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EMPIRICAL RESEARCH

Adolescents' Love Lives: Heterogeneity in Relationship Status Trajectories and Links with Affect

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Abstract

Romantic experiences are more fluid and heterogeneous during middle adolescence than at any other life stage, but current understanding of this heterogeneity and flux is limited because of imprecise measurement. A sample of 531 adolescents (55% female; 28% non-Hispanic White; 32% Black; 27% Hispanic; 14% Other) recruited from an ongoing birth cohort study (Mean age = 16.7 years, SD = 0.358), was administered bi-weekly diaries over 52 weeks to prospectively record transitions in and out of romantic and sexual relationships and to assess links with positive affect (frequency of happiness) and negative affect (frequency of sadness). Relationship statuses considered included not only dating, but also liminal and asymmetrical statuses such as talking/flirting and crushes. Latent profile analyses revealed six relationship status trajectories, or love life profiles, based on the number of intra-year partners and on the extent of involvement in each of the relationship statuses. Approximately half of teens either were in stable dating relationships or uninvolved romantically during the year; however, half experienced variable levels of flux in their love lives. Relationship instability, not romantic involvement per se, was associated with higher levels of sadness and lower levels of happiness. Snapshots of teen romantic involvement based on one or two points in time obscure the extent of relationship heterogeneity and flux and how relationship status trajectories are associated with positive and negative affect.

Keywords Adolescent romantic relationships · Diary study · Relationship status trajectories · Latent profile analysis · Affect

Introduction

Adolescent romantic relationships are a key milestone in the transition to adulthood (Collins et al., 2009). By middle adolescence, most youth have had at least one exclusive relationship; however, romantic experiences during this life stage are more heterogeneous and fluid than at any other stage (Manning et al., 2014). Partly this reflects multiple aspects of adolescent development, including individual differences in emotional maturation, diversification of social networks, and shifts in desired partner attributes (Collins, 2003). Some youth do not date during middle adolescence, but others participate in casual dating with a single or multiple partners or steady dating with a single partner (Davies & Windle, 2000).

Understanding of the heterogeneity and flux in adolescent romantic relationships has been limited by lack of measurement precision in adolescent studies and differing, often narrow, criteria to define relationships, including imposition of minimum durations with little consideration of less formal relationships (Karney et al., 2007). Evidence about emergent romantic attractions, for example, is particularly scarce. Because of variability in both the types and fluidity of romantic experiences during middle adolescence, recent scholarship has suggested a need to portray adolescent relationships as a "movie," with frequent measurement over time, rather than as static "snapshots" based on single or periodic measurements (Furman et al., 2019). Accordingly, the current study characterizes the heterogeneity and fluidity of adolescents' love lives by documenting the number and sequencing of a comprehensive set of relationship statuses on a bi-weekly basis over 52 weeks and linking relationship status trajectories with potential precursors as well as positive and negative affect.

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Adolescent Relationship Experiences

There is generalized agreement that teens' relationships evolve over the course of adolescence from peer group activities to casual dating and formation of dyads (Meier & Allen, 2009); however, the corresponding empirical literature exhibits a broad range of methodological approaches, operational definitions, and associations with various aspects of socio-emotional adjustment (Goldberg & Tienda, 2017). Studies also differ in the frequency of measurements, reliance on retrospective versus prospective reports, and terminology used to characterize flux in romantic experiences. The term "trajectories" illustrates this point.

From the perspective of human development, relationship trajectories combine both the occurrence and sequencing of romantic events or statuses over time or across ages. Past scholarship has represented relationship trajectories as temporally sequenced romantic activities with a single partner (O'Sullivan et al., 2007) or romantic relationship states across multiple partners (Connolly et al., 2013). Some studies use the term trajectories to characterize a single transition, such as entry into dating or casual sex (Grello et al., 2003) or to represent annual changes in relationship statuses across one or more partners (Manning et al. 2014; Rauer et al., 2013). Still other studies eschew the term trajectory altogether, using the temporal ordering of events within romantic relationships to represent theoretical constructs such as relationship scripts (Harding, 2007) or relationship inauthenticity (e.g., Soller, 2014). Studies that use granular measurements to assess links between romantic relationships and affect, including those that use intensive longitudinal designs (e.g., Todorov et al., 2021; Ha et al., 2013), typically focus on within-partnership relationship dynamics, largely eschewing fluctuations in relationship statuses and partners over short durations.

Several studies show that adolescents' love lives exhibit considerable heterogeneity in the occurrence, nature, and sequencing of romantic events (Connolly et al., 2013; O'Sullivan et al., 2007). For example, physical intimacy sometimes precedes the development of dyadic bonds and partner exclusivity (Grello et al. 2003; Harding, 2007). Studies that focus exclusively on within-partnership sequencing of romantic events (e.g., O'Sullivan et al., 2007) are ill-suited to reveal variations in transitions involving multiple partners or the extent of stability with the same partner. A study that used measurements taken one year apart from the National Longitudinal Study of Adolescent Health (Add Health) found considerable diversity in adolescents' relationship statuses and stability: 38% were in no relationships at either time point, 18% were in "steady" relationships at both time points, 3% were in casual relationships at both time points, and 41% experienced at least one change in relationship status over the year (Meier & Allen, 2009). Because the study was unable to examine intra-year flux, the prevalence of changes in relationship status likely was understated. The study also did not consider emergent or liminal relationship statuses such as talking/flirting and crushes that are now particularly important to consider as the proliferation of social media platforms broadens opportunities for adolescents to search for romantic partners online. Talking and flirting virtually can supplant physical interaction in groups or dyads during the relationship initiation stage (Lenhart et al., 2015; Tienda et al., 2022).

Most scholarship recognizes dating as an established relationship, although some studies impose duration restrictions to qualify as a relationship (e.g., Rauer et al., 2013). Imposition of duration restrictions to identify relationships ignores romantic attractions and emergent relationships and understates the extent of flux in the search and screen process. Exclusion of short-lived relationships also misses casual relationships that are part of adolescents' partner search and screen process (Bergdall et al., 2012), yet impact teens' emotional health (Villalta et al., 2023). Some studies distinguish dating with and without sexual activity from casual intimate relationships (Manning et al., 2006); however, the distinction between dating and casual sexual activity is problematic because it excludes casual romantic relationships that do not (yet) involve sexual activity. Evidence about asymmetrical romantic attractions (i.e., "crushes"), including whether these are eventually reciprocated, is also thin.

Asymmetrical and Liminal Attractions

Few studies empirically examine romantic attractions that are largely aspirational ("crushes") and those that involve mutual screening ("talking/flirting") as distinct from dating and/or sexual activity. A recent study that prospectively tracked adolescent relationships reported that approximately one in four relationships evolved from talking/flirting to dating over a year, while an additional 13% transitioned to sexual relationships (Tienda et al., 2022). Possibly signaling the dissolution process, 15% of dating relationships transitioned to talking/flirting. A limitation of these results is that they captured relationship statuses at the start and conclusion of a 12-month period, ignoring possible interim transitions with the same or different partners during the year.

Dyadic bonds: dating and sexual intimacy

Research based on the early waves of Add Health examined transitions into and out of romantic and sexual relationships between waves of a year or more, and the vast majority focused on associations with problem behaviors. An early study that used the first two waves of Add Health revealed a

correlation between several problem behaviors and casual sex, but not romantic sex (Grello et al., 2003). With only two measurements separated by a year, the study could not clarify whether problem behaviors preceded engagement in casual sex, or whether teens disposed to engage in casual sex had more partners than their peers who engaged in romantic sex or dating sans sex.

A study that tracked a cohort of Canadian teens ages 10–14 over six years used group trajectory analysis to portray age variations in both the timing and sequencing of romantic activities leading to dyadic dating (Connolly et al., 2013). The latent categories, which distinguished "early starters" and "late bloomers" from teens whose romantic activities comported with a normative ("on-time") developmental trajectory, underscore the importance of the timing of dating for understanding relationship flux during adolescence. Early starters initiated dyadic dating at younger ages compared with teens in the normative category and they also exhibited higher levels of externalizing symptoms. There were minimal differences between on-time daters and late bloomers; therefore, it is unclear whether the sequencing of romantic events is more consequential for adolescents' socio-emotional adjustment than the timing of dating onset. Because the study relied on annual measurements of relationship statuses to derive the latent categories, it is also unclear whether relationship flux differed across the three groups.

Dissolution

Learning how to negotiate conflict is a core developmental task that also has implications for the stability of romantic relationships in adulthood (Roberson et al., 2018), but there is limited evidence about how adolescents resolve disagreements with their partners. Most studies about adolescents observe relationship dissolution as a single event (Ha et al., 2013); however, because conflict leading to separation may not sever emotional bonds, dissolution may involve one or more reconciliations (Halpern-Meekin et al., 2013). A Dutch study that followed 80 adolescent couples over four years revealed that over half of the relationships dissolved within the first year (Ha et al., 2013). Finding no association between interpersonal discord and relationship survival, the authors conceded that annual measurements are not well suited to capture the volatility of adolescent romantic relationships.

In fact, a longitudinal study of youth ages 17 to 24 who currently or recently were in a dating relationship revealed that over 40% of respondents who had separated from a romantic partner reconciled one or more times, including reunions that involved sexual intimacy (Halpern-Meekin et al., 2013). Because the longitudinal design used retrospective measurements, it is conceivable that reunions were understated, especially the partnerships that dissolved shortly before the last interview. In fact, the authors argued for greater temporal measurement precision to better capture the fluidity and complexity of relationships among adolescents and young adults.

Relationship Dynamics

Most studies of teen romantic relationships rely on longitudinal surveys with intervals of at least one year between waves, including the widely used Add Health study, the Toledo Adolescent Relationship Study (TARS), the Tennessee-Indiana longitudinal study, and several prominent international studies (e.g., Connolly et al., 2013). The early waves of the Add Health study included modules that permitted nuanced views of relationship experiences based on retrospective reports of the sequencing of social (e.g., spent time together in a group), romantic (e.g., kissed or declared love for each other), and sexual events *within* relationships (O'Sullivan et al., 2007). Findings showed that social events generally, but not always, preceded romantic and sexual events for both males and females.

Other analyses of the romantic event data in the Add Health study compared respondents' Wave 1 reports of their "ideal" relationship activity sequences with the activity sequences corresponding to their first relationship after Wave 1 (reported in Wave 2). One study applied optimal matching methods to measure deviations between teens' ideal relationship scripts at the baseline interview and the actual scripts that followed in their first subsequent relationship (Harding. 2007). That adolescents growing up in disadvantaged, culturally heterogeneous neighborhoods were less able to realize their ideal relationship scripts compared with their peers residing in more advantaged, culturally homogeneous places signaled the influence of socioeconomic status in the sequencing of romantic activities among adolescents.

Optimal matching techniques, which assess similarity of pairs of ordered sequences, are not well suited to compare large numbers of event sequences consisting of several relationship states that include multiple partners and churning within relationships. One multi-wave longitudinal study used cluster methods to identify patterns of flux in romantic relationships in young adulthood for a sample of 511 respondents (Rauer et al., 2013). Clustering methods applied to annual measurements of romantic relationship status produced a five-cluster solution that captured variations in the number of partners respondents had and the total number of waves they reported being in a relationship over the observation period. The modal cluster (28%) involved little romantic involvement; the remaining clusters were split between stable and unstable romantic involvement over the observation period. Furthermore, the relationship

profiles showed correlations with experiences in childhood and early adolescence associated with the capacity to form emotional attachments, such as parenting style and monitoring. Besides focusing on an older age group and measurements spaced one year apart, the study did not link profiles with emotional health.

Adolescent Romantic Relationships and Affect

Developmental psychologists recognize that adolescents' romantic experiences are associated with both positive and negative emotions (Collins, 2003). Yet, most scholarship that has empirically examined the psychosocial consequences of adolescents' romantic relationships has focused on detrimental outcomes. For example, one study using Add Health data linked incongruence between teen's reported "ideal" relationship activity sequences and the sequences experienced within their next relationship with elevated risk of severe depression among girls (Soller, 2014). A study focused on the timing of adolescent relationship formation in a Canadian sample observed elevated externalizing symptoms among "early starters" relative to groups with normative romantic trajectories, but not higher levels of internalizing problems (Connolly et al., 2013). Neither study used intensive longitudinal data, nor examined relationship status trajectories across partners.

Related research has linked single-transition measures of relationship involvement and quality with adolescent emotional wellbeing. Associations between adolescent romantic involvement and depressive symptoms were observed in several cross-sectional and periodic longitudinal studies (Davila, 2008). Recent studies using intensive longitudinal designs linked decreases in relationship quality with increases in negative affect (Rogers et al., 2018; Villalta et al., 2023) and increases in relationship quality with positive affect (Villalta et al., 2023). Together, prior research suggests aspects of adolescent relationships are associated with emotional health, and with affect in particular. Study designs have limited observation of within-person trajectories across relationships, such as that afforded by intensive longitudinal measurement of flux in relationship statuses and affect.

Correlates of Adolescent Relationship Experiences

Previous research has identified a variety of sociodemographic and family predictors of adolescent relationship experiences. For example, prior research showed associations between teen dating behavior and measures of family structure and mother's partner instability (Goldberg et al., 2019b), parental approval of dating (Giordano et al., 2016), parents' nativity (King & Harris, 2007), and family socioeconomic status (Karney et al., 2007; Harding, 2007).

Empirical evidence about gender differences in teen romance is mixed owing in part to differences in study design and outcomes of interest. Some studies find no gender differences in associations between romantic involvement and emotional states (Rogers et al., 2018; Villalta et al., 2023), yet others find gender differences in use of social media to build and monitor romantic relationships (Reed et al., 2016), in partner meeting venues (Tienda et al., 2022), in perpetration of intimate partner violence (Giordano et al., 2010), and in associations between romantic experiences and depressive symptoms (Soller, 2014).

Findings about ethno-racial disparities in adolescent romantic experiences also are mixed. Some studies report that Black and Asian American youth are less likely than White youth to be romantically involved (Carver et al., 2003; Meier & Allen, 2009). When in relationships, however, Black adolescents are more likely to progress quickly to steady relationships and their relationships are of longer duration (Giordano et al., 2005; Meier & Allen, 2009). Nonetheless, studies have also found that the relationships of Black youth have a somewhat less intimate or intense style than those of Whites (Giordano et al., 2005; O'Sullivan et al., 2007). The relationships of Hispanic adolescents have been the subject of much less research.

Current Study

Prior scholarship has revealed heterogeneity in both the timing and sequencing of adolescent relationship statuses, but also acknowledged that coarse measurement of romantic relationships understates the amount of flux and heterogeneity in relationship statuses across and within partners. The few studies that rely on granular temporal measurements either use very short observation periods or focus on specific aspects of adolescent romantic relationships, such as dissolution; however, evidence about relationship instability and about asymmetrical and ambiguous relationship statuses is limited, as is information about which childhood and early teen experiences are associated with stable and unstable relationship experiences, and whether there are links between adolescents' relationship status trajectories and affect.

The current study uses granular measurements of relationship statuses to portray the love lives of a cohort of teens followed since birth. In addition to recording relationship statuses on a bi-weekly basis, diaries also track the incidence of romantic attractions (crushes) and liminal statuses (talking/ flirting). Specifically, prospective bi-weekly measurements of relationship statuses are used to (1) capture the extent of heterogeneity and flux in adolescents' romantic relationship trajectories during middle adolescence and identify latent relationship profiles based on status

transitions within and across partners over 52 weeks; (2) describe associations between latent relationship profiles and theoretically relevant, prospectively collected demographic, family, and prior relationship experience covariates; and (3) assess links between romantic relationship trajectories and measures of positive and negative affect. Diary data is ideally suited to portray the extent of heterogeneity and flux in adolescent relationships missed by studies that rely on annual and/or retrospective measurements, and to precisely measure precursors and outcomes associated with relationship status trajectories.

Methods

Analyses are based on the mDiary Study of Adolescent Relationships (*mDiary*) and are supplemented with information collected prospectively since time of birth from the Fragile Families and Child Wellbeing Study (FFCWS). FFCWS is a birth cohort study that followed children born between 1998 and 2000 in 20 large-to-medium size U.S. cities over 15 years (Reichman et al., 2001). FFCWS interviewed caregivers over six waves and interviewed target youth at ages 9 and 15. The FFCWS surveys provide rich background information about the childhood socioeconomic circumstances, family structures, and parental relationship instability experienced by target youth. Combination of the mDiary and FFCWS data provides a unique opportunity to link early childhood and adolescent experiences with relationship status trajectories in middle adolescence. Most longitudinal surveys of adolescents either lack detailed information on earlier childhood experiences or rely on retrospective reports.

The *mDiary* study was designed to track the emergence and evolution of adolescent romantic and sexual relationships by administering bi-weekly surveys over 52 weeks to a subsample of teens from the FFCWS parent study. *mDiary* recruited adolescents who completed the year-15 FFCWS teen survey and whose baseline interview was conducted in 15 of the 20 FFCWS target cities. In 11 of the 15 target cities, *mDiary* sampled 100% of adolescents who completed the FFCWS Year-15 teen survey, and in the remaining four cities, randomly sampled at a rate of 44%. Recruitment for the *mDiary* study occurred over a 17-month period (November 2015 – April 2017), lagging the Year-15 field operations of the FFCWS parent study by approximately one year. The only eligibility requirement to participate in the *mDiary* study was access to a personal email address, which was needed to register for the study and to receive survey reminders if they did not have texting capability on a private device.

The bi-weekly diaries were administered on a device of choice using a custom, mobile-optimized website linked to the Qualtrics web survey platform via Application Programming Interface (API) calls. All diaries remained open for one week, after which time they were considered skipped. Teens who provided mobile phone numbers received reminders via automated text messages. Qualtrics' panel functionality permitted tracking new and continuing partnerships or crushes across diaries if respondents provided an identifier for their partner (initials or a nickname) and enabled customized follow-up questions about specific partnerships or romantic crushes. Tracking partnerships and crushes in this way captures relationship flux without the distortions of recall bias, which is important because adolescent partnerships are typically short and often ambiguous in their emergent stages (Collins et al., 2009).

Of the 689 adolescents who assented to participate in the study, 77% (531) registered on the *mDiary* web portal. Registration required teens to complete a short enrollment survey designed to gauge changes in personal and family circumstances in the interval between the FFCWS Year-15 interview and the *mDiary* study. An important example pertains to dating behavior: both the Year-15 FFCWS teen survey and the *mDiary* enrollment survey asked whether respondents had *ever* dated. Data from the FFCWS baseline survey and the Year 15 surveys conducted with primary caregivers (FFCWS Y15-parent) and target youth (FFCWS Y15-teen) were merged for mDiary respondents.

Analysis Sample

The current analysis is restricted to respondents who completed at least 22 (of a possible 25) bi-weekly diaries and provided partner identifiers (nicknames or initials) for all reported relationships; the latter restriction was necessary to trace status changes within and between partners. Of the 531 teens who enrolled in the study, 234 completed all 25 diaries and an additional 75 completed between 22 and 24 diaries; together, they are denoted as the "high persistence" sample in Fig. 1. Owing to missing partner identifiers, 157 cases were dropped from the high persistence sample, reducing the sample to 152 cases. Teens who skipped 1–3 diaries were included in the analysis sample if their relationship statuses could be reliably imputed for missing diaries based on response patterns before and after the missing diar(ies) ($N = 60$). Restriction of the analytic sample to high persistence respondents who provided identifiers for all partners ($N = 212$) captures all relationship spells as well as periods of noninvolvement, but potentially increases selection bias, which is addressed below.

Measures

Relationship status

In all 25 diaries, teens were asked "Is there someone you are *currently* talking to, flirting with, dating, or hooking up

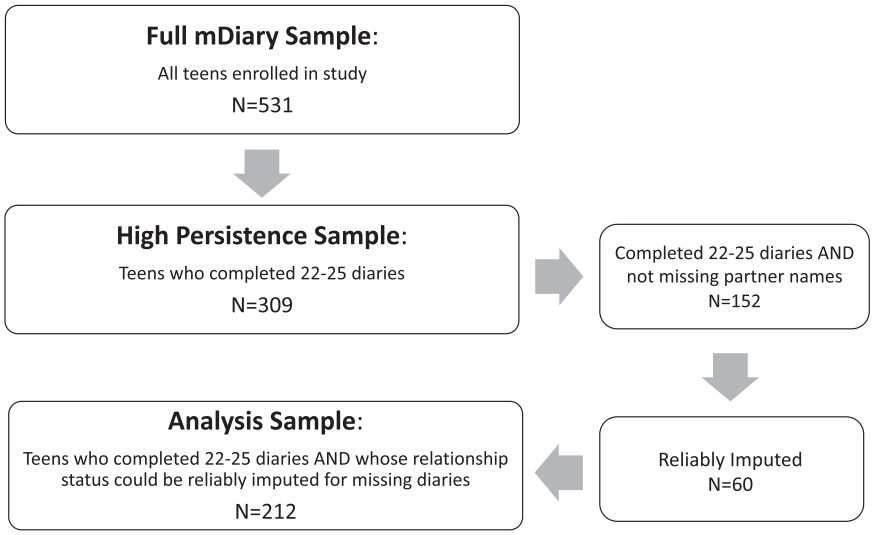

Fig. 1 Analysis sample flowchart

with?" Respondents who responded affirmatively were asked to classify their current partnership as either *dating, friends with benefits*, *talking/flirting*, or *other*. Written answers to the latter included "it's complicated", or "unsure", which can signal ambivalence associated with the process of dissolution or initiation. Respondents who were not in a relationship were asked whether they aspired to have a relationship with someone in their life: "Is there someone in your life you would really like to have a relationship with?" Affirmative responses were designated crushes. Two-thirds of teens reported one or more relationships during the study.

Affect

Measures of both positive and negative affect were assessed because they represent distinct constructs (Watson & Tellegen, 1985; Villalta et al., 2023). In each diary respondents were asked to report how often they felt happy and sad in the past two weeks, with options ranging from 1 (never or rarely) to 4 (most of the time). Reports from the enrollment survey and final diary are used, with the former serving as a baseline control and the latter isolating change in affect since baseline. For positive affect, the two categories representing the lowest levels of happiness are merged due to small cell sizes, such that 1 = never, rarely, or sometimes, 2 = a lot of the time, and 3 = most of the time. Negative affect combines the two categories on the highest end of the scale (3 = a lot or most of the time).

Teen attributes and family background

Because the mDiary sample was drawn from an ongoing birth cohort study, study participants have limited age variation: the median age was 16.7 years with a standard deviation of only 0.36 years. Respondents' assigned sex at birth was obtained from the FFCWS baseline survey and ethno-racial identification was derived from teens' self-reported identity in the Year-15 interview (non-Hispanic White, Black, Hispanic, and other, which combined Asian and mixed-race respondents).

Family structure is operationalized using two indicator variables: parents' marital status at the time of the teen's birth (unmarried and not cohabiting = 1) and whether the youth resided with two parents at age 15 (=1). The first two measures were derived from the FFCWS baseline survey and the latter from the Year-15 teen interview. Primary caregiver's relationship instability was created by counting the primary caregiver's reported transitions into and out of unions with cohabiting or marital partners between the FFCWS Year-9 and Year-15 interviews. For most teens in the analytic sample ($N = 191$ out of 212), this primary caregiver was the mother, but in 17 cases the PCG was the father; these questions were not asked of non-parental caregivers, which affected only 4 teens in the analysis sample, who were coded as missing this variable. Measures of mother's nativity (foreign born = 1) and mother's educational attainment (less than high school, high school graduate, some college, and college graduate and higher) also are included in statistical analyses.

Teen dating experience

Several teen dating experience measures hypothesized to be associated with the romantic relationship statuses recorded in mDiary were captured in the enrollment survey. Specifically, the enrollment survey recorded whether the teen had prior dating experience ("Have you ever dated or been in a relationship with someone?" Yes /No; Yes=1) and if so, age at first date from a range (Never, <13; 13–15; 16+).

Fig. 2 Illustration of bi-weekly relationship status trajectories

Case #	Relationship and Partner Sequence
122	D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1
106	N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.
115	D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.
100	D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,O1,T1,O1,C1,C1,C1,C1,T2,N.,T3,D3,D3
125	D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,D1,N.,N.,N.,N.,T2,F2,F2,F2,N.,C3,T3,T3,T3,C4,N.
119	D1,D1,D1,D1,D1,D1,D1,D1,D1,T2,T2,D2,D2,D2,D2,D2,D2,D2,D2,D2,D2,D2,D2,D2,D2
113	D1,D1,D1,D1,D1,D1,D1,D1,N.,N.,C2,N.,T3,D3,D3,D3,D3,D3,D3,D3,D3,D3,D3,D3,D3
126	D1,D1,D1,D1,D1,D1,D1,D1,N.,N.,N.,N.,N.,N.,C2,N.,T1,N.,N.,N.,N.,N.,N.,N.,N.
103	D1,D1,D1,D1,D1,D1,D1,D1,T1,D1,D1,D1,D1,D1,D1,O1,O1,F1,F1,D1,D1,D1,D1,D1,D1
108	D1,D1,D1,D1,D1,D1,D1,F1,D1,D1,O1,O1,D1,D1,D1,D1,D1,D1,C1,D1,D1,D1,D1,D1,D1
109	D1,D1,D1,D1,D1,D1,D1,N.,C2,C2,C2,C2,C2,C2,T1,F1,F1,D1,D1,D1,D1,D1,D1,D1,F1
101	D1,D1,D1,D1,D1,D1,D1,O1,D1,N.,T2,T3,T3,T3,D3,D3,T3,C1,C1,C1,C1,N.,N.,N.,D4
114	D1,D1,D1,D1,D1,D1,T2,C3,C3,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.,N.
111	D1,T1,T1,T1,T1,T2,T2,T2,T2,T2,D3,D3,D3,D3,D3,D3,D3,C1,N.,T4,D4,D4,D4,D4
117	D1,T2,C3,T4,T4,T4,C3,C3,C5,C5,N.,F5,F5,O5,F5,O5,C5,C5,T1,C5,C5,C5,D5,D5,D5

Note: numbers in sequence indicate partner number; N uses "." because there is no partner. D=dating; T=talking/flirting; F=friends with benefits; C=crush; O= other; N= noninvolvement

The enrollment survey also asked teens whether parents approve of their dating ("Whether or not you have ever dated, would your parents or guardians approve of you dating at this time in your life?" Approve, Wouldn't care; Disapprove; Don't know. Approve = 1), and whether their friends date ("Of the friends you spend the most time with, how many have dated?" All or almost all; Some, A few, None, Don't know. All or almost all= 1).

Analyses

Latent Profile Analysis (LPA), which uses covariance matrices to capture latent constructs, is used to identify romantic relationship profiles based on the bi-weekly measures of relationship statuses and unique partners over 52 weeks (as shown in Fig. 2). LPA, a type of finite mixture model, is appropriate when observed measures are continuous, as in the present analysis that uses counts of relationship statuses and partners to identify relationship profiles (Collins and Lanza, 2010; Ferguson et al., 2020). Latent profile solutions were estimated using Stata's *gsem* command and *lclass* option and were also specified to allow for covariances among error terms. Latent profiles were derived using counts of five relationship statuses (dating; friends with benefits; talking/flirting; noninvolvement; and other) and of the total number of named partners (range = 0, 8). The counts of relationship statuses and number of partners capture different aspects of relationship trajectories across the study period. Relationship status reports of 'other' were rare, and for the LPA analysis were combined with talking/flirting; crush counts served as the reference category in the estimation.

Multinomial logistic regressions were estimated using Stata 17 to establish associations between membership in relationship status profiles and theoretically relevant demographic, family, and relationship experience measures associated with adolescents' romantic behavior. Because positive and negative affect were measured on ordinal scales, links between relationship latent status profiles and affect were assessed using ordered logit regressions. Controls in the regressions included positive/negative affect at baseline, measures of teen attributes and family background, and measures of pre-diary teen dating experiences.

Results

Sample Characteristics

Table 1 reports characteristics of the full *mDiary* sample of 531 teens, the high persistence subsample of 309 teens (defined as those who completed 22–25 diaries), and the analysis sample of 212 teens. With a few exceptions, there are only modest differences across the three samples. The most notable is the higher representation of girls in the analysis sample (64%) compared with the full *mDiary* sample (55%), which is consistent with other survey research showing girls' higher proclivity to persist in longitudinal studies and to report partner names (Goldberg et al., 2019a). Also, compared with the full sample, white teens are slightly overrepresented and black teens underrepresented in the analysis sample, but differences between the high persistence and analysis sample are negligible.

There is evidence of positive bias in the socioeconomic composition and family structure of teens in the analysis sample compared with the full mDiary sample, but differences between the highly persistent and analysis sample are minimal. Teens with college-educated mothers and those living with two parents are overrepresented in the high persistence and analysis samples compared with the full sample, and teens born to mothers not married or cohabiting are underrepresented. Neither the share of foreign-born mothers or primary caregiver's relationship instability differed across the three samples.

Table 1 Characteristics of full mDiary and analysis samples (means (SD)/ percentages)

	Full mDiary sample	High persistence sample*	Analysis sample**
N (%)	531 (100%)	309 (58%)	212 (40%)
Socio-demographic Characteristics			
% Female	55.2	58.3	63.7
Race/ethnicity			
% White	27.7	33.0	34.9
% Black	32.0	28.5	25.5
% Hispanic	26.7	25.2	25.5
% Other	13.6	13.3	14.2
% Living with two parents	63.1	68.0	68.9
Mom's education			
% Less than HS	23.5	17.1	15.1
% HS grad	27.9	26.9	29.0
% Some college	31.5	34.2	34.9
% College grad or higher	17.1	21.8	21.1
% Mom foreign born	18.1	18.8	17.9
% Mom not married or cohabiting at birth	34.7	31.1	26.9
Mom's partner transitions	0.5	0.5	0.6
(s.d.)	(0.9)	(0.8)	(0.9)
Teen Dating Experiences			
% Ever dated at baseline	73.3	69.9	69.3
% Age at first date <13	27.1	24.6	25.0
% All/most friends date	41.4	42.1	44.8
% Parents approve dating	61.0	61.2	62.7
Affect in Past 2 Weeks at Final Diary			
Felt sad			
Never or rarely	46.7	46.8	46.7
Sometimes	42.7	43.2	43.5
A lot of the time or most of the time	10.5	10.0	9.7
Felt happy			
Never, rarely, or sometimes	28.5	27.2	25.1
A lot of the time	22.2	22.9	24.6
Most of the time	49.3	49.8	50.2

Source: mDiary Study of Adolescent Relationships and Fragile Families and Child Wellbeing Study

*Includes respondents who answered 22 or more diaries

**Analysis sample excludes cases with unnamed partners and cases missing diaries that could not be reliably imputed

There is no evidence of selection bias in adolescents' prior dating experiences. Approximately 7 in 10 teens dated prior to enrolling in *mDiary*, and between 41% (full sample) and 45% (analysis sample) reported that all or most of their friends date. Further, over 60% of respondents indicated that their parents approve of dating (61% of all *mDiary* respondents vs. 63% of teens in the analysis sample). Finally, the distribution of positive and negative affect is virtually identical across the three samples.

Relationship Status Trajectories

Figure 2 displays relationship status trajectories based on bi-weekly reports for an illustrative subset of respondents, where D = dating; F = friends with benefits; T = talking/flirting; O = other; C = crush; N = noninvolvement and the accompanying numbers indicate the named partner number. In all, teens in the analysis sample recorded 5,300 diary-statuses (212*25). Except for the 26 (12%) teens who dated the same partner in 24–25 diaries and the 21 (10%) teens

that reported no relationships or crushes, most adolescents experienced some level of flux in their relationship statuses during the year, especially those who reported multiple partners.

Relationship status trajectories shown in Fig. 2 were selected to illustrate variations in both relationship statuses and partners over the observation period. For example, the first trajectory (#122) portrays a stable dating relationship with a single partner, while the following trajectory (#106) reveals no romantic involvement during the observation period. Respondents experienced varying levels of flux in their romantic experiences, with different break-up patterns. For example, respondent #115 illustrates a "clean" dissolution of a dating relationship followed by a period of noninvolvement. For respondent #100, dissolution of the first partnership was likely asymmetrical, as indicated by the status change to talking/flirting and lingering crush after dating ceased. Following a short hiatus that included a second partnership which did not advance beyond talking, this respondent began dating a third partner following a brief talking/flirting episode. Respondent #113 named three partners that included an unrequited crush following a breakup, and a third partnership initiated with a brief talking/flirting period followed by three months of stable dating. The latter two cases illustrate relationship flux often missed by studies that rely on annual, retrospective measurements. Both cases began and ended the year in stable dating relationships but involved three different partners and episodes of noninvolvement and unreciprocated crushes.

About half of teens who were romantically involved during the observation period reported three or more partners, yet even those with one or two partners experienced some relationship volatility. Respondents #103 and #108 both reported dating a single partner but experienced some flux during the year, as indicated by episodes of "talking", friends with benefits, or a liminal status with the same partner. Trajectory #109 illustrates churning—in this instance a spell involving a 3-month crush on a second partner followed by reconciliation with the original partner that involved periods of dating and friends with benefits.

As revealed in lower rows of Fig. 2, the most complex relationship trajectories correspond to respondents who named three or more partners. For instance, respondent #111 reported four partners, beginning with a dating relationship (partner 1) that was followed by several months of "talking/flirting" with the same partner. The attraction with the second partner never advanced beyond talking/flirting and was followed by a 4-month dating spell with a third partner. Following an asymmetrical break-up, a fourth partnership began with talking/flirting and evolved to a dating relationship. For this teen, relationship status snapshots indicating dating at the start and end of the study would miss considerable flux in both the seriousness of the relationships as well as the number of partners involved. The last trajectory (#117) illustrates relationship instability. For this teen, the relationship involving the fifth named partner began with a crush but soon transitioned to intermittent spells of friends with benefits, relationship ambivalence, dissolution, and finally dating.

Relationship Trajectory Profiles

Latent profile analysis (LPA) is used to ascertain whether there are discernible patterns in the heterogeneous relationship status trajectories illustrated in Fig. 2. Selection of the optimal LPA solution relied on log likelihood ratios, Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC) associated with each profile solution, and profile sizes associated with each solution (Ferguson et al., 2020). In addition, theoretically and substantively meaningful considerations guided selection of the most parsimonious solution (Spurk et al., 2020). As shown in Table 2, the 5-, 6-, and 7-profile solutions yielded the largest log-likelihood ratios and the lowest AIC and BIC values, but differences between them in model fit statistics were negligible. The 5-profile solution generated one profile that was not substantively interpretable, aggregated two meaningfully distinct profiles, and produced two profiles

Table 2 Latent profile analysis model selection statistics ($N = 212$)

Solution	Log likelihood	AIC	BIC	Profile: *n*
4-Profiles	−2421.1	4918.1	5045.7	1: 71
				2: 43
				3: 65
				4: 33
5-Profiles	−2339.2	4766.5	4914.2	1: 73
				2: 13
				3: 70
				4: 44
				5: 12
6-Profiles	−2325.4	4750.8	4918.7	1: 56
				2: 30
				3: 19
				4: 49
				5: 12
				6: 46
7-Profiles	−2309.0	4730.1	4918.0	1: 46
				2: 42
				3: 24
				4: 52
				5: 20
				6: 18
				7: 10

Source: mDiary Study of Adolescent Relationships

Table 3 Mean status counts of romantic relationship latent profiles (standard deviations in parentheses)

	Latent Profile Membership						
	Stable Daters	Unstable Daters	Searchers	Idlers	Dreamers	Delayers	Total Sample
Profile *N* (Sample %)	56 (26%)	30 (14%)	19 (9%)	49 (23%)	12 (6%)	46 (22%)	212 (100%)
Diary counts							
Named partner count (s.d.)	1.2 (0.4)	2.6 (1.4)	3.7 (2.1)	1.8 (1.4)	1.6 (1.4)	0.2 (0.5)	1.6 (1.5)
Dating count (s.d.)	**22.5 (2.5)**	**12.7 (2.6)**	2.2 (2.8)	1.4 (2.3)	0.4 (1.2)	0.1 (0.4)	8.3 (9.7)
Friends with benefits count (s.d.)	0.3 (0.9)	0.6 (1.0)	0.8 (1.8)	0.4 (0.9)	0.4 (1.0)	0.0 (0.2)	0.4 (1.0)
Talk, flirt, other count (s.d.)	1.0 (1.4)	5.6 (3.0)	**15.2 (4.2)**	3.4 (3.2)	3.7 (3.0)	0.2 (0.6)	3.5 (4.8)
Crush count (s.d.)	0.4 (2.0)	2.6 (3.0)	3.2 (2.6)	4.4 (3.2)	**16.4 (4.3)**	1.3 (1.6)	3.0 (4.4)
No relationship count (s.d.)	0.6 (1.1)	3.3 (3.2)	3.5 (3.5)	**15.5 (2.9)**	3.7 (3.0)	**23.5 (1.8)**	9.8 (9.4)

Source: mDiary Study of Adolescent Relationships

Modal status counts for each profile appear in bold

comprised of fewer than 15 teens. The 6- and 7-profile solutions each generated one small profile ($n = 12$ and $n = 10$, respectively); however, because the 7-profile solution also yielded one profile that was substantively incoherent as well as an amorphous profile that aggregated distinct combinations of relationship status counts, the 6-profile solution was selected as the most statistically defensible model that also yielded the best substantively interpretable profiles.

Table 3 shows mean diary counts for the number of partners and each of the five relationship statuses. Teens designated *stable daters* averaged 1.2 partners and involvement in a dating relationship during 88% of the observation period on average (22/25 diaries). By contrast, *delayers* averaged romantic involvement in less than 10% of the diaries. Even liminal statuses (taking/flirting/other and crushes) were infrequent among the *delayers*. *Stable daters* and *delayers* accounted for 26% and 22% of the analysis sample, respectively.

Teens in the remaining four profiles, arrayed according to mean number of dating counts, experienced greater relationship instability than *stable daters* and *delayers*, as evident in the larger number of named partners. Representing 14% of respondents, *unstable daters* averaged 2.6 partners over the year, reported dating relationships during about half the year, and averaged approximately 12 weeks in talking/flirting/other status. *Searchers* experienced the most partner turnover, averaging four named partners, but limited dating. *Searchers* reported talking/flirting or another liminal status for over half of the study period, yet also exhibited the highest incidence of friends with benefits—about twice the sample average. *Idlers* differ from *searchers* not only in their higher prevalence of noninvolvement (15.5 vs. 3.5 diaries, respectively), but also in the incidence of liminal statuses. On average, *searchers* reported talking/flirting or another liminal status for more than 30 weeks, compared with 6 weeks for *idlers*. *Dreamers* named a similar number of partners as *idlers*; however, their relationships were largely aspirational, as indicated both by the lower incidence of dating and the higher incidence of liminal statuses: *dreamers* reported talking/flirting in 8 diaries, on average, versus 6 for *idlers* and, more notably, crushes in 16.4 diaries compared with 4.4 for *idlers*.

Multinomial Regression Analysis

Table 4 presents results from the multinomial logistic regression of latent profile membership on the demographic, socioeconomic, and prior dating experiences using *stable daters* as the reference group. The relative risk ratios (RRR) indicate whether the probability of membership in a specific profile is higher (RRR > 1) or lower (RRR < 1) than the probability of being a stable dater.

Compared with boys, girls have a lower probability of being *idlers* (RRR = 0.3; $p < 0.01$) and *delayers* (RRR = 0.3; $p < 0.05$) relative to being *stable daters*. Relationship trajectories during middle adolescence also differ along racial and ethnic lines. Black teens have a higher probability than White teens of being *unstable daters* (RRR = 5.5; $p < 0.05$) and *dreamers* (RRR = 9.0; $p < 0.05$) relative to being *stable daters*. Compared with their White age counterparts, Hispanics have a higher probability of being *searchers* (RRR = 5.8; $p < 0.05$) than *stable daters*. Dating at young ages and parental approval of dating also were associated with relationship trajectories during middle adolescence, but unequally among the relationship profiles. Teens that began dating before 13 experienced a lower probability of being *idlers* (RRR = 0.3; $p < 0.05$) and *delayers* (RRR = 0.3; $p < 0.05$) relative to being *stable daters*. Compared with adolescents whose parents did not approve of dating, teens whose parents did approve of

Table 4 Multinomial relative risk ratios of latent profile membership: reference group = Stable Daters (S.E in Parentheses; $N = 207$)

	Latent Profile Membership									
	Unstable Daters		Searchers		Idlers		Dreamers		Delayers	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Socio-demographic Characteristics										
Female	1.2	(0.7)	0.7	(0.5)	0.3**	(0.1)	0.3	(0.3)	0.3*	(0.2)
Race (White)										
Black	5.5*	(3.9)	4.0	(3.5)	1.5	(1.0)	9.0*	(9.8)	2.6	(1.7)
Hispanic	3.7	(2.8)	5.8*	(5.0)	1.6	(1.0)	5.1	(6.2)	1.2	(0.8)
Other	3.0	(2.6)	0.0	(0.0)	1.1	(0.8)	2.7	(3.4)	1.0	(0.8)
Living with two parents	1.2	(0.7)	0.3	(0.2)	0.9	(0.5)	0.7	(0.6)	1.0	(0.7)
Mom's education (Less than HS)										
HS grad	1.9	(1.5)	0.3	(0.3)	1.3	(0.9)	3.3	(4.5)	0.9	(0.7)
Some college	1.3	(1.1)	1.0	(1.0)	2.0	(1.4)	1.9	(2.7)	1.9	(1.4)
College grad or higher	3.2	(3.2)	3.8	(4.1)	4.2	(3.5)	7.9	(11.4)	4.8	(4.0)
Mom foreign born	0.6	(0.5)	0.4	(0.4)	0.8	(0.5)	1.0	(1.0)	0.9	(0.7)
Mom not married or cohabiting at birth	0.9	(0.6)	1.3	(0.9)	0.9	(0.5)	1.0	(0.9)	1.3	(0.7)
Mom's partner transitions	1.2	(0.4)	1.1	(0.4)	1.1	(0.3)	0.4	(0.3)	1.3	(0.4)
Teen Dating Experiences										
Age first date <13/don't remember	0.4	(0.3)	0.3	(0.2)	0.3*	(0.2)	0.3	(0.2)	0.3*	(0.2)
All/most friends date	0.9	(0.5)	1.4	(0.9)	0.8	(0.4)	0.3	(0.3)	0.4	(0.2)
Parents approve dating	0.5	(0.3)	0.1**	(0.1)	0.3*	(0.1)	0.2	(0.2)	0.2**	(0.1)
Pseudo R^2										0.14
P										*

Source: mDiary Study of Adolescent Relationships and Fragile Families and Child Wellbeing Study

*$p \le 0.05$ **$p \le 0.01$

dating had a lower probability of being *idlers* (RRR = 0.3; $p < 0.05$), *delayers* (RRR = 0.2; $p < 0.01$) or *searchers* (RRR = 0.1; $p < 0.01$) relative to being *stable daters*. Latent profile membership was not associated with socioeconomic status, family structure, primary caregiver partnership instability, or whether most of their peers date.

Links Between Relationship Trajectory Latent Profiles and Affect

Table 5, which presents results from the ordered logit models predicting happiness and sadness by relationship status trajectories, is designed to showcase contrasts among the latent profiles. The ordered logit regressions control for the demographic, socioeconomic and relationship experiences reported in Tables 1 and 4 but are not reported in the interest of parsimony. Associations between the relationship status trajectory profiles and both positive and negative affect reveal few significant contrasts; however, the patterns of association are consistent with prior research. Controlling for affect at baseline, there were no significant differences in affect at endline between *stable daters* and *idlers*, *dreamers*, or *delayers*. Unstable relationship trajectories, however, were associated with lower levels of positive affect and higher levels of negative affect. *Unstable daters* reported a higher frequency of sadness than their peers in stable dating relationships.

Although the coefficient for *searchers* relative to *stable daters* was similar to that of *unstable daters*, the small number of *searchers* likely limited statistical power. *Searchers* reported lower levels of happiness than *stable daters*, *dreamers*, and even *unstable daters*. *Delayers* reported significantly lower levels of happiness than *unstable daters*, but differences in levels of sadness were not statistically significant. Except for a negative association between gender and happiness, with girls reporting less happiness than boys, the background and dating experience measures were not significantly associated with either positive or negative affect (results available upon request).

Robustness Checks

To evaluate the imputation of relationship status when diaries were not submitted, cluster analyses were conducted on the subset of respondents who answered all 25 diaries

Table 5 Ordered logit models predicting happiness and sadness by romantic relationship latent profile

Outcome and reference	Relationship Trajectory Cluster Contrasts												Pseudo R^2	*p*
	Stable Daters		Unstable Daters		Searchers		Idlers		Dreamers		Delayers			
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE		
Panel A: Sadness ($N = 201$)													0.19	***
Stable daters	–	–												
Unstable daters	−1.10*	(0.50)	–	–										
Searchers	−1.07	(0.63)	0.03	(0.66)	–	–								
Idlers	−0.09	(0.45)	1.02*	(0.52)	0.99	(0.62)	–	–						
Dreamers	−0.33	(0.81)	0.77	(0.84)	0.75	(0.90)	−0.24	(0.81)	–	–				
Delayers	−0.27	(0.50)	0.83	(0.55)	0.80	(0.63)	−0.19	(0.48)	0.06	(0.82)	–	–		
Panel B: Happiness ($N = 200$)													0.20	***
Stable daters	–	–												
Unstable daters	−0.78	(0.53)	–	–										
Searchers	1.49*	(0.63)	2.27**	(0.71)	–	–								
Idlers	0.29	(0.45)	1.07	(0.55)	−1.19	(0.62)	–	–						
Dreamers	−0.22	(0.70)	0.56	(0.74)	−1.70*	(0.81)	−0.51	(0.69)	–	–				
Delayers	0.37	(0.48)	1.15*	(0.62)	−1.12	(0.62)	0.08	(0.47)	0.59	(0.69)	–	–		

Source: mDiary Study of Adolescent Relationships and Fragile Families and Child Wellbeing Study

SE standard errors; All contrasts control for sociodemographic measures, age at first date, all/most friends date, and parents approve of dating, plus the baseline happiness and sadness measures; Gender is significantly associated with happiness (girls are less happy) but none of the other covariates attain statistical significance; $^{*}p \le 0.05$ $^{**}p \le 0.01$ $^{***}p \le 0.001$

and provided identifiers for all partners. The reduced sample size ($n = 152$) generated a five-cluster solution that was very similar to the six-cluster solution. The main difference was that the larger sample size permitted a clearer differentiation between *dreamer*s and *idlers*. Regressions of the five-profile solution on affect yielded results virtually identical to those based on the six-cluster solution, with the notable exception that *dreamers* exhibited also lower levels of happiness than *unstable daters*.

Discussion

Romantic relationships are a central component of normative adolescent development, but prior studies have focused on a narrow set of relationship statuses, largely ignoring short-lived and liminal statuses that are key to the search and screen process. Coarse temporal measurement and reliance on retrospective reports of romantic involvement has limited understanding of the extent of flux in adolescents' relationship trajectories. Because romantic experiences are more fluid and heterogeneous during middle adolescence than at any other life stage, numerous scholars have suggested a need to portray adolescents' romantic relationships using frequent measurement over time rather than as snapshots based on single or periodic measurements. Diary methods are well suited to uncover the character and fluidity of romantic experiences during middle adolescence. The analyses revealed enormous heterogeneity and flux in the romantic experiences of 16-year-olds and the latent profile analysis disclosed substantively meaningful patterns in the annual trajectories that were consequential for positive and negative affect.

Studies that use annual measurements to capture romantic experiences during middle adolescence miss relationship instability that is consequential for teens' emotional health. Relationship status trajectories based on bi-weekly measurements reveal considerable heterogeneity over 12 months, with many involving multiple relationship statuses within and across partners, and others involving liminal statuses and crushes that, in turn, are associated with teens' happiness and sadness. During the observation period, over 75% of 16-year-olds reported one or more relationship status changes during the observation period, with some teens experiencing considerable turnover in both partners and relationship statuses. In fact, over half (56%) of teens who reported the same relationship status at the start and end of the study experienced one or more changes in

relationship status and/or romantic partners. Adolescents averaged 1.6 partners; however, unstable daters and searchers averaged 2.6 and 3.7 named partners, respectively. At the other extreme, and emblematic of the heterogeneity of middle adolescence, 45% of teens followed trajectories characterized primarily by lack of romantic involvement across the year consistent with findings in prior work. Overall, the relationship trajectories illustrate the vast heterogeneity of romantic experiences during middle adolescence, suggesting that lack of romantic involvement is as important as accounting for stable and unstable involvement.

Using diary methods to characterize heterogeneity and flux in relationship trajectories permits more precise temporal ordering of the interplay between romantic experiences and other aspects of teens' lives than is possible using conventional survey methods. For example, adolescents who experienced unstable relationship trajectories also reported the most sadness and the least happiness at the study endline. *Unstable daters* reported the most sadness at endline, and teens whose trajectories were marked by flux across all relationship statuses (*searchers)* were the least happy at the end of the year. Positive and negative affect of *stable daters* did not differ significantly from adolescents who forewent relationships and crushes (*delayers*) or who principally reported liminal statuses with less flux (*idlers* and *dreamers*) but it is unclear whether lack of significant associations among *idlers* and *dreamers* are substantive or due to underpowered analyses.

On balance, however, these findings add to prior literature linking relationship quality to sadness and happiness by showing that romantic trajectories during middle adolescence also are consequential for teens' positive and negative affect. Associations between relationship trajectories and affect reveal that unstable involvement is associated with negative and positive affect, which is consistent with studies that directly link relationship quality with sadness and happiness. It is conceivable that cross-sectional associations between adolescents' romantic involvement and depression reported in prior studies capture variations in tumult.

There are several limitations to the study. Although inferences cannot be generalized beyond the analysis sample, there is also some evidence of selection bias. The most notable is sex composition because females comprise two thirds of the analysis sample compared with 55% of the full *mDiary* sample and 58% of the highly compliant respondents. Multivariate analyses showing gender differences in associations with latent profile membership may partly capture the higher propensity of girls to respond to the diaries and to report partner names. Neither the birth cohort nor diary studies include information about gender identity or sexual orientation, however both studies recorded same-sex attractions. Sample size precluded examination of same sex romantic attractions because only a small share of respondents indicated they had ever been attracted to a member of their assigned sex. Supplementary analyses, however, revealed that same-sex attraction was not associated with latent profile membership.

Although latent profile analysis is the appropriate method for ascertaining the presence and substantive coherence in adolescents' romantic relationship trajectories, this approach comes at the expense of investigating variations in relationship quality or intimacy, which require using relationships rather than teens as analytic units. Another study limitation is the inability to precisely account for the temporal ordering of relationship instability with fluctuations in affect. A data check on the distribution of relationship flux among the *unstable daters* and *searchers* showed that instability was not concentrated at either end of the observation period, which provides confidence that links with affect were due to trajectory instability during the year rather than the beginning and end of the observation period.

Conclusion

Adolescents' romantic relationships during middle adolescence are more complex and fluid than past studies revealed. Moreover, focusing on only serious and/or long-term relationships, as in most studies with adolescents, ignores liminal romantic attractions that are consequential for teens' positive and negative affect. Using bi-weekly measurements to record a range of relationship statuses over 52 weeks, the present study reveals extensive heterogeneity and flux in romantic relationship trajectories during middle adolescence. During the 12-month observation period, half of teens either were in stable dating relationships or uninvolved romantically; however, half experienced variable levels of flux in their love lives. Relationship instability, not romantic involvement per se, is associated with affect. Snapshots of teen romantic involvement based on one or two points in time not only obscure patterns of stability and flux, but potentially distort associations with happiness and sadness.

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Authors' Contributions M.T. contributed to the design of the study and drafted the manuscript; S.I.V. conducted the final statistical analyses and robustness checks and drafted the methods and multivariate analyses sections; R.E.G. supervised data collection and relationship coding and collaborated on data analysis and writing the background and results; D.K. contributed to the design of the study and developed code for the relationship trajectories. All authors edited, reviewed, and approved the final manuscript.

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Data Sharing and Declaration The FFCWS survey data used in this study are available at the Office of Population Research Data Archive hosted by Princeton University. https://opr.princeton.edu/Archive/FF/ The *mDiary* data will be made available at a future date.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval This study has been approved by Princeton University's Institutional Review Board (IRB certificate #7214).

Informed Consent Informed consent and assent were obtained by the Princeton University Survey Center using either signed consent forms or verbal parent consent and teen assent. Parent consent was attained before soliciting assent from adolescents.

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