The division of household labor has long been a central area of interest to scholars seeking to understand female labor force participation, the demands and structure of the family, and gender dynamics in households. Much of the research on household labor has investigated the symbolic nature of housework and its importance for conveying gender (Berk 1985, Brines 1994, DeVault 1991), drawing on the perspective that successful maintenance of gender identities requires an ongoing display of activities culturally branded as either masculine or feminine (West and Zimmerman 1987). Recent research remains focused on how gender and conformity to gender norms influence housework, earnings, and a range of other household behaviors (Killewald and Gough 2011, Schneider 2011; Schneider 2012). Though support for some findings has varied, this line of research generally supports the argument that individuals use housework as a means of conforming to gender norms.

Other research examines the *consequences* of couples' gendered division of labor for couple processes, including marital satisfaction, divorce, and other behavior, in keeping with a symbolic interactionist perspective that suggests performances of gender should matter because of the way these gender performances are evaluated by others (Barstad 2014; Frisco and Williams 2003; Greenstein 1996, 2011). West and Zimmerman's (1987) commonly cited perspective that individuals "do gender" argues that rather than being a fixed identity or social role, successful enactments of gender require *ongoing* maintenance. Accordingly, changes in gender performances should also change the responses of those who view gender displays. Yet though symbolic interactionist perspectives on gender imply a dynamic relationship between an individual's performance of gender and the response of their audience to those gender performances, relatively few studies have directly investigated changes in the gendered division of household labor using longitudinal data, as others have observed (Sullivan 2004, Curran 2002).

One possible reason for this lack of research is that there are impediments to using longitudinal data for testing whether changes in gendered household labor change outcomes of interest in households, particularly when there are long lags between observation periods. First, significant life course events, such as the birth of children, declining health, or retirement may change the demands of housework as well as constrain sexual activities. Second, for analyses of married couples, divorce or marital separation may lead to selection bias if sampled couples must remain married over relatively long periods of time in order to be sampled in multiple waves of data. Thus, long time lapses between waves of data collection threaten the validity of claims to a causal relationship between shifts in gendered divisions of housework and changes in marital processes. In contrast, short time lapses between observation periods may better isolate the effects of changes in household labor on changes in dyadic marital processes.

In this article, we offer a unique use of couple-level data, using non-concurrent spouse reports, to allow for a test of the effects of changes in household labor over short periods of time. Substantively, this article investigates sexual frequency, and further investigates claims from a recent article which examined

the link between men's participation in household labor and sexual frequency (Kornrich, Brines, and Leupp 2013). This article found that more traditional divisions of household labor – where women did more female-typed labor and men did more male-typed – were associated with higher sexual frequency. The authors argued that because household tasks are a venue for displaying masculine and feminine behaviors, this evidence supported a gendered sexual scripts perspective, which posits that sexual frequency increases when couples divide household labor along traditional gender lines, because household tasks serve as a venue for performing masculinity and femininity.

According to a gendered sexual script theory, changes in the amount of stereotypical masculine or feminine tasks partners perform should activate (or not) sexual scripts and alter couples' sexual frequency. However, like much other research examining housework as a means of performing gender, the research presented by Kornrich, Brines and Leupp (2013) examines only cross-sectional data. This means that they are unable to document the dynamic process they theorize, in which the division of household labor activates sexual scripts. Instead, they document that couples which have more typically gendered divisions of household labor have, on average, higher sexual frequency. As with all cross-sectional research, this research is subject to a range of pitfalls. Particularly relevant is the threat of omitted variable bias, despite the authors' attempt to control for a range of relevant variables. Examining changes over time in the gendered division of housework and changes in resulting couple behaviors allows for a more robust test of the theoretical perspective and offers the chance to control for unmeasured covariates.

To perform this test, we use data from each spouse's report of sexual frequency and the division of household labor when these spouses do not answer the survey within the same week. Since spouses in this sub-sample report in different time periods, we are able to capitalize on the ability of fixed effects models to control for unmeasured heterogeneity across couples to examine how changes in the division of labor are related to sexual frequency *within* couples. To our knowledge, this is the first research that makes use of non-concurrent opposite spouse reports to investigate within-family change, and this method may be useful in other samples and potentially for sample design. While many of our findings are similar to those found by Kornrich and colleagues, we note several areas where they diverge in ways that are most likely to result from unmeasured differences between couples.

Below, we discuss the "doing" of gender as an interactive process and the role of gender display for sexual interaction according to a gendered sexual-scripts perspective. We then formulate a fixed-effects model for within-couple change using non-concurrent reports. We examine the characteristics of non-concurrent responders, asking whether they differ from couples who report at the same time. Finally, we test the effects of short-run shifts in the division of household labor on sexual frequency. Our results show that short-run shifts toward traditional divisions of labor are associated with increases in sexual

2

frequency. These findings offer further support for both a sexual scripts perspective, and the perspective that successful gender performances require ongoing maintenance.

Gender Performance as an Interactive Process

  The perspective of gender as an ongoing performance, outlined by West and Zimmerman (1987), has been widely drawn upon to understand gendered behavior. Drawing heavily on Goffman's dramaturgical approach, West and Zimmerman argue that individuals perform gender by engaging in activities that have been socially labeled as either masculine or feminine. The "Doing Gender" approach is differentiated from the perspective of gender as a social role by West and Zimmerman's argument that gender categories cross identities and settings, and require ongoing maintenance. Gender performance perspectives have been used to explain a variety of gendered performances associated with romantic, marital, and family behaviors, ranging from erotic dancing among college students (Ronen 2010) to family grocery shopping (DeVault 1991).

  Although other theoretical perspectives have also been important, gender performance theory has been especially influential for scholars seeking to understand the division of household labor (Berk 1985, Brines 1994, Bittman et al. 2003, Greenstein 2000, DeVault 1991, Schneider 2011, Schneider 2012, Killewald and Gough 2012). Household labor seems to be a key way that men and women attempt to portray themselves as masculine or feminine. DeVault (1991:234) writes of the tendency for women to prepare family meals, "the gendered relations of feeding and eating seem to convey that giving service is part of being a woman, and receiving it fundamentally part of being a man." As such, housework has received attention as a means of neutralizing gender deviance in other arenas (Brines 1994, Bittman et. al 2003, Greenstein 2000). Recent studies indicate that women use housework to reduce gender deviance when they earn more than their husbands (Schneider 2011), and that both men and women use masculine and feminine household tasks to neutralize gender deviance in their occupations (Schneider 2012).

  Other research draws on the gender display perspective to examine the impact of gendered divisions of household labor on marital outcomes. While much of this work uses cross-sectional data, some studies use longitudinal data to examine the effects of the division of housework on marital outcomes. For example, using event history analysis, Cook finds that men's housework time increases the risk of divorce in German childless couples (2004), but decreases the risk of divorce in the United States (2006), highlighting the importance of social context for shaping the effect of gendered labor arrangements on marriage. Research on the effects of housework using longitudinal data has also examined the effect of men's participation in housework on fertility, with mixed findings (Baxter, Hewitt and Haynes 2008; Cook 2004). Despite considerable scholarly interest in effects of the gendered division

of household labor, little research to date examines the effect of changes in household labor within individual households on changes in those households' marital characteristics or processes.

Our interest in the consequences of gendered performances of housework on dyadic marital processes is drawn in part from the emphasis those theorizing gender performance have placed on social interactions. A key tenet of the gender performance perspective is that individuals' gender performance occurs within the context of social interaction, so that individuals are accountable for conforming to gender norms. West and Zimmerman write,

> "[T]o "do" gender is not always to live up to normative conceptions of femininity or masculinity; it is to engage in behavior at the risk of gender assessment. While it is individuals who do gender, the enterprise is fundamentally interactional and institutional in character, for accountability is a feature of social relationships and its idiom is drawn from the institutional arena in which those relationships are enacted" (1987: 136-137).

Others have stressed the role of interaction in shaping the doing of gender within the household. Describing the interactive process of doing gender, Oriel Sullivan writes, "When individuals do gender within a couple relationship, they do it as part of a dialectic process, which involves both an interpretation of the other partner's gender consciousness and an interaction with their respective doing of gender" (2004). Thus, examinations of both an individuals' gendered behavior, as well as their partner's response to that behavior, seems important for testing whether a given task serves as a symbolic enactment of gender. Moreover, as Goffman (1959) posits, deviations from expected behaviors disrupt the social scripts that otherwise allow for smooth social interactions. Given the importance of accountability and social interaction for the gender performance perspective, research that examines the effect of gendered divisions of household labor on dyadic marital processes governed by scripts, such as sexual activity, serve as important tests of the doing gender perspective. In this paper, we test the effects of particular gendered behaviors on dyadic interactions, rather than testing whether individuals do or do not act in ways that appear to minimize gender deviance.

A Gendered Sexual Scripts Perspective

Scholars seeking to understand sexual behavior have turned to a range of theoretical perspectives, including exchange theory, equity theory, time availability, gender ideology, and a multiple-spheres perspective (Call et al. 1995; Christopher and Sprecher 1995; Sprecher 1998; Gager and Yabiku 2010;

Yabiku and Gager 2009; Greeley 1991). In this paper, we focus on a gendered sexual scripts perspective since recent research linking housework to sexual frequency finds support for this perspective (Kornrich et al. 2013) and because the sexual scripts perspective incorporates many of the theoretical concepts from a doing gender approach (Gagnon and Simon 1973; Simon and Gagnon 1986).

A scripting approach argues that sexual scripts help structure individual sexual behavior, as individuals follow these scripts when engaging in sexual intercourse (Gagnon and Simon 1973; Simon and Gagnon 1986). Scripts exist at three levels to specify how individuals should act sexually. The set of scripts individuals have to choose from are defined and maintained at 1) the cultural or collective level, and then used at 2) the interpersonal level to manage sexual interactions, as well as at 3) the intrapsychic level to align individuals' behaviors and desires (Simon and Gagnon 1986). A common example of a sexual script is the routinized way in which sexual activity often proceeds from kissing to sexualized touching to intercourse – each a stage in the script which leads individuals to progress along the script to the next stage.

A gendered sexual scripts perspective specifies that sexual scripts are gendered; that performances of normative masculinity and femininity increase heterosexual partners' sexual activity. This happens through a series of interactions that define a moment as sexual. For heterosexual couples, the cultural scripts for sexual attraction and activity largely rest on displays of gender difference. Thus, performances of gender that are more 'masculine' or 'feminine' will lead to greater sexual activity for heterosexual partners. In regards to couples' division of household labor, a sexual scripts perspective posits that sexual frequency increases when couples divide household labor along traditional gender lines because household tasks allow household members to perform masculinity and femininity.

There is substantial evidence that in general, sexual scripts are gendered. Men are typically expected to and do initiate sexual activities and exhibit greater sexual desire by a range of measures, including permissiveness, interest in sex, arousal, and initiation and refusal behaviors (Baumeister, Catanese, and Vohs 2001). Other research suggests that the phenomena and display of masculinity and femininity *per se* are important for sexual activity. For example, teens and young adults finds that teenage couples are more likely to have sex when heterosexual partners conform more closely to masculine and feminine gender norms (Storms et al. 1981, Udry and Chantala 2004). Among college students, Ronen (2010) observed that sexualized dancing is initiated more often by men, and unfolds in a series of behaviors that affirm the sexual agency of men, but not of women.

Though application of the sexual scripts perspective to married couples has been limited, Schwartz (1995) observed that despite the many benefits of egalitarian marriages, spouses who deviated from gender norms reported lackluster sex lives compared to couples who adhered to more traditionally gendered masculine and feminine roles. Kornrich and colleagues (2013) test the perspective using data

5

on men's and women's time spent on traditionally male and traditionally female tasks, arguing that time spent on male and female tasks serves as a signal of gender and activates sexual scripts. They find that households with more traditional divisions of labor report higher sexual frequency and argue that traditional behavior indeed activates traditionally gendered sexual scripts, creating sexual activity.

A sexual scripts perspective implicitly implies a dynamic relationship between behaviors that initiate sexual scripts – in this case, men's and women's participation in housework – and the end result of those sexual scripts, in this case, sexual intercourse itself. Thus, there should be short-term variation in how often sexual scripts are activated – that is, how frequently couples together experience situations and contexts that lead them to initiate sexual behavior. At some points in time, gender display should be high, as should sexual activity, while at other points, both should be low. Thus, a test of a sexual scripts perspective would ideally examine short-term variation within couples to see whether couples indeed have sex more frequently during periods where the division of labor is more traditional.

Substantively, a problem with testing a sexual scripts perspective with a cross-sectional approach, which looks for variation in sexual frequency across couples, is that alternate explanations are difficult to rule out. For example men and women who hold traditional gender beliefs are likely to both have more sex (because men initiate sex more frequently and women refuse less, in line with traditional conceptions of gender and sexuality) and divide labor in gender-traditional ways. One potential response to this problem is to include controls for measured statements of traditional gender ideologies and other variables which pick up on traditional behaviors. Yet standard measures of gender ideology may fail to pick up on traditional behaviors and beliefs, perhaps because of social desirability bias (Hamilton, Geist, and Powell 2011). Regardless of the quality of measures, there is always the possibility that unobserved dispositions could lead to differences when comparing levels of sexual behavior across couples.[1] Thus, measuring the effects of changes in gender displays on changes in sexual frequency serves to test the robustness of cross-sectional findings which support the gendered sexual scripts perspective.

Couple Report Timing and Short-Run Change

Testing for within-couple changes requires the existence of multiple reports of household behavior. While there are multiple waves of the National Survey of Families and Households (NSFH), each wave is separated by several years since interviews were conducted for the first wave in 1987 and 1988, for the second wave between 1992 and 1994, and for the third wave in 2001 and 2002, which creates the potential for substantial changes in the organization of family life as the result of changes in

---

[1] Unobserved dispositions are indeed at the heart of the explanation offered by Gager and Yabiku (2010). They find that couples who do more overall housework also report more frequent sex, and suggest that these couples have more (unobserved) tendencies towards activity in both areas – that they both "work hard" and "play hard."

work, children, or other family features unrelated to sexual scripts. In other words, over the long run, couples may shift to a completely different equilibrium point of both sexual frequency and the division of household labor as a result of household changes which are otherwise unrelated to the division of household labor or sexual frequency. A short-run test is preferable because it more directly addresses the activation of sexual scripts through shifts in the division of household labor.

Because couples are not re-interviewed within a short period, it is not obvious how to conduct a test over a short period of time. However, we suggest using reports from each spouse within a household to examine short-run changes in household behavior. When spouses report at different times, they are presumably reporting (albeit with error) a measure of household-level phenomena at each of the two different times. Differences in these reports should thus represent changes in the phenomena – or, given that they occur in the short-run, variation in these phenomena – rather than simple differences in spouse reports due to, for example, misreporting by one spouse. In contrast, differences between concurrent reports should primarily consist of "noise" in which spouses make non-systematic errors in reporting. For example, when spouses respond on the same day and report the amount of housework done over the past week, they are reporting on the same time period and differences in their reports should result from non-systematic differences based on a spouse's observation of housework done.

Non-concurrent spouse reports exist in Wave II of the NSFH. Data collection for Wave II of the National Survey of Families and Households (NSFH) included attempts to re-interview original respondents to Wave I of the NSFH and their spouses. However, because interviews were conducted privately – including a self-enumerated questionnaire – interviews with the two spouses were not simultaneous. Instead, researchers contacted each spouse when they were available. First visits were conducted in person, with attempts at in-person follow-ups, and additional later follow-ups by phone for by NSFH interviewers for any interviewees who had not yet been interviewed. While both spouses in most couples responded in the same week, roughly 1,300 of the nearly 5,000 couples did not do so.

While the timing of reports should matter when comparing reports from two spouses, relatively little research has noted the timing of reports. For Kornrich and colleagues (2013), who presented results from analyses using housework data from one spouse and sexual frequency data from the other, non-concurrent observations represented additional noise and they discarded non-concurrent observations. [2] Because their interest was in preventing same-source respondent bias but they needed spouses to report

---

[2] The original article designated reports as non-concurrent if they were in different months. Here, we define reports as non-concurrent if they are not within seven days of each other and we focus on this sample of spouses with non-concurrent reports. A seven-day time period corresponds to the NSFH questions on housework, as respondents are asked to report time spent on household tasks in the past week. In additional tests, we limited the sample to those reporting in different months (the recall period for sexual frequency), and found nearly identical results.

on the same period in order for reports of sexual frequency and the division of household labor to match, discarding non-concurrent interviews made sense.

In this paper, we capitalize directly on the existence of non-concurrent observations. We use differences in opposite-spouse reports from different time periods to examine changes in behavior over a short time period. Even if husbands and wives both report accurately on the same "objective" household phenomenon, there should be differences in their reports when they are reporting on different time periods because the underlying phenomena will differ over time. For purposes of modeling household change, non-concurrent spouse reports represent not noise, but a unique possibility to measures short-run changes. If the characteristic is an observable household-level characteristic, spouses' independent reports should both reflect the same reality, and non-concurrent spousal reports can then capture change over time. Figure 1 illustrates non-concurrent reports from a husband and wife. The figure shows two hypothetical points in time, with both spouses offering reports on men's share of housework and sexual frequency. If we assume reports which are perfectly reliable and accurate, then the difference in these two reports perfectly represents a substantive change – where at one point in time, men's share of housework was higher and sexual frequency was lower, while at another point in time, men's share of housework was lower and household sexual frequency was higher.

[Figure 1 About Here]

Whether non-concurrent spousal surveys capture change over time will depend on the phenomena in question. Clearly, this method would not work for most individual-level characteristics, like measures of marital or sexual satisfaction, since differences in the two spouses' reports represent differences in individual characteristics rather than changes in emergent household characteristics. We suggest that this approach is most fundamentally useful for examining observable household-level characteristics, in which a household-level process of interest exists and can be reported on by both spouses.

One potential problem with using non-concurrent spousal reports to capture change over time is reliability: spouses may report different values even if they are reporting on an objective phenomenon in the same time period. If spouses offer unrelated reports of the same phenomenon at the same time point, it raises a substantial concern about whether reports at different times are meaningful measures of change. For the purpose of examining short-term changes, one important question is whether spouses are able to reliably report individually on the main variables of interest, in this case sexual frequency and men's share of household labor. While it is not possible to answer this question with absolute certainty, we can offer some evidence to suggest that spouses' reports represent independent and reliable measures of the same underlying phenomena.

Table 1 shows correlations between spouses' reports of men's share of core and non-core household labor and sexual frequency in different time periods: when they report within 6 days of each other, and when they report 7 or more days apart. Husbands' and wives reports of sexual frequency and men's share of core and non-core household labor are strongly correlated. They are more strongly correlated when spouses report within the same week than when spouses report in different time periods. The stronger correlations when spouses report in the same week are likely a result of spouses reporting two measures of the same division of household labor and sexual frequency. We argue these correlations support the notion that spouses at least somewhat reliably report on the same underlying activity, and that the lower correlations in non-concurrent reports exist because, while there is some stability in levels of sexual frequency and the division of household labor, there is also substantial short-run change, which leads to differences in spouse reports because the levels have changed as the reporting period changes.

[Table 1 About Here]

Another potential problem could be selection effects. If households in which spouses report at different times are substantially different from households where both spouses answer the survey at the same time, results from non-concurrent reports may not be generalizable to the population of married households. In addition, results may systematically differ because of unmeasured and unobservable household characteristics which lead to a difference in the relationship between sexual frequency and household labor. Table 2 shows the extent to which there are differences between concurrent and non-concurrent responders in our sample.

[Table 2 About Here]

Clearly, there are differences between the groups of spouses who complete surveys concurrently and non-concurrently, which reach conventional levels of statistical significance. Some differences are unsurprising: couples with non-concurrent reports spent less time together in the previous month compared to concurrent responders. Other differences, while significant, are substantively small. Men's share of both core and non-core housework is significantly different between concurrent and non-concurrent responders in both husbands' and wives' reports, but the differences are one to three percentage points. The largest differences between the groups are in sexual frequency, health, and age: non-concurrent responders report more frequent sex, are younger than other couples, and self-report having better health than concurrent responders.

9

Differences between concurrent and non-concurrent responders could contribute to any associations we observe in our sample of non-concurrent responders. Because we control for average differences, the primary concern is whether the relationship between sex and housework is different for non-concurrent responders and concurrent responders: that, for example, if we had observed concurrent responders separately, that short-run changes in housework would *not* be correlated with short-run changes in sexual frequency in the ways we found in the sample of non-concurrent responders. While this is possible, we suspect it is unlikely. If the mechanism we propose holds, we would find no relationship only if concurrent responders do not hold traditional sexual scripts. However, concurrent responders are slightly more conservative in terms of their expressed gender ideology and slightly older (see Table 2), so there is no strong reason to suspect that they would not also hold relatively traditional sexual scripts.

We further investigated the possibility that sample selection may bias our results by using a Heckman correction in our analysis. We use a probit regression to estimate the likelihood that households report at separate times. We then used coefficients from this regression to generate an inverse Mills ratio, which we included in an additional model to test for the possibility of selection bias (Heckman 1976). Inclusion of the inverse Mills ratio did not change the sign or significance of coefficients.[3]

Data and Method

We use data from Wave II of the National Survey of Families and Households (NSFH), sampling couples who are married at the time of interview. Because the NSFH sample did not include married same-sex partners, our sample is limited to opposite-sex partners Our measures of men's and women's time in housework come from self-reports of time spent in the last week on preparing meals, washing dishes, cleaning house, outdoor tasks, shopping, washing and ironing, paying bills, auto maintenance, and driving. Following previous research, we separate these into core and non-core tasks, which map closely to female and male tasks, respectively (Bianchi et al. 2000; Schneider 2012). Core, "female" tasks include preparing meals, washing dishes, cleaning house, shopping, washing and ironing, and non-core "male" tasks include outdoor tasks, paying bills, auto maintenance, and driving. To calculate the share of housework done by men and women, we use respondents' reports of their own and their spouses' time. Since our research design relies explicitly on the fact that some respondents do not report household labor

---

[3] We generate this probability separately for each spouse based on their own responses to various questions. If there is a couple-level probability of reporting at different times, which is the same for both spouses it drops out in a fixed-effects formulation, since it is not possible to model the effect of a stable characteristic in a fixed-effects model. Instead, we use the probability of reporting at different times at the individual level. If spouses who are more likely to report at different times are more likely to report high levels of both sexual frequency and traditional divisions of labor, the fixed-effects model can still pick up on this possibility. In addition, this avoids the difficulty of determining which values represent the "true" values to generate a couple-level probability of responding at different times.

at the same time, it would be inappropriate to use data from both spouses in calculating housework shares. As in previous research, we recode values past the 95th percentile for each measure of housework to the 95th percentile of the distribution (South and Spitze 1994; Kornrich et al. 2013). For missing values for individual activities, we exclude cases when individuals do not report eight or more activities (and these cases are excluded from all of our remaining analyses). For cases with fewer than eight missing items of housework, we set missing values to the mean for non-missing cases. As with measures of housework, we recode values of sexual frequency past the 95th percentile to values at the 95th percentile.

We have relatively few other independent variables. Many of the typical variables used to predict sexual frequency are characteristics which are stable across the time we observe or which reflect only differences across spouses in household characteristics. For example, measures of joint religious attendance, household income, and length of marriage are all variables which, while technically changeable over time, typically change little over the short time spans we observe (median gap of 17 days among those with non-concurrent responses). We include some individual-level variables in the model (age, self-reported health status, gender ideology, and sex of the respondent), since differences in these characteristics may influence differences in spouses' reported levels of both sexual frequency and men's share of housework. For example, respondents who are more conservative than their spouses might be likely to report lower shares of men's participation in housework and lower levels of sexual frequency (if they define fewer acts as "sex") than their spouses. We also include a measure of whether the previous week contained a major holiday. We include this control because we suspect that holidays may change household patterns surrounding both household labor and sex. In addition to these individual-level differences, we include the amount of time an individual spent alone with their spouse in the previous month. Differences between spouses' reports should represent actual changes in the amount of time spent alone together for non-concurrent reporters.

For variables other than housework with missing data, we use list-wise deletion. We also tested whether coefficients were similar using multiple imputation for missing data. We generated 10 data sets using regression-based imputation separately for those who reported concurrently and non-concurrently. Levels of significance were identical, with the exception of the coefficient for total housework time in the non-concurrent sample, which became non-significant with imputation. Given the greater simplicity and replicability of the unimputed data, we present those results here.

We designate reports as non-concurrent if they occur 7 calendar days or more apart. We use a 7-day period because the recall period for housework in the NSFH is one week. In addition, while the recall period for sexual frequency in the NSFH is the previous month, Udry (1993) argues that respondents

11

estimate monthly sexual frequency by multiplying sex over the previous week by four. To the extent that this occurs, the effective recall period for sexual frequency is also one week.[4]

We approach non-concurrent reports using a fixed effects framework. Fixed effects regression models are useful for modeling dynamic relationships because they allow researchers to eliminate the effects of unobserved characteristics that do not change over time (Allison 2009). Fixed effects models remove differences between households or any unit of analysis by modeling change within households rather than differences across households. Each household operates as a control for its own stable characteristics, so that stable household characteristics which influence the level of sexual frequency are removed from the model. While unobserved variables are often a source of concern for those relying on survey data, the strength of a fixed effect model is that if the unobserved variable does not change over time, it cannot plausibly cause changes in the dependent variable, which must change as a result of other variables (Stock and Watson 2007).

Because sexual frequency is a count variable, we implement fixed effect regression using a Poisson model. While some previous research has used negative binomial regression, estimates from negative binomial regressions with unconditional fixed effects showed no evidence of overdispersion.[5] We also examined the first-difference approach to fixed effects in two time points, which produced similar patterns of statistical significance. However, since a first-difference approach treats a change of sexual frequency similarly across the range of the dependent variable, we present results from an unconditional fixed-effects poisson regression, which treats one unit changes at larger values of the dependent variable differently than changes at smaller values of the dependent variable.[6] The model takes the form

$$Y_{it} = \exp(\alpha + \beta X_{it} + \gamma Z_i + \varepsilon_{it})$$

where the subscripts i and t refer to household i at time t, Y is sexual frequency, X is a set of covariates including men's share of core housework and non-core housework, and Z is a set of dummy variables for each household. Including these dummy variables generates the unconditional fixed effects model.

---

[4] We tested models in which concurrent reports were designated as those within 29 days or fewer of each other and non-concurrent reports were those 30 days or more apart. These produced patterns nearly identical to Model 2 in Table 3. Coefficient estimates for men's share of both types of housework were larger, as were standard errors, and these coefficients remained significant at conventional levels (p<.05). The significant estimate for total time spent in core housework became non-significant in those models.

[5] We used unconditional fixed effects since conditional fixed effects estimators for negative binomial regression as implemented in most statistical packages are not true fixed effects estimators (Allison 2012; Allison and Waterman 2002).

[6] A first-difference approach would treat a change of 1 in sexual frequency as representing the same type of change regardless of whether a change was from 0 to 1 or from 14 to 15.

The primary benefit of the fixed effects model is that unobserved characteristics which might lead to a correlation between core housework and sexual frequency, such as more traditional beliefs about gender which are not captured by typical gender ideology questions, can be ruled out as explanations. However, this is only true if unobserved characteristics are stable over time. Fixed effects models cannot rule out unobserved characteristics that change over time and are correlated with both independent and dependent variables. For example, a stressful event might lead to a change in both patterns of household labor and sexual frequency, creating an apparent relationship between changes in the two variables. However, given the short time span we observe in most cases, substantial changes in the household are unlikely, and the problem of unobserved differences across households is likely more serious than unobserved changes within households.

We estimate the effect of husbands' and wives' reports of household labor on sexual frequency for concurrent and non-concurrent responders in separate models. As we note above, we expect that differences in reported sex and housework between non-concurrent husband and wife reports represent substantive changes or variation over time in the household division of labor and frequency of sex. On the other hand, we expect that differences between spouses' reports that occur during the same time period simply represent noise. Using a fixed effects model to measure changes housework and sex based on husbands' and wives' reports, we should

1) find a significant relationship between housework and sexual frequency for spouses who report at different times,

2) fail to reject the null hypothesis of no difference for the subsample of spouses who report at the same time, and

3) that coefficients will differ significantly between the samples of concurrent and non-concurrent responders.

Below, we estimate these models and offer a formal test for whether the relationship differs for concurrent and non-concurrent reports.

Effects of short-run changes

Table 3 shows results from fixed-effects Poisson models in which the dependent variable is sexual frequency. We present three regression models. The first two columns show coefficients and standard errors for households in which spouses report within the same week, the second two columns show results for households in which spouses report in different weeks, and the third set of columns show

results which include the inverse Mills ratio from a probit selection equation for the probability of reporting non-concurrently.[7]

[Table 3 about Here]

The results provide general support for a sexual scripts and doing gender perspective and suggest the utility of the methodological approach we have proposed. For non-concurrent responders, we find that men's share of core housework is associated with higher sexual frequency, while men's share of non-core housework is associated with lower sexual frequency. In substantive terms, this model would predict that a household which shifted from men doing no core housework to all the core housework would see a decrease of 30% in sexual frequency (exp(-.35)=.70). If this took place at the mean sexual frequency for non-concurrent responders, which is roughly 5.7, it would mean a decrease in sexual frequency of 1.7 times per month. A household which shifted from men doing no non-core housework to all non-core housework would see an increase in sexual frequency of 43% (exp.36=1.43), which, when considered at the mean of sexual frequency, would be an increase of 2.5 times per month.

For concurrent responders, on the other hand, we find no significant effects of men's share of either type of housework. In addition, while coefficients from both models are similarly signed, the difference between these coefficients is statistically significant. Thus, for couples who report at different times, differences in their reports predict differences in sexual frequency, but this result does not hold for couples who report at the same time. As we note above, this suggests that differences in spouses' reports of housework and sex when those reports occur at the same time reflect errors in reporting (a lack of concordance between husbands' and wives' reports of their sexual frequency and division of household labor),whereas for spouses reporting at different time periods the differences in their reported sexual frequency and housework reflect substantive shifts in behavior.

The results related to increases in the total amount of time spent on housework are mixed. Among non-concurrent responders, there is no effect of changes in non-core housework, and the coefficient for changes in total core housework is significant, but substantively small. For presentation purposes, we have multiplied coefficients for core and non-core housework by 100. Thus, an increase of 1 hour of core

---

[7] The selection equation included the following independent variables: sexual frequency, husband's share of core and non-core housework, total core housework, total non-core housework, husband's hours of paid work, wife's hours of paid work, gender ideology of the each spouse, the religious affiliation of the primary respondent, a measure of marital happiness, happiness with the spouse's contribution to housework, whether spouses attended religious services together, whether the couple was recently married, wife's age, husband's age, the number of children less than 2, 6, and 13, the share of income from the wife, total income, amount of time spent alone together, education, and self-reported health.

housework is associated with an increase of only 0.24% in sexual frequency, a negligible change[8]. Because the effect of hours of core and non-core housework are minimal or non-significant in the fixed effects models, these results suggest that the positive association between hours of housework and sexual frequency reported by studies using cross-sectional data (Gager and Yabiku 2010; Kornrich et al. 2013) were driven by unobserved differences across couples, such as spouses' energy levels, rather than a causal association between total housework hours and sex.

Spending more time alone together in the previous month led to higher sexual frequency for both concurrent and non-concurrent responders. It is relatively clear for non-concurrent responders why this should be the case, as differences in the amount of time husbands and wives report spending together likely reflect real differences in the amount of time spouses spend together during different time periods, and couples who spend more time alone together have greater opportunities to engage in sex. It is less clear why differences in husbands' and wives' reports of time spent together effects concurrent responders. One possibility is that there are still differences in the reporting period for many of the "concurrent" responders – by our sample designation they are required only to report in the same week, but this could be six days apart. Or, potentially, one spouse could be thinking back to simply the previous few days while the other spouse recalled the entire week, leading to potential differences. Notably, even though spouses' report of time spent alone together affects both concurrent and non-concurrent responders, the effects are strongest for non-concurrent responders. This difference in effect magnitude indicates that actual changes in the amount of time spouses spend together increases sexual frequency beyond any tendency for spouses to inflate both their time together and sexual frequency.

Finally, we included several individual level variables to control for the possibility that differences in individual characteristics were responsible for differences in reports, again with the underlying logic that differences on key individual characteristics might lead to higher (or lower) reports on both the independent and dependent variables. For concurrent responders, self-rated health and being female are associated with higher reports of sexual frequency. It may be that these characteristics are simply associated with higher perceptions of sexual frequency since people engage in more activities that can be defined as sex and also perceive more of these activities as sex. For non-concurrent responders, none reach significance. We speculate that effects of individual level variables are not observed in non-concurrent reports because real changes in sexual frequency over time overwhelm perception effects.

One concern about these results is the extent to which couples with non-concurrent reports may be different than other couples. To investigate selection effects, we modeled the likelihood of non-concurrent reports using a probit model. We then generated estimates of an Inverse Mills Ratio and ran

---

[8] Thus, if a household is ordinarily expected to have sex 5 times in the previous month, an increase of 10 hours of total core housework would predict an increase of 2.4%, or 0.12 additional times per month.

the fixed effects model including the Inverse Mills Ratio. While the Inverse Mills Ratio was significant in the fixed effects model for non-concurrent responders, this did not change the substantive findings.

Conclusion

This research uses a unique methodological approach to couple data to test the theoretical perspective that the "doing" of gender has consequences for dyadic marital processes. By examining changes in couples' gendered division of household labor and sexual frequency over a short period of time, we are able to investigate if changes in gender performance activate gendered sexual scripts and lead to sexual activity between married heterosexual partners. This approach was prompted by our own and other scholars' observations that tests of gender performance perspectives on household labor tend to rely on cross-sectional data, ignoring the dynamic relationship between gender performance and the social interactions within which performances of gender occur (Curran 2002; Sullivan 2004, 2011). A doing gender or gender performance approach suggests that moment-by-moment engagement in gendered performances have immediate consequences for social interactions, and notes the possibility for sanctioning or at the very least disruption of scripts when individuals do not engage in expected behaviors (Goffman 1959, West and Zimmerman 1987). We capitalize on short time lags in spouses' reports of their gendered division of household labor and sexual frequency to gain leverage on the dynamic relationship between gender performances and the dyadic social interaction of sexual activity.

As we show, short-run changes in household labor are associated with short-run changes in sexual behavior in a manner consistent with the notion of gendered sexual scripts, and the utility of household labor for gender performance. In examining the effect of changes in gender performance on dyadic marital processes, we highlight the embedded nature of gendered household labor, and the immediate consequences of departures from gender norms for marital interactions. Much of the research identifying housework as a means of gender performance examines the determinants of who does the housework, rather than the effect of housework on marriage. Researchers have long noted the "stalled" revolution in housework, where men's contributions to household labor have not kept pace with women's gains in the paid labor market. Our finding of the importance of adherence to gender norms for couples' sex life suggests that the salience of gender norms for romance may be one reason why the division of household labor has been so slow to change towards egalitarianism. Moreover, the salience of gender performance for romance may partially explain why individuals feel compelled to use housework as a means of neutralizing gender deviance (Brines 1994, Schneider 2011).

Our results deserve two main caveats. First, it is important to remember that results from this study tell us nothing about whether couples who intentionally changed their behaviors with the intention of enhancing sexual frequency would, in fact, experience an increase in sexual frequency. The underlying logic of an intentional effort to change sexual frequency seems different from the unconscious, internalized responses to shifts theorized in a sexual scripts perspective. The changes we observe in household work presumably occur in response to spontaneous household demands and shifts in responsibilities. Were a spouse to attempt to reduce gender atypical household labor in a mechanical fashion to enhance sexual frequency, it seems likely this would be counterproductive, as the easiest way to do so might be perceived by wives as men's refusal to participate in core housework. We suspect that such a sudden refusal without a different underlying logic would not increase sexual frequency, to say the least.

A second caveat is that our findings of a linkage between movements towards more traditional gender divisions of household labor and greater sexual frequency should not be read in isolation from the body of literature finding benefits to egalitarian divisions of household labor. Although sexual frequency is of great interest to many, sexual frequency is far from the only determinant of happiness in marriage. A range of recent research shows that women's perceptions of happiness or fairness in marriage are linked to men's more egalitarian participation in household labor (Amato et al. 2003; Coltrane 2000; Stevens, Kiger, and Mannon 2005; Greenstein 2009; Mencarini and Sironi 2012).Together, these findings suggests that the patterns which govern sex and which govern happiness within marriage may be quite different, and that traditionalism has persisted longer in gendered sexual scripts than in marriages more generally. Indeed, recent research suggests that conformity to traditional gender norms is heightened in sexual contexts (Hundhammer and Mussweiler 2012).

Our results offer little leverage on the question of why traditionally gendered divisions of household labor link sexual frequency and housework but not housework and happiness. This question certainly deserves further attention, but we speculate here that gendered sexual scripts have not changed as quickly as marriages as a whole over the past thirty or forty years because sex is discussed less by spouses than some other topics. In general, scholars argue that individuals' reference groups and expectations matter for their evaluations of their marriage, suggesting that they are aware of what the "going rate" for marital contributions to housework is and that they learn this from discussions with others (Hochschild and Machung 1989; Greenstein 2009). Sex, on the other hand, is a dyadic process, and is less frequently discussed with others outside of the household given its private nature. While dated, Rubin's (1976) work found that sex was a topic that most couples found difficult to discuss, and we suspect this remains the case. In the case of housework, couples may be aware of the division of labor in other households because housework is often observable by others, while sexual behavior is not.

17

Finally, we wish to emphasize the unique methodological contribution of this research, which offers a new and useful approach to modeling couple-level data through using each spouse's report as an independent but reliable report on features of the marriage. By doing so, this research suggests the utility of non-concurrent couple reports generally and planned non-concurrent reports specifically. A model which uses non-concurrent spouse reports opens up the possibility of examining how household characteristics change together over time. In the case of the NSFH (and other household surveys in which both spouses are interviewed), non-concurrent couple reports are accidental results of the survey's design and administration. Yet future research might usefully plan non-concurrent spouse reports. This could allow for a range of tests of short-run changes in household behaviors. Planned non-concurrent responses could also allow for a formal test of whether non-concurrent spouse reports which are unplanned are systematically different than the remaining sample.

Works Cited

Allison, Paul D. and Richard Waterman (2002) "Fixed effects negative binomial regression models." In Ross M. Stolzenberg (ed.), *Sociological Methodology* 2002. Oxford: Basil Blackwell.

Allison, Paul D. 2009. *Fixed Effects Regression Models*. Sage Publications, Thousand Oaks, CA.

---. 2012. "Beware of Software for Fixed Effects Negative Binomial Regression." *Statistical Horizons*. Retrieved online March 2, 2014 at http://www.statisticalhorizons.com/fe-nbreg.

Amato, Paul R., Johnson, David R., Booth, Alan, and Stacy J. Rogers. 2003. "Continuity and Change in Marital Quality between 1980 and 2000" *Journal of Marriage and the Family* 65(1): 1-22.

Barstad, Anders. 2014. "Equality is Bliss? Relationship Quality and the Gender Division of Household Labor." *Journal of Family Issues* published online before print February 12, 2014, doi: 10.1177/0192513X14522246.

Baxter, J., Hewitt, B., & Haynes, M. 2008. "Life course transitions and housework: Marriage, parenthood and time on housework," *Journal of Marriage and Family* 70, 259-272.

Berk, Sarah Fenstermaker. 1985. *The Gender Factory: The apportionment of work in America*. New York: Plenum Press.

Bittman, Michael, Paula England, Nancy Folbre, Liana Sayer, and George Matheson. 2003. "When Does Gender Trump Money? Bargaining and Time in Household Work." *American Journal of Sociology* 109:186–214.

Brines, Julie. 1994. "Economic Dependency, Gender, and the Division of Labor at Home." *American Journal of Sociology* 100(3): 652-688.

Coltrane, Scott. 2000. "Research on Household Labor: Modeling and Measuring the Social Embeddedness of Routine Family Work." *Journal of Marriage and Family* 62:1208-1233.

Cooke, Lynn Prince. 2004. "The gendered division of labor and family outcomes in Germany," *Journal of Marriage and Family* 66, 1246-1259.

Cooke, Lynn Prince. 2006. ""Doing" Gender in Context: Household Bargaining and Risk of Divorce in Germany and the United States." *American Journal of Sociology* 112(2):442-72.

Curran, Sara R. 2002. "Agency, Accountability, and Embedded Relations: "What's Love Got to Do with It?"." *Journal of Marriage and Family* 64(3):577-84.

DeVault, Marjorie L. 1991. *Feeding the Family.* University of Chicago Press.

Frisco, Michelle L. and Kristi Williams. 2003. "Perceived Housework Equity, Marital Happiness, and Divorce in Dual-Earner Households." *Journal of Family Issues* 24(1):51-73.

Gager, Constance T. and Scott T. Yabiku. 2010. "Who has the Time? The Relationship between Household Labor Time and Sexual Frequency." *Journal of Family Issues* 31(2):135-63.

Goffman, Erving. 1956. *The Presentation of Self in Everyday Life*. New York, Anchor Books.

---. 1977. "The Arrangement between the Sexes." *Theory and Society* 4(3): 301-331.

Greenstein, Theodore. 2000. "Economic Dependence, Gender, and the Division of Labor in the Home: A Replication and Extension." *Journal of Marriage and the Family* 62:322–35.

Greenstein, Theodore. 2009. "National Context, Family Satisfaction, and Fairness in the Division of Household Labor." *Journal of Marriage and Family* 71:1039-51.

Heckman, J. J. 1976. "The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models". *Annals of Economic and Social Measurement,* 5(4): 475–492.

Hochschild, Arlie and Anne Machung. 1989. *The Second Shift*. Penguin Books.

Hundhammer, T. and T. Mussweiler. 2012. "How sex puts you in gendered shoes: sexuality-priming leads to gender-based self-perception and behavior." *Journal of Personal Social Psychology* 103(1): 176-193.

Killewald, Alexandra and Margaret Gough. 2010. "Money Isn't Everything: Wives' Earnings and Housework Time." *Social Science Research* 39: 987-1003.

Kornrich, Sabino, Brines, Julie, and Katrina M. Leupp. 2013. "Egalitarianism, Housework, and Sexual Frequency." *American Sociological Review* 78(1):26-50.

Mencarini, Letizia and Maria Sironi. 2012. "Happiness, Housework, and Gender Inequality in Europe." *European Sociological Review* 28(2):203-19.

Ronen, Shelly. 2010. "Grinding On the Dance Floor: Gendered Scripts and Sexualized Dancing at College Parties," *Gender and Society* 24: 355-377.

Rubin, Lillian B. 1976. *Worlds of Pain: Life in the Working-Class Family*. Basic Books.

Schneider, Daniel. 2011. "Market Earnings and Household Work: New Tests of Gender Performance Theory." *Journal of Marriage and Family* 73(4):845-60.

—. 2012. "Gender Deviance and Household Work: The Role of Occupation." *American Journal of Sociology* 117(4):1029-72.

Schwartz, Pepper. 1995. *Love Between Equals: How Peer Marriage Really Works*. New York: The Free Press.

Simon, William and John H. Gagnon. 1986. "Sexual Scripts: Permanence and Change." *Archives of Sexual Behavior* 15(2):97-120.

South, Scott J. and Glenna Spitze. 1994. "Housework in Marital and Nonmarital Households." *American Sociological Review* 59:3(327-347).

Stevens, Daphne Pedersen, Kiger, Gary and Susan E. Mannon. 2005. "Domestic Labor and Marital Satisfaction: How Much or How Satisfied?" *Marriage and Family Review* 37(4):49-67.

Storms, Michael D.; Stivers, Margaret L.; Lambers, Scott W. and Craig A. Hill. 1981. "Sexual Scripts for Women." *Sex Roles* 7(7):699-707.

Sullivan, Oriel. 2004. "Changing Gender Practices within the Household: A Theoretical Perspective." *Gender and Society* 18(2):207-22.

---. 2011. "An End to Gender Display Through the Performance of Housework? A Review and Reassessment of the Quantitative Literature Using Insights From the Qualitative Literature." *Journal of Family Theory & Review* 3(1): 1-13.

Udry, J. R. 1993. Coitus as demographic behavior. In R. Gray, H. Leridon, & A. Spira. (Eds.), *Biomedical and Demographic Determinants of Reproduction*, (pp. 85-97). Oxford: Oxford University Press.

Udry, J. Richard and Kim Chantala. 2004. "Masculinity-Femininity Guides Sexual Union Formation in Adolescents." *Personality and Social Psychology Bulletin* 30(1):44-55.

West, Candace, and Don H. Zimmerman. 1987. "Doing Gender." *Gender and Society* 1(2):125-51.

Figure 1: Hypothetical Illustration of Husband and Wife Non-concurrent Reports.
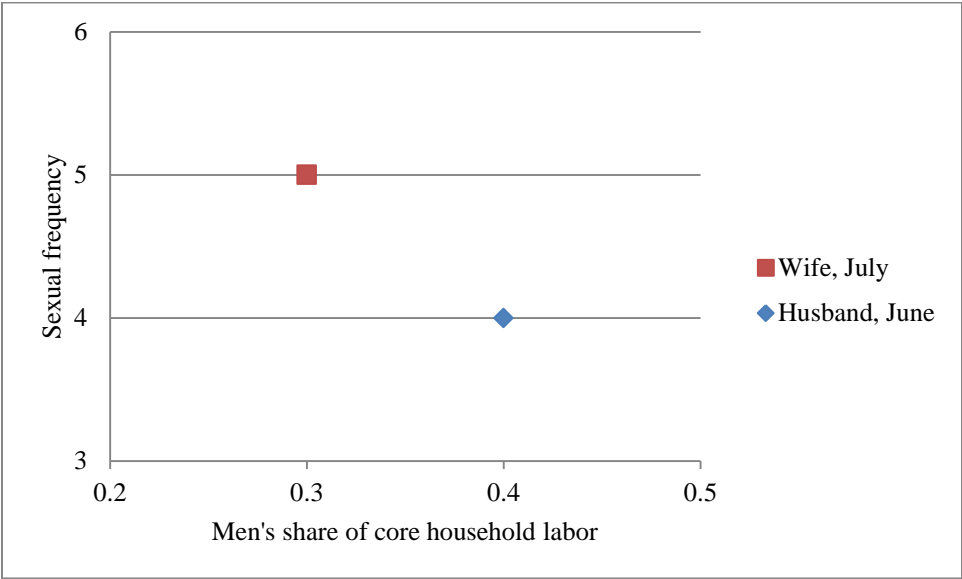
Table 1: Correlations between spouse reports.

Wife-Husband correlation for reports

	Within same week			7 days or more apart		
	Men's Share of core housework	Men's Share of non-core housework	Sexual frequency	Men's Share of core housework	Men's Share of non-core housework	Sexual frequency
	.65	.53	.74	.51	.43	.63
N	3248	3248	2818	1313	1313	1082
Significantly different than same week?				***	***	***

Notes:
All reported correlations are significant at the p<.001 level
Significance for two-tailed difference tests noted are as follows: *:p<.05, **:p<.01, ***:p<.001

23

Table 2: Characteristics of concurrent and non-concurrent reports by gender

	Husbands' reports			Wives' reports		
	Concurrent	Non-concurrent		Concurrent	Non-concurrent	
Sexual frequency in last month	5.00	5.54	***	5.43	5.97	**
SD	4.49	4.63		4.90	5.00	
Men's share of core housework	.24	.26	**	.21	.20	*
SD	.19	.20		.18	.18	
Men's share of non-core housework	.55	.55		.52	.50	**
SD	.18	.19		0.2	.20	
Both spouses' hours of core housework	34.40	33.82		34.67	33.50	*
SD	16.64	16.67		17.16	16.70	
Both spouses' hours of non-core housework	20.18	19.68		17.69	17.03	*
SD	11.33	10.99		9.71	9.59	
How often time spent alone together in past month						
Once a month to once a week	.36	.39	*	.34	.39	**
SD	.48	.49		.48	.49	
Two or three times a week	.22	.25	*	.19	.20	
SD	.42	.43		.39	.40	
Almost Every day	.40	.34	***	.44	.37	***
SD	.49	.49		.50	.48	
Gender ideology	11.22	11.14		10.7	10.51	*
SD	2.47	2.48		2.54	2.54	
Health	3.93	4.03	***	3.96	4.04	**
SD	.80	.80		.80	.82	
Age	46.78	44.84	***	44.31	42.3	***
SD	14.61	12.52		14.15	12.06	
Holiday in past week	.04	0.03	**	.04	.05	*
SD	.21	.16		.19	.22	
Absolute days difference in reporting	.66	86.32	***	(same)		
SD	1.44	108.8				
Overall n	3241	1311		3241	1311	

Notes: Median days different is 17 among non-concurrent responders, Significance noted are as follows: *:p<.05, **:p<.01, ***:p<.001

Table 3: Fixed Effects Poisson Regression, predicting sexual frequency

	Concurrent responders		Non-concurrent responders			β1- β2	With inverse Mills ratio		
	β1	Std. Err.	β2	Std. Err.			β	Std. Err.	
Men's share of core housework	-.04	(.09)	-.35	(.12)	**	*	-.44	(.12)	***
Men's share of non-core housework	.04	(.07)	.36	(.10)	***	**	.31	(.10)	**
Total core housework[a]	.07	(.08)	.24	(.12)	*		.40	(.12)	**
Total non-core housework[a]	.02	(.12)	.04	(.18)			.41	(.19)	*
Gender ideology	-.01	(.00)	-.01	(.01)			-.01	(.01)	
How Often Spent Time Alone with Spouse in Past Month (never is ref. category)									
Once a Month to Once a week	.17	(.07)	*	.49	(.10)	***	**	.56	(.10)	***
Two or Three Times a Week	.26	(.07)	***	.55	(.10)	***	*	.64	(.10)	***
Almost Every Day	.29	(.07)	***	.64	(.10)	***	**	.86	(.11)	***
Self-rated health	.03	(.01)	*	.01	(.02)			-.11	(.02)	***
Female	.06	(.01)	***	.04	(.02)			.05	(.02)	[b]
Previous week contained holiday	.00	(.04)	.06	(.07)			.06	(.07)	
Age	.00	(.00)	.00	(.00)			.00	(.00)	
Inverse Mills Ratio	-	-	-	-			-2.73	(.23)	***
N	5759		2262				2149		
LR chi2(3130)	22340		8151.24				7826		
Prob > chi2	0		0				0		

[a]Coefficient and standard error multiplied by 100.
[b]Coefficient is not twice its standard error due to rounding for both terms (.47 and .244, respectively).
Significance noted are as follows: *:p<.05, **:p<.01, ***:p<.001