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Stable Relationships, Stable Participation? The Effects of Partnership Dissolution and Changes in Relationship Stability on Attrition in a Relationship and Family Panel

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Underrepresentation of life changes is an important issue for panel studies, which are designed to describe such changes. Effects of changes in partner and marital status on attrition have so far been evaluated for several multi-scope and income related panel studies, though not for studies explicitly covering relationship and family topics. This paper examines the effects of reported partnership dissolution and changes in subjective relationship stability on participation in a panel with a focus on relationship and family. We consider both living apart together (LAT) and cohabiting relationships. Using 2008–2014 data from the German Family Panel pairfam (panel analysis of intimate relationships and family dynamics), our analyses support previous findings. Reported separation negatively affects the next wave's participation probability. Effects can be found at the contact as well as cooperation stage of the response process, whereas cooperation only appears to be affected among respondents in LAT relationships. Changes in subjective relationship instability are not strongly associated with participation in the pairfam study.

Keywords: Panel studies; attrition; nonresponse; life events

1 Introduction

Sample attrition in longitudinal studies is considered a serious issue if selectivity is related to the key variables of the study. Panel studies risk not reaching one of their main aims in that they underestimate the occurrence of changes if these are associated with attrition themselves. Prior research has repeatedly revealed evidence for life changes of respondents affecting panel attrition (Fitzgerald, Gottschalk, & Moffitt, 1998; Lemay, 2009; Short & McArthur, 1986; Voorpostel & Lipps, 2011). However, these types of analyses are methodologically very challenging, and research on the impact of life changes on attrition altogether is rare. This is especially the case for panel studies covering a specific topic and changes related to this topic. A recent exception is the study by Trappmann, Gramlich, and Mosthaf (2015) who analyzed, amongst other things, the effects of changes in respondents' welfare receipt on participation in the PASS study which covers labor market and income related topics and sets a special focus on welfare receipt.

So far, the effects of changes in partner and marital status on attrition have been analyzed for several multi-scope or income related household panel studies. Studies based on the Panel Study of Income Dynamics (Fitzgerald et al., 1998; Lillard & Panis, 1998), the European Community Household Panel (Neukirch, 2002), and the Swiss Household Panel (Voorpostel & Lipps, 2011) could thus far support the hypothesis that changes in relationship status and especially divorces are associated with higher attrition probability. In the Survey of Income and Program Participation, however, marital status changes were not shown to be strongly associated with attrition (Short & McArthur, 1986). Trappmann et al. (2015) found a negative effect of separation on the likelihood of contact in the panel study PASS, but this effect is considerably smaller when controlling for household moves. To our knowledge, the effect of partnership dissolution has not been evaluated for panel studies that explicitly cover relationship and family topics. We aim to contribute to this research by analyzing the effects of a reported separation and changes in subjective partnership stability on attrition in the German Family Panel pairfam.

The present study aims at extending previous research in several aspects: First, the pairfam study is based on a sample of individual respondents and gathers information on relationships from their initiation on, independent of respondents' living arrangements. Thus, it differs fundamentally from household based samples that only cover relationships

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of persons living in the same household. This allows us to contribute to existing knowledge of effects of separation on attrition for cohabiting couples and to go beyond the state of research by evaluating these effects for LAT relationships as well. In a further step, we go into detail on the response process and evaluate the effect of partnership dissolution on contacting survey respondents and their cooperation with the survey request once successfully contacted. Respondents in LAT relationships make thereby a very interesting case, as effects on cooperation probability can be analyzed net of selection on the contact stage due to separation-related moves. Finally, in a relationship and family panel, it is interesting to assess whether a subjective decrease in partnership stability already triggers higher drop-off rates, as this would imply a thinning database for research on negative partnership dynamics.

2 Background

Life events such as job changes or divorce are likely to be related to residential mobility (Lepkowski & Couper, 2002). Trappmann et al. (2015) evaluated the effects of life events on attrition in detail. For a subsample of respondents, they were able to include administrative data on household moves between waves and found that effects of events between waves, including separation, to a large extent can in fact be attributed to an increased chance of mobility in the aftermath of life changes. Separation of a cohabiting couple necessarily leads to the relocation of at least one partner – in some cases even both. Separation is therefore hypothesized to negatively affect contact probability for respondents who were cohabiting prior to separation via an increased likelihood of relocation, both immediately after separation and later on. However, there is also evidence for life changes affecting cooperation with the survey request (Neukirch, 2002; Trappmann et al., 2015; Voorpostel & Lipps, 2011). Given the specific topic of the study, there are several reasons why separation might directly affect cooperation with the pairfam survey request.

Assuming that interest in the survey topic is a relevant feature for cooperation (Groves, Singer, & Corning, 2000), the importance of the topic for respondents is likely to vary as a result of life events. Trappmann et al. (2015) found that respondents who overcame welfare dependency had a decreased likelihood of cooperation in the PASS study, which sets a special focus on welfare receipt. The pairfam study has been designed to cover the most important relationship and family formation stages from age 15 to 50. Over the length of the panel study, most respondents experience relationship and family related changes. These are likely to affect the likelihood of survey cooperation. In the aftermath of partnership formation or the birth of a child, the survey topic may become more interesting or relevant. In the case of partnership dissolution, it may become more difficult or even disturbing.

Furthermore, past interview experiences and privacy issues have revealed to be common reasons for dropping out of panel surveys (DeMaio, 1980). The importance of these features of cooperation is also likely to vary with life events related to the survey topic. In a relationship and family panel, reporting the requested information might become difficult and burdensome after separation. Moreover, life events often result in changes in the questionnaire. In the case of the pairfam panel, reporting separation entails additional questions about the circumstances of this separation. If privacy issues are relevant for participation, the perceived sensitivity of the questions asked might change due to separation and, therefore, decrease respondents' willingness to provide such information.

Finally, in a relationship and family panel, respondents' decision to participate could be linked to their (former) partnership. Respondents provided a large amount of information about this partnership in prior waves and were asked in each wave for consent to interview their partners. Once this partnership has ended, they might feel no need to continue participation in a study that they possibly associate with their previous relationship.

In a psychosocial approach, the impact of significant life events on attrition could be the result of respondents' adapting to the "shock" caused by these events (Lemay, 2009, 51f). However, the extent to which these shocks influence further participation in a panel study might vary depending on how committed respondents (already) are to the study. Hence, length of panel participation might affect whether respondents continue their participation in a relationship and family panel after separation.

In summary, the dissolution of a romantic relationship might have:

- immediate and/or lagged negative effects on contact due to an increased likelihood of relocation for respondents who were cohabiting prior to separation
- an immediate negative effect on cooperation due to the delicate nature of the topic and a "relationship adapted" decision to participate, varying with the length of panel participation
- a lagged negative effect on cooperation due to negative past interview experiences and increased privacy issues, also varying with the length of panel participation

Life changes affecting panel drop-off are not captured by panel surveys unless respondents participate in the study once more after the event. Studies investigating the effects of changes on attrition therefore either restrict analyses to these reported changes (Fitzgerald et al., 1998; Short & McArthur, 1986; Voorpostel & Lipps, 2011), as is also done here, or use register data to gain information on non-observed changes between waves, provided these are available (Neukirch, 2002; Trappmann et al., 2015). By analyzing the effect of reported separation on attrition, this paper can

only capture lagged effects. External information on separation that occurs simultaneously to non-response cases is not available; register data on partnership dissolution, regardless of marital and cohabiting status, to match the data of the pairfam study do not exist. In an attempt to shed some light on the immediate effects of non-observed separation on attrition, we analyze the effect of an increase in subjective relationship instability on survey participation. As described in the following section, there is evidence that these changes are likely to precede separation.

2.1 Subjective Relationship Instability

Various theoretical and empirical studies on relationship stability look into partnership dissolution as a process for which a deterioration in relationship quality precedes perceiving the relationship as being unstable and thinking about a separation (Booth & White, 1980; Lewis & Spanier, 1979). Based on these findings, Arránz Becker and Hill (2010) argued that thinking about separating can be seen as a precursor of separation, even if the process of separation is more complicated and despite the fact that further conditions might determine whether intentions to end a relationship become relevant for action (Arránz Becker & Hill, 2010, 154f). Using data from the pairfam pre-study[1], the authors evaluated the predictive value of subjective partnership instability for partnership dissolution and found that, in many cases, this self-assessment was indicative of a separation in later waves. The analysis revealed differences between the three age cohorts (15-17, 25-27, and 35-37 years) of which the pairfam sample is composed: Subjective relationship instability is significantly more predictive of separation for the two oldest cohorts, even when controlling for relationship status (Arránz Becker & Hill, 2010, 167f). Dorbritz and Naderi (2012) provide further evidence for the verbalization of the intention to separate being associated with a higher likelihood of separation among LAT relationships of the two oldest pairfam cohorts. Of course, these results only describe a tendency. Many divorces are preceded by little conflict and low levels of perceived relationship instability (Amato & Hohmann-Marriott, 2007), and there are many long-lasting stable marriages which show recurring conflicts and low relationship quality on multiple dimensions (Hawkins & Booth, 2005). In these cases, while assuming this is true for all types of relationships, indicators of relationship quality and stability cannot capture partnership dissolution.

To summarize, there is evidence - also specifically regarding the pairfam study – that subjective relationship instability, to a certain extent, is predictive of union dissolution. Assuming that partnership dissolution can be seen as a process, we focus on increasing relationship instability as an independent variable, which is indicative of separation and thereby thought to negatively affect contact and cooperation probability. In addition, a deterioration of relationship stability itself, irrespective of its consequences, is assumed to negatively affect cooperation in a relationship and family panel if reporting these changes results in an unpleasant interview experience, or if it increases privacy concerns about the questions asked.

2.2 Distinctive Features of Living Apart Together Relationships

Since pairfam seeks to gather information on relationships regardless of their institutionalization and of living arrangements, it is important to also gain knowledge on effects of separation on attrition for all kinds of relationships. However, LAT relationships differ from cohabiting relationships in specific characteristics that might also affect associations between separation and attrition. Empirically, respondents in LAT and (married and unmarried) cohabiting relationships differ in terms of age, relationship duration, having children and employment status: Living apart together is more frequent among younger respondents, the average duration of LAT relationships is lower than that of cohabiting relationships, full-time employment of both partners is more common and having children is less prevalent. Furthermore, respondents in LAT relationships more often report to have proposed separation, to be less satisfied with their relationships, and to think about separation more often compared to cohabiting relationships (Dorbritz & Naderi, 2012, 444, 450f). Based on these findings, LAT relationships appear to be less stable in terms of both objective and subjective characteristics.

Concerning the contact stage of the response process, the most important difference between LAT and cohabiting respondents is that separation necessarily leads to the relocation of at least one partner, in the case the couple was living together prior to separation. On the contrary, separation is not thought to directly affect the likelihood of relocation for LAT respondents. Hence, we expect effects of separation for cohabiting respondents only and none for LAT constellations.

Cohabitation status has further implications when we analyze the cooperation stage of the response process. First, having less stable relationships, LAT respondents are likely to be affected less intensively by the "shock" effect of separation. Hence, we expect a smaller effect of separation on cooperation among LAT respondents than among cohabiting ones. Second, by definition, analysis of cooperation with the survey request is based on the subsample of respondents who were successfully contacted. As we assume that separation reduces contact chances for respondents who were living together with their partner, identifying the effect of separation

[1]The three-wave panel study on partnership and family processes was conceived as a small pilot study for the large-scale pairfam study. It contains information on about 600 respondents aged 15-17, 25-27, or 35-37 at the time of the first interview.

on cooperation without selection at the contact stage is difficult. This should not apply to respondents in LAT relationships. Thus, we expect to be able to evaluate effects of separation on cooperation with less selectivity.

Finally, effects of separation on attrition are possibly confounded by events which entail separation and increase the likelihood of attrition, such as changes in employment status and relocation. These events in turn are likely to be more prevalent among less stable LAT relationships.

To account for these differences, we evaluate the effects of separation and changes to relationship instability separately for LAT and cohabiting respondents.

3 Data and Research Approach

3.1 Data

Our analysis relies on data from the first six waves of the German Family Panel pairfam (Brüderl, Hank, et al., 2015; Huinink et al., 2011) and paradata covering reasons for non-participation from waves 3 to 7. Pairfam is an annual survey of a random sample of persons from three different birth cohorts: 1971-1973, 1981-1983 and 1991-1993. It started in 2008 with approximately 4000 interviews from each cohort. The focus of the study is on partnership dynamics and partnership dissolution, fertility attitudes and generative behavior, parenting and child development, and intergenerational relationships. With a multi-cohort design and a planned duration of 14 years, pairfam covers the most important relationship and family formation stages from age 15 to 50. The design of the interview is non-monotonic, with a maximum gap of one wave, and is based on computer-assisted personal interviews (CAPI). Sensitive questions including questions on relationship quality and separation are placed in a self-administered section of the questionnaire (CASI).

Pairfam has been designed to gather information from a broad range of romantic relationship types: firstly by not restricting its focus to certain living arrangements, but rather including living apart together (LAT) relationships; secondly by covering any relationships that are of importance to the anchor respondents.[2] In the anchor interview, the study gathers detailed information on any current romantic relationships of the anchor respondents. Furthermore, using a multi-actor design, respondents who report to be currently in a relationship are asked for permission to include their partners into the survey (for more details on the design of the pairfam study, see Brüderl, Schmiedeberg, et al., 2015).

Pairfam uses a non-monotonic design, meaning that respondents who did not participate in one wave of the study due to non-contact or soft refusal are classified as temporary dropouts and are re-contacted in the next wave. In the present study, the effects of separation and changes to relationship instability are not evaluated separately for temporary non-respondents.[3] Rather, we use attrition and wave nonresponse as synonyms. Paradata on reasons for non-participation allow us to differentiate between the contact and cooperation stages of the response process.

3.2 Analysis Approach and Analysis Sample

We use pooled data and lagged independent variables to evaluate effects of reported separation and of changes in subjective relationship stability on overall participation, contact, and cooperation probability. For each model, we apply logistic regression analyses. In teh following sections the models for analyzing the effects of reported separation and a change toward relationship instability are described in detail, followed by a comprehensive discussion of the respective analysis samples.

Effects of reported separation. Effects of reported separation are evaluated based on separations of respondents who reported being in a relationship at the time of the previous interview and are single or in a new relationship in the current wave.[4]

In order to assess concerns of selectivity bias within the pairfam study, we first evaluate the effect of reported separation in wave $t-1$ on participation in wave t based on the sample of all pairfam respondents in the data sets from waves 3 to 7 (full sample, model 1). Based on previous findings on attrition in pairfam (Müller & Castiglioni, 2015), we control for respondent age and age squared, gender, years of

[2]The corresponding entry to the interview is: "We are interested in all relationships that were important to you. This means relationships that lasted longer than 6 months, or those in which you lived with your partner, or those that led to the birth of a child, or those that were important to you for other reasons."

[3]The number of wave non-respondents is small, varying from 518 in wave 2 to 169 in wave 6. This makes it difficult to run a separate analysis of this group. To analyze permanent drop-out, considering observations of wave-non-respondents in the analysis sample until they miss two consecutive waves, we would have to rely on information that dates back at least two waves. Differences in results between wave non-respondents and continuous respondents could then be in part due to different modeling approaches. Effects might also be confounded by other attrition related characteristics, possibly differing between the two groups.

[4]We of course did not take into account relationships ended due to death of a partner, which are a very seldom case in pairfam due to the relatively young age of respondents. It is also worth noting that the pairfam calendar data do record intra-waves relationships as well (i.e. relationships that started after one given wave and ended before the next interview was conducted). However, these separations are not included in our analyses. The reasons for this exclusion are twofold: First, questions about separation and consent to include partners into the survey are only foreseen for ongoing relationships at an interview time. Second, by excluding these short-lived relationships, we can focus on a more homogenous sample in terms of interview experience, perception of the survey topic, and associations between relationships and survey participation in general.

education (8 to 20 years), having children, home ownership, employment and migration status, total number of questions or items that a respondent answered in the interview (number of items), number of items squared, and wave-dummies (dependent variable measured in wave 7 (reference) or wave 3 to 6). To capture differences in baseline levels of respondents' interest, motivation, or ability to answer the questions, we use information on item nonresponse (Loosveldt, Pickery, & Billiet, 2002) and control for the percentage of item nonresponse and nonresponse on household income and on intimate questions. Nonresponse on intimate questions captures invalid answers ("I don't know" and "No answer") to at least one of the questions on satisfaction with sex life and/or use of contraceptives. These indicators operationalize general as well as topic-specific privacy concerns and an unpleasant interview experience.

Next, we evaluate the effect of reported separation in wave $t-1$ on the probability to participate in wave t, considering only respondents with two consecutive observations and a partner at least in wave $t-2$, i.e. only those at risk for separation. At this point, we include further relationship information and differentiate between respondents who were cohabiting and those who were LAT prior to separation (models 2 and 3). Including these additional variables implies that for respondents who separated in wave $t-1$, information on their relationships from wave $t-2$ are necessary; therefore, we have to restrict our sample to respondents who participated both in waves $t-1$ and $t-2$, and who reported a relationship in at least wave $t-2$. Relationship characteristics of respondents who have separated stem from wave $t-2$. For relationship characteristics of respondents who are still in a relationship and for further control variables, we use characteristics from wave $t-1$. In addition to the control variables used in model 1, we control for the length of the relationship, changes in employment status, and residential moves. Changes in labor force status could be an important confounding factor of the association between separation and attrition, especially among respondents in less stable LAT relationships, as they might trigger non-contact due to a greater likelihood of relocation and non-cooperation due to increased time restrictions, and might also affect the likelihood of separation.

In a further set of analyses, again based on respondents who participated in two consecutive waves and reported a relationship at least in wave $t-2$, we go into detail on the response process and evaluate the effect of separation in wave $t-1$ on contact and cooperation probability in wave t for both relationship status groups (models 4 to 7). The dependent variable cooperation is defined only for respondents who were successfully contacted. The analysis of contact probability of LAT and cohabiting respondents controls for respondent age and age squared, gender, having children, home ownership, migration and employment status, changes in employment status, residential moves, and wave. Cooperation probability is analyzed controlling for respondent age, gender, education, relationship length, having children, migration and employment status, changes in employment status, percentage of item nonresponse, nonresponse on household income and on intimate questions, number of items, number of items squared, and wave. To evaluate possible moderating influences of commitment to the panel study on the association between separation and cooperation, we also include interaction terms for reported separation with the length of panel participation into the model.

Effects of a change toward relationship instability. For the subsample of respondents who report being in a relationship with the same partner in waves $t-1$ and $t-2$, we evaluate the effect of changes to the subjective estimates of relationship stability between waves $t-2$ and $t-1$ on the probability of participation in wave t. Also in this case, we differentiate between cohabiting (model 8) and LAT respondents (model 9). Self-assessed instability of the relationship is based on a three-item scale (Thönnissen, Wilhelm, Fiedrich, Alt, & Walper, 2015). The questionnaire foresaw a yes/no response as to whether the following applied: "thought relationship was in trouble", "thought about separation" and "proposed separation".[5] The variable "self-assessed instability of the relationship" with the categories 0=no, 1=yes indicates whether respondents answered affirmatively to at least one of the three items. We use a dummy variable for a change toward relationship instability (0=no change or change toward relationship stability, 1=change toward relationship instability). The models include control variables as described for models 2 and 3 of overall participation by relationship status. As with the previous models, control variables are generally based on wave $t-1$ data. Change indicators also encompass information drawn from wave $t-2$.

We further evaluate the effect of changes in relationship stability between waves $t-2$ and $t-1$ on contact and cooperation probability in wave t for cohabiting and LAT respondents, again based on respondents who report being in a relationship in waves $t-1$ and $t-2$ (models 10 to 13). The models include control variables as described for the cooperation and contact models 4 to 7. Here, too, we test for interactions of changes toward relationship instability with the length of panel participation on cooperation.

Analyses samples. To assess the relative size of the separation effect among other factors affecting attrition bias in pairfam, we begin with analyzing the effect for the full sample of respondents in the data sets from waves 3 to 7. Respondents who had left the country were treated as neutral losses,

[5]Reports on relationship instability might suffer from social desirability bias, which would lead to underreporting difficulties in a relationship. To lessen this problem, in the pairfam questionnaire information on relationship quality is recorded in a self-administered module.

Table 1
Samples and number of observations available for different models (Pooled Data: Waves 3 to 7)

	Key analytical variables	Overall Participation in wave t	Contact in wave t	Cooperation in wave t
Full sample	Reported separation	31499		
Two consec. observations & partner in wave $t-2$	Reported separation	Cohabiting: 14002 LAT: 6643	Cohabiting: 14054 LAT: 6665	Cohabiting: 13680 LAT: 6392
Two consec. observ. with same partner prior to wave t	Change toward relationship instability	Cohabiting: 12199 LAT: 2268	Cohabiting: 12244 LAT: 2274	Cohabiting: 11949 LAT: 2162

as they no longer belonged to the target population of the study. Furthermore, approximately 1% of the respondents in all waves withdrew permission to be re-contacted at the end of an interview or between two waves. According to German data protection laws, these cases cannot be interviewed any more, and were deleted before fieldwork for the next wave started. Hence, they cannot be classified according to our dependent variables. Finally, deceased respondents were considered neutral losses.

The assessment of the effects of reported separation for LAT and cohabiting respondents separately is based on the subsample of respondents fulfilling the following two conditions: offering two consecutive observations, and reported having a partner at least at time point $t-2$. This restriction is necessary to be able to use relationship information for respondents who have separated.

Finally, when evaluating the effects of changes in relationship stability, we restrict the sample to respondents who report being in a relationship with the same partner in at least two waves prior to the outcome wave.[6] As information on self-assessed relationship instability was not recorded for underage respondents, the analysis sample only contains adult respondents over the age of 18.

Information on partnership dissolution and on changes toward relationship instability in the respective analysis samples refer to previously reported relationships and are thus available beginning with wave 2. This implies that we can begin analyzing their effect on wave nonresponse from wave 3. Hence, our analyses focus on wave nonresponse after a good level of panel stability has been reached (c.f. Müller & Castiglioni, 2015). This restriction allows, on the one hand, an easier identification of shock effects due to certain life events as we can assume that other influences on attrition are less pronounced. On the other hand, in a stable panel non-contact occurs very seldom and decomposing unit nonresponse between failure to contact and failure in achieving cooperation becomes rather difficult.

Table 1 offers an overview of the sample size for the different models and analysis steps.

4 Findings

Results are presented as follows: In the first section we present descriptive results on socio-demographic and relationship characteristics of cohabiting and LAT respondents, followed by bivariate associations between separation and a change toward relationship instability and response, contact, and cooperation probability. Multivariate results are subdivided into results on effects of reported separation and effects of a change toward relationship instability on overall participation, contact, and cooperation probability. In order to simplify interpretation, we present average marginal effects (AMEs). AMEs are computed for each observation in the data given their respective values on other variables and then averaged over all observations. As we have pooled data with multiple observations of the same respondents, we apply a robust variance estimate that adjusts for within-cluster correlation.[7]

4.1 Demographic and Relationship Profiles of Respondents in LAT and Cohabiting Relationships

When evaluating the effect of separation by relationship status based on the sample of respondents with two consecutive observations and a partner in at least wave $t-2$ (Table 1) 32 percent of observations stem from respondents in LAT partnerships. Cohabiting and LAT respondents differ in several socio-demographic and relationship characteristics: LAT respondents on average are younger and their relationship duration is lower. Having children is less prevalent and changes in employment status are more frequent. Furthermore, LAT respondents more often assess their relationship as unstable when compared to cohabiting respondents (Table A1, Appendix). Not adjusting for nonresponse, separation

[6] Note that the two subsamples including relationship-related characteristics contain observations on different relationships for one given anchor, as long as the requirements are met for each relationship. As we analyze the first seven waves of the panel, up to three relationships per respondent could be considered for analysis.

[7] All analyses were computed with Stata Version 12.

Table 2
Response rates by separation and changes toward relationship instability, Waves 3 to 7

	n	Response rate %	Contact rate %	Coop. rate %
Full sample	32615	86.7	96.2	90.1
Two consec. observations & partner in wave t-2	21385	88.5	97.1	91.2
Separation in t-1	2190	84.7	93.7	90.4
LAT (t-2)	1740	85.2	94.1	90.5
Cohabiting (t-2)	442	82.6	91.9	89.9
Two consec. observations with same partner prior to wave t	17920	88.9	97.6	91.1
Change toward relationship instability in t-1	1416	87.1	97.7	89.1
LAT (t-1)	342	87.1	95.9	90.9
Cohabiting (t-1)	1069	87.1	98.3	88.6

rates among respondents who were living apart together in the wave prior to separation amount to 25.5% ($n = 1740$) and are thus far more frequent than among respondents who lived together (3.1%, $n = 442$). Consequently, we observe higher separation rates among respondents in the first cohort (25.8%) as compared to the second (7.2%) and third cohort (2.8%). Among respondents who separated, the majority of cohabiting respondents assessed their relationship as being unstable in the wave prior to separation, whereas LAT respondents did not (cohabiting: 58.1%, LAT: 47.3%).

When evaluating the effects of a change toward relationship instability (Table 1), the percentage of respondents in LAT relationships in our sample is rather small and amounts to 22 percent. This might appear surprising, but it is important to keep in mind that this sample focuses on relationships lasting at least two years, which are more common among cohabiting respondents. Changes toward relationship instability are more frequent among LAT respondents (14.8%, $n = 342$) than among cohabiting respondents (8.5%, $n = 1069$), and among respondents in the first cohort (17.4%) as compared to the second (9.6%) and third cohort (7.6%).

In summary, the descriptive results suggest that LAT respondents differ from cohabiting respondents in several socio-demographic characteristics and that their relationships tend to be less stable in terms of objective relationship characteristics as well as based on their subjective assessment. Hence, the two groups should be analyzed separately.

As expected, the majority of formerly cohabiting respondents who then separated reported relationship instability in the previous wave. This finding suggests that the use of this indicator to capture a higher risk of separation and non-participation due to non-observed separation in the next wave, at least among cohabiting respondents, is a reasonable choice.

4.2 Bivariate Associations

When analyzing a simple bivariate association, we find that response rates in wave t are significantly lower in the case of separation in wave $t - 1$. Based on the subsample of respondents with two consecutive observations and a partner in wave $t - 2$, respondents participate significantly less often after they report a separation (Table 2): If the average response rate over this subsample is 88.5%, among respondents experiencing a separation we observe a response rate of 84.7% (Chi-square test significant at level 0.01). The response rate for cohabiting respondents who separated is even lower (82.6%, chi-square test significant at level 0.01). The differences appear to be based on contacting respondents rather than their cooperation, once successfully contacted. Cooperation rates are in fact fairly stable over all groups, with the contact rates of those reporting a separation in wave $t-1$ 3.4 percentage points lower than in the whole subsample and 5.2 percentage points lower if cohabiting prior to separation (Chi-square test significant at level 0.01). Presumably, lower response and contact rates of respondents who were cohabiting and then later separated result from a lagged relocation in the course of a separation. Overall, when focusing on respondents who report changes in relationship stability, we do not observe differences in participation rates.

4.3 Multivariate Results

Effects of reported separation. Consistent with previous findings for various panel studies, multivariate analyses of pairfam data from waves 3 to 7 (full sample) reveal a negative effect of separation on participation probability (Figure 1, model 1). Controlling for common confounders, respondents who report a separation in wave $t - 1$ have a decreased likelihood of participation in wave t of about 2 percentage points. Overall, the average size of the effect of separation in the sample seems to be rather small compared to, for instance, the effects of migration status and education.

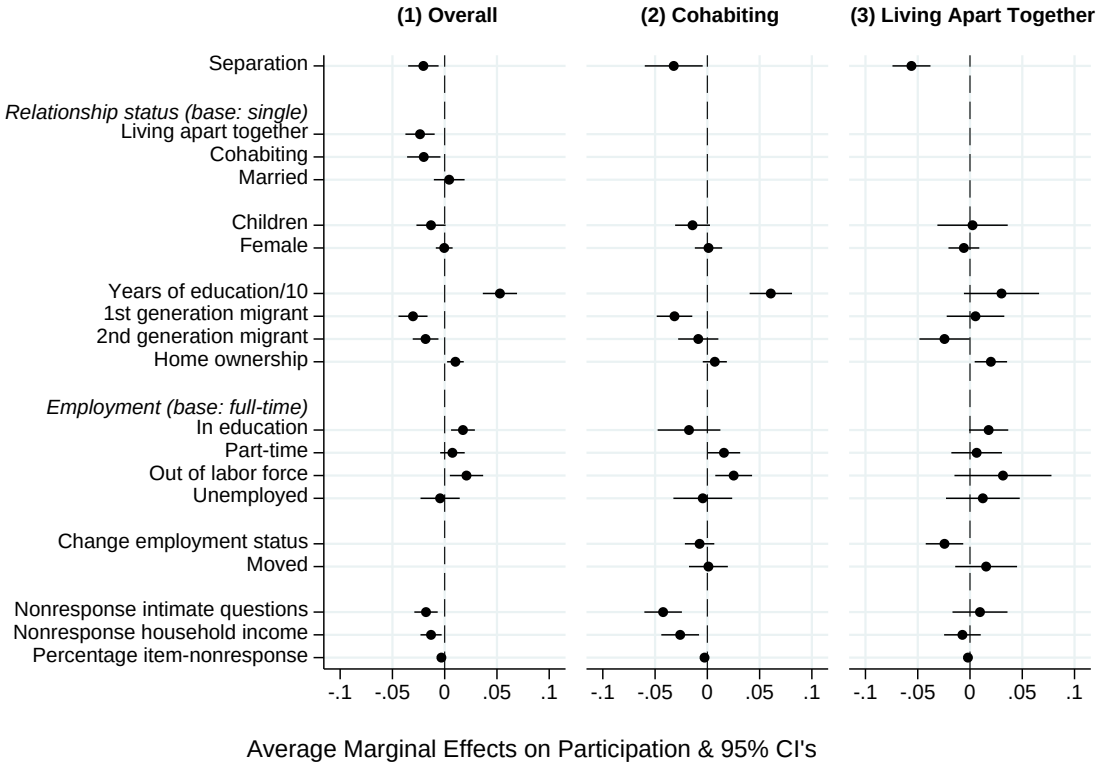

Figure 1. Effects of separation in wave $t-1$ on participation in wave t, Waves 3 to 7.

Notes: Model 1 is based on the full sample of respondents in the data sets from waves 3 to 7 and also includes age, age squared, no. of items, no. of items squared, and wave dummies; n = 31499, 8678 respondents; Models 2 and 3 are based on respondents with two consecutive waves and a partner in wave $t-2$ and also include age, age squared, relationship duration, no. of items, no. of items squared, and wave dummies; Cohabiting: n = 14002; LAT: n = 6643; Note that models are combined into one graph to simplify the presentation of selectivity patterns, but as they are based on different analyses samples results should only be interpreted for significance and direction of effects.

Thus, the focus on relationships and family in the pairfam study does not appear to produce specific selectivity patterns. Rather, determinants of participation are comparable to those observed in multi-scope panel studies.

Based on a restricted sample of respondents with two consecutive observations and a partner at least in wave $t-2$ (Table 1), i.e. those at risk for separation, we also include relationship information and differentiate between LAT and cohabiting respondents (Figure 1, models 2 and 3). Both cohabiting and LAT respondents who reported a separation in wave $t-1$ have a decreased likelihood of participation in wave t, although the effects appear to be more pronounced for LAT respondents. Changes in employment status did not show a confounding influence on the association between separation and participation probability for either relationship status group. Effects remain stable when introducing this change variable into the models (results not shown).

When analyzing the response process in detail, we observe a negative effect of separation on the contact stage for both cohabiting and LAT respondents (Figure 2).[8] Focusing on cooperation probability, we find a significant negative effect of separation only for LAT respondents. Not surprisingly, the effect of separation becomes more pronounced as relationship duration increases (results not shown). Among successfully contacted cohabiting respondents, separation does not appear to affect cooperation (Figure 2). The negative effect of separation on contact probability for cohabiting respondents is in line with our initial expectations; for LAT respondents, though, the effect is contrary to our hypothesis. At the cooperation stage, we expected to find a more pronounced negative effect for cohabiting respondents as compared to LAT respondents. However, as noted earlier, analysis of the cooperation stage for cohabiting respondents is difficult due to

[8]To simplify the presentation of results, only the effects of separation are shown. The complete results of all models can be found in the Appendix A2 (models 4 to 7).

an increased likelihood of drop-out at the contact stage, both immediately and one wave after separation. It is possible that the lack of a separation effect for this group is due to selectivity of the sample available for cooperation analyses after a successful contact.

For LAT respondents, we assumed we could assess the effect of separation on cooperation with less selectivity at the contact stage, but the negative effect of separation on contact for this group is not in line with our assumptions. We find similar effects of separation on contact for both relationship status groups. This result, on the one hand, indicates that lagged relocation in the course of a separation might be a less important influencing factor of contact probability for cohabiting respondents than expected. On the other hand, unobserved factors affecting contact chances after separation might be at work which could possibly apply for both groups, e.g. life style changes due to being single and spending more time outside the home.

We suggested that the effect of separation on cooperation is moderated by the length of panel participation, and tested this assumption by entering multiplicative interaction terms for panel respondents' commitment to the panel study into the regression models. None of the interaction terms proved to be significant for either LAT or cohabiting respondents (results not shown). Differences in the effect of separation on cooperation by length of panel participation could thus not be confirmed.

Effects of a change toward relationship instability. Effects of changes in relationship stability are analyzed within the subsample of respondents who reached the age of 18 and who were in a relationship with the same partner in two consecutive waves prior to the wave for which the dependent variables are analyzed. Changes toward relationship instability between waves $t-2$ and $t-1$ have no significant effect on the probability of participation in wave t for either of the two relationship status groups (Figure 3).

Analyzing the response process in detail reveals a negative effect of a change toward relationship instability on the next wave's cooperation probability for cohabiting respondents, albeit only marginally significant ($p < .05$) (Figure 4).[9] The effect is modest in magnitude: On average, a change in relationship stability between waves $t-2$ and $t-1$ decreases the probability of cooperation in wave t by 1.8 percentage points. Entering multiplicative interaction terms between changes toward relationship instability and length of panel participation into the regression models did not show any effect variation (results not shown).

We conclude that changes in relationship stability, overall, are not strongly associated with contact and cooperation probability. One could argue that the negative effect on cooperation for cohabiting respondents might in fact be due to attriters showing a higher answer variation, resulting from a generally lower motivation to respond to the questions asked.

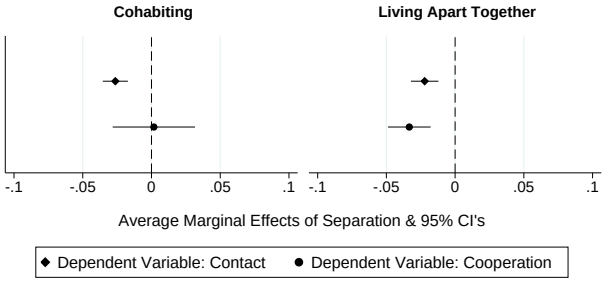

Figure 2. Effects of separation in wave $t-1$ on contact and cooperation probability in wave t by relationship status, Waves 3 to 7.

Notes: Contact models also include age, age squared, having children, gender, migration status, home ownership, (changes in) employment status, moves, and wave dummies. Cooperation models control for age, relationship duration, having children, gender, years of education, migration status, (changes in) employment status, nonresponse on household income & intimate questions, percentage of item nonresponse, no. of items, no. of items squared, and wave dummies; Contact (cooperation) cohabiting: n = 14054 (13680); Contact (cooperation) LAT: n = 6665 (6392).

The effect, however, persists when controlling for various item-nonresponse indicators we used to capture these differences in respondents' ability and motivation to answer the questions. For LAT respondents, our results were not consistent with the assumption that changes in relationship stability are negatively associated with the probability of participation in the next wave. From the literature we have seen differences in the predictive value of relationship instability for partnership dissolution by cohort (Section 2.1). Descriptive results also showed that although reports of relationship instability are more frequent among LAT respondents, they did not report relationship instability more often prior to separation (Section 4.1). Thus, we assume that the lack of an effect for LAT respondents is due to relationship instability being a less adequate indicator of partnership dissolution for this group.

5 Summary and Conclusions

The problem of an underrepresentation of changes in panel studies so far has been attended to for several studies

[9] To simplify the presentation of results, Figures 3 and 4 show only the effects of a change toward relationship instability. The complete results of all models can be found in the Appendix tables A3 and A4 (models 8 to 13).

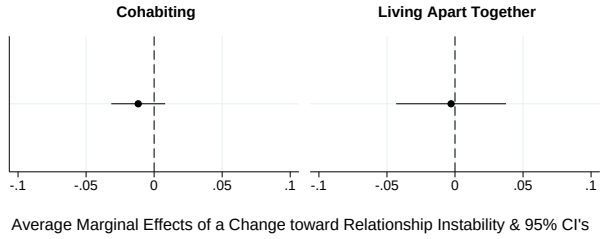

Figure 3. Effects of a change toward relationship instability in wave $t-1$ on participation in wave t by relationship status, Waves 3 to 7.

Notes: Models also include age, age squared, relationship duration, having children, gender, years of education, home ownership, migration status, (changes in) employment status, moves, nonresponse on household income & intimate questions, percentage of item nonresponse, no. of items, no. of items squared, and wave dummies; Cohabiting respondents: 12199; LAT respondents: 2268

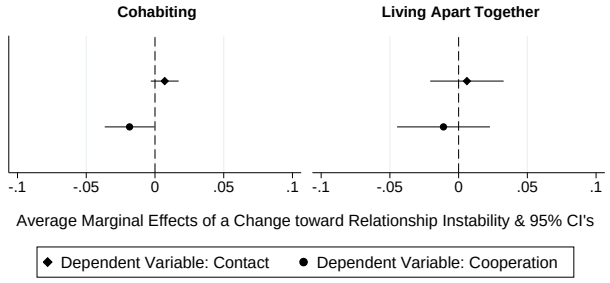

Figure 4. Effects of a change toward relationship instability in wave $t-1$ on contact and cooperation probability in wave t by relationship status, Waves 3 to 7.

Notes: Contact models also include age, age squared, having children, gender, home ownership, migration status, (changes in) employment status, moves, and wave dummies. Cooperation models include age, relationship duration, having children, gender, years of education, migration status, (changes in) employment status, nonresponse on household income & intimate questions, percentage of item nonresponse, no. of items, no. of items squared, and wave dummies; Contact (cooperation) cohabiting: $n = 12244$ (11949); Contact (cooperation) LAT: $n = 2274$ (2162)

(Fitzgerald et al., 1998; Lemay, 2009; Short & McArthur, 1986; Voorpostel & Lipps, 2011). Changes of partner and marital status, especially divorce, have been found to be associated with a higher risk of attrition (Fitzgerald et al., 1998; Neukirch, 2002; Voorpostel & Lipps, 2011). One of the main objectives of pairfam is to conduct research on couples' dynamics. Gaining information on the effects of partnership dissolution on participation, therefore, is of utmost importance. Given the specific topic of the pairfam study, it is of special interest to assess whether effects of separation result from difficulties in contacting respondents, or even cooperation with the survey request. Identifying the effects of separation at these two stages, however, is in many ways challenging. First, effects on contacting survey respondents could be confounded by other attrition related events such as relocation. Second, analyses of effects on cooperation can only be based on a subsample of respondents who were successfully contacted. Differentiating between respondents who were living together with their partner and those who were living apart together allowed us to examine this problem in more detail: In fact, LAT couples do not necessarily need to relocate after separation and relocation is one of the largest causes of contact failure. Hence, the group that could be successfully contacted and investigated in terms of factors affecting cooperativeness is less selective. Still, assessing the immediate effects of separation on participation remains very challenging, as there are no external administrative data that offer valid information on all separations occurring between waves. To shed some light on the immediate effects of separation on attrition, we analyzed changes in relationship stability, which has been identified as a precursor of separation in many cases.

We offer two main conclusions from this study: First, our results are in line with previous findings for longitudinal surveys suggesting that partnership dissolution is associated with attrition at a later wave. Analyses yield evidence of a lagged effect of reported separation on participation in the pairfam study, both for cohabiting and living apart together relationships. Controlling for commonly found influences on attrition, sample members who report a separation are more likely to drop out of the study. Analyzing the response process in more detail revealed a decreased likelihood of contact success in the case of separation for both relationship status groups. Contrary to our expectation of more pronounced effects on cooperation for more institutionalized relationships, only LAT respondents have a decreased cooperation probability in the case of separation. Presumably, the lack of an effect of separation for cohabiting respondents is due to selectivity of the sample which remains for analyzing cooperation after a successful contact.

Second, changes in relationship stability overall have no effect on the next wave's participation probability. More detailed analyses of the response process deliver weak evidence

that an increase in relationship instability is associated with lower cooperation rates for cohabiting respondents. It is, however, unclear whether this is due to (unobserved) separation following this change or the changes themselves being negatively associated with participation.

Thus, the present study provides evidence that to a certain degree, attrition in the pairfam study is selective on partnership stability. But as effect sizes are modest, our findings are all in all good news for potential analyses on relationship dynamics: pairfam respondents do not seem to withdraw from the sample as a consequence of a worsening in the stability of their relationship. Even the significant effect of reported separations on participation does not seem to be worsened by the scope of the study. However, this conclusion is based on lagged effects of separation and an approximation of immediate effects only. The lack of between-wave information does not allow us to draw any final conclusions about the actual level of attrition due to separation. This leads us to possible shortcomings of the study.

First, the results of the study are descriptive and do not allow us to draw any causal conclusions. Although we differentiate between the two relationship status groups, analyze the response process in detail, and control for possibly confounding influences, bringing a deeper understanding of the association between separation and attrition, the mechanisms behind this association could not be completely evaluated. Separation brings about other changes such as relocating or changing employment, which could also explain the lagged negative effect on contact and cooperation. These changes between waves remain unobserved and we cannot evaluate their possibly intervening effect on the association between separation and attrition.

A second limitation concerns changes in relationship stability as a predictor of partnership dissolution. Descriptive results showed that separation in many cases is preceded by reports of relationship instability. However, changes toward relationship instability overall are not strongly associated with participation in the pairfam panel. One explanation could be the quality of this indicator as a predictor of separation and severe relationship quality changes. Social desirability bias due to misreports is likely for sensitive or embarrassing information (for an overview, see Tourangeau & Yan, 2007), and difficulties in a relationship can be considered sensitive information. Additionally, in many cases separations are not preceded by conflicts or reports of relationship instability. On the contrary, stable relationships may show recurring conflicts and low relationship quality. In these cases, indicators of relationship quality and stability cannot capture effects of non-observed partnership dissolution. Furthermore, we only considered information on the perspective of one partner. All in all, we tend to think that a separation is a shock situation, which cannot be captured by reports of relationship instability. Hence, it could be more likely that the shock effect of separation affects participation in a relationship and family panel, whereas changes in relationship stability preceding separation do not. Also, we must bear in mind that there is a time lag between changes in relationship stability and the dependent variable, possibly resulting in a weaker association of this indicator with attrition (see also Rendtel, 2002, p. 14).

As a final point, it is worth mentioning that evaluating the effect of separation on attrition in a relationship and family panel entails a selection problem if respondents who separate during the panel have had more unstable or difficult relationships and therefore a lower likelihood of cooperation from the outset of the study. Effects of separation might then in fact be due to selection of anchor respondents with a lower motivation to participate. By analyzing a hypothesized prestage of separation, we attended to this problem to a certain extent. However, a comprehensive investigation of possible selection along relationship quality is beyond the scope of the current study and needs to be addressed in a separate analysis, including a broader set of relationship quality characteristics and also considering participation in the second wave of the study.

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Appendix
Tables

Table A1
Descriptive statistics of living apart together (LAT) and cohabiting respondents

	LAT		Cohab.	
	n	%	n	%
Total	6834	32.0	14458	67.9
Cohort				
Cohort 1	4778	69.9	800	5.5
Cohort 2	1389	20.3	5475	37.9
Cohort 3	667	9.8	8183	56.6
Relationship duration				
<1 year and 1 year	3785	55.6	622	4.3
2 years	1431	21.0	800	5.6
>3 years	1596	23.4	12978	90.1
Having children	647	9.5	10334	71.5
Change in employment status	1399	20.6	2678	18.6
Instability of relationship	1952	37.7	2860	20.8

Calculations are based on a subsample of respondents with two consecutive observations and who reported having a partner at time point $t-2$ (Table 1); descriptive statistics refer to the distribution of variables entering the models for participation in waves 3 to 7 (models 2 and 3).

Table A2
Effects of separation in wave t − 1 on contact and cooperation probability in wave t by relationship status, Waves 3 to 7

	Contact		Cooperation	
	Cohab. (4)	LAT (5)	Cohab. (6)	LAT (7)
Separation	−0.026***	−0.022***	0.002	−0.033***
	(0.005)	(0.005)	(0.015)	(0.008)
Age	0.001**	−0.002***	0.001	−0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Relationship duration			−0.000	−0.007***
			(0.001)	(0.001)
Having children	0.008*	0.012	−0.021*	−0.002
	(0.003)	(0.012)	(0.008)	(0.014)
Female	0.003	−0.003	−0.002	−0.003
	(0.003)	(0.005)	(0.006)	(0.006)
Years of education/10			0.063***	0.028
			(0.010)	(0.015)
Migration status (base: non migrant)				
1st generation migrant	−0.007	0.001	−0.028***	0.003
	(0.004)	(0.009)	(0.008)	(0.012)
2nd generation migrant	−0.003	−0.002	−0.006	−0.025*
	(0.005)	(0.007)	(0.009)	(0.011)
Home ownership	0.010***	0.008		
	(0.003)	(0.005)		
Employment (base: full-time)				
In education	−0.022**	−0.005	0.010	0.027***
	(0.008)	(0.006)	(0.013)	(0.008)
Part-time	0.002	−0.003	0.016*	0.012
	(0.004)	(0.008)	(0.007)	(0.011)
Out of labor force	0.001	0.023*	0.024**	0.010
	(0.005)	(0.011)	(0.008)	(0.022)
Unemployed	−0.005	−0.003	−0.001	0.013
	(0.006)	(0.012)	(0.013)	(0.016)
Change employment status	−0.005	−0.016**	−0.002	−0.012
	(0.003)	(0.006)	(0.007)	(0.008)
Moved	0.004	0.007		
	(0.004)	(0.009)		
Nonresponse intimate questions			−0.038***	−0.008
			(0.008)	(0.010)
Nonresponse household income			−0.025**	−0.011
			(0.008)	(0.007)
Percentage item-nonresponse			−0.002**	−0.001
			(0.001)	(0.001)
Number of items			0.000	0.000
			(0.000)	(0.000)
Length of panel participation (base: 6 waves)				
2 waves	−0.027***	0.002	−0.082***	−0.019
	(0.004)	(0.009)	(0.011)	(0.012)
3 waves	−0.013***	0.008	−0.009	0.000
	(0.004)	(0.009)	(0.010)	(0.013)
4 waves	−0.004	0.010	−0.014	−0.005
	(0.003)	(0.009)	(0.011)	(0.013)
5 waves	−0.002	0.015	0.005	−0.002
	(0.003)	(0.009)	(0.009)	(0.012)
Pseudo R-squared	0.070	0.025	0.039	0.035
N (observations)	14054	6665	13680	6392

Average marginal effects; robust standard errors in parentheses
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table A3
Effects of a change toward relationship instability in wave $t-1$ on participation in wave t by relationship status, Waves 3–7

	Cohab. (8)	LAT (9)
Change toward relationship instability	−0.012	−0.003
	(0.010)	(0.021)
Age	0.001	−0.001
	(0.001)	(0.002)
Relationship duration	0.001	0.003
	(0.001)	(0.003)
Having children	−0.005	0.029
	(0.009)	(0.029)
Female	−0.000	0.009
	(0.007)	(0.015)
Years of education/10	0.059***	0.037
	(0.011)	(0.032)
Migration status (base: non migrant)		
1st generation migrant	−0.030**	−0.018
	(0.009)	(0.030)
2nd generation migrant	−0.010	−0.011
	(0.010)	(0.023)
Home ownership	0.008	0.026
	(0.006)	(0.016)
Employment (base: full-time)		
In education	−0.024	0.028
	(0.018)	(0.019)
Part-time	0.014	0.029
	(0.008)	(0.022)
Out of labor force	0.022*	0.006
	(0.010)	(0.050)
Unemployed	−0.013	−0.029
	(0.016)	(0.040)
Change employment status	−0.002	−0.011
	(0.008)	(0.017)
Moved	−0.001	0.021
	(0.010)	(0.028)
Nonresponse intimate questions	−0.047***	−0.018
	(0.010)	(0.031)
Nonresponse household income	−0.031**	0.006
	(0.010)	(0.019)
Percentage item-nonresponse	−0.003**	−0.001
	(0.001)	(0.002)
Number of items	0.000	−0.000
	(0.000)	(0.000)
Length of panel participation (base: 6 waves)		
2 waves	−0.113***	−0.082*
	(0.012)	(0.032)
3 waves	−0.024*	−0.061
	(0.012)	(0.032)
4 waves	−0.016	−0.040
	(0.012)	(0.031)
5 waves	−0.001	−0.034
	(0.010)	(0.026)
Pseudo R-squared	0.046	0.018
N (observations)	12199	2268

Average marginal effects; robust standard errors in parentheses
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table A4
Effects of a change toward relationship instability in wave t − 1 on contact and cooperation probability in wave t by relationship status, Waves 3–7

	Contact		Cooperation	
	Cohab. (10)	LAT (11)	Cohab. (12)	LAT (13)
Change toward relationship instability	0.007	0.006	−0.018*	−0.011
	(0.005)	(0.014)	(0.009)	(0.017)
Age	0.001*	−0.001	0.001	−0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Relationship duration			0.000	0.000
			(0.001)	(0.002)
Having children	0.011***	0.023	−0.011	0.008
	(0.003)	(0.019)	(0.009)	(0.023)
Female	0.003	−0.002	−0.004	0.010
	(0.003)	(0.009)	(0.007)	(0.012)
Years of education/10			0.065***	0.037
			(0.010)	(0.028)
Migration status (base: non migrant)				
1st generation migrant	−0.007	−0.016	−0.026**	−0.001
	(0.004)	(0.020)	(0.009)	(0.024)
2nd generation migrant	−0.005	0.000	−0.007	−0.012
	(0.005)	(0.014)	(0.010)	(0.020)
Home ownership	0.009**	0.021*		
	(0.003)	(0.010)		
Employment (base: full-time)				
In education	−0.024**	−0.001	0.001	0.032*
	(0.009)	(0.012)	(0.017)	(0.015)
Part-time	0.002	0.011	0.015	0.020
	(0.004)	(0.013)	(0.008)	(0.019)
Out of labor force	0.002	0.019	0.021*	−0.009
	(0.005)	(0.023)	(0.009)	(0.046)
Unemployed	−0.002	−0.013	−0.013	−0.018
	(0.007)	(0.025)	(0.015)	(0.035)
Change employment status	−0.005	−0.008	0.003	−0.003
	(0.003)	(0.011)	(0.007)	(0.015)
Moved	0.001	−0.002		
	(0.005)	(0.016)		
Nonresponse intimate questions			−0.043***	−0.019
			(0.009)	(0.025)
Nonresponse household income			−0.031***	0.007
			(0.009)	(0.016)
Percentage item-nonresponse			−0.003***	−0.003
			(0.001)	(0.002)
Number of items			0.000	−0.000
			(0.000)	(0.000)
Length of panel participation (base: 6 waves)				
2 waves	−0.028***	−0.030	−0.088***	−0.057*
	(0.004)	(0.019)	(0.011)	(0.024)
3 waves	−0.013**	−0.019	−0.014	−0.043
	(0.004)	(0.015)	(0.011)	(0.027)
4 waves	−0.004	−0.004	−0.017	−0.034
	(0.003)	(0.013)	(0.012)	(0.026)
5 waves	−0.002	−0.005	−0.000	−0.028
	(0.003)	(0.012)	(0.009)	(0.022)
Pseudo R-squared	0.070	0.023	0.042	0.019
N (observations)	12244	2274	11949	2162

Average marginal effects; robust standard errors in parentheses
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$