or mailed questionnaires along with postage-paid return envelopes and a letter reminding partners to complete forms independently. In some studies, couples were asked to bring completed questionnaires with them to the laboratory, where they engaged in a variety of tasks beyond the scope of the present analyses. In 10 studies, couples provided data every 6 months across the first 4 years of marriage. In two studies, couples were assessed every 4 months, but only waves at the yearly interval (i.e., waves that overlapped with the other studies) were used in the present analyses. Thus, spouses could have participated in a maximum of three to eight biannual assessments (M = 6.7 waves). Table S1 in the online

Table 1
Sample Characteristics

Sample characteristic	Wives	Husbands
N	1,249	
Mean age (*SD*)	25.63 (4.53)	26.99 (4.89)
Mean premarital relationship length (*SD*)	3.76 (2.69)	3.72 (2.64)
% Parents	27.86%	27.62%
% Dissolved marriages	14.65%	
Annual income		
<$10,000	37.47%	26.90%
$10,001–$20,000	19.78%	21.14%
$20,001–$30,000	15.85%	18.01%
$30,001–$40,000	10.65%	11.37%
$40,001–$50,000	6.49%	8.01%
>$50,001	6.08%	12.09%
Education level[a]		
High school	4.96%	8.01%
Some college/associates/vocational training	16.33%	17.77%
Bachelor's degree	37.39%	33.55%
Post college	38.51%	37.23%
Graduate/medical/law	1.84%	1.68%
Race[b]		
White	72.78%	74.06%
Black/African American	8.65%	8.49%
Hispanic/Latinx	7.21%	6.97%
Asian	3.20%	2.16%
Other	7.13%	7.37%

Note. *N* represents sample size. Age and premarital relationship length are measured in years.
[a] Education was harmonized across studies by recoding the number of years of education in some studies to represent categorical levels of education that were found in other studies. [b] Two studies coded race using "White" and "other categories," and one study coded race using "White," "Black," and "other." As such, Black/African American, Hispanic/Latinx, and Asian race categories are crude approximations based on the availability of information across studies.

Andrea L. Meltzer

Supplemental Materials summarizes recruitment strategies, eligibility criteria, participant compensation, location, and timespan for each study.

Measures

Marital Satisfaction

Spouses' global sentiments toward their marriage were assessed using six items from the semantic differential (SMD; Fincham & Bradbury, 1987). Spouses rated their relationship on 7-point scale of opposing adjectives (e.g., bad–good). Summed, these items yield scores ranging from 6 to 42, with higher scores indicating greater satisfaction. Across studies, coefficient α for wives and husbands exceeded .84 and .87 at every time point.

Dissolution

Dissolution was measured using a binary item (0 = *no*, 1 = *yes*), reflecting whether the couple legally separated or divorced; 14.65% of the total sample (n = 183 couples) had dissolved their marriage by the conclusion of the study.

Analytic Strategy

To evaluate within-class heterogeneity and within-person variability in marital satisfaction trajectories, we fit a series of increasingly complex GBTMs to wives' and husbands' data (see online Supplemental Materials, for equations). Best fitting models were chosen by (a) evaluating fit statistics across models (i.e., Bayesian information criterion [BIC]; see Nylund et al., 2007, and Vuong–Lo–Mendell–Rubin, Lo–Mendell–Rubin adjusted, and parametric bootstrapped likelihood ratio tests; see Grimm et al., 2017), (b) model convergence, and (c) the number of individuals falling into each of the classes, such that solutions in which a class contained less than 3% of the sample (n < 37) were considered as less likely to be replicable and thus not a viable solution. All models were fit using Mplus Version 8 (L. K. Muthén & Muthén, 2017). Missing data were assumed missing at random and accommodated using full-information maximum likelihood with robust standard errors. Plots were created in Statistical Analysis System OnDemand for Academics.

To replicate previous findings, we fit the most commonly used GBTM to wives' and husbands' data—*latent class growth models* (i.e., LCGMs). LCGMs are a semiparametric group-based mixture model in which the parameters defining the shape of the trajectory are free to vary across classes, and the optimal number of classes and proportion of the sample belonging to each class are derived from the data (Nagin, 1999). After selecting the best fitting models for each spouse, dissolution was incorporated into the model as a covariate of class membership.

Next, we fit GMMs to wives' and husbands' satisfaction data. As in the LCGMs, parameters defining the shape of the trajectory are free to vary across classes, and the optimal number of classes and proportion of the sample belonging to each class are derived from the data. GMMs, however, allow for an examination of the magnitude of individual differences in intercepts and slopes within a class, as well as class differences in the magnitude of within-class heterogeneity and the magnitude of within-person variability within each class.

Following Grimm et al. (2017), we first fit baseline latent growth models (M1 models) to the full data set, separately for wives and husbands—assessing no change, linear, quadratic, and latent basis change (i.e., nonparametric) models. Next, separately for wives and husbands, we estimated a series of GMMs with 2–4 classes, with each class differing in terms of the (a) mean (M2 models); (b) mean and covariance structure (M3 models); and (c) mean, covariance structure, and residual variances (M4 models). We expected the M4 models would provide the best fit to spouses' data (Hypothesis 1) with a 3-class solution (Hypothesis 2), and we expected within-class variances of the growth parameters and residual variance to be significant in each class such that the majority of participants would not show uniformly high and stable satisfaction trajectories across the early years of marriage (Hypothesis 3).

After selecting the best fitting models, dissolution was included in the GMMs as a covariate of class membership and the growth parameters within each class to respectively examine associations between dissolution and class membership and, within each class, differences in growth parameters (e.g., intercept, slopes) among spouses with intact versus dissolved marriages.

James K. McNulty

Results

Out of 8,592 possible observations, wives and husbands, respectively, provided 7,015 and 6,880 observations (82% and 80% completion rates). With regard to the proportion of within-person versus between-person variation, intraclass correlations indicated that 51.1% and 56.1% of the variation in satisfaction for wives and husbands came from between-person variation—suggesting that approximately half the variance in satisfaction was within person. Plotting wives' and husbands' satisfaction trajectories revealed notable ceiling effects and wide heterogeneity in satisfaction changes (see Supplemental Figure S1). In order to replicate prior findings most closely, we present results from LCGMs that do not take the observed ceiling effects into account. We also fit LCGMs that accounted for ceiling effects by using the "Censored" command in Mplus (L. K. Muthén & Muthén, 2017). In short, when accounting for ceiling effects in our LCGMs, a larger number of classes were found for both spouses, and there were subgroups of wives and husbands who showed significant increases in satisfaction. Additional information regarding these results can be found in the online Supplemental Materials.

Latent Class Growth Models

Fit statistics suggested that 4- and 3-class solutions provided the best fit to wives' and husbands' data (see Supplemental Table S2). Although spouses differed in the number of estimated classes, the mean trajectories for each class and class-membership proportions were similar (see Figure 2A). Consistent with prior studies using this approach, the largest class for wives (64%) and husbands (65%) was characterized by a high and relatively flat marital satisfaction trajectory. The second most populated class for wives (23%) and husbands (26%) showed a trajectory with a slightly lower intercept and relatively small changes in satisfaction. The third class for wives (9%) showed the same initial levels (i.e., intercepts) of marital satisfaction as the previous class but showed moderate declines, and the third class for husbands (9%) was exemplified by a trajectory with a relatively low intercept and moderate declines in satisfaction. Finally, wives' least populated class (3%) was characterized by the lowest initial levels and the steepest declines in satisfaction. Overall, these findings are highly consistent with prior work, in that (a) the majority of spouses were grouped in classes characterized by very little change in satisfaction and (b) when satisfaction changed, it declined steadily.

Latent Class Growth Models Conditional on Dissolution

Figure 2B shows that class membership proportions slightly shifted with dissolution included as a covariate, and for wives, the group-mean trajectories were also affected: Class 3's trajectory had a higher intercept and showed steeper declines, and Class 4's trajectory had a lower intercept and less steep declines. Consistent with prior studies, classes characterized by low initial levels and/or steeper declines in satisfaction had significantly higher proportions of dissolution compared to classes characterized by high initial levels and relatively stable levels of satisfaction. Specific information regarding the dissolution rates in each class, along with statistical difference tests, can be found in the online Supplemental Materials.

Growth Mixture Models

While the analyses presented thus far replicate prior GBTM findings, LCGMs fail to account for (a) within-class heterogeneity in intercepts and growth parameters (e.g., slopes) and (b) between-classes differences in the magnitude of within-class heterogeneity and within-person variability. To address this oversight, we fit GMMs, separately, to wives' and husbands' data.

Likelihood ratio tests indicated that the linear model fit the data significantly better than the no-change model for wives and husbands, $\chi^2(3) = 271.97$, $p < .01$; $\chi^2(3) = 228.17$, $p < .01$, respectively, and that the quadratic model fit the data significantly better than the linear model, $\chi^2(4) = 75.68$, $p < .01$; $\chi^2(4) = 82.82$, $p < .01$, respectively. Comparing the quadratic model to the latent change model, the Akaike information criteria (AIC) and BIC estimates suggested that the quadratic model fits the data better than the latent change model for wives and husbands (see Supplemental Table S4). Interestingly, when comparing the AIC and BIC estimates from the baseline quadratic models to the LCGMs, the single-class, growth curve models provided a better fit to the data than the best-fitting solutions for the LCGMs (see Supplemental Tables S2–S4). This suggests that purely categorical quantifications of between-person differences in

Lisa A. Neff

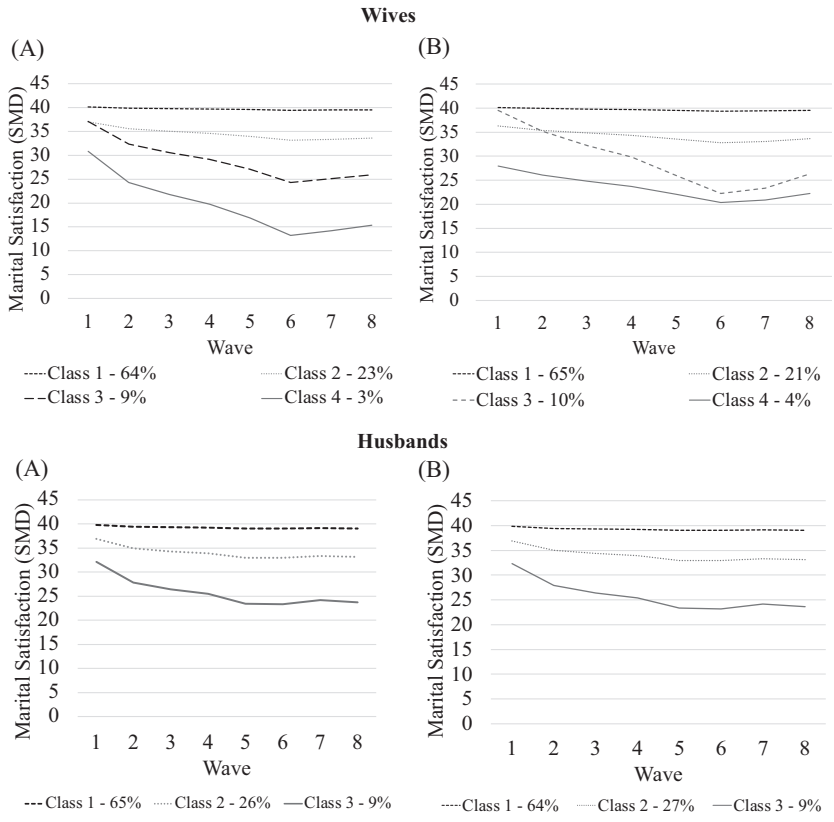
satisfaction change provide less information than models in which these differences are quantified continuously.

Next, separately for wives and husbands, we estimated a series of increasingly complex GMMs that accounted for ceiling effects. In contrast to the LCGMs, fit statistics for the GMMs indicated that 2-class solutions with between-class differences in the mean, covariance structure, and residual variances provided the best fit to wives' and husbands' data (see Supplemental Table S5). Thus, Hypothesis 1 was supported: a model including between-class differences in the mean, covariance structure, and residual variances provided the best fit to wives' and husbands' data. Hypothesis 2, however, was not confirmed: We identified two classes rather than three.

A majority of wives (68%; $n = 849$) and husbands (58%; $n = 724$) were categorized into Class 1, with the remaining 32% of wives ($n = 400$) and 42% of husbands ($n = 525$) categorized into Class 2. Cross-tabulation of wives' and husbands' class assignments indicated that both partners

Figure 2

Spouses' Estimated Latent Class Growth Curve Trajectories (A) Unconditional and (B) Conditional on Dissolution



Note. Marital satisfaction was assessed using the semantic differential (SMD). In A, dissolution is not included in the model, and, in B, dissolution was included in the model. Across wives' Classes 1–4, dissolution rates were, respectively, 6%, 8%, 51%, and 70%. Across husbands' Classes 1–3, dissolution rates were, respectively, 9%, 17%, and 46%.

Benjamin R. Karney

were assigned to Class 1 in 44% of the cases ($n = 553$), and both partners were assigned to Class 2 in 21% of the cases ($n = 263$). Class 1 wives and Class 2 husbands comprised 22% of the cases ($n = 274$), whereas the remaining 13% ($n = 158$) of cases consisted of Class 2 wives and Class 1 husbands. Table 2 provides parameter estimates for each class. Figure 3 provides visual depictions of each class's estimated mean trajectory with intraindividual trajectories for a stratified random subsample. Consistent with the substantial overlap in the distribution of intraindividual trajectory estimates across classes, entropy estimates, which range from .00 to 1.00 and indicate sufficient reliability when greater than .80, suggested only moderate reliability of categorization of spouses to classes (wives, entropy = .64; husbands, entropy = .59).

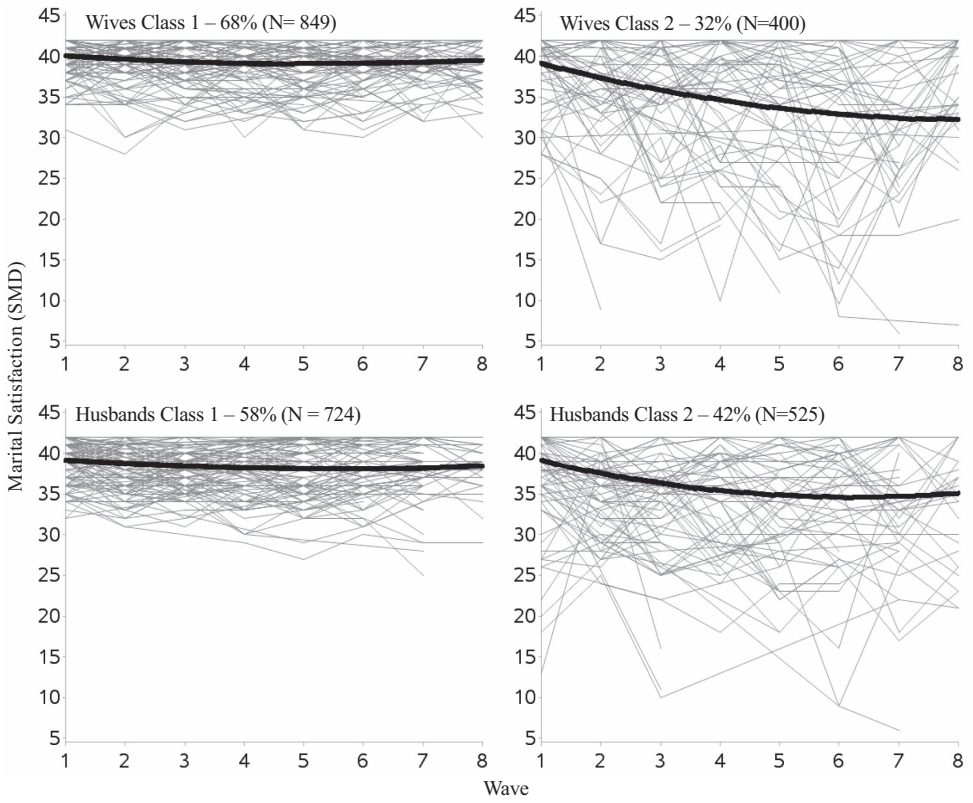
As shown in Figure 3, for wives and husbands, the mean trajectory in Class 1 began high and remained relatively flat, whereas the mean trajectory in Class 2 started off high but showed notable declines. The intercept of the mean

Table 2
Estimated Factor Means, Variances, and Covariances for Marital Satisfaction Trajectory Classes

Estimated parameter	Unconditional		Conditional on dissolution	
	Class 1	Class 2	Class 1	Class 2
Wives				
Sample size	849	400	824	425
Average class membership probability	.68	.32	.66	.34
Estimated factor means (standard error)				
Intercept	40.06*** (0.15)	39.14*** (0.51)	40.10*** (0.16)	39.39*** (0.60)
Time	**−0.92*** (0.15)	**−3.77*** (0.64)	**−0.88*** (0.16)	**−2.17*** (0.57)
Time^2	0.22*** (0.05)	0.52** (0.18)	0.21*** (0.05)	0.15 (0.16)
Divorce × Intercept			−0.27 (0.50)	−0.78 (0.37)
Divorce × Time			**−0.81** (0.85)	**−6.65*** (1.50)
Divorce × Time^2			0.21 (0.34)	1.30* (0.54)
Estimated factor variances/covariance (standard error)				
Intercept	**6.54*** (1.10)	**20.19*** (5.37)	**6.59*** (1.18)	**19.30*** (5.39)
Time	**3.15*** (0.93)	**23.24*** (9.23)	3.20* (0.93)	16.74* (8.65)
Time^2	**0.29*** (0.09)	**2.19*** (0.84)	**0.29*** (0.09)	**1.86*** (0.78)
Covariance intercept and mime	**1.28** (0.70)	**13.79*** (5.46)	1.19 (0.70)	11.58* (0.04)
Covariance intercept and time^2	**−0.39** (0.20)	**−4.07**** (1.48)	**−0.37** (0.20)	**−3.53*** (1.52)
Covariance time and time^2	**−0.87**** (0.22)	**−6.59*** (2.72)	−0.87*** (0.28)	−5.13* (2.51)
Residual	**4.95** (0.45)	**42.40** (3.48)	**4.91** (0.47)	**41.40** (3.69)
Husbands				
Sample size	724	525	712	537
Average probability of class membership	.58	.42	.57	.43
Estimated factor means (standard error)				
Intercept	39.11*** (0.16)	39.10*** (0.43)	39.09*** (0.16)	39.59*** (0.50)
Time	**−0.87***** (0.16)	**−3.40***** (0.53)	**−0.91***** (0.16)	**−2.79***** (0.56)
Time^2	**0.19***** (0.04)	**0.65***** (0.15)	0.21*** (0.05)	0.53*** (0.16)
Divorce × Intercept			**0.28** (0.56)	**−2.07*** (0.90)
Divorce × Time			**1.17** (0.63)	**−3.25*** (1.32)
Divorce × Time^2			−0.55** (0.20)	0.38 (0.45)
Estimated factor variances/covariance (standard error)				
Intercept	**6.41*** (1.00)	**34.11*** (5.62)	**6.50*** (1.01)	**33.02*** (5.51)
Time	**3.26*** (0.80)	**26.65*** (6.94)	**3.53*** (0.83)	**24.57*** (6.59)
Time^2	**0.20*** (0.07)	**2.12*** (0.56)	**0.20*** (0.07)	**2.00*** (0.54)
Covariance intercept and time	−0.31 (0.57)	3.43 (4.39)	−0.24 (0.57)	1.39 (4.40)
Covariance intercept and time^2	0.05 (0.15)	−1.22 (1.20)	0.04 (0.15)	−0.68 (1.21)
Covariance time and time^2	**−0.73***** (0.22)	**−7.06***** (1.93)	**−0.74***** (0.23)	**−6.61** (1.83)
Residual	**3.94** (0.30)	**28.36** (2.78)	**3.97** (0.32)	**28.47** (2.85)

Note. Bold estimates indicate a statistically significant difference (at least $p < .05$) between Classes 1 and 2 parameter estimates. Asterisks indicate factor mean or variance/covariance estimates within a class significantly differ from zero.
* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Figure 3
Spouse's Unconditional Classes of Marital Satisfaction Change



Note. The bold line represents each class's estimated mean trajectory, and the collections of thin lines are observed intraindividual trajectories for a stratified random subsample of participants, based on class membership proportions. SMD = semantic differential.

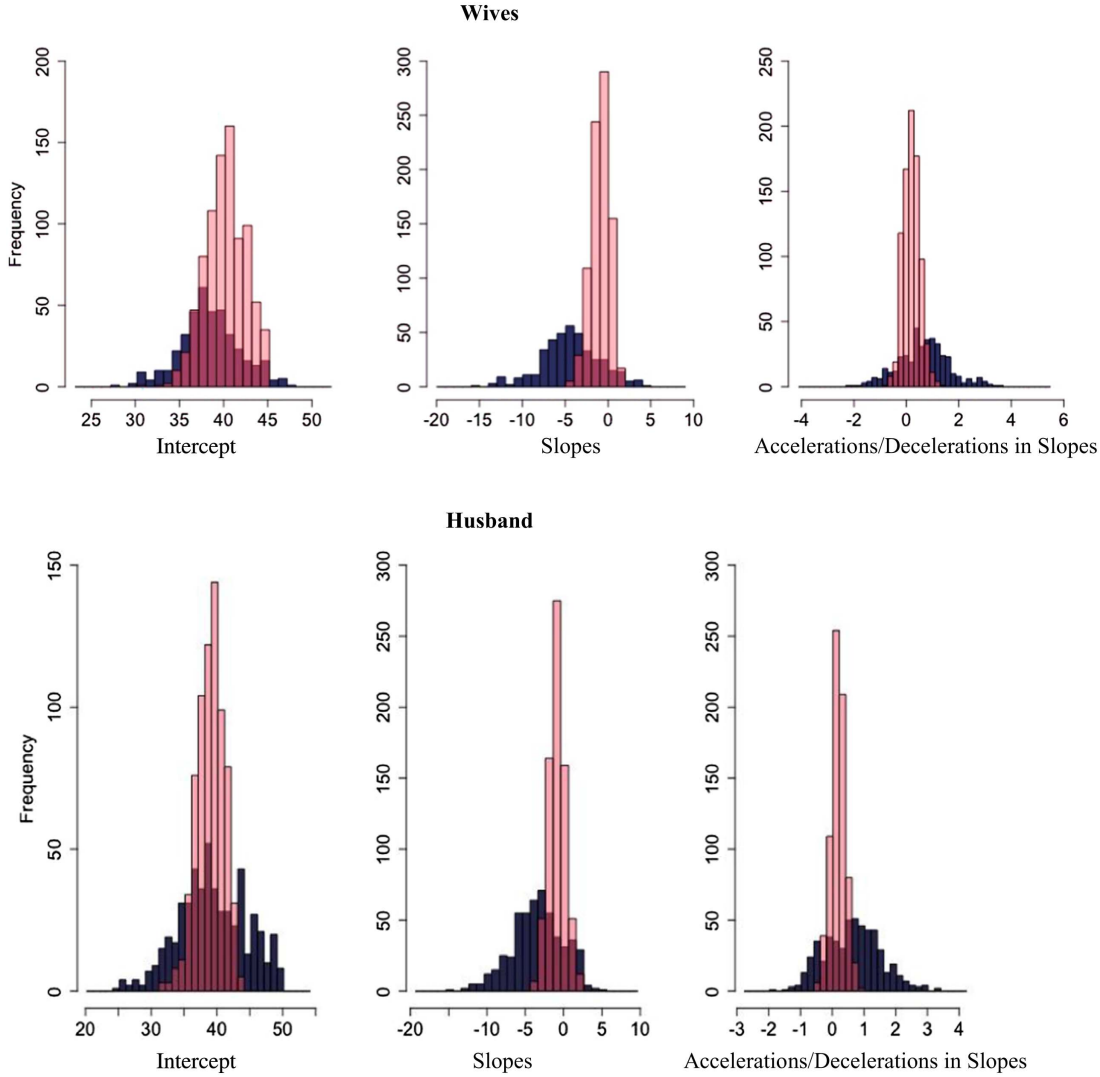
trajectory did not differ across classes for wives or husbands ($\widehat{b_{00}^{c2}} - \widehat{b_{00}^{c1}} = -0.91$, $p = .12$; $\widehat{b_{00}^{c2}} - \widehat{b_{00}^{c1}} = -0.01$, $p = .99$, respectively), but Class 2 wives and husbands, on average, experienced steeper declines in satisfaction compared to Class 1 ($\widehat{b_{10}^{c2}} - \widehat{b_{10}^{c1}} = -2.85, p < .001$; $\widehat{b_{10}^{c2}} - \widehat{b_{10}^{c1}} = -2.53, p < .001$, respectively). Class 2 husbands, on average, also showed significantly greater rates of decelerations in their satisfaction declines, compared to Class 1 husbands ($\widehat{b_{20}^{c2}} - \widehat{b_{20}^{c1}} = 0.45$, $p = .006$). Differences in the quadratic effect were not found when comparing wives in Classes 1 and 2 ($\widehat{b_{20}^{c2}} - \widehat{b_{20}^{c1}} = 0.30$, $p = .11$).

Crucially, wives' and husbands' latent classes differed not only in terms of their mean trajectory but also in terms of variance: Class 2 wives and husbands had significantly greater variance in estimated (a) intercepts ($\widehat{\text{var}b_{00}^{c2}} - \widehat{\text{var}b_{20}^{c1}} = 13.65$, $p = .02$; $\widehat{\text{var}b_{00}^{c2}} - \widehat{\text{var}b_{20}^{c1}} = 27.69$, $p < .001$, respectively), (b) slopes ($\widehat{\text{var}b_{10}^{c2}} - \widehat{\text{var}b_{10}^{c1}} = 20.09$, $p = .03$; $\widehat{\text{var}b_{10}^{c2}} - \widehat{\text{var}b_{10}^{c1}} = 23.39$, $p = .001$, respectively), (c) accelerations/decelerations in the slope (i.e., quadratic effect; $\widehat{\text{var}b_{20}^{c2}} - \widehat{\text{var}b_{20}^{c1}} = 1.90$, $p = .03$; $\widehat{\text{var}b_{20}^{c2}} - \widehat{\text{var}b_{20}^{c1}} = 1.92$, $p = .001$, respectively), and (d) residual variance (i.e., within-person variability; $\text{var}\hat{u}_i^{c2} - \text{var}\hat{u}_i^{c1} = 37.44$, $p < .001$; $\text{var}\hat{u}_i^{c2} - \text{var}\hat{u}_i^{c1} = 24.42$, $p < .001$, respectively). Figure 4 provides histograms of the distributions of the intraindividual estimates.

Importantly, although the mean trajectory for wives and husbands in Class 1 was high and relatively stable, the variances of the intercept ($\widehat{\text{var}b_{00}^{c1}} = 6.54$, 95% CI [4.57, 8.87]; $\widehat{\text{var}b_{00}^{c1}} = 6.41$, 95% CI [4.60, 8.51], respectively), slope ($\widehat{\text{var}b_{10}^{c1}} = 3.15$, 95% CI [1.60, 5.23]; $\widehat{\text{var}b_{10}^{c1}} = 3.26$, 95% CI [1.88, 5.02], respectively), and accelerations/decelerations in the slope ($\widehat{\text{var}b_{20}^{c1}} = 0.29$, 95% CI [0.14, 0.49]; $\widehat{\text{var}b_{20}^{c1}} = 0.20$, 95% CI [0.08, 0.36], respectively) were all statistically significant, indicating that among wives and husbands in Class 1, satisfaction changed in a variety of ways—showing decreases, stability, and even increases over time. In terms of fluctuations, which are indexed by residual error estimates, spouses in both classes showed significant within-person variability, with fluctuations being more pronounced in Class 2 (Class 1 wives: $\text{var}\hat{u}_i^{c1} = 4.95$, 95% CI [4.75, 5.15]; Class 1 husbands: $\text{var}\hat{u}_i^{c1} = 3.94$, 95% CI [3.85, 4.03]; Class 2 wives: $\text{var}\hat{u}_i^{c2} = 42.40$, 95% CI [31.15, 387.74]; Class 2 husbands: $\text{var}\hat{u}_i^{c2} = 28.36$, 95% CI [21.16, 170.26]). Thus, although the majority of spouses were

Figure 4

Distribution of Spouses' Intercepts, Slopes, and Accelerations/Decelerations in Change in Each Class



Note. The pink (light gray) bars are intraindividual estimates for individuals in Class 1, and the dark blue (dark gray) bars are intraindividual estimates for individuals in Class 2. See the online article for the color version of this figure.

categorized into Class 1, where satisfaction remained high, only a minority of spouses showed stable, unchanging levels of satisfaction (approximately 30% of wives and husbands, based on the frequency distributions presented in Figure 4), providing partial support for Hypothesis 3.

In sum, fluctuations, within-class heterogeneity, and group-level mean changes were all found to be distinguishing characteristics of satisfaction change across the early years of marriage, challenging descriptions that emphasize stability and stable declines in satisfaction.

Growth Mixture Models Conditional on Dissolution

Class membership was significantly associated with dissolution, such that wives and husbands in Class 2 had 5.69 ($OR = 5.69$, 95% CI [3.41, 9.49]) and 3.77 ($OR = 3.77$, 95% CI [2.28, 6.24]) times higher odds of dissolution than wives and husbands in Class 1. Observed dissolution rates for wives ($n = 49$) and husbands ($n = 49$) in Class 1 were 6% and 7%, and, in Class 2, observed dissolution rates were 32% and 25% for wives ($n = 134$) and husbands ($n = 134$). Spouses' class memberships were significantly associated ($\chi^2 = 98.68$, $p < .001$), such that spouses were likely to be in similar classes (see Supplemental Table S6). Dissolution rates were lowest when both spouses were in Class 1 (4%, $n = 24$ couples) and highest when both spouses were in Class 2 (41%, $n = 109$ couples). After taking dissolution into account, only 2% of wives and 1% of husbands changed class membership, moving from Class 1 to Class 2. The stability of these results indicates

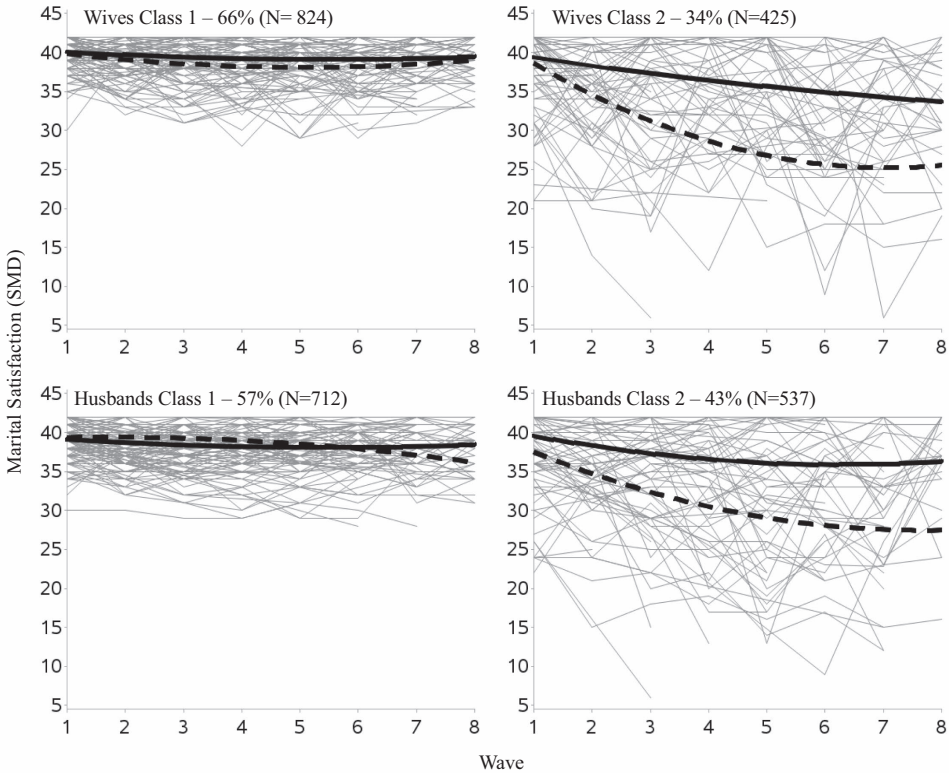
that independent of marital dissolution the GMMs are well-defined. Table 2 provides parameter estimates for each class. Statistical tests of class differences are presented in the online Supplemental Materials.

With respect to the association between dissolution and satisfaction within classes, Figure 5 reveals that for wives and husbands, the association between marital satisfaction changes and dissolution varied across classes. Notably, in Class 1, dissolution was not significantly related to between-person differences in wives' or husbands' intercepts ($\widehat{b_{01}^{c1}} = -0.27$, $p = .59$; $\widehat{b_{01}^{c1}} = 0.28$, $p = .61$, respectively) or slopes ($b_{11}^{c1} = -0.81$, $p = .34$; $b_{11}^{c1} = 1.17$, $p = .06$, respectively). For husbands in Class 1, however, dissolution was related to between-person differences in accelerations/decelerations of the slope ($b_{21}^{c1} = -0.55$, $p = .007$), indicating that, on average, in Class 1, husbands whose marriages dissolved showed steeper declines in satisfaction at later waves. For wives in Class 1, dissolution was not related to between-person differences in accelerations/decelerations of the slope ($\widehat{b_{21}^{c1}} = 0.21$, $p = .54$). Taken together, for wives in Class 1, marital satisfaction trajectories did not differ for wives with intact or dissolved marriages, whereas for husbands in Class 1, husbands whose marriages dissolved showed slightly greater declines in marital satisfaction compared to husbands whose marriages remained intact.

In Class 2, dissolution was significantly associated with between-person differences in husbands' intercepts ($\widehat{b_{01}^{c2}} = -2.07$, $p = .02$) but not wives' intercepts ($\widehat{b_{01}^{c2}} = -0.78$, $p = .37$), and dissolution was associated with significant between-person differences in the slope for both wives and husbands ($\widehat{b_{11}^{c2}} = -6.65$, $p < .001$; $\widehat{b_{11}^{c1}} = -3.25$, $p = .01$, respectively). In terms of accelerations/decelerations of the slope, for wives in Class 2 dissolution was significantly associated with between-person differences in accelerations/decelerations ($\widehat{b_{21}^{c2}} = 1.30$, $p = .02$), whereas dissolution was not associated with between-person differences in accelerations/decelerations for husbands in Class 2 ($\widehat{b_{21}^{c2}} = 0.38$, $p = .40$). Taken together, on average, in Class 2, wives whose marriages dissolved showed steeper declines in satisfaction that leveled off toward the third year of marriage, compared to the satisfaction trajectories of wives whose marriages remained intact—who, on average, showed less steep declines that did not plateau in

Figure 5

Spouses' Classes of Marital Satisfaction Change Conditional on Divorce



Note. Solid bold lines reflect estimated class mean trajectories for intact marriages throughout the study, and dashed bold lines reflect estimated class mean trajectories for dissolved marriages. The collections of thin lines are intraindividual trajectories for a stratified random subsample of participants based on class membership proportions. SMD = semantic differential.

the third year of marriage. For Class 2 husbands, those whose marriages dissolved began marriage with lower levels of satisfaction and showed steeper declines in satisfaction compared to husbands with intact marriages, on average.

Discussion

Partners' feelings about their intimate relationships fluctuate in response to evolving circumstances, such as daily stress (Zhao et al., 2022) and financial strains (Masarik et al., 2016). Yet over the last decade, characterizations of marital satisfaction change have largely emphasized stability and steady declines (e.g., Bühler et al., 2021; Karney & Bradbury, 2020). This emphasis has been exacerbated by an almost exclusive focus on group-level mean trajectories of satisfaction. The overarching goal of the present study was to determine whether characterizations of satisfaction change that account for within-class heterogeneity and within-person variability provide more refined descriptions of long-term marital satisfaction changes.

Summary of Results and Implications

GMMs that accounted for class-specific between-person heterogeneity and within-person variability challenge descriptions of stable and steady marital satisfaction change in two ways. First, unconstrained GMMs identified only two classes of satisfaction trajectories for spouses, rather than the three or more identified in prior work. Relatively low entropy estimates indicated that these groupings did not discriminate among spouses strongly. Nonnormality, such as the ceiling effects observed in the present study, can create the illusion of multiple latent classes underlying the data, even when the data are simulated from a single population (Bauer & Curran, 2003a). In real-world applications, however, the "correct" model is always unknown, and as such, substantive theory should guide modeling building and selection, with theoretically consistent results lending validity to latent classes (Bauer & Curran, 2003b; B. B. Muthén, 2003). Taken together, despite the observed ceiling effects in our data and the low entropy estimates of our solutions, the consistency of our results with theoretical notions of individual differences and volatility in satisfaction support the latent class solutions found in the present study.

Second, we observed substantial variability in both classes, and variability was a distinguishing feature of class membership. Although the mean trajectory estimates did not always differ across classes, variability on every parameter was significantly greater in the class experiencing steeper mean declines. Nevertheless, even in the less variable class (i.e., Class 1), there was substantial between-person heterogeneity and within-person variability in satisfaction. That is, spouses in both classes showed declining and increasing satisfaction trajectories and were likely to fluctuate markedly around their person-specific trajectories. Consequently, although a majority of individuals maintained relatively high levels of satisfaction, only a minority of individuals actually had stable, flat trajectories across the early years of marriage. Accounting for these additional types of variability reveals that, at least within the early years of marriage, fluctuations, as opposed to stable and steady change, appear to be the norm.

This characterization of satisfaction change has important implications for explaining and predicting relationship changes. Our results highlight fluctuations in relationship evaluations as central to the experience of being in a marital relationship. In line with research using diary methods (e.g., Arriaga, 2001; Campbell et al., 2005), this suggests that correlates and causes that are unstable and time-varying (e.g., shifting circumstances) are likely to be at least as important to understanding marital changes across long timescales (e.g., annually) as those that are relatively constant and time-invariant, including personality traits, parental conflict, and divorce histories, and even observed communication tendencies (Williamson, 2021). Previous work in this area shows lower, compared to higher, income married couples display greater volatility in semi-annually assessed satisfaction (Jackson et al., 2017), yet less research focuses on time-varying mechanisms underlying greater longer term variability (cf. Neff & Karney, 2004, 2007), and how these mechanisms may differ across diverse populations. The centrality of fluctuating relational experiences highlights the need for future research aimed at understanding volatility across longer timescales as a phenomenon in and of itself, predicted by variables that may differ from those predicting initial levels, rates of change, and fluctuations across shorter timescales.

Accounting for Dissolution

Incorporating dissolution into these analyses revealed the consequences of this approach for understanding marital outcomes. Our results indicate that spouses who dissolve their marriage were several times more likely to show satisfaction changes characterized by greater within-person variability, a factor overlooked in prior GBTM studies. Yet, even in the classes experiencing a smaller magnitude of within-person variability, dissolution rates were not zero. Examining associations between satisfaction change and dissolution within classes revealed that, among spouses in the subgroups experiencing the highest dissolution rates, those whose marriages dissolved experienced steeper declines in satisfaction, on average—consistent with theories that explain the decision to end a marriage as a reaction to increases in distress (e.g., Gottman, 1993). Among spouses in the subgroup experiencing the lowest dissolution rates, however, dissolution was unrelated to satisfaction levels and changes. This parallels findings from LCGMs and supports the longstanding idea that some couples end their relationships for reasons unrelated to their relationship satisfaction (e.g., Lewis & Spanier, 1979). Progress in understanding the course

of marital satisfaction will therefore require future work that addresses different types of marital dissolution processes, including work that identifies reasons that satisfied partners might nevertheless choose to end their marriage.

Limitations

While preregistered hypotheses and well-powered tests bolster our conclusions, several other factors temper them. First, our sample consisted of predominantly White, well-educated, different-gender couples. Although markedly varied satisfaction trajectories emerged even within this relatively homogenous group, inclusion of couples from diverse backgrounds may reveal greater heterogeneity in satisfaction (e.g., Jackson et al., 2017). Second, the instrument we used to assess satisfaction may not fully capture satisfaction changes, particularly at the high end of the scale, given observed ceiling effects. Third, whereas marital development and marital dissolution are dyadic processes and outcomes, here we analyzed data at the individual level—limiting our ability to examine distinct intradyadic processes (e.g., covariation of spouses' satisfaction changes). Finally, we cannot assume generalizability in the set of trajectories that we observed. Replication with a greater number of and more frequent assessments may yield even more variability in satisfaction trajectories and in the latent classes that distinguish among them.

Conclusion

Notwithstanding these limitations, important implications follow from the idea that spouses' satisfaction trajectories are characterized by extensive within- and between-person variability. From a methodological perspective, categorization techniques that do not account for within-class heterogeneity and within-person variability in satisfaction trajectories misrepresent the diversity of relationship processes within and across spouses. Acknowledging researchers may not always have a large enough sample to estimate unconstrained GMMs, we offer several recommendations. First, when debating between single-group growth curve models and constrained GBTMs, our results suggest that using single-group growth curve models to quantify individual differences continuously, as opposed to categorically, better represents satisfaction changes; further, by allowing for time-varying and time-invariant predictors, growth curve models are better suited for explaining satisfaction changes within and across spouses. Second, when multiple populations are expected or known to exist in the data (i.e., are not latent), multiple group growth curve models have smaller sample size requirements and can be used to test confirmatory hypotheses regarding population differences in initial levels, rates of change, fluctuations, and time-varying covariate associations (Grimm et al., 2017). Third, when enough data are available to estimate an unconstrained GMM, examining time-varying covariates within each latent class may reveal important nuances in fluctuation-generating mechanisms across different (unknown) populations of couples. From an explanatory perspective, we anticipate that any integration of time-varying predictors will prove fruitful to the extent that within- and between-person factors are embedded within the complex contexts to which couples routinely adapt. Taken together, the present findings encourage us to conceptualize relationship satisfaction not as a set of fixed and normative pathways but as a fluctuating and dynamic process that partners idiosyncratically navigate as they strive to develop fulfilling lives together.

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Correction to "Atypical Child–Parent Neural Synchrony Is Linked to Negative Family Emotional Climate and Children's Psychopathological Symptoms" by Su et al. (2024)

In the article "Atypical Child–Parent Neural Synchrony Is Linked to Negative Family Emotional Climate and Children's Psychopathological Symptoms," by Haowen Su, Christina B. Young, Zhuo Rachel Han, Jianjie Xu, Bingsen Xiong, Zisen Zhou, Jingyi Wang, Lei Hao, Zhi Yang, Gang Chen, and Shaozheng Qin (*American Psychologist*, 2024, Vol. 79, No. 2, pp. 210–224, https://doi.org/10.1037/amp0001173), Figure 2 and its caption were corrected to fix a mismatch between the *r* coefficients and scatterplots. The caption was changed from "(c) Child–parent hippocampal activity concordance was significantly higher for boundary than nonboundary event time series ($Z = 2.30$, $p = .01$). (d) Child–parent vmPFC activity concordance was marginally significantly higher for boundary than nonboundary time series ($Z = -1.39$, $p = .08$)" to "(c) Child–parent vmPFC activity concordance was marginally significantly lower for boundary than nonboundary time series ($Z = -1.39$, $p = .08$). (d) Child–parent hippocampal activity concordance was significantly higher for boundary than nonboundary event time series ($Z = 2.30$, $p = .01$)." In addition, in the second sentence of the second paragraph of the "Reduced Child–Parent vmPFC Connectivity With the Hippocampus Links to Negative Family Emotional Climate and Children's Internalizing Symptoms" section, "anxious/depressed" and "internalizing" were switched. All versions of this article have been corrected.

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