

Mothers, Peers and Gender Identity*

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Abstract

We study the formation of gender identity by looking at whether a woman's work behavior is shaped by the work behavior of her adolescent friends' mothers. Using a representative sample of U.S. teenagers and their schoolmates followed over time, we find that hours worked by high school peers' mothers positively affect women's work hours well into adulthood. The peers' mother role model effect operates independently from both own mother's influence and standard peer effects.

Key words: Intergenerational transmission of culture, role models, female labor supply, peer effects.

JEL Classification: J22, Z13.

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1 Introduction

An extensive literature focuses on the importance of cultural norms for economic decisions and for the persistence of beliefs, norms, and socio-economic status across generations (Alesina and Giuliano, 2010, 2014; Bisin and Verdier, 2011). When it comes to women, a number of studies have established that gender norms can explain some of the differences in women’s labor market outcomes over time, across countries and ethnicities, and across generations (see Fortin, 2005, 2015, and the surveys by Bertrand, 2010, and Fernández, 2011). Some of these studies are grounded in Akerlof and Kranton (2000, 2010)’s identity economics framework. For example, Bertrand et al. (2015) establish that gender identity, interpreted as both the husband and wife having an aversion to the wife earning more, is an important determinant of marriage formation and satisfaction, as well as a married woman’s labor force participation and income conditional on working.

But how are these behavioral prescriptions or social norms acquired? This paper explores the role of early socialization for shaping gender identity and subsequent work choices of a recent cohort of women. Our analysis starts from the premise that gender norms are shaped during women’s adolescence by observing the behavior of a specific reference group: their *mothers*. This includes both the same-sex parent and peers’ mothers, a set of female adults she is likely to have been frequently exposed to.¹ Although social psychology has emphasized both mechanisms as fundamental factors in gender identity formation during adolescence, most work in economics has so far only focused on the first mechanism.

In the same vein as the intergenerational transmission model of Bisin and Verdier (2000, 2001), our behavioral mechanism emphasizes both the direct role played by having a working mother (*direct vertical socialization*) and the role played by the work behavior of the daughter’s friends’ mothers (*oblique socialization*). The large and growing economic literature documenting the importance of gender norms for female outcomes has mostly overlooked the second mechanism, apart from the work by Fogli and Veldkamp (2011) and Fernández (2013) who emphasize both the direct vertical channel and the horizontal channel (defined by geographic proximity and contemporaneous societal behavior, respectively). Our findings reveal that the oblique channel is important and that it operated independently from the

¹In the psychology literature, gender role socialization is thought to occur through three main channels: reinforcement by parents of gender appropriate behavior, children modeling their behavior on same sex parents, and children learning the rules of appropriate behavior from observing adults in a society (e.g., Hyde and Rosenberg, 1980; Williams, 1977). The importance of the quality and quantity of contact for gender stereotyping has been emphasized both in the social psychology and in the economic literature. See for example, Asgari et al. (2010) and Carrell et al. (2010).

possible presence of peer effects (*horizontal socialization*).

In order to avoid concerns relative to the endogeneity of friendship networks, our empirical strategy exploits the variation in *student composition across cohorts within schools* to identify endogenous effects in post-graduate outcomes. Specifically, our identification of the oblique channel comes from the variation in average hours worked by mothers across different cohorts of high school students within a school. This approach follows recent research examining the relationship between the characteristics of classmates and individual outcomes (Angrist and Lang, 2004; Friesen and Krauth, 2007; Hanushek et al., 2002; Hoxby, 2000; Lavy and Schlosser, 2011; Lavy et al., 2012; Bifulco et al., 2011).

We use data from the National Longitudinal Survey of Adolescent Health (AddHealth) to extend this line of research to the analysis of gender roles and their impact on adult women's work choices. The structure of the AddHealth allows us to estimate these effects using comparisons across cohorts within schools for a representative sample of U.S. teenagers. The most closely related paper in this literature is Bifulco, Fletcher and Ross (2011), who also use the AddHealth data and focus on the effect of school composition - percent minority and the percent of students with a college educated mother - on high school drop out and college attendance decisions, as well as risky behavior in the late teens and early twenties. A novelty of our analysis lies in the use of the longitudinal component of the AddHealth. This (underutilized) feature of the data together with its extensive information on schoolmates make it possible to study how behavioral prescriptions formed during adolescence shape adult women's work choices and to isolate the peers-mothers channel. Specifically, we measure work outcomes, educational attainment, marital status and presence of children as of 2007-08 (wave IV), when women in our sample are aged 24 to 30. Information on mothers' working hours and education, as well as other background characteristics are instead drawn from wave I (1995-96), corresponding to age 15 to 18.

As in previous studies, we find a positive correlation between the labor supply of mothers and daughters. Daughters whose mothers worked more hours while they were in high school tend to work more, all else being equal, when they are in their late twenties. Most important, having controlled for own mother work hours, we find a positive relationship between the labor supply of young women and that of their adolescent peers' mothers. This effect is not mediated by a standard peer effect, which in our case is the labor supply, as adults, of girls who were in the same high school cohort.

We find that the gender-role effect of high school friends' mothers is as large, if not larger, than that of one's own mother. This is consistent with findings from the literature on developmental psychology and economics. For example, Gustafson et al. (1992) show that young

female adolescents with low educational motivation are more susceptible to the influence of “nonconventional peers” (that is, the broader social environment including older peers, co-workers and a steady boyfriend) than to family inputs. Carrel and Hoekstra (2010) show that negative spillovers in the classroom caused by children who witnessed domestic violence at home have a larger detrimental effect on students’ academic outcomes and behaviors than domestic violence experienced in their own household.

Our work complements the literature on the correlation of work and gender role attitudes between mothers and daughters. For example, Farré and Vella (2013) and McGinn et al. (2015) document a high correlation between gender roles attitudes and work experience of mothers and daughters, respectively, in the U.S. and across countries.² Boustan and Collins (2014) show that the the mother-daughter mechanism coupled with the racial gap in women’s labor force participation under slavery contribute to explain racial differences in women’s work well into the twentieth century.

We also add more directly to the literature on societal/cultural influences on women’s labor choices. Fernández (2007) and Fernández and Fogli (2009) use the lagged values of the outcome variables in a woman’s country of ancestry and a cross-section of second-generation immigrants to identify the impact of culture on women’s work and fertility. Alesina et al. (2013) exploit the variation in the use of plough agriculture across ethnic groups to isolate the effect of gender norms on women’s participation in the labor force and in the political arena. Our paper offers an additional strategy for identifying these effects that exploits the variation in the work behavior of mothers across grades, in the same high school.

Although there is a large and growing literature on social interactions in economics (Jackson, 2008; Ioannides, 2012; Jackson et al., 2016) and the AddHealth data have been used extensively to study peer effects, this paper is the first, to our knowledge, to investigate the role of early socialization for the formation of gender norms and to isolate the peers’ mothers’ channel stemming from children learning the rules of appropriate gendered behavior from observing a reference group of adults.

Finally, this paper is also related to the literature that uses a neighborhood approach

²Intergenerational gender role attitudes are positively correlated for the cohort of women born between 1978 and 1984 (that is, the AddHealth cohort). General Social Survey data for this cohort show that 51% of all women whose mother did not work when they were 16 years old agree with the statement: “It is much better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family”. This share drops to 24% among women whose mother worked. There is also a -2.6 difference in average hours worked between women who agree with the statement and those who did not. This is a relatively large number, it implies that differences in gender role attitudes can explain 7% of average hours worked by this cohort of women.

to identify the importance of early socialization for economic outcomes (Katz et al., 2001; Kling et al., 2005; Oreopolous, 2003; Patacchini and Zenou, 2011; Fryer and Katz, 2013; Ludwig et al., 2013; Damn, 2014; Damn and Dustmann, 2014; Gibbons et al., 2014; Katz, 2015). The innovation relative to this literature is that we measure neighborhood influences more precisely using high school schoolmates' mothers.

The paper is organized as follows. Section 2 describes the data. Section 3 discusses our empirical strategy while Section 4 presents the results of the analysis. Section 5 investigates the mechanisms underlying our analysis. Finally, Section 6 concludes.

2 Data description

Our analysis is based on data from the National Longitudinal Survey of Adolescent Health (AddHealth).³ The AddHealth has been designed to study the impact of the social environment (i.e. friends, family, neighborhood and school) on adolescents' behavior in the United States by collecting data on students in grades 7-12 from a nationally representative sample of roughly 130 private and public schools in years 1994-95 (wave I). While cross sectional analysis of these data are widespread both in the sociological and economics literatures, the longitudinal information has not been exploited much. Indeed, a subset of adolescents selected from the rosters of the sampled schools, about 20,000 individuals, is interviewed again in 1995-96 (wave II), in 2001-2 (wave III), and again in 2007-2008 (wave IV). This longitudinal structure of the survey is key for our analysis as it provides information on the characteristics of the wave I adolescents when they become adults, including their employment outcomes.

We measure the mothers' influence using information on weekly hours worked by mothers from wave I, whereas the work decision in adulthood is measured using the individual data on weekly hours worked from wave IV. In particular, wave IV asks detailed information about the current/most recent job that involves at least ten hours per week, including total number of hours worked in a typical week. Individuals are between 24 and 30 years old in

³This research uses data from AddHealth, 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.

wave IV. Virtually all of them are either currently working or have impediments to work (e.g. military service, jail, disabilities, etc...).⁴ As a result, we extract information on hours worked in the current/most recent job and we focus our analysis on the intensive margin.⁵ The information on mothers' hours worked in Wave I is more problematic. Unfortunately, in wave I, it was the children who answered a question about their resident mothers that asked: "Approximately how many hours a week does she work for pay?" This could potentially introduce a measurement bias. For instance, one could imagine that perceptions of work that a girl has may affect her (mis)measurement of hours worked by her mother and her adult decisions at the same time, leading us to find spurious results about the impact of a girl's mother and that of the mothers of her friends. To assess the quality of this information and the potential extent of this bias, we compare the distribution of hours worked by mothers in our sample to the one observed for a comparable sample of women from the 5% extract of the 1990 decennial Census (Ruggles et al, 2010). As shown in Figure 1, the two distributions are remarkably similar. A formal comparison of the two distributions does not reject the null hypothesis that the two samples are two random drawings from the same population (Wilcoxon signed-rank test p-value=0.3562; paired samples t-test for equality in means p-value equal to 0.8254). This finding mitigates our concerns about the importance of this measurement bias in (potentially) driving our findings.

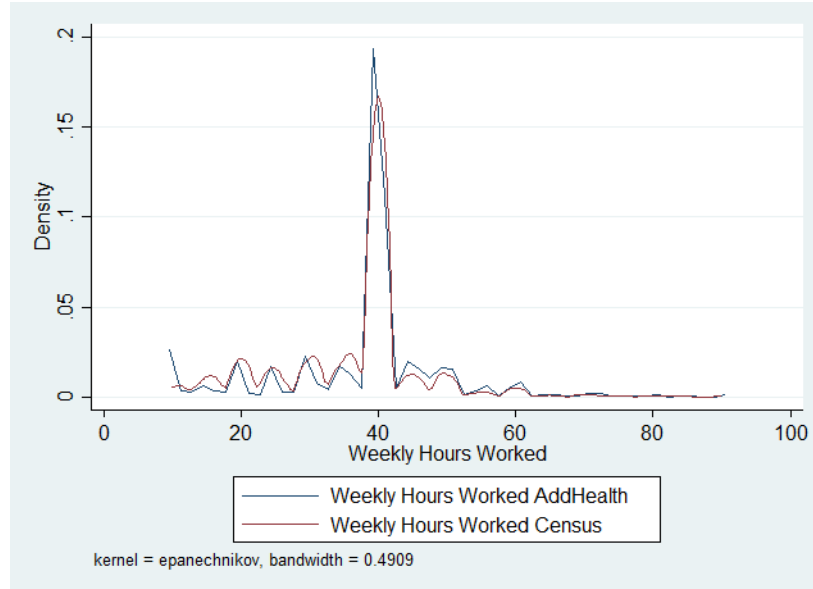
Our final sample of wave I students with no disabilities that are followed over time and with non-missing information on our target variable and basic demographic characteristics both in wave I and in wave IV consists of 3,271 female students in 75 schools and 2,861 male students in 76 schools (that is, there is one single (male) sex school in the sample).

Because we are interested primarily in post-high school outcomes, we follow Bifulco et al. (2011) and drop the 6,000 students who were not in grades 9-12 (grades 10-12 for three year high schools) during wave I and approximately 80 additional students who report still being in high school during Wave III. In addition, we drop approximately 4,500 individuals who were not followed through Wave III. Since our identification strategy depends upon having multiple cohorts within schools, we drop 500 students who are in schools that do not have a 10th, 11th, and 12th grade. Finally, we drop approximately 150 students who did not identify themselves as either white, black, Hispanic, or Asian and 60 students in grades with fewer than 10 sample students

⁴Less than 1% have never been employed.

⁵To the extent that gender norms affect the extensive margin of labor force participation (see, for example, Fortin, 2015), we might be under-estimating the overall importance of mothers on adult women's work choices.

Figure 1: Distribution of mothers' work hours in AddHealth and Census data



Notes. Kernel density estimates of the distribution of hours worked by mothers in AddHealth (based on information reported by students in wave I) and in the Census (based on self-reported information). The “census” sample is drawn to be comparable (in terms of size and composition) to the set of students’ mothers in wave I of Add Health. A Wilcoxon signed-rank test does not reject the null hypothesis that the two samples are two random drawings from the same population (p -value=0.3562). A paired samples t -test does not reject the null hypothesis that the means of the two samples are equal (p -value equal to 0.8254). Data Sources: IPUMS 5% extract of 1990 Census (Ruggles et al. 2010) and AddHealth (Harris et al, 2009).

Table 1 provides some descriptive statistics by gender. Female students make up 50% of our sample and 58% of them are white. As for their mothers, 54% have a high school diploma, while 32% have at least a college degree. Approximately 80% of the mothers are U.S. born. Mothers worked on average about 38 hours a week in wave I (when their daughters were in grade 9 to 12). This is also true if we compute average hours worked by the mothers of male classmates. By age 24 to 30 (wave IV), 46% of our wave I schoolgirls are married, 57% of them have children. Only 4% of them are high-school drop outs, while 42% have a college degree or a higher level of educational attainment. They work on average 39 hours per week. We also report working hours by presence of children. As expected, women with children work fewer hours and the variation in hours worked is larger than that observed among childless women.

The two samples (male and female) exhibit gender differentials of the expected sign and significance. For example, males work on average 5 more hours per week than females. Opposite to what we observe for women, men with children work more hours than men without children, and the coefficient of variation in working hours is slightly larger for the latter group. Men aged 24-30 are also less likely to be married and have children than women in the same age group, which is consistent with what we observe for the overall population. Consistent with patterns documented for this cohort (see Goldin and Katz, 2008), girls in our wave I sample are more likely than boys to have obtained a college degree by wave IV. There is also a small gender difference in the racial composition of the boys and girls sample: 60% of boys are white, 3 percentage points more than for girls. The characteristics of the female and male sample are otherwise the same.

[Insert Table 1 here]

3 Empirical model and Identification Strategy

A large number of studies measure the social context using the friendship nomination file in the AddHealth data. Students were asked to identify their best friends from a school roster. As a result, one can reconstruct the whole structure of the friendship networks, as well as derive information on the nominated friends. While this information is certainly important, the use of nominated friends as the relevant social community poses empirical challenges in the identification of the impact of the social context on individual behavior that are difficult to overcome. Most notably, since friends are self-reported, it is difficult to tease out unobserved factors driving both friendship choices and individual behavior. In the context of our exercise, an adult woman's work hours could be related to her friends' mothers' work hours via a selection mechanism whereby friendships are formed based on shared preferences, past experiences, or expectations (among girls and/or their parents). The daughter of a working mother could choose friends whose mothers also work. Mothers could themselves choose friends who are working, and girls could be more likely to become friends with their mother's friends' daughters. In addition, some connections may be misspecified (i.e. some schoolmates who are actually interacting with a given student may not be reported as friends by the student) and some others may be missing (i.e. friends outside of school).

In order to mitigate these concerns, we will not use the self-reported friends each student nominates but instead exploit the variation in *student composition across cohorts within*

schools to identify endogenous effects in post-graduate outcomes.⁶ The AddHealth data are ideal for this approach because they include students from multiple cohorts in a nationally representative set of schools. Thus we can exploit cross-cohort variation within a school to estimate the effect of schoolmates' mothers characteristics (i.e. their work behavior) on women's working decisions ten to twelve years later. Our empirical model can then be written as:

$$h_{igs,t+1} = \alpha_g + \beta_s + \alpha_g\beta_s + \gamma h_{igs,t}^m + \phi Ah_{gs,t}^m + \sum_{k=1}^K \theta^k x_{igs,t,t+1}^k + \varepsilon_{igs,t+1} \quad (1)$$

where i denotes students, g denotes grades or cohorts, s denotes schools, and t denotes time. Thus, $h_{igs,t+1}$ is the number of hours worked as adult (i.e. at time $t + 1$) by a woman i who was in school s and grade g at time t , α_g is a cohort or grade specific effect, β_s is a school fixed effect, $\alpha_g\beta_s$ is a school-specific time trend, $h_{igs,t}^m$ is the number of hours worked by i 's mother at time t (i.e. when student i was in school), and $Ah_{gs,t}^m$ is the average number of hours worked by mothers of students who are in the same school and grade as student i at time t .⁷ We also include controls for individual characteristics, $x_{igs,t,t+1}^k$ at time t and $t + 1$. Finally, $\varepsilon_{igs,t+1}$ are i.i.d. innovations with zero mean and variance σ^2 .

Because students from different cohorts are in different grades in the AddHealth data, *grade fixed effects* control for initial differences across cohorts. *School fixed effects* control for unobserved differences in average student characteristics across schools as well as for aspects of school quality that are constant across cohorts within a school. Finally, school-specific trends control for potential changes in school effects over time.

The grade and school fixed effects control for selection across schools. The idea is to treat the composition of students by grade and gender within a school as quasi-random and to use this quasi-random variation as opposed to variation that can be traced to parental school and residential decisions. Indeed, when parents choose the school for their children, they are unlikely to be aware of how the hours worked by mothers vary by grade within a particular school. There may be, however, some trends in peer characteristics that can be of particular concern if correlated with unobserved characteristics affecting student outcomes. This would be the case, for instance, if parents are able to discern if a given trait in a school (e.g. share of students with highly educated parents or with stay-at-home mothers) is increasing over time, so that older students differ in a systematic and unobserved way from younger cohorts.

⁶The results obtained using self-reported friends as peers are qualitatively similar to those discussed in this paper. These can be found in a previous version of this paper (Olivetti et al., 2013).

⁷For each woman, own mother's hours are, of course, excluded from this average.

The inclusion of school/grade fixed effects in the main specification should mitigate these concerns.⁸

While the Add-Health data provides an ideal (possibly unique) set-up to identify the presence of the oblique channel of transmission, it does not provide valuable information to solve a possible endogeneity of own mothers' labor supply. A mother employment during a daughter's adolescence could be correlated with unobserved characteristics shaping her labor supply decisions as an adult. Borrowing from the literature on intergenerational transmission of educational attainment, one can think of three ways to instrumenting for own mother's working hours: using relatives' working hours (e.g. mother's siblings working hours), or deviations from their average (assuming deviations are exogenous), and using exogenous variation from natural events, policies, or policy changes. Since we do not have information on mother's siblings or other relatives in the AddHealth data, we cannot use either of the first two strategies. Similarly, we know of no large policy reforms that would exogenously impact mothers' schooling and/or labor force participation that we could use in this sample (see Dumas and Lambert, 2011, and Olivetti and Petrongolo, 2016, for overviews).

Our empirical strategy thus arguably identifies the spillover effects from adolescent peers' mothers on adult outcomes. However, as it is common in the literature studying mother-daughter intergenerational transmission, the own mother effect cannot be given a causal interpretation (it can be simply seen as a covariate). We argue that, because own-mother's and peer-mothers' working hours are (virtually) orthogonal conditional on the other controls,⁹ our estimated coefficient on peers' mothers' hours remains unbiased.

3.1 Evidence on the identification strategy

Before describing the main results of our analysis, following Lavy and Schlosser (2011), we investigate the validity of our identification strategy by performing two exercises.

In Table 2, we examine the extent of variation in cohort composition that is left after removing cohort, school and cohort/school fixed effects. This is an important check since the precision of our estimates rests on the assumption that there is sufficient residual variation in our target variable. As we would expect, removing fixed effects reduces the standard deviation in mothers' average hours worked for both the female and male sample, but only by approximately 46% percent.

⁸The school-year effects could also operate on outcomes non-linearly. As a robustness check, we run regressions with quadratic school trends, obtaining results that are qualitatively similar to those in our main specification.

⁹The correlation is below 0.10 and non statistically significant.

[Insert Table 2 here]

In Table 3, we produce an array of “balancing tests” for our target variable. To the extent that the variation in the mothers’ working hours is unrelated to the variation in a number of pre-determined student characteristics, net of school, cohort and school/cohort fixed effects, this analysis can be used to rule out systematic differences due to sorting along observable students’ characteristics. Note that the set of pre-determined characteristics includes (in this and all subsequent regressions) the Picture Vocabulary Test (PVT) score as a measure of ability.¹⁰

As shown in the table, none of the estimated correlations appear to be significantly different from zero. Altonji et al. (2005) suggest that the degree of selection on observables can provide a good indicator of the degree of selection on unobservables. In light of this argument, the evidence of no correlation from Table 3 supports the assumption that our model specification identifies a source of variation unrelated to unobservable characteristics, which might impact a student’s post-graduation outcomes.

[Insert Table 3 here]

Finally, in Table 4 we investigate the validity of our identification strategy by running some placebo regressions in which, for each student, we replace the actual cohort composition with the composition of a randomly selected cohort from the same school. If our fixed-effect strategy controls for both unobserved school and student characteristics, then the composition of other cohorts in the same school should not show any effect on student outcomes in these placebo regressions. There is no evidence of a significant impact on adult work outcomes of average hours worked by the mothers of “peers” in this randomly selected cohort from the same school. The only significant variable are hours worked by own-mother during adolescence and whether the woman currently (i.e. at time $t + 1$) has children.

[Insert Table 4 here]

Taken together, the results in Tables 2-4 lend support to our identification strategy. It appears that there is sufficient variation to obtain precise estimates and that unobserved fac-

¹⁰This is administered to each Add Health participants in wave 1. The PVT is an abbreviated version of the full-length Peabody Picture Vocabulary Test (PPVT), a test used to assess verbal abilities and receptive vocabulary. As argued in the psychology literature this is a good measure of an individual’s ability (see Rowe, Jacobson and Van den Oord, 1999; Beaver and Wright, 2011).

tors that influence within school variation in both cohort composition and student outcomes are unlikely to be confounding our estimates.

4 Empirical Results

Table 5 reports the estimation results of model (1). All specifications include grade and school fixed effects, and school time trends. Standard errors are clustered at the grade-school level. As shown in columns (1) and (2), we find that there is a positive and significant relationship between daughter’s hours and mother’s hours. Most important, the coefficient on average hours worked by peers’ (at the time of high school) mothers’ are positive and significant. The fact that the size of this coefficient increases substantially going from column (1) to column (2) suggests that school trends matter.

These findings are confirmed in all the subsequent specifications as we increase the set of controls (moving to the right of the table). Specifically, column (3) controls for daughter’s pre-determined characteristics, PVT score, race and demographic characteristics, marital status and presence of children, at the time she makes work decisions. Column (4) also includes family background variables such as (own) mother’s immigration status and educational attainment (whether she has a college degree or higher title). We also add a control indicating what fraction of peer-mothers have at least a college degree, which as been shown to be important for educational outcomes (graduating high school/going to college) of high school kids (e.g. Bifulco, Fletcher and Ross, 2011). Finally, column (5) adds a variable that measures the quality of mother-daughter interactions during adolescence¹¹ to capture difficult-to-measure features of the mother-daughter relationship. We also include an indicator of residential building quality to capture differences in family of origin’s socio-economic status.¹²

The estimates of the control variables follow the pattern that is common in the literature

¹¹High mother care is an indicator variable equals 1 if our index of quality of mother-daughter interactions is above average. This index is obtained by factor analysis using two AddHealth variables (from wave I). The first variable records the answer to the question “How much do you think she (mother) cares about you?”. The answers were recorded on a 1 to 5 scale, with 1 = not at all and 5 = very much. For the second variable, the respondent had to indicate her level of approval to the following statement: “When you do something wrong that is important, your mother talks about it with you and helps you understand why it is wrong.” The answers were recorded on a 1 to 5 scale, with 1 = strongly agree and 5 = strongly disagree.

¹²This indicator is based on the interviewer response to the question: “How well kept is the building in which the respondent lives”, coded as 4= very poorly kept (needs major repairs), 3= poorly kept (needs minor repairs), 2= fairly well kept (needs cosmetic work), 1= very well kept.

on female labor supply. For instance, women work significantly fewer hours if they have children (see columns (3) to (5)).

The estimated coefficient on mother's weekly hours is relatively stable, around 0.08, across specifications. This estimate means that one standard deviation increase in hours worked by a girl's mother (corresponding to about 11 hours per week, see Table 1) is correlated with an increase in weekly hours worked at age 24-30 by about 1/10th of a standard deviation, corresponding to one hour (about 54 minutes) of work. As we emphasized earlier, this coefficient cannot be given a causal interpretation. However, its size is in line with findings from the literature. For example, Fernandez and Fogli (2009) find that for second-generation women in the United States, a one standard deviation increase in female labor force participation in the parents' source country is associated with an increase in hours worked by 0.82 hours (roughly 50 minutes).

The marginal effect of the social context is very important. The estimated coefficient on average hours worked by peers' mothers is about 0.4 across all specifications that include school specific time trends. This implies that one standard deviation increase in the average number of hours worked by mothers of the students in the same school and same cohort (that is, 1.3 hours, net of all fixed effects) translates into an additional 31 minutes of work, corresponding to about 1/20th of a standard deviation in women's weekly hours worked in their late twenties.

The stability of these coefficients as we add a number of observable characteristics mitigates the concerns that our results might be capturing the influence of (omitted) background factors that determine adult labor market outcomes independent of gender.

[Insert Table 5 here]

To better understand our findings, we also study whether the quantitative importance of the horizontal and oblique channel differ by presence of children, marital status, mother's education and own education.

Table 6 presents the result of regressions where our two target variables are interacted with presence of children (columns (2) and (3)) and by own education (columns (4) and (5)). This analysis reveals interesting patterns.

The work behavior of mothers seems to affect daughters' work choice *only when they have children* (columns (2) and (3)). The coefficients on the interaction terms with no children (column (2)) are positive but smaller and not statistically significant. The coefficients on the interaction terms for women with children are instead statistically significant and indicate that the effect is slightly larger than for the overall population. The estimated coefficient

on mother’s weekly hours implies that one standard deviation increase in hours worked by a woman’s mother would increase her weekly hours worked by 1 hour and 6 minutes approximately. For the average hours worked by peers’ mothers, one standard deviation (net of fixed effects) increase translates into an additional 48 minutes of work. This result seems to suggest that, to the extent that the work-family balance observed during adolescence shapes gender identity, the long lasting effects of mothers’ work behavior are stronger when the daughters themselves face the same family-work trade-off and make decisions.

An alternative interpretation of this result is that we are simply picking up the larger variation in working hours on the sample of women with children relative to those without children. However, as noted in our discussion of the summary statistics in Table 1, while it is of course true that, conditional on working, women with children work fewer hours per week than women without children and display a slightly higher degree of variation, the comparison of the coefficient of variations (0.26 and 0.23, respectively) does not seem large enough to be fully explaining our finding.

One additional possible concern, is that this evidence simply reflects the fact that women with working mothers might be delaying childbearing. Our data reveals that this does not seem to be the case. We run a specification of our model where the dependent variable is a dummy variable indicating whether a woman has children (instead of hours worked). Neither of our target variables shows a significant effect. If anything, we find that having children for a woman is positively correlated with her own mother’s working hours while she was in high school.

Columns (4) and (5) show that the importance of mothers is stronger for women who do not hold a college degree. This is reasonable given that, for these women, high-school experiences remain most salient. For college educated women the mothers effects are positive but lose significance.

[Insert Table 6 here]

4.1 Horizontal vs oblique channel

Given the positive association of a woman’s working hours with her mother’s working hours, the effect of friends’ mothers working hours can simply be a mechanical effect coming from a standard peer effect mechanism. The Add-Health data does not collect information on continued social contacts with high school friends in adulthood. However, the richness of this data allows us to tackle this issue in the following way. We exploit the fact that the

schools in our sample are almost all mixed gender,¹³ and thus each individual’s friendship network is composed of both males and females. The gender variation in cohort/school composition is substantial, ranging from a minimum of 31% male to 100% male (for one school). We proceed as follows. First, we show that the working behavior of mothers does not have an effect on males’ working hours. Second, we use the mothers of the boys only as a role model and show that they still have an impact on a woman’s working hours.

Column (1) in Table 7 reports the results of our analysis on the male sample only. It reveals *no significant impact* of mothers’ work hours on the work behavior of men. The coefficient on peers’ mothers hours is very small and insignificant. The work behavior of peers’ mothers during high school cannot at all explain hours worked of men in the late twenties. The coefficient on own mother’s hours is also positive and not statistically significant and much smaller than that for women. Note that the fact that men do not respond to mother’s or peers’ mothers labor supply is not driven by lower variation in men’s working hours. If anything, as shown in the summary statistics (Table 1), male’s working hours are slightly more volatile than women’s hours (standard deviations are 11 and 10, respectively, and the coefficient of variation hovers around 0.25 for both genders).

Columns (2) to (4) in Table 7 show the results of our analysis for our sample of women when only the *mothers of the boys* in a given cohort are used to measure the oblique channel of transmission, with an increasing set of controls. Compared to the estimates in Table 4, it appears that the estimated effect of male friends’ mothers on daughter’s work hours is still positive but smaller and not significant. This evidence suggests that the mechanism through which the working decision of an adult woman may be linked to the male peers’ mothers hours decision via marriage (Fernández et al., 2004) is unlikely to be driving our results.

[Insert Table 7 here]

5 Potential mechanisms

The evidence collected so far confirms the importance of own mother’s behavior in shaping daughters’ work decisions and identifies a novel channel of mothers-daughters transmission: the *oblique channel*.

In this section, we take a closer look to some of the potential mechanisms, other than the behavioral effects of social norms about mothers’ work, that could explain our findings.

¹³There appears to be only one all-male-school in our sample.

Specifically, we provide suggestive evidence that (i) rules out alternative mechanisms and (ii) is in line with a role model mechanism.

(i) **Preferences vs. human capital production function**

Several papers that investigate cultural transmission in female labor force participation (such as Fernández and Fogli, 2009) discuss the possibility that cultural transmission is driven by human capital transmission. If this were the case, then we should observe that, everything else being equal, a daughter’s hourly wages should be increasing in mother’s working hours. An alternative story would be the “preference” story. This mechanism should imply that daughters of mothers who work more hours, or who were exposed to mothers working more hours, are more likely to have more egalitarian gender role attitudes. The conceptual distinction between transmission as investment in market-specific human capital and transmission as influence on preferences is important and the AddHealth data allow us to investigate this issue further.

We can use information on hours worked and earnings to obtain an hourly wage rate, and use it as a measure of productivity. Furthermore, wave III (in 2001-2002) contains a key question that enables us to make some progress in understanding the relative importance of these two theories. Indeed, individuals (who are 18 to 24 years old at the time of the survey) were asked a question aimed to measure their attitudes towards gender roles. The respondent had to indicate her level of approval to the following statement (standard in the literature): “It is better for anyone involved if the man earns more money and the woman takes care of home and family”. The answers were recorded on a 1 to 5 scale, with 1 = strongly agree and 5 = strongly disagree. Based on this information, we construct a binary indicator of *egalitarian gender role attitudes* that is equal to one if the respondent strongly disagreed with the statement and is equal to zero otherwise. Table 8 reports the result of regressions where we use as dependent variables this qualitative indicator of gender norms (column 1 to 3) and the hourly wage rate (column 4 to 6). Note that information about gender roles attitudes is only available for a third of the analysis sample, which might explain the weaker pattern of statistical significance.

The results show that a daughter’s egalitarian attitudes towards gender roles are positively correlated with both own-mother and peer-mothers working hours at the time she was in high school. Other factors that seem to be relevant are whether mom is US born and the share of peer-mothers with a college degree.

The wage regressions reveal that the daughter’s productivity (as measured by log hourly wage) is not at all correlated with the working hours of mothers. Instead it seems to be affected by own-mother and peer-mothers education and by ability as measured by the PVT

score in high school. Though they should be interpreted with caution, these results suggest that our findings are likely to be driven by a *preference* story rather than a *human-capital production* mechanism.

[Insert Table 8 here]

(ii) Role models and intensity of interactions

The importance of the quality and quantity of contact for gender stereotypes has been emphasized both in the social psychology and in the economic literature. One way to tease out a cultural transmission mechanism from other alternative stories is to study how the importance of a given role model varies with the intensity of social interactions. We measure the intensity of contacts with peers' mothers using a question that asks parents to assess the degree of knowledge of and contact with their adolescents' friends and the parents of these friends. Specifically, the question asked each child's parent to indicate how many parents of their child's friends they had talked to in the four weeks prior to the interview. We use this question to construct an indicator of *social distance*. We use a dummy variable (high social distance) that takes a value equal to 1 if the students' parents had below average interactions (relative to each student's school/grade) and 0 otherwise.¹⁴ As shown in Table 9, when we interact our target variable with an indicator of social distance, we find that the importance of peers' mothers is significant when the social distance of the adolescent to her network of peers' parents is low. That is, this happens when the frequency of interactions is high.

[Insert Table 9 here]

6 Concluding remarks

In this paper, we study the quantitative importance of early socialization for shaping women's gender identity and subsequent work choices. We find that both the mother's working hours and the high school peers' mothers' working hours during adolescence are important determinants of labor supply decisions in adulthood. The influence of peers' mothers is not mediated by a traditional peer effects mechanism. Our analysis suggests that we have

¹⁴This variable has been used in sociology to measure "intergenerational closure". Indeed, Coleman (1988)'s theory of social capital predicts that students who have high levels of "intergenerational closure", that is, whose parents know more of their children's friends' parents, will have better educational outcomes than will students with low levels of intergenerational closure. See, in particular, Carbonaro (1998), Morgan and Sorensen (1999), and Harrington Cleveland and Crosnoe (2004).

identified behavioral effects of the transmission of *social norms* of the mothers' working hours.

As it is common in the literature, this paper uses working hours both as the outcome of interest and to measure socialization. However, weekly working hours are an imperfect indicator of women's choices regarding the career-family trade-off. An interesting avenue of research would be to exploit information on the women's field of study to examine the impact of early socialization on women's career choices. We leave this for future research.

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Table 1: Sample description

	Female Sample		Male Sample		Gender Differential	
	Average	Standard Deviation	Average	Standard Deviation	T-test statistic	p-value
Weekly hours worked	39.22	10.03	44.13	11.04	-18.73	0.00
Weekly hours worked conditional on:						
Children	37.68	9.99	45.20	10.14	-19.83	0.00
No children	41.25	9.72	43.51	11.48	-6.41	0.00
Own-mother work hours	38.15	11.22	38.19	11.18	-0.05	0.96
Peers-mothers average work hours	38.30	2.39	38.29	2.39	0.05	0.96
Male peers-mothers average work hours	38.07	3.69	38.42	3.03	0.70	0.48
Share white	0.58	0.50	0.60	0.49	-2.31	0.02
Share married	0.46	0.50	0.41	0.49	3.97	0.00
Share with children	0.57	0.50	0.37	0.48	16.48	0.00
Share with less than High School	0.04	0.18	0.06	0.24	-4.56	0.00
Share with High School	0.55	0.50	0.61	0.49	-5.17	0.00
Share with College+	0.42	0.49	0.33	0.47	7.32	0.00
Mothers' share with:						
Less than High School	0.14	0.35	0.11	0.32	3.44	0.00
High School	0.54	0.50	0.55	0.50	-0.33	0.74
College+	0.32	0.46	0.34	0.47	-2.09	0.04
Share with US born mother	0.81	0.39	0.80	0.40	0.85	0.40
PVT test score	0.12	0.93	0.13	0.90	0.28	0.78
Student share in:						
Grade 9	0.26	0.44	0.25	0.43	0.56	0.58
Grade 10	0.26	0.44	0.27	0.44	-0.49	0.62
Grade 11	0.27	0.44	0.28	0.45	-0.74	0.46
Grade 12	0.21	0.41	0.20	0.40	0.76	0.45
Number of observations	3,271		2,861			
Number of schools	75		76			

Notes: Sample includes students with non-missing information on mother's work hours and education (Wave I), and hours worked, marital status, presence of children (Wave IV). *Source:* National Longitudinal Survey of Adolescent Health (AddHealth), Harris et al. (2009).

Table 2: Raw and residual variation in average hours worked by peers' mothers

	Mean	Standard Deviation	Minimum	Maximum
<u>Female sample</u>				
Raw cohort variable	38.274	2.408	28.989	47.493
Residuals: net of fixed effects	0.000	1.292	-5.322	5.343
<u>Male sample</u>				
Raw cohort variable	38.252	2.384	28.731	47.879
Residuals: Net of fixed effects	0.000	1.248	-4.620	5.551

Table 3: Balancing tests for cohort composition measures

Dependent variable: Average weekly hours worked by peers mothers

PVT test score	0.0503 (0.0377)
Parent born in the US	-0.159 (0.121)
Single parent family	0.0834 (0.0766)
Black	-0.145 (0.0991)
Other races	-0.00347 (0.148)
Parental education: High school/GED	0.146 (0.0910)
Parental education: College plus	0.0262 (0.109)
Household size	0.000610 (0.0249)
Residential building quality	0.0362 (0.0361)

Notes. Sample and sources are defined in the notes to Table 1. All specifications include school and grade effects as well as a set of school/grade dummies. Standard errors (in parentheses) are clustered at the grade/school level. PVT test score is the score on the student's Picture Vocabulary Test (PVT) that is administered at the beginning of wave I interview. Age is age of the student in Wave I. Parent years since arrival in US is the number of years the family has lived in the US as reported by the student in Wave I. Parent born in the US is a dummy variable equal to one if the parent reports being born in the US. Single parent family is a dummy variable equal to one if the student belongs to a single parent family as reported by the parents. Number of older siblings is the number of older siblings reported by the students. Significance levels are: * 10%, ** 5%, *** 1%.

Table 4: Results of placebo regression where the target variable is based on a random school/cohort.

	<i>Dependent variable: Weekly hours worked</i>
Own-mother work hours	0.0845*** (0.0295)
Peers-mothers avg work hours	-0.254 (0.155)
White	0.0973 (0.763)
Married	-0.564 (0.647)
Children	-4.859*** (0.625)
PVT test score	-0.0505 (0.401)
Mother born US	0.414 (1.039)
Mother high school	0.643 (0.677)
Mother college+	1.215 (5.402)
High mother care	0.568 (0.813)
Residential building quality	0.209 (0.349)

Notes: Sample and sources are defined in the notes to Table 1. All specifications include school and grade effects as well a set of school/grade dummies. Standard errors (in parentheses) are clustered at the grade/school level. The omitted category for education is less than high school. "High mother care" and "Residential building quality" are defined in footnotes 10 and 11 in the paper. Significance levels are: * 10%, ** 5%, *** 1%.

Table 5: Main results

	<i>Dependent variable: Weekly hours worked</i>				
	(1)	(2)	(3)	(4)	(5)
Own-mother work hours	0.083*** (0.025)	0.088*** (0.025)	0.089*** (0.026)	0.081*** (0.026)	0.080*** (0.026)
Peers-mothers avg work hours	0.268** (0.109)	0.404*** (0.133)	0.409*** (0.137)	0.463*** (0.142)	0.449*** (0.147)
White			0.262 (0.724)	0.020 (0.722)	0.156 (0.724)
Married			-0.441 (0.568)	-0.446 (0.579)	-0.499 (0.588)
Children			-4.671*** (0.546)	-4.650*** (0.561)	-4.622*** (0.568)
PVT test score			-0.074 (0.338)	-0.174 (0.365)	-0.203 (0.368)
Mother born US				0.481 (0.920)	0.580 (0.911)
Mother college+				0.436 (0.608)	0.570 (0.617)
Share peers mothers' with college+				-2.822 (4.672)	-2.306 (4.971)
High mother care					0.599 (0.765)
Residential building quality					0.264 (0.320)
Constant	25.735*** (4.200)	20.048*** (4.416)	35.843*** (6.248)	36.387*** (9.645)	33.566*** (10.166)
School fixed effects	Y	Y	Y	Y	Y
Grade fixed effects	Y	Y	Y	Y	Y
School/grade effects	N	Y	Y	Y	Y
Observations	3,591	3,591	3,398	3,312	3,271
R-squared	0.055	0.090	0.138	0.139	0.141

Notes: Sample and sources are defined in the notes to Table 1. Standard errors (in parentheses) are clustered at the grade/school level. "High mother care" and "Residential building quality" are defined in footnotes 10 and 11 in the paper. Significance levels are: * 10%, ** 5%, *** 1%.

Table 6: Heterogeneous effects

	(1)	(2)	(3)	(4)	(5)
	All	By presence of children		By own education	
		No children	Children	Less than College	College+
Own-mother work hours	0.080*** (0.026)	0.0548 (0.0364)	0.102*** (0.0352)	0.0958*** (0.0295)	0.0459 (0.0475)
Peers-mothers avg work hours	0.449*** (0.147)	0.241 (0.194)	0.622*** (0.176)	0.552*** (0.165)	0.302 (0.184)
Constant	33.566*** (10.166)	43.28*** (11.81)		9.704 (10.17)	
Observations	3,271	3,271		3,271	
R-squared	0.141	0.144		0.131	

Notes: Sample and sources are defined in the notes to Table 1. All regressions include school, grade and school/grade fixed effects, as well as the same set of controls as in column 5 in Table 4. Standard errors (in parentheses) are clustered at the grade/school level. Entries in the table reports the results of regressions where mother's hours and average hours worked by friends' mothers are interacted with a dummy indicating presence of children (column 2 and 3), marital status (column 4 and 5), mother's education (column 6 and 7) and own education (column 8 and 9). Significance levels are: * 10%, ** 5%, *** 1%.

Table 7: Horizontal vs. oblique channel

<i>Dependent variable: Weekly hours worked</i>				
	<i>Males</i>		<i>Male peers' mothers only</i>	
	(1)	(2)	(3)	(4)
Own-mother work hours	0.0383 (0.0260)	0.0869*** (0.0251)	0.0897*** (0.0257)	0.0804*** (0.0258)
Peers-mothers average work hours	0.0538 (0.163)	0.111 (0.0957)	0.138 (0.0910)	0.159 (0.0964)
White	0.189 (0.759)		0.287 (0.730)	0.180 (0.731)
Married	1.947*** (0.683)		-0.430 (0.570)	-0.479 (0.590)
Children	0.802 (0.791)		-4.676*** (0.546)	-4.632*** (0.567)
PVT test score	0.531 (0.416)		-0.0693 (0.337)	-0.195 (0.367)
Mother born US	-1.575 (1.125)			0.615 (0.912)
Mother college+	-1.175 (0.781)			0.528 (0.616)
Share peers mothers' with co	1.793 (4.862)			-3.514 (5.307)
High mother care	-0.565 (0.788)			0.601 (0.766)
Neighborhood quality	-0.154 (0.407)			0.277 (0.319)
Constant	13.15 (9.737)	40.59*** (3.085)	51.22*** (3.976)	51.87*** (8.163)
Observations	2,861	3,591	3,398	3,271
R-squared	0.123	0.088	0.136	0.139

Notes: Sample and sources are defined in the notes to Table 1. All specifications include school and grade effects as well as a set of school/grade dummies. Standard errors (in parentheses) are clustered at the grade/school level. In column 1 the sample is restricted to male students, in column 2 to 4 the sample is restricted to female students but average hours worked by friends' mothers are computed based on the behavior of mothers of male 'friends'. "High mother care" and "Residential building quality" are defined in footnotes 11 and 12 in the paper. Significance levels are: * 10%, ** 5%, *** 1%.

Table 8: Preferences vs. human capital

	<i>Dependent variable is</i>					
	Index of egalitarian gender role attitudes			Log hourly wage		
	(1)	(2)	(3)	(4)	(5)	(6)
Own-mother work hours	0.00413** (0.00171)	0.00352* (0.00195)	0.00298 (0.00241)	-0.000126 (0.00147)	0.000116 (0.00147)	0.000838 (0.00155)
Peers-mothers' avg work hours	0.0128* (0.00744)	0.0153+ (0.0106)	0.0188+ (0.0127)	0.00903 (0.00707)	0.00522 (0.00877)	0.00825 (0.00891)
Mother born US			0.231** (0.0941)			0.0151 (0.0575)
Mother college+			-0.00585 (0.0661)			0.0806** (0.0406)
Peers mothers' avg college+			1.141** (0.476)			0.621* (0.341)
High mother care			0.0940 (0.0761)			0.0394 (0.0413)
PVT test score			0.0149 (0.0380)			0.0387* (0.0199)
Constant	-0.194 (0.286)	-6.106*** (1.647)	-11.74*** (1.433)	2.231*** (0.279)	1.979** (0.928)	1.617 (1.186)
School fixed effects	Y	Y	Y	Y	Y	Y
Grade fixed effects	N	Y	Y	N	Y	Y
School/grade effects	N	Y	Y	N	Y	Y
Observations	1,063	1,063	853	3,432	3,432	3,123
R-squared	0.012	0.209	0.287	0.093	0.134	0.207

Notes: Sample and sources are defined in the notes to Table 1. Standard errors (in parentheses) are clustered at the grade/school level. The specification in column (3) and (6) includes the same set of controls as in column 5 in Table 4. The omitted category for mothers' education is less than college. Significance levels are: +15%, *10%, ** 5%, ***1%.

Table 9: Role models and intensity of interaction

	(1)	(2)	(3)
	All	Peers-mothers' average work hours by social distance	
		Low	High
Own-mother work hours	0.0802*** (0.0260)	0.0878*** (0.0287)	
Peers-mothers avg work hours	0.449*** (0.147)	0.542*** (0.188)	0.254 (0.215)
Constant	33.57*** (10.17)	42.02*** (11.92)	
Observations	3,271	2,786	
R-squared	0.141	0.153	

Notes: Sample and sources are defined in the notes to Table 1. All regressions include school and grade effects and a set of school/grade dummies, as well as the same set of controls as in column 5 in Table 4. Entries in the table report the results of regressions where mother's hours and average hours worked by friends' mothers are interacted with an indicator of social distance (column 2 and 3), and an indicator of mother care (column 4 and 5). Standard errors (in parentheses) are clustered at the grade/school level. Significance levels are: * 10%, ** 5%, *** 1%.