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Continued and On-Time Participation  
in a Weekly Online Survey

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## Abstract

As longitudinal measurement becomes more intensive – particularly with the increase in Internet-based interviewing – convincing respondents to continue participating may become more difficult. We analyze data from a weekly longitudinal panel to identify factors in the rate of continued participation and the probability of on-time response to weekly surveys. We find the same individual-level characteristics that typify continued participation in less frequent longitudinal data collection (e.g., race, SES) also predict continued participation in this study. These variables, along with personality characteristics, also influence on-time responses to weekly surveys. Minority, low-SES, extroverted, and less conscientious respondents are less timely. But we also find that some factors central to the study – for example, having many sexual partners during the study – were associated with *both* more completed interviews *and* late interviews. Changes in behaviors key to our study – such as sexual partners, contraceptive use, and pregnancy – are associated with a delay in the subsequent interview.

## INTRODUCTION

Social scientists have long recognized the importance of measuring dynamic aspects of social behavior over sustained periods to gain insights on key areas of social life. For example, the National Survey of Family Growth has been collecting information about relationships, sex, and contraceptive use retrospectively, using a life history calendar (Mosher 1998), since 1995. The National Longitudinal Survey of Youth has been collecting yearly or biennial data on individuals and their children since 1979 (Wu and Li 1995). These data, along with new longitudinal datasets in the 1980s such as the National Survey of Families and Households and the Intergenerational Panel Study, were used to make important discoveries about how an individual's past may influence his or her future – for example, the intergenerational consequences of divorce (Bumpass and Martin 1991; Thornton 1991), the risk of divorce following premarital cohabitation (Axinn and Thornton 1992; Bramlett and Mosher 2002; Manning and Cohen 2012), and the evolving relationship between cohabitation and childbearing (Bumpass and Lu 2000; Manning 1995).

This recognition has led to increases in both the frequency and the duration of longitudinal data collections to better capture the temporal dynamics of behaviors. For example, the five-wave Fragile Families study has dramatically increased knowledge of the consequences of parents' behavior for children's well-being by collecting longitudinal data from families approximately every two years beginning with the birth of a child (McLanahan et al. 2010). Add Health, consisting of four waves, has revolutionized our understanding of the trajectory of young adult relationships and health, broadly construed, by measuring young adults' behaviors at intervals of between one and six years (e.g., Harris 2010; Meier & Allen, 2009; Raley et al., 2007).

Studies focused on events and points in the life course that are particularly dynamic have collected even more frequent data. The first "intensive" longitudinal data<sup>1</sup> collections used pagers (beepers) to collect timed or event-driven data (Larson and Csikszentmihalyi 1983). Today, web- and smartphone-based technologies greatly facilitate frequent collection (Walls and Schafer 2006). And as these technologies become less expensive and more pervasive, intensive longitudinal data collection is likely to become a more common approach in social science research (Couper and Miller 2008).

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<sup>1</sup> Intensive longitudinal data is often defined as at least 40 observations. For a comprehensive overview, see (Walls and Schafer 2006).

The Relationship Dynamics and Social Life (RDSL) study – focused on the associations among attitudes, relationships, contraception, and pregnancy – collected *weekly* data from 18- and 19-year-old women for 2.5 years. By shrinking the reporting period to a single week, the study greatly increases researchers' ability to analyze the sequence of events surrounding key study variables and to identify reciprocal relationships among attitudes and behaviors.

Diary-based methods of data collection – in which respondents are asked to record events more or less as they occur – have been used for the measurement of a wide variety of frequent behaviors such as alcohol consumption (Lemmens et al. 1988); sexual behavior (Baer et al. 2002; Coxon 1999; Garry et al. 2002; Jaccard et al. 2002; Searles et al. 2000), infant feeding practices (Zhang et al. 2012), and travel (Axhausen et al. 2002). Salient to this analysis, Schroder et al. (2003) review the advantages and disadvantages of using diaries specifically for measuring sexual behaviors. Internet-based methods of making frequent timed or event-triggered data collections also have been used successfully in the past (Baer et al. 2002).

All data collection strategies have strengths and weaknesses. One obvious risk of methods with frequent measurement is the potential that respondents will feel burdened by the task and will not continue in the study or will not complete interviews in a timely manner. Much research has addressed the causes and consequences of continued participation in multi-wave studies, as attrition affects the extent to which the sample remaining at the end of the study represents the initial sampling frame (e.g., Fitzgerald et al. 1998; Lillard and Panis 1998). Little research, however, has addressed attrition in a population-based *intensive* longitudinal study.

Analyses of factors affecting on-time participation, an issue that is especially crucial to longitudinal designs with frequent measurement, is also lacking. Computer-based interviewing methods now allow tailoring survey questions to reflect late or skipped participation by referring to the period since the respondent's last interview. However, at some point, late participation in frequent data collections weakens the data set. For example, a weekly survey in which only one in four interviews is completed becomes a monthly survey. Little is known about the differences between respondents who complete frequent surveys in a timely manner and respondents who do not.

In this analysis, we examine factors associated with continued and on-time participation in the RDSL study – an intensive longitudinal data collection project in which respondents were asked to complete a 5-minute survey (a journal) each week for 130 weeks. We analyze the differential rate of continued participation (attrition) and probability of on-time responses to the weekly surveys based on participant characteristics and the experiences they reported during the course of the study.

## THE STUDY

The RDSL is based on population-based sample of 1,003 respondents. The sample was randomly selected from a list of young women, ages 18 and 19, who held a driver's license or a Personal Identification Card (PID), from a single county in Michigan. The list was provided by the Michigan Department of State. The list-based sampling method was a cost-based decision – because of the relatively sparse distribution of 18 to 19-year-olds in the general population, a list allowed us to avoid screening a large number of households. Comparison of the driver's license and PID data by zip code to 2000 census-based projections revealed 96% agreement between the frame count and the projections for this population (authors' calculations).

A 60-minute face-to-face baseline survey interview was conducted between March 2008 and July 2009 to assess important aspects of family background, demographics, attitudes, romantic relationships, education, and career trajectories. At the conclusion of this baseline interview, respondents were invited to participate in a journal-based survey every week for 2.5 years. Each week respondents could elect to complete the journal online or with an interviewer via phone. The journal portion of the study concluded in January 2012.

RDSL researchers took several steps to minimize attrition and nonresponse in the study. Allowing the respondent to choose the mode of interview was the first step – research clearly demonstrates that tailoring the mode to the respondent can powerfully reduce nonresponse (Groves and Couper 1998; Groves et al. 2004).

Incentives were the second step toward reducing attrition. Respondents were paid \$1 per weekly journal with \$5 bonuses for on-time completion of five weekly journals in a row. Journal incentives were distributed via reloadable, prepaid debit cards. Our research suggests that the convenience of the cards encouraged continued participation (Gatny et al. 2009). Respondents also received small tokens of appreciation for their continued participation in the journal study, such as a pen, compact, lip balm, etc. We also provided regular “respondent reports” on current study findings because, in our previous ethnographic work, we found that the 18-year-old participants expressed their desire for updates on the research to which they were contributing. We also developed procedures to help respondents remember to do their journals. Figure 1 summarizes this protocol. The day a journal is completed is considered “Day 0.” The next journal became available on the study's website five days later, on day 5. On day 7, respondents received an automated invitation to complete the next journal via the method they chose to receive the invitation (text, email, or both). These automated invitations recurred until day 10, when the reminder mode was switched to

telephone. A second reminder call was made on day 12 and, if the journal was still not completed, a new invitation was sent via email/text on day 14. This pattern of invitations and reminders was repeated until the respondent completed another journal interview or explicitly asked to be removed from the study. To supplement the automated email/text reminder protocol, we mailed “refusal conversion packets” that included a letter and a small gift (e.g., pen, compact, lip balm) on day 30, 60, 90, and 120, and, in addition, offered respondents a cash bonus for completing the next journal (\$10 at day 60, \$20 at day 90, or \$30 at day 120).

These steps, along with the cooperative nature of this age group and their interest in the subject matter, resulted in an 83% response rate and a 93% cooperation rate (among located women) for the baseline interviews. Over 99% of respondents who completed a baseline interview enrolled in the weekly journal portion of the study (N=992), and 75% of these respondents remained in the journal study for at least 18 months. Of the 130,398 possible weekly journals (1,003 respondents x 130 weeks/respondent), 58,594 (45%) were completed. Because weekly survey questions were adjusted to refer to the period since the last interview, for up to two weeks between surveys, this resulted in only a modest number of missing weeks. Item-specific missing data in the weekly interviews was also quite low at 3%.

## ANALYSIS

### Respondent-Specific Models

Our first set of analyses focus on continued participation in the study. We model the respondent’s hazard of completing an additional journal interview – the opposite of dropping out of the study. Because we use discrete-time methods and logistic regression to estimate these models, person-days are the unit of analysis. Each person-day is coded 1 or 0 – if the respondent ever completed an additional interview after that day (i.e., if she continued to participate after the current interview), it is coded 1. If the respondent did not complete any additional journal interviews after that day (i.e., that day represents her last day in the study), it is coded 0. These models take the form

$$\text{logit}(p_{it}) = \beta_{0t} + \beta_{1t}\text{InterviewNumber} + \boldsymbol{\gamma} \cdot \mathbf{X}_i$$

where  $p_{it}$  is respondent  $i$ ’s conditional probability of completing an additional journal interview in week  $t$ , given that she completed a journal interview *before* week  $t$ .  $\beta_{1t}$  is the parameter indicating the association between the (time-varying) number of interviews a respondent has completed and the probability of completing an additional interview.  $\mathbf{X}_i$  is a vector of characteristics of respondent  $i$  that do not change over time. The hazard of completing an additional journal interview can be interpreted

as the opposite of the drop-out rate<sup>2</sup>, or the time spent (in days) in the study. In other words, fewer days in the study is equivalent to dropping out before the end of the study. Respondents remained in the study for an average of 741 days, slightly more than two years. Table 1 presents descriptive statistics for all variables used in these analyses.

On-time participation is the focus of the next analyses. We use OLS regression to estimate models of two measures: the total number of journal interviews completed for each respondent and the proportion of a respondent's interviews that were completed "on time", defined as within 14 days of the prior interview.<sup>3</sup> The mean number of journal interviews per respondent was 61. The mean percentage of interviews completed on time, across all respondents, was 78%. The statistical models for both of these outcomes take the form

$$Y_i = \beta_0 + \boldsymbol{\gamma}^* \mathbf{X}_i + \varepsilon_i,$$

where  $\mathbf{X}_i$  is again a vector of respondent-level characteristics.  $\varepsilon_i$  are the residual errors.

### Week-Specific Models

We also analyze two week-specific<sup>4</sup> variables representing on-time completion, a dichotomous indicator of whether the journal interview was late, and the time since last interview (measured in days). Because these measures are specific to the week of interview, they allow for an analysis of whether events that occurred just prior to the interview may have influenced the probability of late completion.

First, we use multilevel logistic regression (estimated using the SURVEYLOGISTIC procedure in SAS) to estimate the log-odds of the interview being late, which accounts for the nesting of interviews within respondents. This model takes the form

$$\text{logit}(p_{it}) = \beta_{0t} + \boldsymbol{\gamma}^* \mathbf{X}_i + \boldsymbol{\delta}^* \mathbf{Z}_{it}$$

where  $p_{it}$  is the probability of a journal interview being late,  $\mathbf{X}_i$  is a set of non-time-varying characteristics of individual  $i$ , and  $\mathbf{Z}_{it}$  is a set of time-varying characteristics associated with journal interview  $t$ , for each individual  $i$ . These models estimate effects on the probability of a particular

<sup>2</sup> Because the probability of *not* completing an additional interview is so small for each specific day, the hazard is very similar to the rate.

<sup>3</sup> We define 14+ days as "late" because journal interviews that occurred within this period adjust the reference period to the prior journal interview. In other words, there is no missing data for these interviews. If the interview occurred at 14 days or later, the reference period is the prior week only.

<sup>4</sup> We refer to the period as a week, as shorthand, even though it may vary from five to thirteen days.



journal interview being late, as a function of characteristics of the individual completing the interview ( $\mathbf{X}_i$ ), but also as a function of the events that occurred since the prior journal interview ( $\mathbf{Z}_{it}$ ). The overall percent of weekly interviews that were late is 11%.

Finally, we examine the hazard of, or time to, completing the next journal. We use multilevel logistic regression to estimate models of the time (in days) until the next journal interview, accounting for the nesting of journal interviews within respondents. Journal-days are the unit of analysis. The model is as follows

$$\text{logit}(p_{itd}) = \beta_{0td} + \gamma \mathbf{X}_i + \delta \mathbf{Z}_{it}$$

where  $p_{itd}$  is respondent  $i$ 's conditional probability of completing journal interview  $t$  on day  $d$ , given that she has not yet completed journal interview  $t$  before day  $d$ .  $\mathbf{X}_i$  is a vector of characteristics of respondent  $i$  that do not change over time.  $\mathbf{Z}_{it}$  is a set of characteristics associated with journal interview  $t$ , for each individual  $i$ . The mean number of days since the prior interview was 10 (median = 8, mode = 7).

### Independent Variables

We investigate four sets of respondent-level variables that do not change over time: (1) sociodemographic characteristics, (3) personality characteristics, (2) contact information/mode, and (4) adolescent experiences (prior to the study) related to pregnancy. Table 1 provides the means for these variables for the 953 respondents who completed the baseline interview and at least one journal interview.

***Sociodemographic characteristics.*** Previous research has documented that respondents from low socioeconomic backgrounds, and minority respondents, are more likely to drop out of panel studies (Lipps 2009; Watson and Wooden 2009). In these analyses, we investigate a large set of sociodemographic characteristics that we have included in other papers using these data. Each of these measures is based on question(s) from the baseline interview.

Approximately one-third of the sample was African American. The sample included very few Latinas, but they are coded according to their answer to the race question – some selected African American, others selected white. Because respondents were sampled at age 18 or 19, many were still enrolled in school; few had time to complete post-secondary education. We use a categorical measure combining enrollment and attainment: 14% were enrolled in high school, 29% were enrolled in a 2-year college/vocational program, 28% were enrolled in 4-year college, 22% had completed high school but were not enrolled in further education, and 8% dropped out of high school and were not

currently attending school. Over one-quarter (26%) of the respondents were receiving public assistance. On average, they rated the importance of religion in their lives 2.69 on a scale of 1 (not important) to 4 (more important than anything else). Over one-half (52%) grew up with two parents, 40% with one biological parent only (no step-parent), and 8% in another arrangement (e.g., with grandparents or an aunt, etc.) Respondents were relatively equally distributed throughout four parental income categories, with 20% not knowing their parents' income. The average age, in months, for all respondents at the time of the baseline interview was 19.19, with a median age of 19.

***Personality characteristics.*** Previous research has also documented the relationship between personality characteristics and attrition. Attrition tends to be low among respondents who are agreeable and/or conscientious and higher among respondents who are extroverted (Costa and McCrae 1992). The baseline interview included a series of 40 questions that measured extraversion, agreeableness, conscientiousness, neuroticism, and intellect/imagination. These items were presented as statements, coded from 1 (strongly disagree) to 5 (strongly agree).

***Contact information/mode.*** Respondents were asked during the first journal interview (completed with the professional interviewer immediately following the baseline interview) to provide a home phone number, cellphone number, and an email address; 84% provided both an email address and a phone number, 16% provided only one or neither. Respondents also selected their preferred automated reminder method for future journals, with 33% electing to receive both a text and an email, and 67% choosing one or neither. Finally, each week respondents could choose whether to complete their interview via phone or web. 12% of interviews were completed by phone. Recall from Figure 1, however, that respondents received only automated reminders for the first ten days after each journal. Many of the journal interviews that were completed by phone resulted from a telephone call reminder – in other words, an interviewer called the respondent on day 10 and attempted to complete the interview during the phone call. Thus, interviews completed by phone had a higher fraction late (20%) than those completed online (10%).

***Adolescent Experiences Related to Pregnancy.*** Although previous research has not linked pregnancy-related experiences to attrition, we explore several salient experiences that occurred *prior to the study period* because these topics were central to the study. For all respondents, 52% reported having had sex by age 16; 60% had two or more sexual partners prior to the study period; 48% had ever had sex without contraception; and 26% had a prior pregnancy, with the majority of those experiencing only one pregnancy.

***Experiences during the study.*** We also investigate a set of measures that may vary with each journal interview – that is, events occurring since the prior interview. Table 1 includes three variables that summarize these experiences. Respondents reported an average of 1.83 new sexual partners during the study. Approximately half (48%) reported having sex without contraception at least once during the study. And 21% reported a pregnancy during the study.

Respondents were asked several questions about sex, partners, contraception, and pregnancy in every weekly journal; each question referred to the week (or specific number of days) since the last journal. Table 2 provides the means for these variables, which are based on the 57,602 journal interviews completed by the 953 respondents. Although in the majority of interviews respondents' answers to these questions in the current week did not change from the prior week, respondents did report transitions over the course of the study. So while 57% of journal interviews indicated no sex in either the current or the prior week, and 27% of interviews indicated sex in both weeks, about 8% of interviews reported transitions from sex to no sex (stopped having sex) and 8% reported transitions from no sex to sex (started having sex). Partner transitions are more complicated to assess, because they involve transitions among a variety of partner statuses. We found that 33% of interviews reported no partner in the current or prior week, 57% indicated a steady partner in both weeks, 4% indicated a switch from a partner to no partner (a break-up), 2% indicated a switch from no partner to a new partner, 1% indicated a switch between partners, 2% indicated a switch from no partner to a former partner, and 1% indicated a switch from a current to a former partner. In terms of contraception, respondents reported *not* using contraception this week or the prior week for 86% of interviews, reported continued use of contraception for 6% of interviews, and reported stopping in 4% and starting in 4% of the interviews. Similarly, respondents continued *not* being pregnant in 95% of the interviews, continued *being* pregnant in 4% of interviews, and in only .4% of the interviews reported beginning or ending a pregnancy.

## RESULTS

### Respondent-Specific Models

Table 3 presents results predicting three different participation variables: the hazard of continued participation in the study, the total number of journal interviews completed, and the proportion of journal interviews completed on time. Column 1 under each dependent variable lists coefficients for models using baseline measures only. Column 2 lists results for models that include three summary measures of experiences during the study period (number of sexual partners, had sex

without contraception, any pregnancies). These nested models allow us to see how experiences during the study may explain the relationship between baseline characteristics and participation.

The first set of models in Table 3 examines continued participation. In this model, negative numbers indicate factors associated with dropping out (non-continuing participation), and positive numbers indicate factors associated with continued participation. Specifically, the coefficients represent the additive effects on the log-odds of completing an additional journal interview, given that a journal interview was completed in the prior week. Because we include a time-varying measure of the number of interviews a respondent has already completed, to represent the baseline hazard of dropping out, the models compare respondents who have been in the study for a similar amount of time in terms of the independent variables.

Several sociodemographic characteristics were negatively associated with continued participation: African Americans, young women who were not enrolled in postsecondary education, and those with teen and/or less-educated mothers remained in the study for a shorter duration. Personality characteristics were not related to the drop-out rate. Respondents who provided both an email address and a phone number stayed in the study longer. Entering the study with a prior pregnancy was not associated with continued participation, but respondents who had *two* prior pregnancies remained in the study for a shorter duration.

Note that the coefficients for sociodemographic characteristics, contact information/reminder mode, and adolescent pregnancy-related experiences are quite similar in the base model and the model that also includes changes during the study period. Thus, respondents' pregnancy-related experiences during the study do not explain the relationship between those variables and the drop-out rate.

Although experiences during the study are not strongly related to continued participation, respondents who reported a pregnancy during the study period remained in the study for a shorter period than their counterparts. Also note that the coefficient for having two prior pregnancies is smaller by 10% in the model that includes a measure of pregnancy during the study period. This suggests that *prior* pregnancy is associated with dropping out of the study in part because respondents with a prior pregnancy have higher rates of pregnancy *during* the study, which is negatively associated with continued participation.

The second set of columns in Table 3 presents OLS regression model results for total number of journal interviews completed by each respondent. This dependent variable combines indicators of both continued participation (total length of time in study is related to number of interviews completed) and timeliness (length of intervals between interviews is related to number of interviews

completed). As such, it captures the quantity and quality of participation and, ultimately, the level of information provided to the study. In this model, positive coefficients indicate a larger number of completed journals at the end of the respondent's participation in the study, and negative coefficients indicate a smaller number of journals.

Multiple variables are associated with the total number of completed interviews. Being African American, not being enrolled in school, having a teen mother, having grown up in an "other" type of family, and being extraverted are all linked to fewer interviews completed. On the other hand, providing both email and phone as contact information, and being conscientious, are linked to completing more journal interviews.

The coefficients for these variables are similar in both the baseline model and the model that also includes transitional experiences during the study, suggesting that these baseline characteristics are associated with the total number of completed journals largely *net of* experiences during the study.

Adolescent pregnancy-related experiences (i.e., pre-study experiences) and changes in those experiences during the study period present a more complex story. Respondents with two or more sexual partners, who ever had sex without contraception, and who experienced two or more pregnancies *as adolescents* completed fewer journals than their peers. However, unlike sexual activity during adolescence, respondents with more new sexual partners and pregnancy(ies) *during the study period* completed *more* journal interviews. Note that the coefficients for adolescent pregnancy-related experiences are slightly smaller in the models that do not include measures of experiences during the study. This is because the adolescent experiences are strongly and positively correlated with the experiences during the study, but experiences during the study are positively correlated with the total number of journals (in contrast with adolescent experiences). We further investigate the effects of these experiences on participation in the week-specific models.

The final two columns in Table 3 present OLS regression models of the proportion of journal interviews completed on time for each respondent. Note that this dependent variable focuses only on timeliness, regardless of the number of journal interviews completed. In this model, positive coefficients indicate a higher proportion of journal interviews completed on time, and negative coefficients indicate a smaller proportion.

The effects of several variables on timeliness are similar to the effects on dropping out of the study. African Americans and those who had quit high school completed a smaller proportion of their interviews on time, as did extraverts and respondents who had two or more sexual partners in adolescence. Conscientious respondents completed a larger proportion of their interviews on time.

Contact information and experiences with sex, contraception, and pregnancy during the study were not related to the proportion of journal interviews completed on time. The coefficients for these measures are similar across models that exclude and include measures of experiences during the study period.

### **Week-Specific Models**

Table 4 presents week-specific models of timely journal interviews, which allow us to use specific events occurring during the prior journal period to predict the lateness of the journal interviews in which these events were reported. In these models, the journal interview is the unit of observation, and the time-varying events refer to the period prior to that interview.

The first column presents estimates of the additive effects on the log-odds of completing the journal interview late (14+ days after the prior interview) based on respondent sociodemographic and personality characteristics, contact information/mode, adolescent (pre-study) experiences, and weekly transitions during the study period. Positive coefficients indicate characteristics associated with completing the journal late, and negative coefficients indicate characteristics associated with completing the journal on time.

The sociodemographic characteristics associated with late interviews closely parallel those associated with dropping out of the study and completing fewer interviews – that is, being African American, not enrolled in post-secondary education, and not conscientious. Providing both email and phone contact information is linked to lower log-odds of late interviews. These coefficients are largely consistent across the models that exclude and that include measures of experiences during the study period, indicating that the associations are independent of what happened during the study. However, having adolescent sex without contraception is associated with late interview completion, and this is partly because of experiences during the study period, as indicated by the substantial decrease across columns. Below, we explore the effects of these experiences during the study period.

Weekly transitions were associated with whether journal interviews were completed late. Nearly all types of weekly change – in terms of sex, partners, contraception, and pregnancy – were associated with a higher log-odds of late journal completion. Weeks in which the respondent stopped having sex, started having sex, broke up with a partner, got a new partner, switched partners, got back together with an old partner, stopped using contraception, got pregnant, or ended a pregnancy are *all* associated with late journal completion. With the exception of sex, continuing in the same state was not related to late journal completion. In other words, although having sex in the prior week

(regardless of whether it is a change from the prior week) is associated with late journal completion, having a partner, using contraception, and being pregnant are *not* associated with late journal completion, except in the first week in which they occur.

Further, although the coefficients for adolescent (pre-study) pregnancy-related experiences are just under the cutoff for statistical significance, except for ever had sex without contraception, the comparison across columns is informative. When measures of weekly transitions are added to the model, these coefficients decrease in magnitude (between 21% and 91%), suggesting that adolescent pregnancy-related experiences are associated with late journal completion partly or mainly because they are related to similar experiences during the study period.

The second model in Table 4 (columns 3 and 4) presents estimates of the time (in days) between journal interviews. Positive coefficients indicate a shorter time and negative coefficients indicate a longer time.

The estimates for time to complete the next interview have a similar relationship to the independent variables as completing the journal interview late, which makes sense given the former measure is a continuous version of the latter dichotomous indicator (late versus not late). The variance in the time between journal interviews tells exactly the same story as the previous columns.

Again, the decrease in magnitude across the columns is striking and consistent. The associations of weekly transitions during the study period to extended time between journal interviews are nearly identically to their associations with the log-odds of late journal completion. And, these weekly experiences explain much of why adolescent pregnancy-related experiences predict lengthier survey intervals.

## **DISCUSSION**

In sum, our findings on duration of participation in an intensive longitudinal survey are consistent with more general findings on survey participation: minority and lower-SES respondents drop out more quickly than others. Personality factors – extraversion, agreeableness, conscientiousness, neuroticism, and intellect/imagination – are not associated with dropping out of the journal study. But we did find that personality is related to level of participation – that is, extraverted respondents completed fewer interviews, completed fewer on time, and had correspondingly longer intervals between interviews, while conscientious respondents completed more interviews, completed more on time, and had shorter intervals between journal interviews. We also found that method of respondent contact was an important factor, with respondents who

provided both an email address *and* a phone number having lower drop-out rates than those who provided only one (or no) contact mode.

Of greatest interest to this particular study, we found that number of sexual partners and sex without contraception were related to interview timeliness, but not to continued participation. Respondents who experienced a pregnancy before or during the study, however, remained in the study for a shorter period than their counterparts. Further, although those who reported risky sexual behavior *before* the study (in adolescence) tended to complete *fewer* and *later* interviews during the study, respondents with riskier sexual behavior *during* the study completed *more* interviews. (The specific weeks when those risky sexual behaviors occurred, however, were associated with late interviews or longer intervals for on-time interviews.) We know from semi-structured interviews and an open-ended question at the end of the journal interview that some respondents found the long-term and repetitive nature of the journal interviews tedious. Several responses to, “Is there anything else you would like to tell us?” at the end of each weekly journal, highlighted this:

*I think that you guys need to ask different questions. I am answered (sic) the same questions over and over again.*

*No but I think you should make the survey shorter or combine it to a couple of pages.*

*Same questions every week!!! Come on.*

We speculate, therefore, that perhaps the frequent interviews may have seemed less burdensome for respondents whose lives included more of the experiences that were the focus of the study. This was also hinted at in some of the responses to the open-ended question at the conclusion of the journal, for example:

*Doing this survey helps me to vent quite a bit because I don't have many people around me that I can tell the whole truth to. So thank you for this opportunity...*

## **LIMITATIONS**

This study of continued and on-time participation in a weekly survey, as well as the RDSL study more generally, has several important limitations. Most important, we lack crucial information about respondents who dropped out of the study. Although we can summarize changes experienced during the period that study drop-outs completed interviews, we do not know what events occurred just prior to their decision to stop participating in interviews. For example, although we found that respondents dropped out at higher rates after reporting a pregnancy, some respondents may have left the study when they discovered they were pregnant but had not yet reported it. We do not believe this



is the case – our study’s pregnancy rates closely resemble the vital statistics rates for this age group in this area – but we cannot rule out this possibility. Further, we do not know what other unmeasured experiences may have contributed to respondents’ decision to drop out.

Second, the narrow geographic focus (a single county in Michigan) of the RDSL study is also a limitation. However, although the sample is not nationally representative, Michigan falls around the national median for many of the measures of interest in this study: cohabitation, marriage, age at first birth, completed family size, non-marital childbearing, and teenage childbearing (see Lesthaeghe & Neidert, 2006). This is not to suggest that Michigan is representative of the nation, rather that it is not an outlier. Another constraint is that the study includes only a small number of Latinas. We hope that these analyses, and the research findings of the RDSL, will motivate future researchers to implement journal methods on larger and more diverse populations.

In this study, the complicated nature of the association between pregnancy-related behaviors and study participation – the reduced timeliness of interviews during weeks of change, but the larger number of interviews for respondents who tend to be engaged in these behaviors – highlights the need for responsive designs in survey research. For example, respondents who are *not* sexually active might be more engaged if the frequency of interviews was reduced to monthly, or if interview content could be tailored to better reflect their experiences. And respondents who *are* sexually active, and who may have trouble completing their journal interviews during particularly busy or messy weeks of their lives, may find it easier to participate via a mobile phone version of the journal interview.

Our study suggests that very frequent, even weekly, measurement in a longitudinal study is feasible. However, investigators should be aware that participation may vary not only by respondent characteristics, but by the social behaviors they seek to measure as well. Investigators should also consider permanent attrition separately from interview-level nonresponse in these studies. As intensive longitudinal studies become more common in social research, strategies for assuring continued and on-time participation become increasingly valuable.

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**Table 1.** Descriptive Statistics for Key Non-Time-Varying Characteristics (N=953)

	Mean/ Proportion	SD
<b>Dependent Variables</b>		
# of days in the study	740.70	303.68
Total number of journal interviews	61.45	42.54
% interviews completed on time	.78	.22
Interview completed late (n=57,602)	.11	
# days since last interview (n=57,602)	10.25	12.76
<b>Sociodemographic Characteristics</b>		
African American	.34	
Education		
Enrolled in high school	.14	
Enrolled in 2-year college or vocational program	.29	
Enrolled in 4-year college	.28	
Completed high school/not enrolled	.22	
Dropped out of high school/not enrolled	.08	
Receiving public assistance	.26	
Religious importance (1=not important, 4=more important than anything else)	2.69	
Living with partner	.15	
Biological mother less than 20 years old at first birth	.37	
Family Structure		
Two parents	.52	
One biological parent only	.40	
Other	.08	
Mother's education less than high school graduate	.08	
Parent's income		
\$14,999 or less	.14	
\$15,000 to \$44,999	.28	
\$45,000 to \$74,999	.19	
\$75,000+	.19	
Don't know/Refused	.20	
Age	19.19	.57
<b>Personality</b>		
Extraversion	2.69	.53
Agreeableness	3.07	.42
Conscientiousness	2.72	.47
Neuroticism	2.49	.46
Intellect/Imagination	2.91	.42
<b>Contact Information/Mode</b>		
Contact information: provided email and phone	.84	
Reminder mode: text and email	.33	
Mode of journal interview (phone vs. web) (n=57,602)	.12	
<b>Adolescent Experiences Related to Pregnancy</b>		
Age at first sex 16 years or less	.52	
Number of sexual partners 2 or more	.60	
Ever had sex without contraception	.48	
Number of prior pregnancies		
0 prior pregnancies	.74	
1 prior pregnancy	.17	
2 or more prior pregnancies	.09	
<b>Summary of Changes During Study Period<sup>†</sup></b>		
Number of (new) sexual partners	1.83	1.91
Ever had sex without contraception	.54	
Any pregnancy	.21	

**Table 2.** Descriptive Statistics for Weekly Transitions During the Study Period (N=57,602)

	Proportion/ Mean
<b>Sex</b>	
No sex in either week	.57
Sex in both weeks	.27
Stopped having sex	.08
Started having sex	.08
<b>Partner transitions</b>	
No partner in either week	.33
Steady partner (same partner both weeks)	.57
Break-up (partner to no partner)	.04
New partner (no partner to new partner)	.02
Partner switch (partner to new partner)	.01
Rekindled old partner (no partner to old partner)	.02
Partner switch to old partner (partner to old partner)	.01
<b>Sex without contraception</b>	
Not using contraception either week	.86
Continued using contraception	.06
Stopped using contraception	.04
Started using contraception	.04
<b>Pregnancy</b>	
Not pregnancy in either week	.95
Continuing pregnancy	.04
Pregnancy ended	.004
New pregnancy	.004

**Table 3.** Respondent-Specific Models

	Continued Participation		Total Number of Journal Interviews		Proportion Completed On Time	
	1	2	1	2	1	2
<b>Sociodemographic characteristics</b>						
African American	-.22** (.09)	-.21** (.09)	-10.92*** (3.25)	-11.35*** (3.16)	-.04* (.02)	-.04* (.02)
Education						
Enrolled in high school	-.18* (.10)	-.16 (.10)	-6.15 (4.49)	-6.99* (4.38)	-.03 (.02)	.02 (.03)
Enrolled in 2-year college or vocational program	-.05 (.09)	-.05 (.09)	-3.15 (3.43)	-3.88 (3.36)	-.003 (.02)	-.01 (.02)
Completed high school/not enrolled	-.18* (.10)	-.16 (.10)	-11.47** (3.90)	-12.29*** (3.82)	-.03 (.02)	-.03 (.02)
Dropped out of high school/not enrolled	-.29* (.15)	-.31* (.15)	-15.32** (5.61)	-14.90** (5.48)	-.07* (.03)	-.07** (.03)
Religious importance	.03 (.04)	.03 (.04)	-.05 (1.51)	.54 (1.48)	-.01 (.01)	-.01 (.01)
Biological mother less than 20 years old at first birth	-.13* (.07)	-.11 (.08)	-7.13** (2.81)	-6.52** (2.74)	-.02 (.02)	-.02 (.02)
Family Structure (ref: two parents)						
One biological parent only	-.12 (.08)	-.10 (.08)	-4.21 (2.95)	-4.49 (2.87)	-.03* (.02)	-.03 (.02)
Other	-.17 (.14)	-.18 (.14)	-8.89* (5.05)	-8.47* (4.92)	-.04 (.03)	-.04 (.03)
Mother's education less than high school	-.21* (.12)	-.22* (.12)	-7.23 (4.67)	-7.37 (4.55)	-.01 (.03)	-.01 (.03)
Parent's income						
\$15,000 to \$44,999	.11 (.11)	.10 (.11)	3.50 (4.25)	2.97 (4.14)	.02 (.02)	.01 (.02)
\$45,000 to \$74,999	-.01 (.13)	-.01 (.13)	-2.43 (4.77)	-3.63 (4.65)	-.005 (.03)	-.01 (.03)
\$75,000 or greater	-.001 (.14)	-.02 (.14)	1.60 (5.09)	1.73 (4.97)	-.003 (.03)	-.01 (.03)
Don't know/Refused	.12 (.12)	.12 (.12)	6.62 (4.40)	5.56 (4.29)	.03 (.02)	.03 (.02)
Age	-.04 (.06)	-.05 (.06)	-.96 (2.35)	.22 (2.30)	.01 (.01)	.01 (.01)
<b>Personality</b>						
Extraversion	-.07 (.07)	-.05 (.07)	-6.40** (2.54)	-7.88*** (2.49)	-.03* (.01)	-.03* (.01)
Agreeableness	.07 (.09)	.09 (.09)	3.12 (3.38)	1.85 (3.30)	.01 (.02)	.01 (.02)
Conscientiousness	.10 (.07)	.09 (.07)	5.82* (2.76)	6.48** (2.69)	.03* (.02)	.04** (.02)
Neuroticism	-.01 (.08)	-.01 (.08)	-1.31 (2.95)	-1.74 (2.88)	-.01 (.02)	-.01 (.02)
Intellect/Imagination	-.01 (.08)	-.02 (.08)	.11 (3.16)	.75 (3.08)	-.002 (.02)	-.002 (.02)
<b>Contact Information/Mode</b>						
Contact information: provided email and phone	.40*** (.10)	.41*** (.10)	17.99*** (3.74)	16.26*** (3.66)	.04* (.02)	.03 (.02)
Reminder mode: text and email	-.02 (.07)	.003 (.07)	-.88 (2.73)	-1.96 (2.66)	.01 (.02)	.01 (.02)
<b>Adolescent Pregnancy-Related Experiences</b>						
Age at first sex 16 years or less	-.06 (.09)	-.02 (.09)	-2.84 (3.38)	-3.85 (3.31)	.01 (.02)	.01 (.02)

	Continued Participation		Total Number of Journal Interviews		Proportion Completed On Time	
	1	2	1	2	1	2
Number of sexual partners 2 or more	-.06 (.09)	-.03 (.09)	-5.01 (3.48)	-9.65** (3.46)	-.04* (.02)	-.05** (.02)
Ever had sex without contraception	-.12 (.08)	-.09 (.09)	-7.74** (3.16)	-9.92*** (3.10)	-.02 (.02)	-.02 (.02)
Number of prior pregnancies (ref: zero)						
1 prior pregnancy	-.07 (.11)	-.05 (.11)	-2.91 (4.01)	-4.06 (3.93)	.02 (.02)	.02 (.02)
2 prior pregnancies	-.40*** (.13)	-.36*** (.13)	-15.74*** (5.03)	-16.75*** (4.91)	-.03 (.03)	-.03 (.02)
<b>Summary of Changes During Study Period<sup>‡</sup></b>						
Number of (new) sexual partners		-.03 (.02)		3.82*** (.70)		.01 (.004)
Ever had sex without contraception		.004 (.08)		4.70 (2.85)		.01 (.02)
Any pregnancy		-.20* (.09)		6.64* (3.29)		-.02 (.02)
Total number of journals completed	-.02*** (.001)	-.02*** (.001)				
N (respondent-days)	704,929	704,929				
Chi-square	596.74	609.26				
Df	29	32				
N (number of respondents)	952	952	953	953	953	953
R <sup>2</sup> (adjusted)			.20	.24	.05	.06

Standard errors in parentheses.

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001 (One-tailed tests, except where noted with †.)

**Table 4.** Week-Specific Models

	Log-Odds of Late Journal		Time Between Interviews	
	1	2	1	2
<b>Sociodemographic Characteristics</b>				
African American	.19* (.09)	.22* (.09)	-.05 (.04)	-.05 (.04)
Education				
Enrolled in high school	-.02 (.14)	-.03 (.14)	.02 (.05)	.02 (.05)
Enrolled in 2-year college or vocational program	.05 (.11)	.04 (.11)	-.01 (.04)	-.01 (.03)
Completed high school/not enrolled	.22* (.12)	.22* (.12)	-.09* (.05)	-.09* (.04)
Dropped out of high school/not enrolled	.31* (.17)	.33* (.17)	-.14* (.09)	-.17 (.08)
Receiving public assistance	-.02 (.10)	-.01 (.10)	.001 (.04)	.01 (.04)
Religious importance	.07 (.04)	.08* (.04)	-.02 (.02)	-.02* (.01)
Biological mother less than 20 years old at first birth	.12 (.09)	.12 (.09)	-.05 (.04)	-.05 (.03)
Family Structure (ref: two parents)				
One biological parent only	.09 (.09)	.08 (.09)	-.01 (.03)	-.02 (.03)
Other	.06 (.17)	.04 (.17)	-.06 (.08)	-.05 (.07)
Mother's education less than high school	.12 (.13)	.12 (.13)	-.06 (.06)	-.02 (.06)
Parent's income				
\$15,000 to \$44,999	-.03 (.12)	-.002 (.12)	.04 (.06)	.02 (.05)
\$45,000 to \$74,999	.12 (.14)	.15 (.14)	-.04 (.06)	-.05 (.05)
\$75,000 or greater	-.06 (.16)	-.02 (.16)	.04 (.06)	.01 (.05)
Don't know/Refused	-.14 (.13)	-.11 (.13)	.08 (.06)	.05 (.05)
Age	.005 (.07)	.02 (.07)	.003 (.03)	-.01 (.03)
<b>Personality</b>				
Extraversion	.11 (.08)	.08 (.08)	-.06 (.03)	-.05 (.03)
Agreeableness	-.05 (.09)	-.05 (.09)	.02 (.04)	.01 (.03)
Conscientiousness	-.23** (.08)	-.23** (.08)	.06* (.03)	.06* (.03)
Neuroticism	.01 (.09)	-.01 (.09)	-.01 (.03)	-.01 (.03)
Intellect/Imagination	.06 (.09)	.06 (.09)	-.01 (.03)	-.02 (.03)
<b>Contact Information/Mode</b>				
Contact information: provided email and phone	-.20 (.13)	-.21* (.12)	.13* (.06)	.10* (.06)
Reminder mode: text and email	.03 (.08)	.03 (.08)	-.01 (.03)	-.01 (.03)
Mode of journal interview (phone versus web)	.35*** (.09)	.36*** (.09)	-.39*** (.05)	-.38*** (.05)
<b>Adolescent Pregnancy-Related Experiences</b>				
Age at first sex 16 years or less	.08 (.10)	.05 (.10)	-.01 (.04)	-.01 (.04)
Number of sexual partners 2 or more	.11 (.10)	.01 (.10)	-.07* (.04)	-.01 (.04)

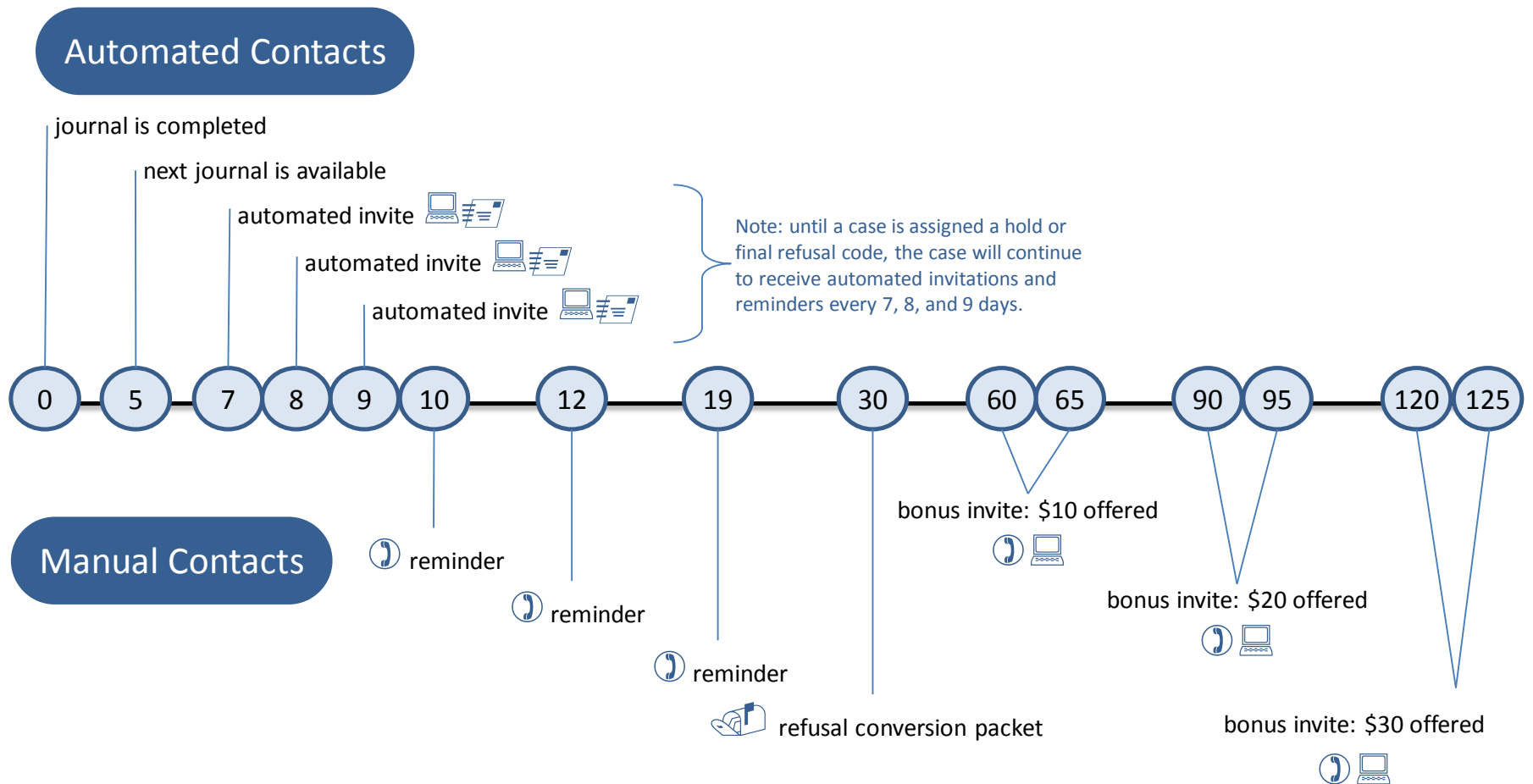
	Log-Odds of Late Journal		Time Between Interviews	
	1	2	1	2
Ever had sex without contraception	.16* (.09)	.10 (.09)	-.05 (.04)	-.02 (.03)
Number of pregnancies				
One	.12 (.11)	.09 (.11)	-.05 (.05)	-.01 (.05)
Two or more	.19 (.16)	.13 (.16)	-.19* (.09)	-.11 (.08)
<b>Weekly Transitions During Study Period<sup>‡</sup></b>				
Sex (ref: no sex in either week)				
Sex in both weeks		.30*** (.09)		-.14*** (.03)
Stopped having sex		.30*** (.07)		-.12*** (.04)
Started having sex		.31*** (.08)		-.16*** (.04)
Partner transitions (ref: no P in either week)				
Steady partner (same partner both weeks)		.02 (.09)		.02 (.03)
Break-up (partner to no partner)		.38*** (.09)		-.24*** (.05)
New partner (no partner to new partner)		.78*** (.10)		-.56*** (.07)
Partner switch (partner to new partner)		1.24*** (.12)		-1.04*** (.10)
Rekindled old partner (no partner to old partner)		.32** (.12)		-.10 (.06)
Partner switch to old partner (partner to old partner)		.48* (.20)		-.13 (.10)
Sex without contraception (ref: using contraception both weeks)				
Continued <i>not</i> using contraception		-.01 (.11)		.06 (.05)
Stopped using contraception		.18* (.08)		-.16** (.06)
Started using contraception		.01 (.08)		-.07 (.06)
Pregnancy (ref: not pregnant in either week)				
Continuing pregnancy		-.03 (.11)		.10** (.04)
Pregnancy ended		1.94*** (.14)		-1.39*** (.12)
New pregnancy		1.67*** (.14)		-1.30*** (.14)
Total Number of Journals completed	-.01*** (.001)	-.005*** (.001)	.005*** (.0004)	.004*** (.0004)
N (number of journal interviews)	57,602	57,602		
N (number of person-days)			705,881	705,881
Chi-square	1529.38	2768.78	5147.33	7490.40
Df	30	45	30	45

Standard errors in parentheses.

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001 (one-tailed tests, except where noted with <sup>‡</sup>.)



Figure 1. Heuristic of Reminder Protocol



Note: Reward gift packets are sent out quarterly regardless of participation performance.

Mode of contact:

📞 phone call   📧 email   📄 text message   📦 gift packet



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