California Center for Population Research
University of California - Los Angeles

Variation in Associations Between Family Dinners and Adolescent Well-Being

Ann Meier
Kelly Musick

PWP-CCPR-2012-011

Latest Update: August 27, 2013
July 26, 2013

California Center for Population Research
On-Line Working Paper Series

VARIATION IN ASSOCIATIONS BETWEEN FAMILY DINNERS

AND ADOLESCENT WELL-BEING

July 26, 2013

Ann Meier
Department of Sociology and Minnesota Population Center
University of Minnesota
1127 Social Sciences
Minneapolis, MN 55455 (meierann@umn.edu)

Kelly Musick
Department of Policy Analysis and Management and Cornell Population Center
Cornell University
254 Martha Van Rensselaer Hall
Ithaca, NY 14853-4401 (musick@cornell.edu)

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis. An earlier version of this article was presented at the 2011 Annual Meeting of the American Sociological Association, San Francisco, CA and the University of Wisconsin-Madison's Center for Demography and Ecology 50th Anniversary Celebration in October, 2012. We thank Aimee Dechter, Robert Faris, Pinar Karaca-Mandic, Jordan Matsudaira, and Emily Owens for many helpful comments and suggestions on this work.

ABSTRACT. Empirical evidence and conventional wisdom suggest that family dinners are associated with positive outcomes for youth. Recent research using fixed effects models as a more stringent test of causality suggests a more limited role of family meals in protecting children from risk. Estimates of average effects, however, may mask important variation in the link between family meals and well-being, in particular, family meals may be more or less helpful based on the quality of family relationships. Using two waves of the National Longitudinal Study of Adolescent Health (*N* = 17,977), this study extends recent work to find that family dinners have little benefit when parent – child relationships are weak, but contribute to fewer depressive symptoms and less delinquency among adolescents when family relationships are strong. The findings highlight the importance of attending to variation when assessing what helps and what hurts in families.

Keywords: family demography, National Longitudinal Study of Adolescent Health (ADDHealth), parental investment/involvement, child well-being

Running Head: Variation in Family Dinners Associations

A substantial body of research has demonstrated strong associations between the frequency of family meals and a range of positive adolescent outcomes, including healthy body weight, psychological well-being, academic achievement, and risk behavior avoidance (e.g., CASA, 2010; Hammons & Fiese, 2011; Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004). In a recent study relying on the National Longitudinal Study of Adolescent Health (Add Health) and fixed effects, however, we reported weaker estimated effects of family dinners on adolescent depression, substance use and delinquency (Musick & Meier, 2012). Another study, also relying on fixed effects but focusing on a younger sample, found no evidence of a causal link between family meals and academic or behavioral outcomes (Miller, Waldfogel, & Han 2012). This latest round of research points to weaker family dinner effects than typically assumed, but it leaves open the possibility that average associations mask important variation in family dinner experiences and their link to child well-being. For families characterized by poor quality relationships, gathering regularly around the table may produce another site for conflict thereby dampening, eliminating, or reversing any good that may come of the family meal (Wilk, 2010). To our knowledge none of the work on family meals examines how associations with child well-being vary by the quality of family relationships. We address this gap in the literature using a nationally representative panel study of adolescents and rigorous methods for assessing causality.

BACKROUND

Family meals may contribute to child well-being by providing a routine time for parents to connect with children, check-in about achievements or problems, transmit values, establish family identity, and feed general family solidarity (Fiese, Foley, & Spagnola, 2006). But it may also be the case that families who get along are more successful in regularly bringing family members around the table—and that the meal is simply a reflection of other resources and relationships supporting child development (e.g., Resnick, Bearman, Blum, Bauman, Harris, Jones, Tabor, Beuhring, Sieving, Shew, Ireland, Bearinger, & Udry, 1997). Greater family meal frequency is indeed associated with higher quality family relationships (Musick & Meier, 2012), and part of the association between family meals and adolescent well-being has been attributed to family relationship quality (Eisenberg et al., 2004; Fulkerson, Story, Mellin, Leffert, Neumark-Sztainer, & French, 2006; Musick & Meier, 2012; Sen, 2010).

Family theory and research point further to the importance of relationship quality in *conditioning* associations between child well-being, what families do, and how they are structured. For example, prior work has demonstrated that the association between family structure and child well-being depends on the quality of parental relationships (Amato & Booth, 2001; Musick & Meier, 2010). In relation to mealtime, a handful of studies in nutrition have examined how characteristics of the meal are associated with children's eating patterns, suggesting that frequent *well-managed* meals may be beneficial, whereas meals characterized by negative patterns of interaction may not. In particular, meals characterized by positive atmosphere, direct communication, and role assignment were associated with better child eating behavior (Neumark-Sztainer, Wall, Story, & Fulkerson, 2004), whereas overcontrolling parenting, less positive communication, and restrictive food practices at the table were associated with overweight or obese status (Faith, Scanlon, Birch, Francis, & Sherry, 2004). Time diary data revealed that mealtime communication was associated with adolescent emotional well-being (Offer, 2013). These studies point to the possibility that more general aspects of a family's affective environment may condition the effects of family meal frequency on broader measures of adolescent well-being.

Consistent with this notion, aspects of the family environment may be seen as a package of family features that influence youth development, with shared meals and other family processes reinforcing each other (Furstenberg, 2011). For example, parents who maintain higher quality relationships with their children may be better at soliciting participation in mealtime conversation and checking in with children in nonthreatening ways. Conversely, gathering at dinnertime may tax strained relationships and offer little space for positive communication. As the work of family scholars suggests, the family table, like the broader household, is a potential arena of conflict (DeVault, 1991; Fulkerson, Story, Neumark-Sztainer, & Rydell, 2008).

In the present study, we contribute to the growing literature on family meals by asking whether family relationship quality spills over to the dinner table and *conditions* associations between family dinners and child well-being. We use our recent study (Musick & Meier, 2012) as a starting point, leveraging the same data, measures, and rigorous design to generate estimates of the causal relationship between family dinners and three dimensions of adolescent well-being: depressive symptoms, substance use, and delinquency. We extend our prior findings by examining to what extent the relatively weak *average* effects of family dinners we reported mask variation in effects by family relationship quality.

We expect that more frequent family dinners will be associated with larger reductions in depressive symptoms, substance use, and delinquency when family relationships are strong. In the context of poor quality family relationships, we expect more frequent family dinners to be associated with smaller reductions—or perhaps even increases—in these outcomes. In what follows, we test these hypotheses in two steps. First, relying on Wave 1 of the Add Health, we estimate models of adolescent well-being including a rich set of controls and interactions, added each in turn, between family dinners and three indicators of family relationship quality: parent –

child relationship quality, global family relationship quality, and arguments with parents. Controls tap potential confounders, including dimensions of parenting, family size, family structure, family income, parental education, and maternal employment. Prior research has shown, for example, less frequent family meals in lower-income, single-parent, and working-mother families (Musick & Meier, 2012), and that children in turn tend to fare poorer in these families (Morrisey, Dunifon, & Kalil, 2011; Resnick et al., 1997).

In the second step of our analysis, we use Waves 1 and 2 and a fixed effects approach to estimate change in our outcomes over the course of a year as a function of change in family dinners conditioned by Wave 1 family relationship quality. Again, we test interactions with three indicators of family relationship quality, each entered in turn in separate models. Leveraging the panel data in this way controls for preexisting, stable individual differences between adolescents (e.g., temperament or family ideology that may influence family meal frequency and adolescent well-being), more rigorously assessing the notion that the quality of family relationships shapes family dinner effects on trajectories of adolescent well-being.

METHOD

National Longitudinal Survey of Adolescent Health

Add Health is a nationally representative survey of U.S. adolescents who were in Grades 7 to 12 in 1994 – 1995. In 1995, more than 90,000 adolescents in 80 schools completed a self-administered, in-school questionnaire, and more than 20,000 students and one of their parents completed an in-home interview. The Add Health cohort has been followed into young adulthood with a total of four in-home interviews; the present study relied on the first two. The Wave 2 in-home interview was conducted in 1996 and was limited to the 14,736 students who had not yet graduated high school. We drew primarily from the adolescent in-home questionnaires, although some information (i.e., family income and parental education) was taken from the resident parent questionnaire (fielded only in Wave 1). In all analyses, we adjusted for Add Health's complex sampling design (Chantala & Tabor, 2010).

We relied on data from Add Health's probability sample, which includes 18,924 adolescents at Wave 1 (this excludes 1,850 respondents, or 9%, who were either not in the original sampling frame or selected as part of a pair in which both were not interviewed; Chantala & Tabor, 2010). In our analysis of Wave 1, we excluded adolescents not living with a parent (388, or 2% of cases) and those missing information on dependent variables of interest (559, or 3% of cases), for an analysis sample of 17,977. In our fixed effects analysis of Waves 1 and 2, we further lost 3,294 cases (18%) due to non-follow-up, 1,669 (11%) due to nonresponse, 364 (3%) with no parent or parent figure in the household at Wave 2, and 204 (2%) with missing data on dependent variables at Wave 2, for a sample of 12,446.

Two of our control variables were missing data for more than 5% of our analysis sample: family income was missing for 25% of respondents (ascertained in the parent interview, which 14% of our sample did not complete); father's education was missing for 6% of cases (collected from both parents and adolescents, but disproportionately missing for respondents living apart from a father). We imputed missing data using chained equations in Stata. These were informed by our analysis variables and a small number of auxiliary variables from the Wave 1 panel, as well as by measures collected at Waves 2 and 3. The auxiliary variables included whether a parent was foreign born and did not speak English, factors associated with lower response to the parent interview (J. Tabor, personal communication, Oct. 1, 2011). We followed Shafer and Graham's (2002) suggestion to use multiple waves of longitudinal data to impute missing values at any wave. All cases were used in the imputation, although we excluded those with imputed dependent variables from our analysis (von Hippel, 2007). We generated 25 datasets and combined estimates from the multiply imputed data using Stata's MI prefix. Our key findings appeared robust to variations in imputation model and number of datasets, consistent with Johnson and Young's (2011) sensitivity analysis showing few differences in findings based on a range of imputation strategies applied to large-scale family data.

Outcomes

We examined three outcomes capturing well-being in adolescence: depressive symptoms, substance use, and delinquency. *Depressive symptoms* were assessed at Waves 1 and 2 using nine items from the Center for Epidemiological Studies Depression Scale (CES – D; Radloff, 1977). Respondents were asked, "How often was each of the following things true during the past week?" (a) you were bothered by things that usually don't bother you; (b) you felt that you could not shake the blues, even with help from family and friends; (c) you felt that you were just as good as other people; (d) you had trouble keeping your mind on what you were doing; (e) you felt depressed; (f) you felt that you were too tired to do things; (g) you enjoyed life; (h) you felt sad; and (i) you felt that people disliked you. Response options were 0 = "never or rarely," 1 = "sometimes," 2 = "a lot of the time," and 3 = "most or all of the time." We reverse-coded items (c) and (g) and averaged over all items for a scale ranging from 0 to 3, with higher scores indicating more depressive symptoms (αs = .79 at Wave 1 and .80 at Wave 2).

We used six questions at Waves 1 and 2 to measure *substance use.* Items pertained to binge drinking (5 or more drinks in one sitting), cigarette smoking, marijuana, cocaine products, inhalants, and other illegal drugs. The time referent was "ever" at Wave 1 and "since date of last interview" at Wave 2. Because of the dissimilarity in response options, we followed McCarthy and Casey (2008) and constructed a binary indicator of any use across the six items.

To assess *delinquency,* we created an index from self-reports of participation in 14 delinquent activities in the past 12 months: painting graffiti, damaging property, shoplifting, stealing something worth less than $50, stealing something worth $50 or more, burglarizing, using a car without the owner's permission, selling drugs, getting into a serious physical fight, seriously injuring another person, threatening to use a weapon on someone, getting into a group fight, pulling a knife or gun on someone, or shooting or stabbing someone. Adolescents reported on the same items at both waves, and we counted the number of activities from 0 to 14 (αs =.80 at both Waves 1 and 2). See Musick and Meier (2012) for a discussion of the substance use and delinquency indices and sensitivity analyses of their associations with family dinners.

Family Dinners

Our key explanatory variable was *family dinners.* At Waves 1 and 2, adolescents were asked, "On how many of the past 7 days was at least one of your parents in the room with you while you ate your evening meal?" This is coded 0 – 7. Questions about family meal frequency differ across surveys (e.g., the NSLY97 asks: "In a typical week, how many days from 0 to 7 do you eat dinner with your family?"). Despite inconsistencies in wording, estimates of shared meals appear reasonably consistent across surveys, with about 60% eating dinner together 5 or more times per week (CASA, 2010; Musick & Meier, 2012; Sen, 2010).

Quality of family relationships

We examined three measures of the quality of family relationships, assessed at Waves 1 and 2: parent – child relationship quality, global family relationship quality, and arguments with a parent. *Parent – child relationship quality* was based on five questions addressing, in turn, adolescents' relationships with their resident mothers and fathers. The first two items were assessed on a scale from 1 (*not at all)* to 5 (*very much)*: (a) "How close do you feel to your mother/father?" and (b) "How much do you think she/he cares about you?" The next three items were assessed on a scale from 1 (*strongly agree)* to 5 (*strongly disagree)*: (c) "Most of the time, your mother/father is warm and loving toward you," (d) "You are satisfied with the way your mother/father and you communicate with each other," and (e) "Overall, you are satisfied with your relationship with your mother/father." We reverse-coded items so that higher values represented better relationships and separately averaged items pertaining to mothers and fathers (αs = .85 and .84 for mothers' scores and .89 and .87 for fathers' scores at Waves 1 and 2, respectively). We took the higher of the two scores (or just one, in the case of single parents).

We measured *global family relationship quality* with an average of responses to three items, asking adolescents, "How much do you feel that . . ." (a) "people in your family understand you?" (b) "you and your family have fun together?" and (c) "your family pays attention to you?" Response options were on a scale from 1 (*not at all)* to 5 (*very much)*, with higher scores indicating better family relationships (αs = .79 at Wave 1 and .70 at Wave 2).

We generated an indicator for *arguments with a parent* from adolescent reports of whether they had gotten into a serious argument about their behavior with their resident mother or father in the past 4 weeks. This was coded 1 if the adolescent reported a serious argument with either the mother or father.

Controls

We included controls for characteristics of adolescents and their families potentially associated with both the management of a regular family dinner and child well-being: adolescent age, gender, and race and ethnicity; dimensions of parenting, including activities with a parent and parental control over adolescent decision-making; and indicators of family resources, including family size, family structure, family income, parental education, and maternal employment. Descriptive statistics and coding details are included in Table 1.

<Table 1 about here>

Models

The first step of our analysis used data from Wave 1 to assess variation in associations between family dinners and adolescent outcomes, including all controls and testing interactions between family dinners and our three measures of family relationship quality, each in a separate model. Outcomes were modeled using ordinary least squares (OLS) regression, which greatly facilitates the interpretation of interaction terms—a challenge with nonlinear models (Norton, Ai, & Wang, 2002). Whereas the probability of substance use and the count of delinquent acts are in principle better suited to nonlinear models, in practice we found little difference in estimated main effects of family dinners on these adolescent outcomes whether we used linear or nonlinear models (results available upon request).

The second step of our analysis relied on Waves 1 and 2, using the same measures of adolescent outcomes, family dinners, and relationship quality at both time points. We estimated first-difference models, which are equivalent to fixed-effects models in the two-period case, running OLS models of changes in well-being on changes in family dinners and an interaction conditioning family dinners effects by Wave 1 measures of family relationship quality. We ran three models for each outcome, entering interactions between changes in family dinners and our three measures of family relationship quality in turn. Regressing change in y on change in x eliminates bias due to time-invariant unobserved factors that might jointly determine family dinners and adolescent well-being (e.g., temperament or family ideology). Modeling changes as opposed to levels also reduces bias due to persistent reporting errors, for example, any tendency to misreport depressive symptoms, substance use, or delinquency.

Though the first-difference model reduces bias due to time invariant factors, estimated effects may nonetheless suffer from bias due to time-varying unobservables. To reduce this possibility, we ran models controlling for changes in family resources, namely, in the number of household children, family structure, and maternal employment. Unobserved changes remain a potential source of bias, as does any change in children's behavior that might affect family dinners (Allison, 1990; Winship & Morgan, 1999).

RESULTS

Table 2 presents results of Wave 1 OLS regression models of adolescent depressive symptoms, delinquency, and substance use. As noted, we ran three models for each of our outcomes, including our full set of controls in all models plus one of three family relationship quality interactions discussed above. In Table 2, we show results of our models only if the interaction term is statistically significant (see online Table 1A for full model results and Figures 1A-3A for illustrations of key findings).

The first set of columns in Table 2 reports OLS coefficients from a model of adolescent depressive symptoms interacting family dinner frequency with parent – child relationship quality. The interaction term coefficient was negative and statistically significant, indicating that more frequent family dinners were associated with greater declines in depressive symptoms with each unit increase in parent – child relationship quality. That is, in line with expectations, the association between family dinners and teen psychological well-being was stronger when children reported higher quality relationships with parents. There was no significant variation in associations between family dinner frequency and depressive symptoms at different levels of global family relationship quality or by recent arguments with a parent (see Table 1A, online).

<Table 2 about here>

We calculated predicted depression scores based on M1 (Table 2), varying family dinners and parent – child relationship quality while holding all other variables at their mean levels (Figure 1A, online). Depressive symptoms ranged from 0 – 3, with a mean of 0.63 and standard deviation of 0.47 (see descriptives in Table 1). Parent – child relationship quality was high on average (with a mean of 4.51 on a scale of 1 – 5 and a standard deviation of 0.57). For teens reporting the maximum parent – child relationship quality, the predicted depression score was 0.67 among those sharing no family dinners but 0.54 among those eating family dinners every night of the week—a difference of 0.13 points or 28% of a standard deviation in depression symptoms. For teens reporting very low parent – child relationship quality (assessed at a score of 3, or more than 2 standard deviations below the mean), there was little difference in predicted depression scores among those sharing no family dinners versus those eating family dinners every night of the week (0.74 vs. 0.72, respectively). And for teens reporting parent – child relationship quality at an average of 2 and below, increases in dinners were associated with *increases* in depressive symptoms. This suggests that family dinners may be counterproductive when relationships quality is poor, although these findings should be interpreted with caution as a small share of adolescents in our sample reported relationship quality in this range.

The second set of columns in Table 2 reports coefficients from a linear probability model of adolescent substance use. The interactions of family dinners with parent – child relationship quality (M1), global family relationship quality (M2), and arguments with a parent (M3) are all statistically significant in predicting substance use. As expected, more frequent family dinners were associated with a lower probability of substance use with each unit increase in parent – child relationship quality and global family relationship quality. The coefficient on the family dinners by arguments with a parent interaction was positive, pointing to relatively higher probabilities of substance use with increases in family dinners for those reporting a serious argument with a parent in the last month.

To demonstrate this last difference, we calculated predicted probabilities of substance use based on M3 (Table 2), varying family dinners and arguments with a parent while holding all other variables at their mean levels (Figure 2A, online). Overall, 63% of teens reported substance use. For teens reporting a serious argument with a parent in the last month (38% of the sample), the predicted probability of substance use was 0.76 among those sharing no family dinners and 0.70 among those eating family dinners every night of the week—a difference of 0.06 points. For those reporting no recent arguments, the predicted probabilities were 0.69 and 0.55 among those sharing no meals versus meals every night—a differences of .14 points. Family dinners in the presence of conflict were thus associated with substantially *smaller reductions* in substance use (although not with absolute increases in substance use).

The third set of columns in Table 2 shows OLS model results for adolescent delinquency. Here, consistent with above, family dinners appear to be more beneficial when family relationships are strong: More frequent family dinners were associated with greater declines in delinquent acts with each unit increase in parent – child relationship quality (M1) and global family relationship quality (M2). There was no significant variation in associations between family dinner frequency and adolescent delinquency by whether the adolescent recently argued with a parent (see Table 1A, online).

We calculated predicted values of delinquency, here based on M2 (Table 2), varying family dinners and global family relationship quality while holding all other variables at their mean levels (Figure 3A, online). Delinquency ranged from 0 – 14, with a mean of 1.77 and standard deviation of 2.35. Global family relationship quality tended to be high (mean of 3.76 on a scale of 1 – 5 and standard deviation of 0.82). For teens reporting the maximum global family relationship quality, the predicted count of delinquent acts was 1.55 among those sharing no family dinners and 0.94 among those eating family dinners every night of the week—a difference of 0.61 points or 26% of a standard deviation in delinquency. For teens reporting low parent – child relationship quality (assessed at a score of 3, or about 1 standard deviation below the mean), the predicted change in delinquency was substantially smaller (.28 points, from 2.38 to 2.10 among those eating no dinners vs. dinners every night).

To summarize so far, family dinners appear to be associated with healthier adolescent outcomes when family relationships are stronger. Drawing on data from Wave 1 and a rich set of controls, we found statistically and substantively significant variation in associations between family dinners and adolescent outcomes by the quality of family relationships. This was a reasonably consistent finding across outcomes and indicators of relationship quality: in total, 6 of the 9 interactions tested were statistically significant, including at least one interaction for each of the outcomes assessed. Do these associations hold up to a more stringent test of causality?

We turn next to first difference models that estimate change in adolescent well-being over the course of a year as a function of change in family dinners conditioned by Wave 1 family relationship quality. OLS results are shown in Table 3. Again, we tested interactions between family dinners and three indicators of family relationships quality, each entered into models in turn, though in Table 3 we show only models with statistically significant interactions. To reduce potential bias from time-varying factors, we included controls for changes in family size, family structure, and maternal employment. Full model results are included in online Table 2A.

Fixed effects results in Table 3 show somewhat weaker evidence for conditional effects of family dinners as compared to findings from our Wave 1 analysis. In particular, 2 (vs. 6) of the interactions we tested were statistically significant: the change in family dinner frequency over the course of one year with parent – child relationship quality (for depressive symptoms) and global family relationship quality (for delinquency). Consistent with cross-sectional results, an increase in family dinners decreased depressive symptoms more with each unit increase in initial parent – child relationship quality. Similarly, an increase in family dinners decreased delinquency more with each unit increase in initial global family relationship quality.

<Table 3 about here>

CONCLUSION

Recent research has found weaker support for causal links between family meals and child well-being than suggested by either past empirical work or conventional wisdom (Miller et al., 2012; Musick & Meier, 2012). We assessed whether weak or null average estimated effects of family dinners mask variation based on the quality of family relationships. High quality family relationships are associated with adolescent well-being; they have also been shown to condition associations between well-being and other aspects of the family environment. We proposed that the communication and monitoring thought to link family dinners and child well-being would work best in the context of high quality family relationships—that is, that the quality of relationships likely sets the tone at the table, altering what good (or bad) may come of the shared meal.

Looking first at Add Health's Wave 1 data including rich controls, we found that adolescents who reported high quality relationships with a parent had lower levels of depressive symptoms, a lower probability of substance use, and fewer delinquent acts with each additional family dinner shared each week. Conversely, those with very low quality parent – child relationships appeared to benefit little from sharing meals more frequently. Indeed, we found some suggestion that family dinners were associated with *detriments* in adolescent well-being, although this applied to adolescents reporting parent – child relationship quality below the range of most of our sample. More frequent family dinners were also more strongly associated with reduced substance use and delinquent acts among adolescents reporting higher global family relationship quality. Finally, in support of the notion that high conflict families may experience the dinner table as a site for airing grievances, we found that more frequent family dinners were more strongly associated with reduced substance use among those reporting no recent arguments with a parent. Our Wave 1 analysis found reasonably consistent evidence for statistically and substantively significant benefits of family dinners when family relationships are strong.

We next applied a more stringent test of the causal nature of these relationships, using a fixed effects estimation strategy that relies on change over time. We examined links between changes in adolescent outcomes and changes in family dinners over the course of one year conditioned by initial levels of family relationship quality. Although not as consistent across outcomes and indicators as in our Wave 1 analysis, the fixed effects approach nonetheless provided evidence for variation in family dinner effects. The interaction of family dinners with parent – child relationship quality was statistically significant in predicting depressive symptoms, as was the interaction with global family relationship quality in predicting delinquency. Family dinner effects on substance use by family relationship quality did not hold up in fixed effect models, however, nor did any conditioning effects of arguments with a parent. Taken together, our results provide solid evidence that family dinner effects on depressive symptoms and delinquency depend on the quality of parent – child and global family relationship quality.

Our study (to our knowledge) is the first to assess the degree to which links between family meals and adolescent well-being may be conditioned by family relationship quality. As such, it extends to the study of family meals the careful attention to the conditioning role of family relationship quality paid to family transitions like divorce. Explicitly testing the notion that family dinners may yield limited benefits—and potentially do harm—for youth with poor quality family relationships adds important nuance to our understanding of what helps and what hurts in families. Further, we apply rigorous methods to assess causality and examine adolescent well-being across internalizing and externalizing behaviors, highlighting the range of outcomes that may be influenced by family dinners.

The study also has limitations. Despite efforts to establish causal connections, family processes are difficult to disentangle. Our family dinners estimates may be upwardly biased by reverse causation, for example, capturing adolescents engaging in risky behaviors who skip the family dinner to avoid parents. At the same time, to the extent that family dinners foster high quality family relationships, our approach may underestimate the total effect of family dinners.

We assume that family relationships manifest at the dinner table, and thus matter for how the dinner translates into positive or negative outcomes for youth. Research remains limited on actual mealtime practices and, in turn, what features of family meals are most important for child well-being. We recently piloted a series of questions on an omnibus national survey that asked about who is present at dinnertime as well as roles, conversation, and conflict at the table. Preliminary results indicated that generally all family members were present (75% very often or always), everyone took part in conversation (88% very often or always), and disagreements were uncommon (60% seldom or never). Nonetheless, for about 10% of respondents, dinnertime disagreements happened always or very often (authors' tabulations, Cornell National Social Life Survey, 2011). Future research that incorporates such measures in conjunction with broader assessments of the family environment and child well-being would allow us to further unpack the family meal—and potentially offer strategies to use at the table to promote adolescent health and well-being.

REFERENCES

Allison, P. D. (1990). Change scores as dependent variables in regression analysis. *Sociological Methodology, 20*, 93–114. DOI:10.2307/271083

Amato, P. & Booth, A. (2001). Parental predivorce relations and offspring postdivorce well-being. *Journal of Marriage and Family, 63,* 197 – 212. DOI:10.1111/j.1741-3737.2001.00197x

CASA. (2010). The importance of family dinners VI. The National Center on Addiction and Substance Abuse, Columbia University. Retrieved from http://www.casacolumbia.org/templates/publications_reports.aspx

Chantala, K., & Tabor, J. (2010). Strategies to perform a design-based analysis using the Add Health data. Carolina Population Center, University of North Carolina at Chapel Hill. Retrieved from http://www.cpc.unc.edu/projects/addhealth/data/guides/weight1.pdf

Cornell University. Survey Research Institute. Cornell National Social Survey. (2011) [Computer file]. CISER version 1. Ithaca, NY: Cornell Institute for Social and Economic Research [producer and distributor], 2012.

DeVault, M. (1991). *Feeding the family: The social organization of caring as gendered work*. Chicago: Chicago University Press.

Eisenberg, M. E., Olson, R. E., Neumark-Sztainer, D., Story, M., & Bearinger, L. H. (2004). Correlations between family meals and psychosocial well-being among adolescents. *Archives of Pediatric and Adolescent Medicine, 158,* 792 – 796. DOI:10.1001/archpedi.158.8.792

Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. S. & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, *12*, 1711 – 1722. DOI:10.1038/oby.2004.212

Fiese, B. H., Foley, K. P. & Spagnola, M. (2006). Routines and Ritual Elements in Family Mealtimes: Contexts for Child Well-Being and Family Identity. *New Directions for Child and Adolescent Development*, *111*, 67 – 89. DOI:10.1002/cd.156

Fulkerson J. A., Story, M., Neumark-Sztainer, D., Rydell, S. (2008) Family meals: Perceptions of benefits and challenges among parents of 8- to 10-year-old children. *Journal of the American Dietetic Association,108 (4),*706 – 709. DOI: 10.1016/j.jada.2008.01.005

Fulkerson, J. A., Story, M., Mellin, A., Leffert, N., Neumark-Sztainer, D., & French, S. A. (2006). Family dinner meal frequency and adolescent development: Relationships with developmental assets and high-risk behaviors. *Journal of Adolescent Health, 39,* 337 – 345. DOI:10.1016/j.jadohealth.2005.12.026

Furstenberg, F. F. (2011). The challenges of finding causal links between family educational practices and schooling outcomes. In G. J. Duncan & R. Murnane (Eds.), *Whither Opportunity: Rising Inequality, Schools, and Children's Life Chances*. New York: Russell Sage.

Hammons, A. J., & Fiese, B. H. (2011). Is frequency of shared family meals related to the nutritional health of children and adolescents? *Pediatrics, 127,* e1565 – e1574. DOI:10.1542/peds.2010-1440

Johnson, D. R., & Young, R. (2011). Toward best practices in analyzing data sets with missing data: Comparisons and recommendations. *Journal of Marriage and Family, 73,* 926 – 945. DOI:10.1111/j.1741-3737.2011.00861.x

McCarthy, B., & Casey, T. (2008). Love, sex, and crime: Adolescent romantic relationships and offending. *American Sociological Review, 73*, 944 – 969. DOI:10.1177/000312240807300604

Miller, D., Waldfogel, J., & Han, W. (2012). Family meals and child academic and behavioral outcomes." *Child Development, 83*, 2104 – 2120. DOI:10.1111/j.1467-8624.2012.01825.x

Morrisey, T. W., Dunifon, R. E., & Kalil, A. (2011). Maternal employment, work schedules, and children's body mass index. *Child Development*, *82*, 66 – 81. DOI:10.1111/j.1467-8624.2010.01541.x

Musick, K., & Meier, A. (2010). Are both parents always better than one? Parental conflict and young adult well-being. *Social Science Research*, *39*, 814 – 830. DOI:10.1016/j.ssresearch.2010.03.002

Musick, K., & Meier, A. (2012). Assessing Causality and Persistence in Associations between Family Dinners and Adolescent Well-Being. *Journal of Marriage and Family*, *74* (3), 476 – 493. DOI: 10.1111/j.1741-3737.2012.00973.x

Neumark-Sztainer, D., Wall, M., Story, M., & Fulkerson, J. A. (2004). Are family meal patterns associated with disordered eating behaviors among adolescents? *Journal of Adolescent Health 35,* 350 – 359. DOI:10.1016/j.jadohealth.2004.01.004

Norton, E., Wang, E., & Ai, W. (2004). Computing interaction effects and standard errors in logit and probit models. *The Stata Journal*, *4*, 154 – 167.

Offer, S. (2013). Assessing the relationship between family mealtime communication and adolescent emotional well-being using the experience sampling method. *Journal of Adolescence*, *36*, 577-585.

Radloff, L. S. (1991). The use of the Center for Epidemiological Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149 – 166. DOI:10.1007/BF01537606

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., Tabor, J., Beuhring, T., Sieving, R. E., Shew, M., Ireland, M., Bearinger, L. H., & Udry, J. R. (1997). Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association, 278* (10), 823 – 32. DOI:10.1001/jama.1997.03550100049038

Sen, B. (2010). The relationship between frequency of family dinner and adolescent problem behaviors after adjusting for other family characteristics. *Journal of Adolescence, 33,* 187 – 196. DOI:10.1016/j.adolescence.2009.03.011

Schafer, J. & Graham, J. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7,* 147 –177. DOI:10.1037/1082-989X.7.2.147

von Hippel, P. (2007). Regression with missing *Y*s: An improved strategy for analyzing multiply imputed data. *Sociological Methodology, 37,* 83 – 117. DOI:10.1111/j.1467-9531.2007.00180.x

Wilk, R. (2010). Power at the table: Food fights and happy meals. *Cultural Studies – Critical Methodologies*, *10,* 428 – 436. DOI:10.1177/1532708610372764

Winship, C., & Morgan, S. L. (1999). The estimation of causal effects from observational data. *Annual Review of Sociology*, *25,* 659 – 707. DOI:10.1146/annurev.soc.25.1.659

Table 1.
Means on Analysis Variables

T1 measures (*N* = 17,977)	Mean	Std Dev	Range
Depressive symptoms	0.63	(0.47)	0 - 3
Substance use	0.63		
Delinquency	1.77	(2.35)	0 - 14
Family dinners	4.71	(2.48)	0 - 7
Parent-child relationship	4.51	(0.57)	1 - 5
Global family relationship	3.76	(0.82)	1 - 5
Arguments with parent	0.38		
Age at Wave 1	15.96	(1.81)	11 - 21
Female	0.50		
White	0.66		
Black	0.15		
Hispanic	0.12		
Asian	0.04		
Other race/ethnicity	0.04		
Activities with parent	1.74	(1.14)	0 - 5
Parental control	1.87	(1.58)	0 - 7
Family size (other children in HH)	1.21	(1.24)	0 - 11
Both parents	0.56		
Stepparent	0.16		
Single parent	0.23		
Other family structure	0.43		
Family income (thousands)	45.36	(52.48)	0 - 999
Mother <HS	0.18		
Mother HS	0.37		
Mother some college	0.20		
Mother college degree	0.25		
Father <HS	0.18		
Father HS	0.36		
Father some college	0.18		
Father college	0.28		
Mother employed full time	0.58		
Mother employed part time	0.19		
Mother not currently employed	0.23		
Change *T2* - *T1* (*N* = 12,466)			
Depressive symptoms	0.10	(0.44)	-3 - 3
Substance use	-0.05	(0.47)	-1 - 1
Delinquency	-0.43	(2.09)	-14 - 14

Table 1 (continued)

Change *T2* - *T1* (*N* = 12,446)					
Family dinners	-0.19	(2.50)	-7	-	7
Number of other children in HH	-0.09	(0.68)	-11	-	11
Family structure (0/1)	0.12				
Mother starts full-time employment (0/1)	0.12				
Mother stops full-time employment (0/1)	0.08				

Note: Weighted and design adjusted descriptives using svy commands in Stata 12.0. Standard deviations are in parentheses. Age is measured at Wave 1 in years. Gender is coded 1 for female. Race/ethnicity is a set of mutually exclusive categories: Non-Hispanic (NH) White, NH Black, Hispanic, NH Asian American, NH other. Activities with parent is a count of up to 5 activities done with a parent in past four weeks (higher of mother or father). Parental control is a count of up to 7 child-related decisions on which parents (vs. children) decide. Family size is measured by the number of other children under 18 in the household (HH). Family structure is a set of mutually exclusive categories: two biological/adoptive parents, one biological and one stepparent, single parent, or other. Family income is measured in thousands. Mother's and father's education are coded: less than high school (HS), HS graduate, some college, college graduate or higher. Mother's employment is coded: full-time, part-time, not employed.

Table 2.
OLS Regression Models of Adolescent Depressive Symptoms, Substance Use, & Delinquency (N = 17,977)

	Depressive Symptoms	Substance Use			Delinquency	
	M1	M1	M2	M3	M1	M2
Family dinners	0.022	0.029**	0.011	-0.020**	0.153*	0.030
Parent-child rel.	-0.035*	0.025*	-0.014	-0.011	-0.017	-0.197**
Global family rels.	-0.149**	-0.072**	-0.041**	-0.073**	-0.515**	-0.414**
Arguments with parent	0.116**	0.124**	0.123**	0.070**	0.701**	0.701**
FD x parent-child rel.	-0.008*	-0.010**			-0.047**	
FD x global family rels.			-0.007**			-0.024†
FD x arguments with parent				0.012**		
Constant	1.126**	0.455**	0.512**	0.634**	6.468**	6.876**

Note: Analyses are weighted and design adjusted using svy commands in Stata 12.0. All three interactions listed in Column 1 were tested in separate models for each outcome; only models with significant interactions are shown (see online Table 1A for full results). Ordinary least squares (OLS) coefficients are not standardized. Controls for child's age, child's gender, race and ethnicity, parenting, family size, family structure, family income, parental education, and maternal employment are included but not shown. rel. = relationship; rels. = relationships; FD = family dinners.

†$p < 0.10$ (two-tailed). *$p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed).

Table 3.
First Difference Models of Depressive Symptoms and Delinquency T2 - T1 (N = 12,446)

	T2 - T1 Depressive Symptoms	*T2 - T1* Delinquency
Change in family dinners	0.030	0.101
Δ FD x parent-child relationship	-0.009†	
Δ FD x global family relationship		-0.028†
Constant	0.105**	-0.427**

Note: Analyses are weighted and design adjusted using svy commands in Stata 12.0. Interactions between change in family dinners and all three measures of Wave 1 family relationship quality (parent-child, global family, and arguments with parent) were entered in separate models for each outcome; only models with significant interactions are shown (see online Table 2A for full results). OLS regression coefficients (not standardized). Controls for changes in family size, family structure, and maternal employment are included but not shown. Δ FD = change in family dinners.

†$p < 0.10$ (two-tailed). *$p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed).

Table 1A.

*OLS Regression Models of Adolescent Depressive Symptoms, Substance Use, and Delinquency (*N *= 17,977)*

	Depressive Symptoms			Substance Use			Delinquency		
	M1	M2	M3	M1	M2	M3	M1	M2	M3
Family dinners	0.022	-0.004	-0.015**	0.029**	0.011	-0.020**	0.153*	0.030	-0.062
Parent-child rel.	-0.035*	-0.064**	-0.063**	0.025*	-0.014	-0.011	-0.017	-0.197**	-0.186
Global family rels.	-0.149**	-0.139**	-0.150**	-0.072**	-0.041**	-0.073**	-0.515**	-0.414**	-0.520
Arguments with parent	0.116**	0.116**	0.107**	0.124**	0.123**	0.070**	0.701**	0.701**	-0.033
FD x parent-child rel.	-0.008*			-0.010**			-0.047**		
FD x global family rels.		-0.003			-0.008**			-0.024†	
FD x arguments with parent			0.002			0.012**			0.016
Age at wave 1	0.012**	0.012**	0.012**	0.030**	0.030**	0.030**	-0.139**	-0.138**	-0.137**
Female	0.112**	0.112**	0.112**	-0.035**	-0.035**	-0.035**	-1.075**	-1.075**	-1.076**
White (ref.)									
Black	0.051**	0.051**	0.052**	-0.148**	-0.148**	-0.147**	0.170*	0.171*	0.175*
Hispanic	0.056**	0.057**	0.057**	-0.079**	-0.079**	-0.079**	0.533**	0.535**	0.534**
Asian	0.105**	0.106**	0.106**	-0.163**	-0.163**	-0.163**	0.104	0.107	0.108
Other race/ethnicity	0.025	0.024	0.024	0.037	0.037	0.037	0.579**	0.578**	0.578**
Activities with parent	-0.006	-0.006	-0.006	-0.032**	-0.031**	-0.031**	-0.033	-0.032	-0.060
Parental control	0.017**	0.017**	0.017**	-0.020**	-0.020**	-0.020**	-0.060**	-0.060**	-0.062
# other children in HH	0.008*	0.008*	0.008*	-0.010**	-0.011**	-0.011**	0.010	0.008	0.009
Two bio. parents (ref.)									
Stepparent	0.024*	0.025*	0.252*	0.083**	0.084**	0.084**	0.202**	0.206**	0.207**
Single parent	0.031*	0.031*	0.012*	0.082**	0.082**	0.082**	0.406**	0.405**	0.404**

Table 1A (continued)

Other family structure	0.100**	0.100**	0.100**	0.088**	0.088**	0.087**	0.487**	0.486**	0.485**
Log family income	-0.011	-0.011	-0.011	0.011	0.011	0.011	0.262	0.025	0.025
Mother high school (ref.)									
Mother < high school	0.052**	0.052**	0.052**	-0.006	-0.006	-0.006	-0.011	-0.013	-0.013
Mother some college	-0.030*	-0.030*	-0.030*	-0.007	-0.007	-0.007	-0.050	-0.050	-0.050
Mother college degree	-0.028*	-0.029*	-0.029*	-0.022	-0.022	-0.022	-0.152*	-0.153	-0.153*
Father high school (ref.)									
Father < high school	0.040*	0.041*	0.041*	0.039*	0.040**	0.040**	0.060	0.061	0.062
Father some college	-0.034**	-0.034**	-0.034**	-0.018	-0.018	-0.018	-0.058	-0.059	-0.058
Father college	-0.048**	-0.048**	-0.048**	-0.046**	-0.046**	-0.046**	-0.129†	-0.130†	-0.127†
Mother employed FT (ref.)									
Mother not employed	-0.005	-0.005	-0.005	-0.044**	-0.044**	-0.044**	-0.039	-0.038	-0.038
Mother employed PT	-0.004	-0.004	-0.004	-0.033*	-0.033*	-0.033*	-0.043	-0.043	-0.042
Constant	1.126**	1.213**	1.253**	0.455**	0.512**	0.634**	6.468**	6.876**	7.226**

Note: Analyses are weighted and design adjusted using svy commands in Stata 12.0. Ordinary least squares (OLS) coefficients are not standardized. FD = family dinners. rel. = relationship. rels. = relationships. HH = household. FT = full time. PT = part time.

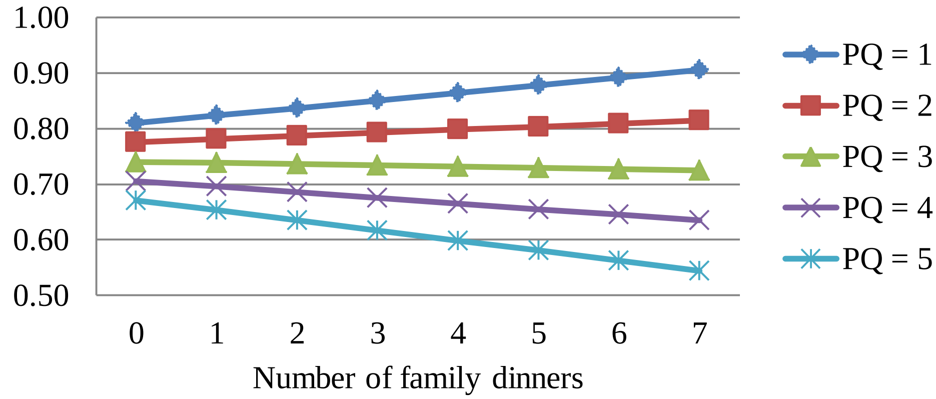
†$p < 0.10$ (two-tailed). *$p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed).

Table 2A.
First Difference Models of Depressive Symptoms, Substance Use, and Delinquency T2 - T1 (N = 12,446)

	T2 - T1 Depressive Symptoms			*T2 - T1* Substance Use			*T2 - T1* Delinquency		
	M1	M2	M3	M1	M2	M3	M1	M2	M3
Change in family dinners	0.030	0.003	-0.012**	-0.005	-0.015†	-0.003	0.103	0.101	-0.015
Δ FD x parent-child rel.	-0.009†			0.000			-0.024		
Δ FD x global family rels.		-0.003			0.003			-0.028†	
Δ FD x arguments with parent			0.007			-0.002			0.031
Change in family structure	-0.010	-0.010	-0.009	-0.001	-0.001	-0.001	-0.144†	-0.145†	-0.142†
Change in number of children	0.005	0.005	0.005	-0.013	-0.013	-0.013	0.025	0.026	0.026
Mother starts FT employment	-0.000	-0.001	-0.000	0.049**	0.049**	0.049**	0.079	0.079	0.079
Mother stops FT employment	-0.030	-0.030	-0.030	0.010	0.010	0.010	0.045	0.046	0.045
Constant	0.105**	0.105**	0.105**	-0.062**	-0.062**	-0.062**	-0.428**	-0.427**	-0.427**

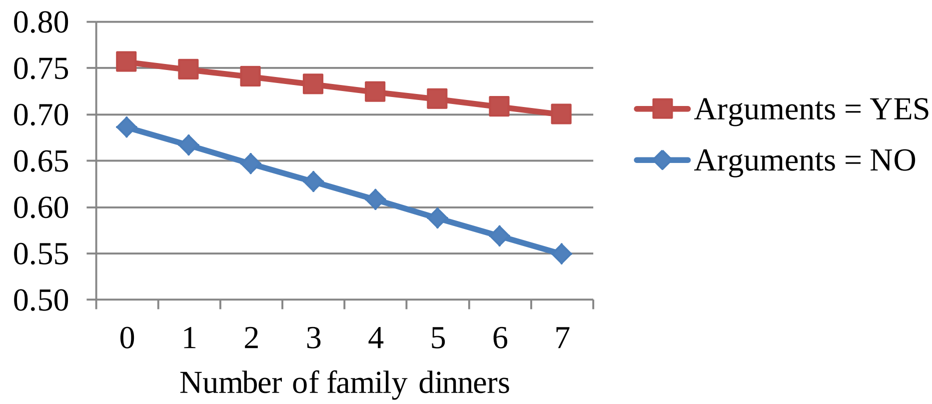
Note: Analyses are weighted and design adjusted using svy commands in Stata 12.0 OLS regression coefficients (not standardized). Δ FD = change in family dinners. rel = relationship. rels. = relationships. FT = fulltime.

Figure 1A.
Predicted depressive symptoms scores, varying frequency of family dinners and parent-child relationship quality



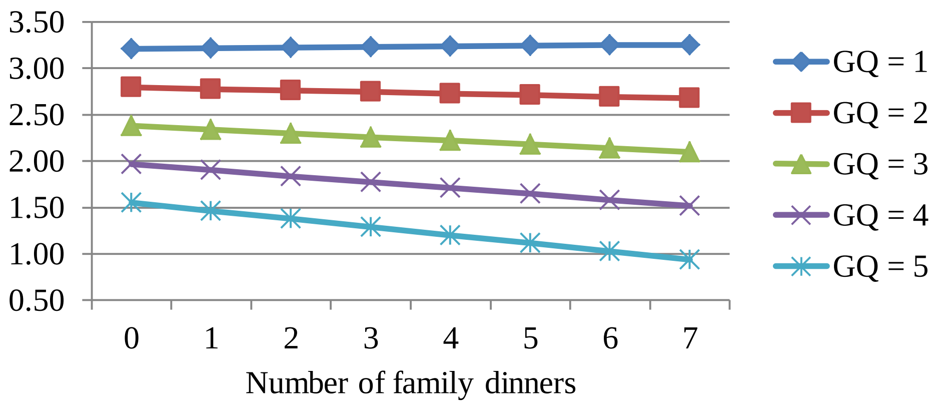
Note: Predicted scores are based on M1 (Table 2), varying family dinners and parent – child relationship quality while holding all other variables at their mean levels. PQ = parent – child relationship quality.

Figure 2A.
Predicted probability of substance use, varying frequency of family dinners and arguements with a parent



Note: Predicted scores are based on M3 (Table 2), varying family dinners and arguments with a parent while holding all other variables at their mean levels.

Figure 3A.
Predicted count of delinquent acts, varying frequency of family dinners and global family relationship quality



Note: Predicted scores are based on M2 (Table 2), varying family dinners and global family relationship quality while holding all other variables at their mean levels. GQ = global family relationship quality.