Collective Health Lifestyles and Life Course Plasticity in Women’s Smoking

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Abstract (max 150 words): Health lifestyles are important for understanding health behaviors, but empirical research has not captured the theorized collective influences on these lifestyles. Previous work has also characterized lifestyles as static, rather than changing with life stage as we know health behaviors do. Using the nationally representative Early Childhood Longitudinal Study-Birth Cohort of 2001, we address these gaps by using an innovative technique to characterize the county-level prevalence of smoking behaviors and changes in prevalence between the pre-pregnancy, pregnancy, and postpartum periods. Counties vary substantially in their levels of what we call “collective health lifestyle plasticity,” or changes in prevalence of smoking across these life phases. This plasticity strongly predicts women’s trajectories of smoking from pre-pregnancy through pregnancy and into the postpartum period. Results suggest that collective influences on health lifestyles and life course dynamics are important to integrate into future work on health lifestyles.
Introduction

Health lifestyles—defined as individuals’ interrelated health behaviors rooted in group-based identities (Cockerham 2005)—are increasingly considered important for understanding health behaviors and population health. But empirical advances have lagged behind theoretical developments. Although health lifestyles are expected to be shaped by collective phenomena such as group identities and group members’ behaviors (Cockerham 2005; Frohlich and Potvin 1999), empirical research has not addressed the collective level. In this study, we take a first step in doing so, characterizing county-level descriptive norms (behavioral prevalence) as a collective influence on individual-level behaviors. Little theoretical work on health lifestyles has addressed the role of the life course (Mollborn et al. 2014).

Studies of specific health behaviors have shown that behavior is dynamic, changing across different phases of the life course (Øvrum et al. 2014). This may be particularly true for smoking, especially in response to fertility transitions in the life course (Pampel et al. 2014). Thus, conceptions of health lifestyles, even in adulthood, need to allow for the flexibility of changing behaviors across life stages. We introduce the concept of health lifestyle plasticity, here measured at the collective level of counties, to address this issue. We show that at the contextual level, descriptive norms (behavioral prevalence) are different for smoking in different life phases—particular stages of fertility as pre-pregnancy, during pregnancy, and after childbirth. Some counties demonstrate more collective health lifestyle plasticity than others, as their descriptive norms change substantially depending on fertility stage.
Although health lifestyles are comprised of many health behaviors, for feasibility our exploratory analysis focuses on tobacco smoking. Research has consistently demonstrated that smoking during pregnancy has deleterious consequences on perinatal (Ananth et al. 1999) and early-life health outcomes (Agrawal et al. 2010; Sven Cnattingius 2004; DiFranza and Lew 1995; Lammer et al. 2005; J. A. Martin et al. 2003; Matthews 2001; Shah et al. 2006; US Department of Health and Human Services 2001). Research has also shown that the early-life health risks caused by prenatal smoking continue to affect later-life health as well (Agrawal et al. 2010; Buka et al. 2003; Fried et al. 1992; Leech et al. 1999; Wakschlag et al. 1997). Several risk factors have been identified for the persistence of smoking during pregnancy including socioeconomic disadvantage (S. Cnattingius et al. 1992; Colman and Joyce 2003; Kahn et al. 2002; O’Campo et al. 1992; Orr et al. 2005; Wakschlag et al. 2003; Zimmer and Zimmer 1998), marital status and household living arrangement (Flick et al. 2006; Orr et al. 2005; Wakschlag et al. 2003), other health risk behaviors (e.g., alcohol consumption) (L. T. Martin et al. 2008), maternal mental health (Orr et al. 2005), and access to prenatal health care (Zimmer and Zimmer 1998).

Despite the known health risks associated with prenatal smoking and the reliable and valid information regarding the key risk factors for the behavior, nearly one-half of all women who smoke before pregnancy continue to do so throughout their pregnancy (Ebrahim 2000; Ludman et al. 2000; Yu et al. 2002), resulting in nearly 10% of U.S. pregnant women smoking throughout their pregnancy (J. A. Martin et al. 2006; US Department of Health and Human Services 2011). A central perinatal health aim of Healthy People 2020 is to reduce the percentage of U.S. women who smoke while pregnant to 1.4 percent by the year 2020 (US Department of Health and Human Services 2011).
Unfortunately, public health cessation interventions during pregnancy are consistently unsuccessful for a substantial proportion of women (Sven Cnattingius 2004; Fiore et al. 2000), leading to vast amounts of medical expenditures, loss of life, poor health, and economic and social costs (Wakschlag et al. 2000).

The risk factors described above are all conceptualized and measured at the individual-level, but it is well-known that women do not experience their pregnancy independent of those around them. Expectant mothers’ knowledge of risks, their access to resources to help them quit, and their overall health lifestyles are shared with and modeled after those with whom they co-reside. Smoking prevalence varies a great deal across counties in the United States (Dwyer-Lindgren et al. 2014), but there is very little information about the extent to which county of residence can affect the likelihood of changing smoking behaviors during pregnancy. In this paper, we focus on how county-level contexts in the United States influence the likelihood that a woman will quit smoking during her pregnancy or return to smoking following the birth of their child. Thus, our general interest is in identifying how county context affects changes in smoking behaviors among women who become pregnant. Specifically, we examine how county contexts shape the likelihood of women remaining “consistent smokers” throughout pregnancy; the likelihood of women “quitting during pregnancy” but returning to smoking after birth; and the likelihood of women quitting during pregnancy and “remaining non-smokers” after birth. These three groups denote health lifestyles which have been described as “patterns of health-related behavior, values, and attitudes adopted by groups of individuals in response to their social, cultural, and economic environment (Abel 1991, p. 901). The emphasis on the social and cultural environments has recently coalesced into the term
“collective lifestyles” that prioritizes the places in which individuals live as being fundamental determinants of health because characteristics of places shape the understanding and opportunities of a healthy lifestyle (Frohlich et al. 2001). Thus, beyond the individual-level factors that influence pregnant women's lifestyle behaviors, we investigate how county-level factors shape the “collective lifestyles” in which these women are embedded, and specifically test how these “collective lifestyles” influence smoking patterns during pregnancy.

We focus on women who were smokers prior to pregnancy and we evaluate their smoking behaviors during pregnancy and after pregnancy. We describe the individual-level and county-level prevalence of smoking persistence among these women, the prevalence who quit smoking altogether, and the prevalence that ceases smoking during pregnancy but return to smoking. We utilize several new and innovative methodological approaches to summarize differences in behavioral changes in light of the same event (pregnancy) that are attributable to area of residence. As we describe below, these measures are in line with current conceptualizations of collective health lifestyles literature, and evidence for variation in these behaviors denotes an important contribution in its own right. We go beyond this important step to evaluate the extent to which county of residence predicts individual behaviors.

**Contextual Effects on Health**

Despite the large body of research on individual-level risk factors of smoking during pregnancy very little is known about contextual factors associated with smoking behaviors during pregnancy. Smoking does not occur in isolation but is embedded within a larger
social context (Pickett et al. 2002), and smoking behaviors are strongly associated with social relationships, personal interactions, and daily routines (Bottorff et al. 2006). For example, being in the company of other smokers reportedly accounts for a substantial portion of variance in likelihood of prenatal and postpartum relapse (Ashford et al. 2009; Gaffney and Henry 2007; Lemola and Grob 2007; Solomon et al. 2007). Furthermore, having a partner who smokes greatly reduces the likelihood of smoking cessation during pregnancy (Curry et al. 1997). To our knowledge, the only nationally representative study to consider the effects of social and residential context on smoking behaviors during pregnancy was carried out by Shoff and Yang (2013). They found that higher social capital within counties was associated with lower odds of smoking during pregnancy in rural areas, while this relationship was reversed in more urban areas. In addition, they found that overall rates of smoking during pregnancy were lower in counties with a large number of individuals in higher socioeconomic status groups. Our study seeks to build upon this research by considering the role of social norms regarding smoking during pregnancy, and how these county-level norms are associated with changes in individual women’s prenatal smoking behaviors.

The first studies on the relationship between residential context and health were written over 70 years ago (Faris and Dunham 1939; Shaw et al. 1942). Our understanding of neighborhood effects has improved (Chase-Lansdale et al. 1997; Crane 1991; Kawachi and Berkman 2003; Ludwig et al. 2011) since that time but there continues to be uncertainty regarding how area of residence actually affects health and there is a renewed interest in cultural influences that limit or enable healthy lifestyles (cite). Key researchers in this area argue that “culture is among the most widely discussed but least developed,
theoretically or *empirically*” (Harding and Hepburn 2015). A similar point was made by Christine Bachrach in her PAA presidential address where she argued that “Demographers need culture because as many of my distinguished colleagues have pointed out, culture and material conditions exert interdependent and complementary influences on the behaviors that drive demographic change” (Bachrach 2013). Government agencies have invested millions of dollars to examine the role of the built environment – sidewalks, parks, trails, food outlets – in determining individuals’ choices about food, exercise and, health (Handy et al. 2005; Parra et al. 2010; Scribner et al. 2000), but evidence suggests that conclusions about the role of the built environment also depend on the attitudes, beliefs, and knowledge of the residents (Blacksher and Lovasi 2012). While a small number of studies have attempted to assess culture (Boardman et al. 2005; Kirk and Papachristos 2011), specific measures for area of residence level remain lacking (Small and Newman 2001).

**Data**

The Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) is a nationally representative sample of about 14,000 children born in 2001. The data are composed of individual-level records that track respondents from infancy through the start of kindergarten (National Center for Education Statistics 2007). The sample was selected using a clustered, list frame design based on births registered in the National Center for Health Statistics vital statistics system. Births were sampled from 96 core primary sampling units composed of both counties and county groups. Children whose mothers were younger than 15 years old at the birth were excluded from the sampling frame due to
state confidentiality laws and sensitivity concerns. As a result, the data are not representative of children born to very young mothers, who represent a very small proportion of all teenage mothers (Kost and Henshaw 2014).

This study uses data from the first wave of the ECLS-B study when the children were approximately 9 months old. Personal interviews were conducted with the child’s primary parent (typically the mother) by trained interviewers. The weighted response rate for this wave of data collection was 74%. We restrict our analyses to only those interviews that were carried out with a mother as the primary respondent because we are interested in valid measures of mothers’ smoking behaviors during and after pregnancy. In addition, to understand the factors associated with smoking cessation during pregnancy, we restrict our analyses to only those mothers who reported smoking during the three months before pregnancy. Finally, in order to attain robust estimates of county-level effects on prenatal and perinatal smoking behaviors of mothers, we limit our analyses to include records from counties with at least 50 respondents. The analytic sample is composed of all mothers in these counties who self-reported to be smokers prior to their pregnancies.

**Measures and Statistical Analyses**

Our outcome of interest is time-specific smoking behavior during and after pregnancy. The measure is composed of mothers’ responses to questions about their smoking behavior at three points in time. The first two time points are based on retrospective accounts of smoking during the three months before pregnancy (T1) and the third trimester of pregnancy (T2), respectively. The final time point is based on whether or not the mother was currently smoking at time of interview, which occurred nine months
following the birth of the child (T3). As we are interested in analyzing changes in smoking behaviors related to pregnancy (i.e., quitting) we include only women who were smoking during the three months prior to pregnancy (i.e., those at risk of quitting smoking). Based on responses about smoking behavior, we developed three categories of smoking history. The first group, “persistent quitters,” is made up of women who quit smoking during pregnancy and had not resumed in the nine months following birth. The second group, “temporary quitters,” is made up of women who quit smoking during pregnancy but had resumed smoking within the nine months following birth. Finally, the third group is “persistent smokers,” who indicated no change in smoking behavior throughout pregnancy and continued smoking into the perinatal period as well.

To estimate the county-level effect on individual women’s smoking history, we developed two indicators of a county’s relative “collective health lifestyle plasticity” to U.S. norms of smoking behavior during pregnancy. The first indicator measures the plasticity of changes in smoking norms between pre-pregnancy and pregnancy, while the second indicator measures the plasticity of these changes between pregnancy and postpartum. To estimate these indicators of counties’ collective health lifestyle plasticity to smoking norms among pregnant women, we fit multilevel binary logistic regression models on the entire sample to predict individual-level likelihood of smoking at each time point. The models included county-level random-intercepts as well as individual-level demographic controls such as age, race/ethnicity, educational attainment, and marital status. From this model we output the empirical Bayes predictions of each counties’ random effect to generate a county-level relative measure of smoking likelihood. We then regressed these relative measures from the random-intercepts at T2 on the random intercept values from T1.
Results from this model can be thought of as the county-level average change in smoking likelihood between the time prior to pregnancy and pregnancy. Next, we regressed the relative measures from the random-intercepts at T3 on the random intercept values from T2. Results from this model estimate the county-level change in smoking likelihood between pregnancy and the perinatal time period. In short, both of these models estimate the average U.S. county-level smoking behavior prior to pregnancy, during pregnancy, and after pregnancy, as well as each county’s relative change in smoking behavior across these times. The measures are estimated as standardized coefficients, such that counties with positive values on these measures have higher than the average level of adherence to continued smoking during pregnancy, while counties with negative values have lower than the average level of adherence to smoking. That is, counties with standardized values less than zero were those counties in which women who were smoking prior to pregnancy were more likely to quit smoking when becoming pregnant than the average U.S. county. Alternatively, counties with standardized values greater than zero were those counties in which women who were smoking prior to pregnancy were more likely to continue smoking through pregnancy than the average U.S. county.

We then analyzed how these county-level measures of “collective health lifestyle plasticity” to smoking norms during pregnancy affected women’s likelihood of smoking behaviors across pregnancy beyond known individual-level risk factors and county-level risk factors. Individual-level demographic controls included a continuous measure of mother’s age at birth, a categorical measure of mother’s education at birth (less than high school [reference], high school, some college, and college grad or higher), a categorical measure of mother’s race/ethnicity (non-Hispanic white [reference], non-Hispanic black,
Latina, Asian-American, and other), and a binary indicator of whether the mother was married at birth (not married [reference], married). In addition, we included a binary indicator of whether the pregnancy was intended, a binary indicator of whether the birth included multiple children, a continuous measure of birth order [Endnote alternative specifications of functional form of age, birth order, etc.]. County-level controls were also included in all models using measures derived from the entire ECLS-B sample. These county-level structural controls included smoking prevalence before pregnancy (percent of women self-reported as smoker at T1), mothers’ age structure (average age of mother at birth), race/ethnic composition (percent nonwhite), educational attainment (average years of mothers’ schooling), and marital composition (percent of mothers married at birth).

To analyze the effects of county-level norms of smoking behaviors during pregnancy on women’s prenatal and perinatal smoking behaviors, we fit two multinomial logistic regression models on three smoking status: (1) “persistent quitters,” composed of women who stopped smoking at pregnancy and report to remain not smoking nine months after birth; (2) “temporary quitters,” composed of women who stopped smoking at pregnancy but report to be smoking nine months after birth; and (3) “persistent smokers,” composed of women who did not change their smoking behavior during pregnancy or after birth. In the first model, we estimate the likelihood of women smokers changing their smoking behaviors to become “persistent quitters” or “temporary quitters” as a function of individual-level risk factors and county-level structural risk factors. In the second model, we add the county “collective health lifestyle plasticity” measures to test if these county-level indicators of smoking norms are substantively associated with women’s likelihood of quitting smoking during their pregnancies beyond the individual-level and county-level
risk factors. To account for sampling design effects, we utilize probability weights provided by the National Center for Education Statistics. We also utilize multiple imputation by chained equations to retain observations with missing data.

Results

Table 1 shows descriptive statistics of our analytic sample. Here, we see that nearly half (43.5%) of all women in the sample continued to smoke throughout pregnancy. In addition, we see that temporary quitters tend to the youngest group with an average age of 25.37 years. It is also interesting to note that there are very large racial disparities. In particular, the likelihood of being a persistent smoker or temporary quitter amongst non-Hispanic black women is almost three times higher than the likelihood of being a persistent quitter. On the other end of the spectrum, Hispanics are twice as likely to be persistent quitters than persistent smokers. Likewise, educational disparities are readily apparent. Women with less than a high school diploma or equivalent are more than twice as likely to be persistent smokers than persistent quitters. Finally, it is noteworthy that persistent smokers were highly concentrated amongst women who were having children later in the birth order.

In Figure 1, we illustrate variation in smoking behaviors across counties. Each row of the chart represents one of the counties represented in our study. The shaded regions illustrate the distribution of smoker types within each county. As the graph shows, there is incredible variation in how smoking behaviors are predominantly carried out within counties. For example, some counties have a large share of constant smokers, while other counties have none. Similarly, there are some counties with a high proportion of persistent
quitters and other without persistent quitters. If smoking behaviors vary this greatly across counties, it suggests that these contexts may play a role in shaping the behaviors of women at the individual level.

Table 2 shows results from a multinomial logistic regression model comparing temporary quitters and persistent smokers to the referent category of persistent quitters with measures of individual and county controls included in Model 1. Here, we show that race has only a small effect on women's smoking behavior during pregnancy. Specifically, Hispanic mothers are much less likely than whites to persistent smokers. Education appears to be more strongly associated with smoking behaviors. Some college, compared to less than high school, is negatively associated ($\beta=-0.911$) with the likelihood of being a temporary quitter. Likewise, high school graduates ($\beta=-0.710$), those with some college ($\beta=-2.109$), and college graduates ($\beta=-2.002$) are significantly less likely to be persistent smokers than those mothers who did not complete high school. Characteristics of the pregnancy are also significantly correlated with a mother's smoking behavior during pregnancy. Mother's having children higher in birth order are at an increased risk of being a temporary quitter ($\beta=0.792$), as well being a persistent smoker ($\beta=0.651$). Finally, a pregnancy that results in a multiple birth is associated with a decreased likelihood of being a persistent smoker ($\beta=-0.843$). At the county level, mothers’ average age at birth is negatively correlated with the likelihood of being a temporary quitter ($\beta=-0.276$), as well as a persistent smoker ($\beta=-0.358$). Additionally, mothers’ average years of education is positively associated with being a temporary quitter ($\beta=0.476$), as well as a persistent smoker ($\beta=0.587$).
In Model 2 of Table 2, we introduce measure of collective lifestyle plasticity associated with prenatal and post pregnancy smoking. The individual and county effects from Model 1 remain virtually unchanged. However, we see very large effects from the collective lifestyle plasticity measures. One of the most interesting comparisons is between the persistent quitters and temporary quitters. Here, we see that a standard deviation increase in post-pregnancy collective lifestyle plasticity increases the odds of being a temporary quitter by 2.47. However, what is perhaps more interesting is the fact that collective lifestyle plasticity is playing a role even during pregnancy when both groups are not smoking. In fact, prenatal collective lifestyle plasticity increases the odds of being a temporary quitter by 1.57. It is also interesting to note the differences between the persistent quitters and the persistent smokers. Here, the effect of collective lifestyle plasticity also has a very large effect. Prenatally, a rise of one standard deviation increases the odds of being a persistent smoker by 2.91, while the same increase in post-pregnancy increases the odds by 1.92. Together, these two comparisons illustrate that collective lifestyle plasticity has a very large effect on smoking behaviors both during and after pregnancy. However, it is important to note that the effect is strongest during pregnancy.
Works Cited


National Center for Education Statistics. (2007). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Longitudinal 9-Month/Preschool Restricted-Use Data File (NCES*


Table 1. Descriptive statistics of sample

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Persistent Quitters</th>
<th>Temporary Quitters</th>
<th>Persistent Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's Age at Birth</td>
<td>25.75</td>
<td>26.06</td>
<td>25.37</td>
<td>25.97</td>
</tr>
<tr>
<td>Mother's Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>0.66</td>
<td>0.69</td>
<td>0.59</td>
<td>0.70</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.14</td>
<td>0.06</td>
<td>0.17</td>
<td>0.16</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.15</td>
<td>0.20</td>
<td>0.20</td>
<td>0.09</td>
</tr>
<tr>
<td>Asian</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Other</td>
<td>0.04</td>
<td>0.04</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Mother's Education Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>0.25</td>
<td>0.14</td>
<td>0.22</td>
<td>0.33</td>
</tr>
<tr>
<td>High School Grad</td>
<td>0.43</td>
<td>0.32</td>
<td>0.46</td>
<td>0.47</td>
</tr>
<tr>
<td>Some College</td>
<td>0.23</td>
<td>0.37</td>
<td>0.23</td>
<td>0.14</td>
</tr>
<tr>
<td>College Graduate</td>
<td>0.09</td>
<td>0.17</td>
<td>0.09</td>
<td>0.07</td>
</tr>
<tr>
<td>Mother Married at Birth</td>
<td>0.48</td>
<td>0.56</td>
<td>0.43</td>
<td>0.49</td>
</tr>
<tr>
<td>Pregnancy was Intended</td>
<td>0.45</td>
<td>0.52</td>
<td>0.43</td>
<td>0.45</td>
</tr>
<tr>
<td>Multiple Birth</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Birth Order of Child</td>
<td>1.96</td>
<td>1.57</td>
<td>1.88</td>
<td>2.26</td>
</tr>
<tr>
<td>Doctor Advised Against Smoking</td>
<td>0.91</td>
<td>0.86</td>
<td>0.93</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Source: Early Childhood Longitudinal Study-Birth Cohort.
Table 2. Multinomial logistic regression model, compared to persistent quitters

<table>
<thead>
<tr>
<th></th>
<th>Model 1 Temporary Quitters</th>
<th>Model 1 Persistent Smokers</th>
<th>Model 2 Temporary Quitters</th>
<th>Model 2 Persistent Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's Age at Birth</td>
<td>0.000 (0.03)</td>
<td>0.020 (0.03)</td>
<td>0.007 (0.03)</td>
<td>0.038 (0.03)</td>
</tr>
<tr>
<td>Mother's Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.532 (0.4)</td>
<td>0.213 (0.42)</td>
<td>0.549 (0.4)</td>
<td>0.224 (0.43)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.347 (0.33) ***</td>
<td>-1.358 (0.37) ***</td>
<td>-0.353 (0.33) ***</td>
<td>-1.458 (0.38) ***</td>
</tr>
<tr>
<td>Asian</td>
<td>0.104 (0.46)</td>
<td>-0.905 (0.63)</td>
<td>0.297 (0.51)</td>
<td>-1.097 (0.65)</td>
</tr>
<tr>
<td>Other</td>
<td>-0.554 (0.46)</td>
<td>-0.487 (0.5)</td>
<td>-0.652 (0.55)</td>
<td>-0.629 (0.5)</td>
</tr>
<tr>
<td>Mother's Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Grad</td>
<td>-0.180 (0.31) *</td>
<td>-0.710 (0.31) *</td>
<td>-0.216 (0.33) *</td>
<td>-0.842 (0.33) **</td>
</tr>
<tr>
<td>Some College</td>
<td>-0.911 (0.33) **</td>
<td>-2.109 (0.34) ***</td>
<td>-0.967 (0.35) **</td>
<td>-2.276 (0.36) ***</td>
</tr>
<tr>
<td>College Grad</td>
<td>-0.912 (0.49) *</td>
<td>-2.002 (0.51) ***</td>
<td>-1.033 (0.51) *</td>
<td>-2.446 (0.53) ***</td>
</tr>
<tr>
<td>Mother Married at Birth</td>
<td>-0.209 (0.29)</td>
<td>-0.112 (0.3)</td>
<td>-0.189 (0.3)</td>
<td>-0.075 (0.31)</td>
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<tr>
<td>Pregnancy Intended</td>
<td>-0.123 (0.27)</td>
<td>-0.062 (0.28)</td>
<td>-0.137 (0.28)</td>
<td>-0.118 (0.29)</td>
</tr>
<tr>
<td>Multiple Birth</td>
<td>-0.488 (0.32)</td>
<td>-0.843 (0.33) *</td>
<td>-0.466 (0.33)</td>
<td>-0.885 (0.34) **</td>
</tr>
<tr>
<td>Birth Order</td>
<td>0.371 (0.16) *</td>
<td>0.651 (0.17) ***</td>
<td>0.352 (0.16) *</td>
<td>0.590 (0.16) ***</td>
</tr>
<tr>
<td>Prenatal Care Received in Third Trimester</td>
<td>-0.319 (0.31)</td>
<td>-0.415 (0.33)</td>
<td>-0.320 (0.33)</td>
<td>-0.536 (0.35)</td>
</tr>
<tr>
<td>Doctor Advised Against Smoking</td>
<td>0.792 (0.37) *</td>
<td>0.599 (0.39)</td>
<td>0.831 (0.4)</td>
<td>0.752 (0.41)</td>
</tr>
<tr>
<td>County Percent Smoking Before Pregnancy</td>
<td>-0.006 (0.02)</td>
<td>0.013 (0.02)</td>
<td>-0.079 (0.03)</td>
<td>-0.026 (0.03)</td>
</tr>
<tr>
<td>County Mothers' Average Age at Birth</td>
<td>-0.276 (0.14) *</td>
<td>-0.358 (0.14) **</td>
<td>-0.456 (0.14)</td>
<td>-0.398 (0.15) **</td>
</tr>
<tr>
<td>County Percent of Nonwhite Mothers</td>
<td>0.008 (0.01)</td>
<td>-0.006 (0.01)</td>
<td>-0.014 (0.01)</td>
<td>-0.008 (0.01)</td>
</tr>
<tr>
<td>County Mothers' Averge Years of Educatio</td>
<td>0.476 (0.24)</td>
<td>0.587 (0.25)</td>
<td>0.449 (0.23)</td>
<td>0.666 (0.27)</td>
</tr>
<tr>
<td>County Peorent of Mothers Married at Birth</td>
<td>-0.009 (0.01)</td>
<td>-0.012 (0.01)</td>
<td>-0.010 (0.01)</td>
<td>-0.012 (0.02)</td>
</tr>
<tr>
<td>Collective Lifestyle Plasticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal</td>
<td></td>
<td></td>
<td>0.451 (0.18) *</td>
<td>1.069 (0.19) ***</td>
</tr>
<tr>
<td>Post Pregnancy</td>
<td></td>
<td></td>
<td>0.906 (0.22) ***</td>
<td>0.653 (0.23) **</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.922 (3.08)</td>
<td>3.160 (3.12)</td>
<td>9.892 (3.63) **</td>
<td>3.870 (3.68)</td>
</tr>
</tbody>
</table>

Source: Early Childhood Longitudinal Study-Birth Cohort. Analyses adjust for complex survey design. 
***p≤0.001, **p≤0.01, *p≤0.05 (two-tailed) standard error in parentheses.
Figure 1. Collective lifestyle plasticity variable construction
Figure 2. Distribution of smoking behaviors by county

Percent within County

- Constant Smokers
- Temporary Quitters
- Persistent Quitters